BRAIDEN ACOUSTICS LTD

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

RESIDENTIAL ACOUSTIC SURVEY

Prepared For : Mr Z & Mrs W Fareed Partnership

Date : 1 Apr 2021

Site : 308 Moseley Road, Levenshulme

Report No. : 10899

1 INTRODUCTION

Braiden Acoustics has been commissioned by Mr Z & Mrs W Fareed Partnership to undertake an acoustic survey at the site of 308 Moseley Road, Levenshulme in order to support a planning application for the change of use to residential dwellings

1.1 AIM

This report assesses potential noise impact on the proposed residential site and recommends any acoustic mitigation measures so that the relevant noise thresholds are met.

2 DESCRIPTION OF SITE

The site is a three-storey building that are currently offices and training facilities.



Figure 1
Street view of site

2.1 SITE LOCATION AND SURROUNDING AREA

The site is currently an office building with a car park to the rear.



Figure 2
Site location and surrounding uses

The site is bounded by Moseley Road to the front (north). To the west is a substation and residential beyond. To the east is commercial at ground floor and residential above.

2.1.1 Nearby external plant

There are no external plant nearby.

2.2 PROPOSED USE

The proposal is for a four-storey building to accommodate 17no. apartments.

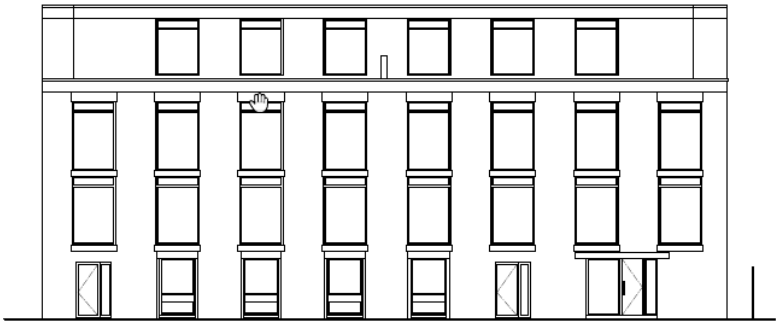


Figure 3
Proposed front elevation

3 ACOUSTIC CRITERIA AND METHODOLOGY

This is a residential development that may be susceptible to environmental noise. Potential mitigation measures are determined by recommended indoor noise levels from BS 8233 "Sound insulation and noise reduction for buildings" [1] which, in turn, takes guidance from the research based World Health Organisation "Guidelines for Community Noise".

Noise level thresholds are usually given for the night-time – 2300-0700 hrs and day time – 0700-2300 hrs.

3.1 NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

The National Planning Policy Framework is the current document for planning guidance. Paragraph 123 of the NPPF says that planning decisions should aim to:

- avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- mitigate and reduce to a minimum, other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
- recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and
- identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

3.2 Noise Policy Statement for England

The main aim of the Noise Policy Statement is to:

> *Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.*

Therefore, the NPSE is mainly concerned with environmental noise.

The document sets out categories in order to help distinguish is if there is an adverse effect due to noise and if there is, how significant is it.

> *NOEL – No Observed Effect Level*
> *This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.*
>
> *LOAEL – Lowest Observed Adverse Effect Level*
> *This is the level above which adverse effects on health and quality of life can be detected.*
>
> *SOAEL – Significant Observed Adverse Effect Level*
> *This is the level above which significant adverse effects on health and quality of life occur*
>
> *It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.*

3.3 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)

NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

Internal noise levels in habitable rooms are calculated using either the simple or rigorous method as described in Annex G in BS 8233:2104.

3.3.1 Noise levels in external living areas

For external living areas such as gardens and balconies, BS 8233:2014 § 7.7.3.2 recommends an upper limit of 55dB $L_{Aeq,day}$ although there is a caveat:

However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.

3.3.2 Maximum noise levels

In the 2014 edition of the Standard, the criterion of 45dB L_{AFMax} inside bedrooms has been removed although there is Note 4:

NOTE 4 regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or LAmax,P depending on the character and number of events per night. Sporadic noise events could require separate values.

3.4 COUNCIL CRITERIA

For residential developments, Manchester Council's document "Noise and Planning Guidance" dated 2015, Section 3.6.1.1 states:

Manchester City Council has adopted the following noise limits for residential properties:

- *Bedrooms (night time - 23.00 - 07.00) 30 dB LAeq (individual noise events should not normally exceed 45 dB LAmax,F by more than 15 times)*
- *Living Rooms (daytime - 07.00 - 23.00) 35 dB LAeq*
- *Gardens and terraces (daytime) 55 dB LAeq*

These criteria have been adopted for the following reasons:

BS 8233: 2014 recognises these levels as a good standard for resting/sleeping conditions.

- *The WHO document 'Guidelines for Community Noise' recommends an internal LAeq of 30dB for optimal sleep conditions (and no more than 35dB for internal rooms during daytime).*
- *The performance of acoustic insulation schemes can often be below that specified, according to the quality of installation, materials, noise spectrum and deterioration / wear and tear of building elements. A high design specification introduces a 'safety margin' should building elements not perform as well as expected ('on-site' performance).*
- *Performance specification for glazing does not usually take into account the detrimental effect of vents on the sound insulation. Even 'acoustic' vents will reduce the performance of the facade insulation, as they will inherently contain a free open area for air exchange.*
- *There is a general increase in urban noise levels, which can in the future be reasonably accommodated by these standards.*

- *The standards support the Local Authority corporate objective to prevent ill-health and improve local people's health and well-being.*

4 MONITORING DETAILS

Noise measurements focussed on the road traffic noise from Moseley Road and any potential noise from the electricity substation.

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 significant drift reported.

Monitoring was unmanned with audio recorded.

4.2 VISIT ONE - FRONT

The first visit was to monitor noise levels at the front of the site.

Date: Monday 8th March 2021 (24 hours)

Weather: 4 – 9°C temperature; ~5ms^{-1} wind; ~20-40% cloud;

4.2.1 Monitoring location (ML)

The monitoring location was located at a position that was near the road and also near the substation approximately 1m from an upstairs window.

4.2.2 Results

Date	Time		Duration	Time Period	L_{A90} dB	L_{Aeq} dB	L_{Amax} dB
	Start	Finish					
Thurs 27/02/2020	17:00:00	23:00:00	0600:00	day	59	66	88
	23:00:00	07:00:00	08:00:00	night	51	62	74[1]
	07:00:00	17:00:00	10:00:00	day	62	69	103

Table 2
Summary of visit 1 - front

The measured noise levels were dominated by road traffic noise from nearby roads.

The substation did not produce any audible noise.

[1] L_{Amax} level not exceeded 15 times

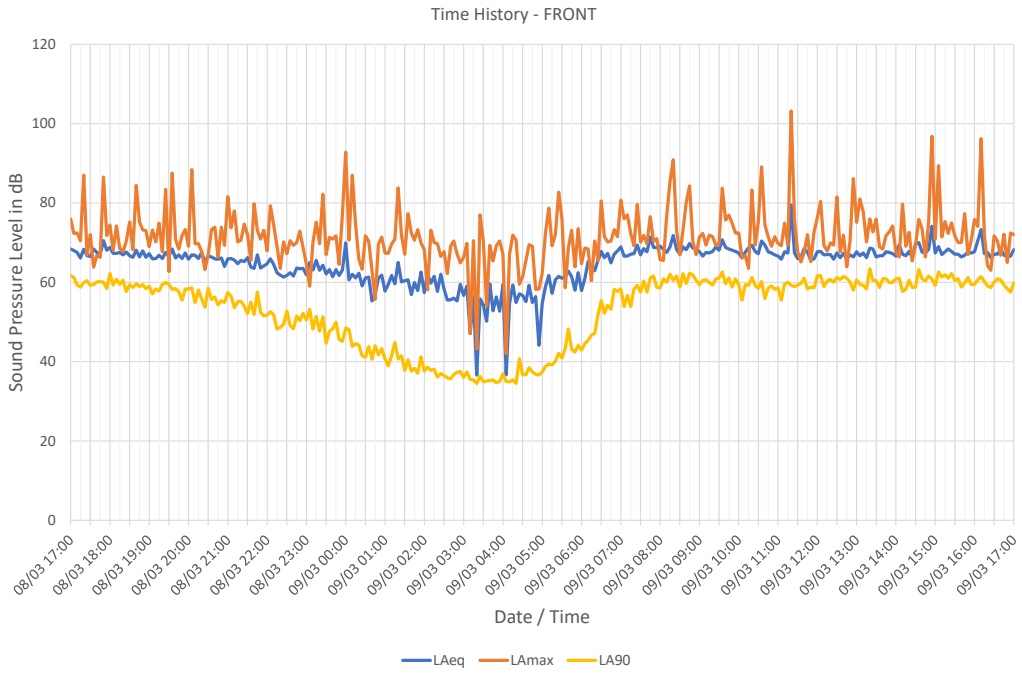


Figure 4
Time history

L_{Aeq} (night)	62 dB(A)
L_{Amax} (night)	74 dB(A)
L_{Aeq} (day)	68 dB(A)

5 Acoustic Assessment

5.1 Internal Noise Levels

5.1.1 Simple initial assessment

Given the external noise levels, the initial glazing scheme can be suggested. However, it should be noted that this assumes windows closed in order to achieve the internal noise levels based on BS 8223:1999.

The amount of attenuation from the building façades were readily computed using the simple method in Appendix G of BS 8233:2014 whereby the sound insulation index (SRI) of the glazing (the weakest element of the building façade, acoustically) is determined by simply deducting the required internal noise level from the external free field noise level[2].

A 3dB façade correction was necessary as the noise monitoring was at a facade.

No distance attenuation required as noise monitoring was taken at the location of the front façade.

There is no barrier correction due to direct line of sight to the road.

Hence, the day and night levels used for the assessment are:

⇒ night (07:00 – 23:00) L_{Aeq} is 62 – 3 = 59 dB

⇒ night (07:00 – 23:00) $L_{AFmax, <10}$ is 74 – 3 = 71 dB

[2] When the measured levels are façade levels, then 3dB is deducted to obtain the free field levels.

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⇒ day time (07.00-23.00) L_{Aeq} is 68 – 3 = 65 dB

The front and side elevations shall be assessed using the same data.

Spot measurements were made to compare the noise level at the front and rear and the difference was 10dB.

Façade	period	room	External Levels measured / calc'd		Internal Levels recommended		Required glazing	
			L_{Aeq} (dB)	L_{Amax} (dB)	L_{Aeq} (dB)	L_{Amax} (dB)	SRI ($R_w + C_{tr}$)	Example Spec[3]
Front / side	night	bedroom	59	71	30	45	**29**	10 / (6-20) / 4
	day	lounge	65	--	35	--	**30**	10 / (6-20) / 4
Rear	night	bedroom	49	61	30	45	**19**	4 / (6-20) / 4
	day	lounge	55		35		**20**	4 / (6-20) / 4

Table 3
Calculated SRI values and recommended glazing

The front and side elevations will require uprated glazing with a Sound Reduction Index of at least 30 dB $R_w + C_{tr}$ for all habitable rooms. This can be achieved with 10 / (6-20) / 4mm glazing which should give a sound reduction value of 30 dB $R_w + C_{tr}$ according to Table B.1 in BS 12354-3.

The rear elevation will suffice with standard 4mm double glazed units.

5.2 BS 4142 ASSESSMENT – ETERNAL PLANT NOISE

There will be no external plant associated with the site.

6 CONCLUSION

An acoustic survey has taken place at the 308 Moseley Road, Levenshulme to support a planning application for the change of use to apartment dwellings.

From the assessment the following mitigation measures are recommended:

- standard double glazing to the rear.
- 10 / 6 to 20 mm / 4 or equivalent glazing to the front and side elevations.

Implementing this recommendation will ensure compliance with the Council's noise criteria and ensure the amenity of future tenants will be safeguarded.

7 REFERENCES

[1] BS8233: 2014
Sound Insulation and noise reduction for buildings – Code of Practice,
British Standards Institute, 2014.

[3] Example glazing build up and performance from Saint Gobain – table in Appendix. Other glazing build-ups available.

Appendix

A1 GLAZING TYPES FROM BS 12354-2

Table B.1 - Examples of the sound reduction index of glazing

Glazing type	Sound reduction index (dB)						
	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 k Hz	R_w (C;C_{tr}) dB
Single panes (mm)							
3	14	19	25	29	33	25	28 (–1; –4)
4	17	20	26	32	33	26	29 (–2; –3)
5	19	22	29	33	29	31	30 (–1; –2)
6	18	23	30	35	27	32	31 (–2; –3)
8	20	24	29	34	29	37	32 (–2; –3)
10	23	26	32	31	32	39	33 (–2; –3)
12	27	29	31	32	38	47	34 (0; –2)
Laminated panes (mm) + plastic laminate (0,5 to 1) mm							
6+	20	23	29	34	32	38	32 (–1; –3)
8+	20	25	32	35	34	42	33 (–1; –3)
10+	24	26	33	33	35	44	34 (–1; –3)
Double pane units with single or laminated panes (mm); air filled cavity from (6 to 16) mm							
4-(6-16)-4	21	17	25	35	37	31	29 (–1; –4)
6-(6-16)-4	21	20	26	38	37	39	32 (–2; –4)
6-(6-16)-6	20	18	28	38	34	38	31 (–1; –4)
8-(6-16)-4	22	21	28	38	40	47	33 (–1; –4)
8-(6-16)-6	20	21	33	40	36	48	35 (–2; –6)
10-(6-16)-4	24	21	32	37	42	43	35 (–2; –5)
10-(6-16)-6	24	24	32	37	37	44	35 (–1;–3)
6-(6-16)-6+	20	19	30	39	37	46	33 (–2;–5)
6-(6-16)-10+	24	25	33	39	40	49	37 (–1;–5)

NOTE 1 This selection and the values are in accordance with prEN 12758-1. The single number ratings are deduced from results in 1/3-octave bands and therefore single number ratings deduced from the given octave band data might result in values which differ 1 dB at the most.

NOTE 2 Though it is known that for a given double pane unit the sound reduction increases with increasing cavity width, this effect has been found to be too small to take into account here for air filled cavities in the light of the inherent spread in results for nominally identical units.

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