BRAIDEN ACOUSTICS LTD

Innovation Forum | 51 Frederick Road | Salford | Manchester | M6 6FP

NOISE IMPACT ASSESSMENT (EXT. PLANT)

Prepared For :	Barry Cullen Architecture	Date :	17 May 2025
Site :	65 Kingsway, Burnage	Report No. :	11384revA

1 INTRODUCTION

Braiden Acoustics has been commissioned by Barry Cullen Architecture to undertake an acoustic survey at the site of 65 Kingsway, Burnage to support a planning application for a change of hours.

1.1 PLANNING PERMISSION

The current planning permission that pertains to the ground floor of 65 Kingsway is:

> *046575/FO/CENTL3/94 - Change of use of ground floor hairdressing salon to office use (immigration consultancy) including alterations to front elevation to bring entrance door forward – Approved 20 December 1994.*

This permission was subject to conditions, which included the following:

> *2. No work or other activity shall take place on the site on Sundays or Bank Holidays and all work and other activity on other days shall be confined to the following hours:-*
>
> *9.00 a.m. to 6.00p.m. - Mondays to Saturdays.*

The ground floor has been a café that has operated under the planning permission above.

1.2 AIM

This acoustic report assess noise sources related to the ground floor use during the proposed opening hours and suggest any mitigation, where and if necessary.

2 DESCRIPTION OF SITE

The application site is the ground floor of 65 Kingsway which is an end-of-terrace property.



Figure 1
Street view of ground floor cafe

2.1 SITE LOCATION AND SURROUNDING USES

The site is bounded by Kingsway (A34) to the west, a commercial property directly to the north, an alleyway to the south and another alleyway to the east (rear). Beyond each alleyway are residential properties with the nearest being 67 Kingsway to south.



Figure 2
Site location and surrounding uses

Further to the west, by some 50m, is the Manchester to Crewe railway line.

To the north are a row of commercial properties.

There are further residential properties to the south and east

2.2 EXISTING USE

The site has previously been operating as café as the premises has an authorised Class E use, so it can be used as a café/restaurant without the requirement for change from the current planning permission described in Section 1.1..

2.3 PROPOSED USE

It is proposed to continue the use as a café, but with a change of hours.

2.3.1 Opening hours

The proposed opening hours are:

Daily	16:00 – 01:00

2.3.2 Building services

2.3.2.1 Extract ventilation

There are two small extract fans to expel stale air. These are non-standard fans called "Vortex Acoustic Box Fans". As they are non-standard, there are no formal acoustic data available.



Figure 3
Extract fan

3 ACOUSTIC CRITERIA AND METHODOLOGY

3.1 BS 4142

BS 4142:1999 "Method for rating industrial noise affecting mixed residential and industrial areas" [1] assesses industrial noise with regards to nearby residential dwellings. The guidance is commonly used to compare the equivalent noise from an industrial source only (*specific noise level*), L_{Aeq}, to the background noise level, L_{A90}, at the nearest sensitive receptor (NSR).

This Standard has been recently updated, BS 4142:2014 "Methods for rating and assessing industrial and commercial sound" [2]. Whereas the old standard added 5dB 'penalty' to the Specific Noise Level (SNL) if the noise source has a 'character' that can draw attention that may be described as tonal, intermittent or impulsive, the new standard gives clearer guidance on noise 'character'. Furthermore, the previous Standard gave only one 5 dB penalty whereas the new Standard may not. When added to the specific noise level it forms the *rating level*. The new Standard gives the guidance for the following types of noise character:

> *Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed.*
>
> *Correct the specific sound level if a tone, impulse or other characteristic occurs, or is expected to be present, for new or modified sound sources.*
>
> *NOTE 1 The prominence of tonal or impulsive sound from a source can be masked by residual sound. In many cases the amount of masking varies as the residual sound changes in level and possibly character. The source's tonal and/or impulsive characteristics could also vary with time.*
>
> *Consider the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention.*
>
> *Tonality*
>
> *For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible.*
>
> *Impulsivity*
>
> *A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible and 9 dB where it is highly perceptible.*

Other sound characteristics

Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

NOTE 2 Where tonal and impulsive characteristics are present in the specific sound within the same reference period then these two corrections can both be taken into account. If one feature is dominant then it might be appropriate to apply a single correction. Where both features are likely to affect perception and response, the corrections ought normally to be added in a linear fashion.

Intermittency

When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. This can necessitate measuring the specific sound over a number of shorter sampling periods that are in combination less than the reference time interval in total, and then calculating the specific sound level for the reference time interval allowing for time when the specific sound is not present. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

Once a penalty for noise character is added to the Specific Noise Level then this is termed the *Rating Level*.

The background level is then compared to the rating level. It is usual that the rating level due to the source should be below the background noise level at the nearest sensitive receptor; indeed BS 4142 states:

"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."

3.1.1 Manchester Council BS4142 criterion

The Council have guidance for noise criteria and assessment methodologies that are described in their planning document [3]. It states:

The guidance aims to provide help and advice in relation to noise in a planning context to encourage good acoustic design. It outlines what is expected in relation to current guidance and policy with the aspiration that new developments achieve the highest possible standards without compromising the health and well being of people that live and work within the City of Manchester.

3.1.1.1 Noise and Vibration from Fixed Plant / Equipment

Section 3.6.1.5.1 of the Council's planning guidance states:

Any noise assessment needs to consider not only the overall level of noise emitted but also its particular characteristics. The noise assessment should be based on BS 4142: 2014 and any application for fixed plant, equipment or machinery must demonstrate that:

'Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location'.

By designing the sound pressure level of any plant items to generate a noise impact of at least 5dB below the existing background level, any plant noise impact should be of a negligible level which should not give rise to complaints from users or occupiers of existing noise-sensitive usages.

3.2 BS 8233: 2014

3.2.1 Residential

The British Standard BS 8233:2014 "Guidance on sound insulation and noise reduction for buildings" gives guidance on recommended indoor ambient noise levels for residential dwellings.



Room	Criterion	$L_{Aeq,T}$	
		night	day
Bedroom	Sleeping	30	35
Dining Room/Area	Dining	--	40
Living Room	Resting	--	35

Table 1
Recommending indoor ambient noise level thresholds from anonymous noise (taken from Table 4, BS 8233:2014)

Internal levels are simply predicted by the subtraction of the estimated sound reduction index (SRI) of the building façade from the external free field noise measurements. When considering the SRI of a particular façade it is usual to only consider the glazing as this is the weakest element acoustically.

3.2.2 Offices

Table 2 in BS 8233:2014 give a range of target noise levels for a variety of internal spaces, such as offices. The upper limits should not be breached in order for the occupants of the space to not be disturbed. However, for open-plan offices for example, a minimum noise level can be useful to provide masking for acoustic privacy.

Table 2 **Indoor ambient noise levels in spaces when they are unoccupied and privacy is also important**

Objective	Typical situations	Design range $L_{Aeq,T}$ dB
Typical noise levels for acoustic privacy in shared spaces	Restaurant	40 – 55
	Open plan office	45 – 50
	Night club, public house	40 – 45
	Ballroom, banqueting hall	35 – 40
	Living room	35 – 40

NOTE See Noise control in building services [28] and BS EN ISO 3382.

Table 2
Target internal noise levels of unoccupied spaces

As Table 2 above shows, the noise levels within an open plan office should be between 45 – 50 dB(A).

4 Measurement Details

4.1 Background Noise Levels

4.1.1 Monitoring overview

Personnel: John Braiden, BSc & MSc Acoustics, MIOA.

Equipment: NTi XL2 integrated real time analyser & B&K 4231 calibrator.

Weather 08- 14degC, 1-3m/s wind, 60-80% cloud, no precipitation

Time / Date: Tue 2025-04-15 15:09:52 for over 22 hours.

The sound level meter was calibrated before after the measurements with no drift reported.

Monitoring was unmanned.

Background noise (L_{A90}), 'average' noise levels (L_{Aeq}) and maximum noise levels (L_{Amax}) where taken in 15-minute intervals.

4.1.2 Monitoring location

The monitoring location was at 1.2m from local ground on a flat roof where the extract fans are located, as shown in Figure 2.

This background noise at this location is representative of the background noise at the rear of the Nearest Sensitive Receptor (NSR), 67 Kingsway.



Figure 4
Flat roof to the rear where noise monitoring took place

4.1.3 Monitoring results

4.1.3.1 Typical Background Noise Levels

It was possible to determine the typical daytime (during opening hours) and night-time (also during opening hours) Background Noise Levels using histograms.

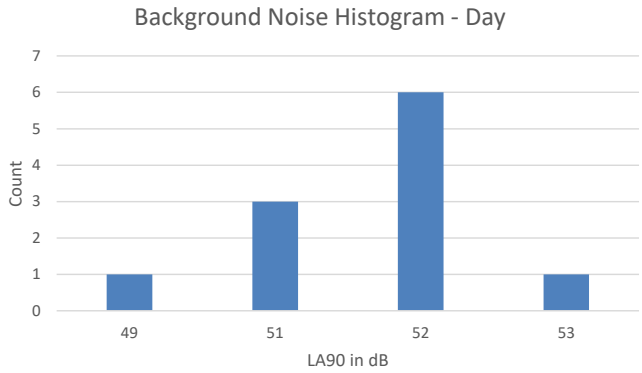


Figure 5
Histogram showing typical daytime Background Noise Levels

Figure 5 shows that typical Background Noise Level, when the site would be open (daytime), is

52 dB L_{A90}.

The same was done for the night time Background Noise Level.

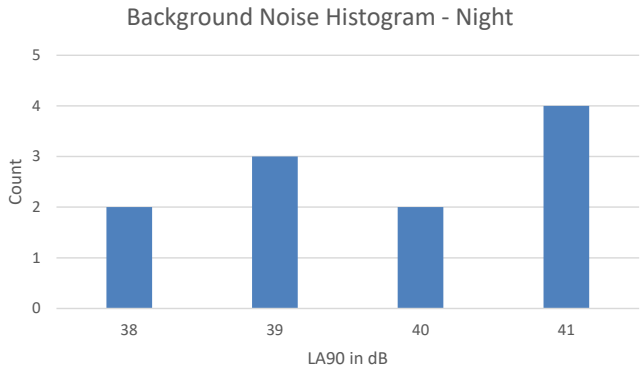


Figure 6
Histograms showing typical night time Background Noise Levels

Figure 6 shows that typical Background Noise Level during the night time period is

41 dB L_{A90}.

4.2 External plant noise measurements

Spot measurements were made of the two fans. The fans are denoted '1' & '2' as shown in the figure below.



Figure 7
Fan '1' & '2'

Noise measurements were taken, 1m from the cowl of each fan, with the fans both on and off.

Description	Duration	Distance	Level dB(A)	Specific Noise dB(A)
Fan 1 OFF	1min	1m	54.8	n/a
Fan 1 ON	1 min	1m	69.0	65
Fan 2 OFF	1 min	1m	58.8	n/a
Fan 2 ON	1 min	1m	66.6	67

Table 3
External plant measured noise levels

The Specific Noise Levels are found by logarithmic subtraction of the measured level of the noise source off from the measured level of the noise source on.

5 Acoustic assessment

The potential noise issues to be assessed are:

1. Noise from external plant
    a. Extract Fans 1 & 2

The assessment will logarithmically sum the noise levels of the two fans and take a single source location at the middle of the flat roof, as shown in Figure 8.

5.1 Distance to NSRs

The nearest habitable window to the noise source(s) is on the rear elevation of 67 Kingsway. There is no direct line of sight to the window from either fan, as shown in Figure 8.

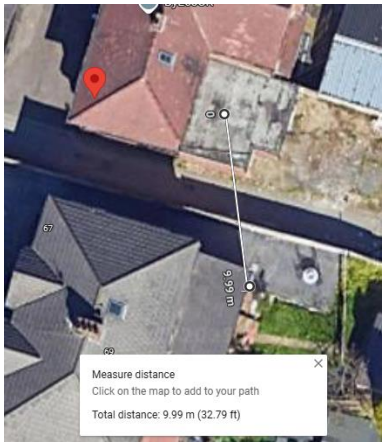


Figure 8
Distance from the middle of the flat roof to the nearest habitable window

5.2 Background noise level

The typical Background Noise Levels are given in Section 4.1.3.1.

Daytime (opening hours)	52 dB L_{A90}
Night time	41 dB L_{A90}

5.3 BS4142 assessments

For the BS4142 assessment, the following will be taken into account:

- Shielding
- Distance attenuation
- Acoustic characteristics such as, intermittency, tonality and impulsivity.

5.3.1 Fans 1 & 2

There is shielding from the rear corner of 67 Kingsway.

According to Figure 8, the distance from the middle of the flat roof to the nearest window on the rear elevation of 67 Kingsway is 10m.

The fans are broadband and will stay on for the duration of the opening hours. The fans have no impulsive nature, even on startup. Therefore, no penalties have been applied.

Noise from the fans is constant but the Background Noise Level (BNL) for the night time is lower than the day time. Hence, the night time BNL is used as a worst-case scenario.

BS 4142 Noise Assessment Fans 1 & 2 - Night	Value	dB
Fans 1 & 2	1m	66
Barrier	yes	-10
Distance	10	-20
Total Specific Noise Level @ NSR		36
BS 4141		
Tonality	0/2/4/6	0
Impulsivity	0/3/6/9	0
Intermittency	0/3	0
Rating Noise Level		**36**
Background Noise Level	*night*	41
Rating minus Background		**-5**

Table 4
BS 4142 assessment of extraction fans

Table 5 shows that the Rating Level for both fans is 36 dB which is 5 dB below the typical night time Background Noise Level and thus meets the Council's threshold.

6 Conclusion

An BS 4142 acoustic survey has taken place at 65 Kingsway, Burnage to determine whether noise levels from the external plant will be acceptable given the proposed opening hours.

The assessment revealed the two extract fans on the rear flat roof are within Council guidelines for the proposed opening hours, thus no mitigation is required.

7 References

[1] BS 4142: 1997
Method for Rating industrial noise affecting mixed residential and industrial areas
British Standards Institute, 1997.

[2] BS 4142: 2014
Methods for rating and assessing industrial and commercial sound
British Standards Institute, 2014.

[3] Environmental Protection
Planning & Noise - Technical Guidance
Manchester City Council, Dec 2015.

Appendix

A1 Drawing

A1.1 Site location

SITE LOCATION PLAN
AREA 2 HA
SCALE: 1:1250 on A4
CENTRE COORDINATES: 386565 393871,



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A1.2 Existing plans

