Our ref: NIA/10240/22/10398/v1 27 High Street

6th May 2022

Mr. Adrian Fox
AF Architecture
65 Robin Hoods Walk
Boston
Lincolnshire
PE21 9EX

By email only: [redacted]

Dear Sirs

NOISE IMPACT ASSESSMENT FOR PROPOSED CHANGE OF USE OF GROUND FLOOR TO A HOT FOOD TAKEAWAY (USE CLASS SUI GENERIS) AT 27 HIGH STREET, BOSTON, PE21 8SH

BOSTON BOROUGH COUNCIL PLANNING APPLICATION B/22/0030

1.00 INTRODUCTION

1.01 Environmental Noise Solutions Ltd (ENS) have been commissioned by AF Architecture to carry out a noise impact assessment for the proposed change of use to a hot food takeaway (Use Class Sui Generis) at the ground floor of 27 High Street, Boston, PE21 8SH (hereafter referred to as the application site).

1.02 Planning permission for the change of use is sought under application ref: B/22/0030, which was submitted to Boston Borough Council in February 2022. The following comments relating to noise were received from Environmental Health at BBC in February 2022:

'I also note the hours the premises are to be in use extends until 3.30am. The shop has existing residential/bb directly above and whilst this is long standing the previous use a hairdressers and beauty salon meant that the hours of use were mainly daytime. The applicant needs to provide evidence in terms of a noise assessment that noise from the newly proposed used will not impact the residential/bb premises above. It is likely a noise assessment will be required.'

'For clarity my issue was not that of people coming and going from the premises as it is recognised this already an active night time economy area. However I do have concerns that activity within the premises (both equipment and people) particularly during the later hours the applicant seeks may have upon the residential neighbour above. We need to be assured that this will not be an issue and therefore I would suggest an acoustic report is sort.'

1.03 The objectives of the noise impact assessment were therefore to:

- Undertake a sound insulation test to establish the airborne sound insulation of the existing separating floor between first floor (existing flats) and ground floor (proposed takeaway)
- Assess the noise impact of the proposed hot food takeaway on the overlying dwelling flats with reference to pertinent guidance

1.04 This report details the methodology and results of the assessment. It has been prepared to accompany Planning Application B/22/0030 submitted to BBC.

1.05 This report has been prepared for AF Architecture for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties making reference to the report should consult AF Architecture and ENS as to the extent to which the findings may be appropriate for their use.

1.06 A glossary of acoustic terms used in the main body of the text is contained in Appendix 1.

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2.00 APPLICATION SITE SETTING AND PROPOSED CHANGE OF USE

2.01 The application site comprises an existing 3-storey building (27 High Street) located in a mixed-use area in Boston town centre.

2.02 The proposed change of use is to form a hot food takeaway at ground floor. The proposed opening hours are 1000 to 0000 hours Sunday to Thursday and 1000 to 0330 hours on Friday and Saturday.

2.03 The overlying first floor of No. 27 High Street is occupied by an existing apartment.

3.00 AIRBORNE SOUND INSULATION TEST OF THE EXISTING SEPARATING FLOOR BETWEEN FIRST FLOOR DWELLING AND PROPOSED GROUND FLOOR TAKEAWAY

3.01 The pertinent transmission path between the proposed ground floor takeaway and the overlying first floor dwelling is through the separating floor. A building regulations sound insulation test of the existing party floor was therefore undertaken.

3.02 Airborne sound insulation testing was undertaken for all third octave frequency bands between 100–5000 Hertz. Two source positions were used. The spatial average sound pressure level was obtained for each source position in both source and receiving rooms using a swept microphone technique (continuously moving). An averaging time of 30 seconds was used for each microphone sweep. Reverberation time measurements were undertaken using one loudspeaker position and an interrupted source. The average of six decay measurements for each frequency band was determined from three fixed microphone positions with two readings in each case. The measurement system calibration was verified immediately before the commencement of the measurement sessions and again at the end, with no drift in calibration level noted.

3.03 The airborne sound insulation of the existing separating floor is summarised in the following table (with the graphical results reproduced in Appendix 2). For reference, $D_{nT,w}$ is a single-number quantity which characterizes the airborne sound insulation of the separating element between the source and receiving rooms as defined in BS EN ISO 717-1.

Table 3.1 – Sound Insulation Test Results of Separating Floor

Source Room	Receiving Room	$D_{nT,w}$	Comment
Ground Floor Commercial Unit	First Floor Kitchen	56	Timber joist flooring with chipboard deck and vinyl finish above and direct-fixed plasterboard below, underdrawn with additional plasterboard ceiling forming a 100mm cavity with insulation

3.04 The airborne sound insulation of the existing separating floor is **56 dB $D_{nT,w}$**, which is relatively high, and consistent with a traditional timber joist floor upgraded with an additional suspended plasterboard ceiling.

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4.00 ASSESSMENT OF NOISE FROM PROPOSED TAKEAWAY AT GROUND FLOOR

4.01 BS 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' (BS 8233) sets indoor ambient noise levels for residential dwellings as follows (see table below).

Table 4.1 – Target Internal Ambient Noise Levels (BS 8233:2014)

Activity	Location	Good Indoor Ambient Noise Levels	
Dining	Dining Room/Area	40 dB $L_{Aeq\ (0700–2300)}$	-
Resting	Living Room	35 dB $L_{Aeq\ (0700–2300)}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq\ (0700–2300)}$	30 dB $L_{Aeq\ (2300–0700)}$

4.02 The airborne sound insulation of the existing separating floor is 56 dB $D_{nT,w}$. In layman's terms, this means that the noise level in the overlying dwelling flats will be circa 56 dB lower than in the proposed takeaway. This is a high degree of airborne sound insulation.

4.03 In order for the BS 8233 night time target of 30 dB $L_{Aeq,\ T}$ to be exceeded in bedrooms, the noise level in the ground floor takeaway would need to exceed 86 dB(A) (i.e. 86 dB takeaway level – 56 dB separating floor). Takeaway noise levels of 86 dB(A) are inconceivable; for context, hearing protection becomes mandatory in a workplace once 85 dB(A) is exceeded.

4.04 In summary, the mitigation works already carried out to protect the dwelling flats (suspended plasterboard ceiling) will ensure that the BS 8233 target levels are met.

4.05 On the basis of the above, it is evident that there is no unacceptable noise impact associated with the proposed takeaway.

I trust the foregoing is sufficient for your needs. Should you have any queries regarding the above, please do not hesitate to contact me.

Yours sincerely,

Jamie Hayes
AMIOA, Dipl. Acoustics and Noise Control
Environmental Noise Solutions Limited

cc File

Appendix 1
Glossary of Acoustic Terms

Sound Pressure Level (L_p)

The basic unit of sound measurement is the sound pressure level. As the pressures to which the human ear responds can range from 20 µPa to 200 Pa, a linear measurement of sound levels would involve many orders of magnitude. Consequently, the pressures are converted to a logarithmic scale and expressed in decibels (dB) as follows:

$L_p = 20 \log_{10}(p/p_0)$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_0 = reference sound pressure (20 µPa).

A-weighting Network

A frequency filtering system in a sound level meter, which approximates under defined conditions the frequency response of the human ear. The A-weighted sound pressure level, expressed in dB(A), has been shown to correlate well with subjective response to noise.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq, T}$

The value of the A-weighted sound pressure level in decibels of continuous steady sound that within a specified time interval, T, has the same mean-square sound pressure as a sound that varies with time. $L_{Aeq, 16h}$ (07:00 to 23:00 hours) and $L_{Aeq, 8h}$ (23:00 to 07:00 hours) are used to qualify daytime and night time noise levels.

$L_{A10, T}$

The A-weighted sound pressure level in decibels exceeded for 10% of the measurement period, T. $L_{A10, 18h}$ is the arithmetic mean of the 18 hourly values from 06:00 to 24:00 hours.

$L_{A90, T}$

The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T. L_{A90} is typically taken as representative of background noise.

$L_{AF\ max}$

The maximum A-weighted noise level recorded during the measurement period. The subscript 'F' denotes fast time weighting, slow time weighting 'S' is also used.

Sound Exposure Level (SEL or L_{AE})

The energy produced by a discrete noise event averaged over one second, no matter how long the event actually took. This allows for comparison between different noise events which occur over different lengths of time.

Weighted Sound Reduction Index (R_W)

Single number quantity which characterises the airborne sound insulation properties of a material or building element over a defined range of frequencies (R_W is used to characterise the insulation of a material or product that has been measured in a laboratory).

Weighted Airborne Sound Insulation ($D_{nT,w}$)

Single number quantity which characterises the airborne sound insulation between rooms.

Appendix 2
Sound Insulation Test Result – Existing Separating Floor

Standardized level difference according to ISO 140-4
Field measurements of airborne sound insulation between rooms

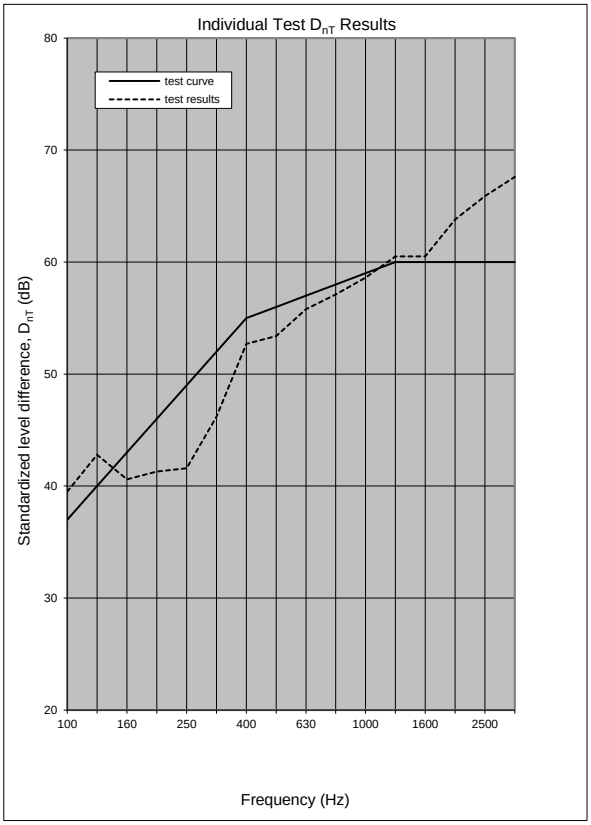
Rating according to ISO 717-1

$D_{nT,w}$ (C; C_{tr}) = 56 (-2; -6) dB

Evaluation based on field measurement results obtained in one-third octave bands by an engineering method.

Freq	Test D_{nT} values (dB)		
(Hz)	curve	test	
100	37	39.5	
125	40	42.8	
160	43	40.6	
200	46	41.3	
250	49	41.6	
315	52	46.2	
400	55	52.7	
500	56	53.4	
630	57	55.8	
800	58	57.1	
1000	59	58.6	
1250	60	60.5	
1600	60	60.5	
2000	60	63.8	
2500	60	65.9	
3150	60	67.6	

# indicates background corrected
* indicates limit of measurement



Construction details:
Timber joist flooring with chipboard deck and vinyl finish above and direct-fixed plasterboard below, underdrawn with additional plasterboard ceiling forming a 100mm cavity with insulation.

Test Reference Number: Test 1

Date of test:	[redacted]ignature of tester:	Source Room:	Vol (m3)	Receiver Room:	Vol (m3)
03/03/2022	[redacted]	Ground Floor	115	First Floor	47