



BRAIDEN ACOUSTICS LTD

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NOISE IMPACT ASSESSMENT

Prepared For : Tom Brown

Date : 10 Oct 2023

Site : Former Granada Cleaners, Bridge St, Manchester

Report No. : 11214

1 INTRODUCTION

Braiden Acoustics has been commissioned by Tom Brown to undertake an acoustic survey at the site of Former Granada Cleaners, Bridge St, Manchester to support planning application 137415/FO/2023 which proposes "Change of use from existing dry cleaners to bar/eatery - proposals include front elevational changes and internal alterations."

1.1 PLANNING APPLICATION

in a letter from Manchester City Council, dated 6 July 2023, it was stated that the application is currently invalid pending further documentation, one of which is a Noise Impact Assessment:

2) An acoustic study identifying ambient noise levels during daytime, night time and weekends along with details of the noise levels that are currently achieved within the accommodation at various times during operating hours. The study should identify the acoustic treatment and measures necessary to limit the breakout of noise in accordance with a noise study of the premises and a scheme of acoustic treatment. The scheme proposed shall include measures such as acoustic lobbies at access and egress points of the premises, acoustic treatment of the building structure, sound limiters linked to sound amplification equipment, details of the acoustic glazing and acoustically treated ventilation you have installed/propose to use and specified maximum internal noise levels.

There are three main noise issues:

1. Noise from external plant
2. Noise transmission from the ground floor to the first floor
3. Noise breakout.

1.2 AIM

This report will address all the relevant noise sources (as described above) and receivers and suggest mitigation, where necessary, to ensure relevant noise thresholds are achieved.

2 DESCRIPTION OF SITE

The site is a three-storey building within a commercial terraced row on Bridge Street in Manchester city centre.



Figure 1
Street view of site

2.1 SITE LOCATION AND SURROUNDING USES

The property is bounded by Bridge Street to the south (front) and Back Bridge Street to the north (rear). There are commercial units either side with some office / storage above. Directly above the site, and to the front, is The One Thai Massage (as shown in Figure 1).

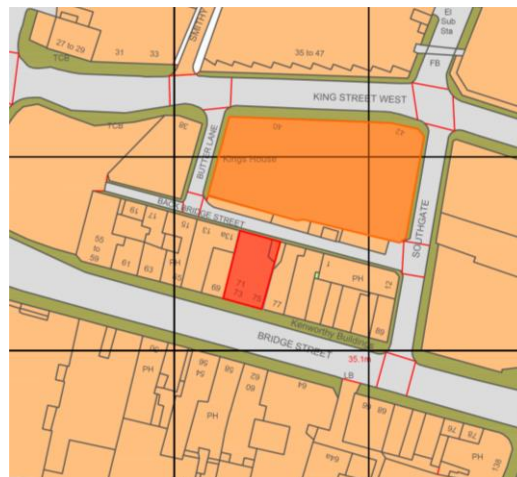


Figure 2
Site location

On the other side of Back Bridge Street, on the upper floors, are more storage / office spaces, namely the Bruntwood office of Kings House, highlighted in orange. The same can be said for the uses above the commercial units on each side of Bridge Street, although these are predominantly storage / commercial on the upper floors. There is no residential accommodation in the vicinity.

2.1.1 Nearest sensitive receptors

The nearest receptors will be the office use on the upper floors of Kings House to the rear.

2.2 PROPOSED USE

It is proposed to fit out the building as shown in Figure 3 and Figure 4.





Figure 3
Proposed Basement and Ground floor layouts

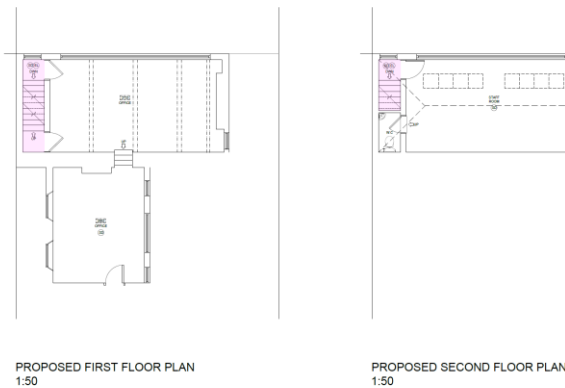


Figure 4
Proposed First and Second floor layouts

2.2.1 Opening hours

The site will be open during the following hours:

Daily 10:00 – 04:00

2.2.2 Building services

The external plant comprises of kitchen extract ventilation.

There is also likely to be external condenser units.

2.2.2.1 Kitchen Ventilation

Extraction Fan

S&P CVAT/4-6000/450N D

Silencer

1x 1D Attenuator

Ductwork

The ducting will start from the rear of the canopy hood rising vertically towards the rear of the building and terminating with a jet cowl at least 1m above ridge.



There are no drawings yet for the proposed kitchen ventilation system.

The kitchen extract ventilation system will only operate during opening hours.

2.2.2.2 External Condenser units

The amount, type and location of any external condenser units are not yet known.

2.2.3 Sound system

The sound system, at the time of writing, is unknown.

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.”

3.2 BS 8233: 2014

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.

3.3 COUNCIL CRITERIA

3.3.1 External plant noise

It is usual for Councils to adhere to a BS4142:2014 for industrial noise. Manchester council are no different and state that:

... Rating noise level of 5dB below the existing background (L_{A90}) in each octave band at the nearest noise sensitive location

4 MEASUREMENT DETAILS

External noise measurements were made at the rear of the property where the external plant will be located.



4.1 MONITORING OVERVIEW

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

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

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

Monitoring was unmanned but with audio recorded.

4.1.1 Monitoring locations

The microphone was placed one metre from a rear window on the second floor, as shown in Figure 1Figure 5.

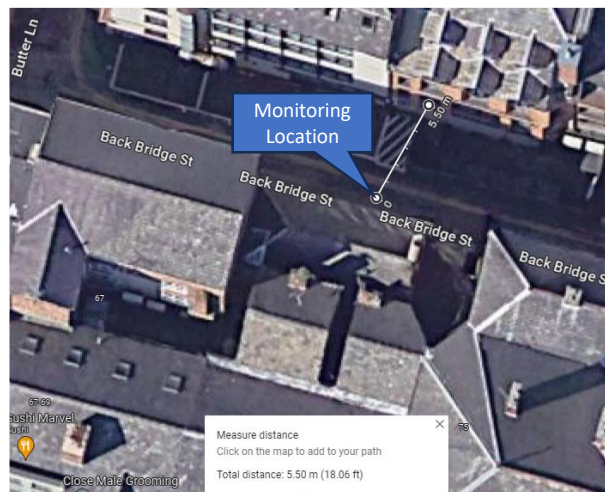
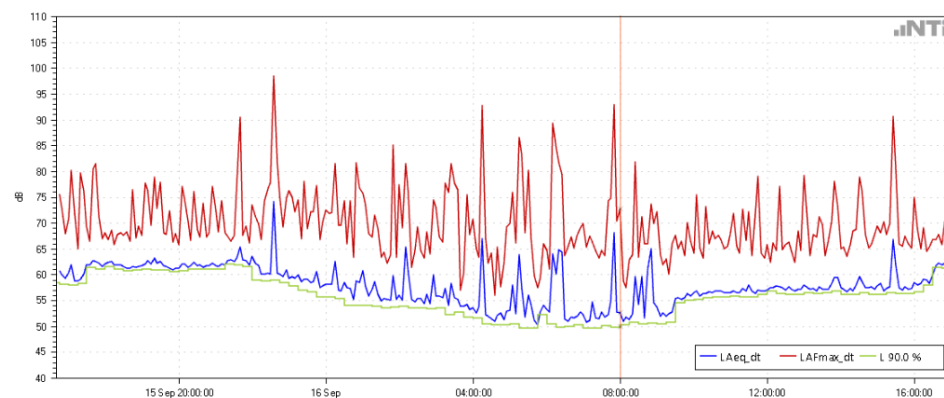


Figure 5
Monitoring location

4.1.2 Monitoring results

4.1.2.1 Rear

Noise levels at the rear were high due to an abundance of external plant in Back Bridge Street, servicing the various commercial uses on Bridge Street and also air conditioning for the offices in Kings House. There was also city centre ‘hum’ from road traffic noise and general urban noise.



Cursor: Position=2023-09-16 08:00:00 LAeq_dt=52.5 dB LAFmax_dt=72.7 dB L 90.0 %=49.8 dB

Figure 6
Time History - REAR

The lowest 15-minute Background Noise Level, when the offices would be in use was 49.9 dB LA90.



5 ACOUSTIC ASSESSMENT

The potential noise sources are:

1. noise from 'external plant'
 - a. the kitchen ventilation
 - b. noise from condenser units
2. noise transmission via the separating floor (ground to first)
3. noise break-out to the front.

5.1 EXTERNAL PLANT NOISE ASSESSMENT

The exact details of the external plant are not yet known; however, the combined Rating Level should not exceed 5 dB less than the Background Level shown in Figure 6, i.e. 44 dB.

5.2 NOISE BREAK OUT

5.2.1 Internal noise transmission

The ceiling of the first floor was in some disrepair but that eased inspection.

Figure 7 shows the original lathe and plaster ceiling, as well as the floor joists and even the underside of the first-floor floorboards.

Remnants of the suspending ceiling can also be seen, that was hung from wooden battens connected to the supporting beams.

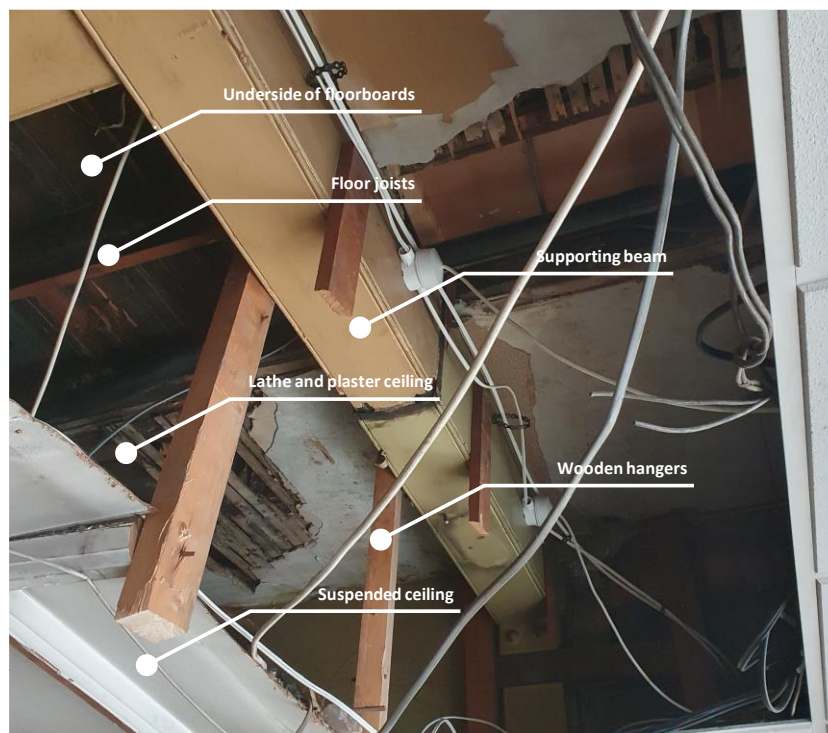


Figure 7
Ceiling of first floor



5.2.1.1 Proposed ceiling upgrade

It is proposed to remove with existing suspended ceiling AND the original lathe and plaster ceiling. The original ceiling should be upgraded to 2no. layers of SoundBloc acoustic plasterboard and acoustic mineral wool in the cavity (not shown in Figure 8). Once the original ceiling has been upgraded, then there should be an independent ceiling underdrawn that conforms to Floor Treatment 1 in Approved Document E.

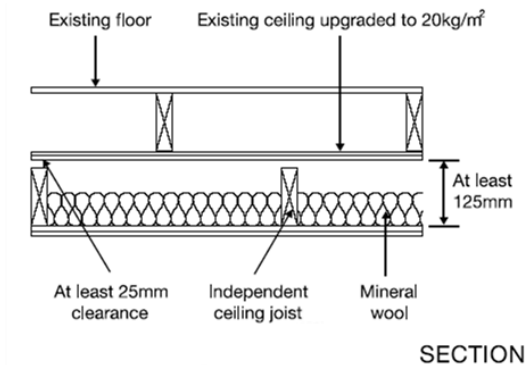


Figure 8
ADE Floor treatment 1 - Independent ceiling with absorbent material

The resistance to airborne (and impact) sound depends on the :

- the combined mass of the existing floor and the independent ceiling,
- the absorbent material,
- the isolation of the independent ceiling and
- the airtightness of the whole construction.

The construction of the separating floor is as follows:

- **make good original ceiling so that it is airtight;**
- the independent ceiling shall be supported by independent joists fixed only to the surrounding walls. A clearance of at least 25mm should be left between the top of the independent ceiling joists and the underside of the existing ceiling.
- any supporting beams should sit within the cavity of the independent ceiling with enough space that the beams are at least 10mm from the topside of the acoustic boards of the acoustic independent ceiling.
- at least 2 layers of 15mm acoustic plasterboard with staggered joints, minimum mass per unit area 20kg/m².
- an absorbent layer of mineral wool laid on the ceiling , minimum thickness 100mm, minimum density of 10 kg/m³.

NB The plasterboards attached to the underside of the independent ceiling should be below any beams, so that the beams are within the cavity of the independent ceiling. Please contact Braiden Acoustics for further information, if required.**





Figure 9
Computer model of proposed ceiling system

For services such as lights, smoke alarm etc. then there should be a sacrificial ceiling as shown below.

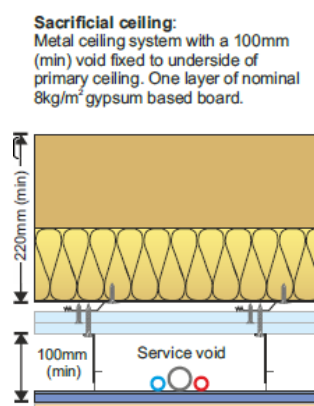


Figure 10
Typical sacrificial ceiling

The acoustic ceiling should create a minimum of 100mm cavity.

One layer of standard plasterboard is sufficient for the sacrificial ceiling, as it will have no real acoustic performance.

5.2.1.2 Noise transfer to first floor

The above construction described in Section 5.2.1.1 will give an on-site sound insulation performance of, at least, 60 dB. Considering that the likely upper noise level in the bar, **during office hours of 08:00 – 20:00**, will be 90 dB(A), then the noise level within the first floor will be 90 – 60 = 30 dB. This is 5 dB below the 35 dB daytime internal noise limit in commercial spaces.



5.2.2 Noise break-out via front façade

Due to the lack of sensitive receptors on Bridge Street, then noise breakout at the front should not be an issue.

However, it is good practice to have lobbied door systems to minimise noise leaking out during the ingress and egress of patrons.

6 CONCLUSION

A baseline acoustic survey has taken place at Former Granada Cleaners, Bridge St, Manchester to assess noise levels from the proposed external plant, internal noise transfer and noise break out.

The report stipulates noise limits for the external plant at the nearest sensitive receptor. Once the external plant scheme has been finalised then the report can be updated.

Design and discussion of the proposed upgraded ceiling is detailed also.

Noise breakout to the front should not be an issue, although lobbied doors systems should be employed.

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.



Appendix



A1 DRAWINGS

A1.1 Basement and Ground Floor Layouts



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