



BRAIDEN ACOUSTICS LTD

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

RESIDENTIAL ACOUSTIC SURVEY

Prepared For : The Daylesford Trust

Date : 7 May 2020

Site : 84 - 86 Oldham Street, Manchester

Report No. : 10850revA

1 INTRODUCTION

Braiden Acoustics has been commissioned by The Daylesford Trust to undertake an acoustic survey at the site of 84 - 86 Oldham Street, Manchester in order to support a planning application for the renovation of the site with the addition of residential accommodation.

1.1 AIM

This report assesses potential noise impact on the proposed new residential units and recommends any mitigation acoustic measures so that the Council's noise thresholds are met.

2 DESCRIPTION OF SITE

The site is the upper residential floors of two connected properties: one being 4 stories and the other 3 stories.

At ground level there is a café that spans 84 and 86 Oldham Street.



Figure 1
Street view of site

2.1 SITE LOCATION AND SURROUNDING AREA

The site is bounded by Oldham Street to the front, commercial to the north east at ground level and residential on the upper floors. To the rear and south west are currently car parks although construction for residential accommodation is currently underway.

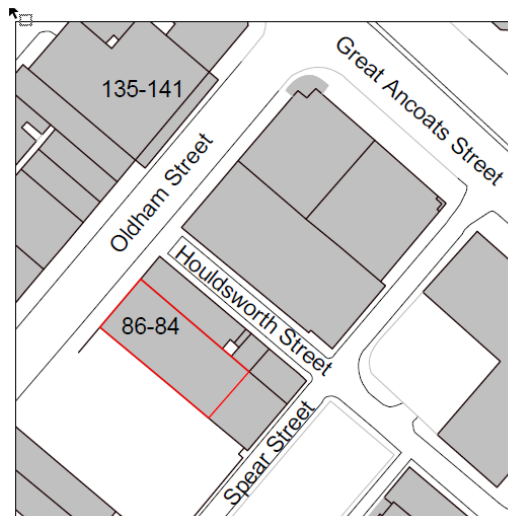


Figure 2
Site location and shit layout

2.2 PROPOSED USE

It is proposed to construct additional accommodation to form four floors of apartments, as shown in Figure 3 and Figure 4.



Figure 3
Proposed front elevation with additional accommodation on top



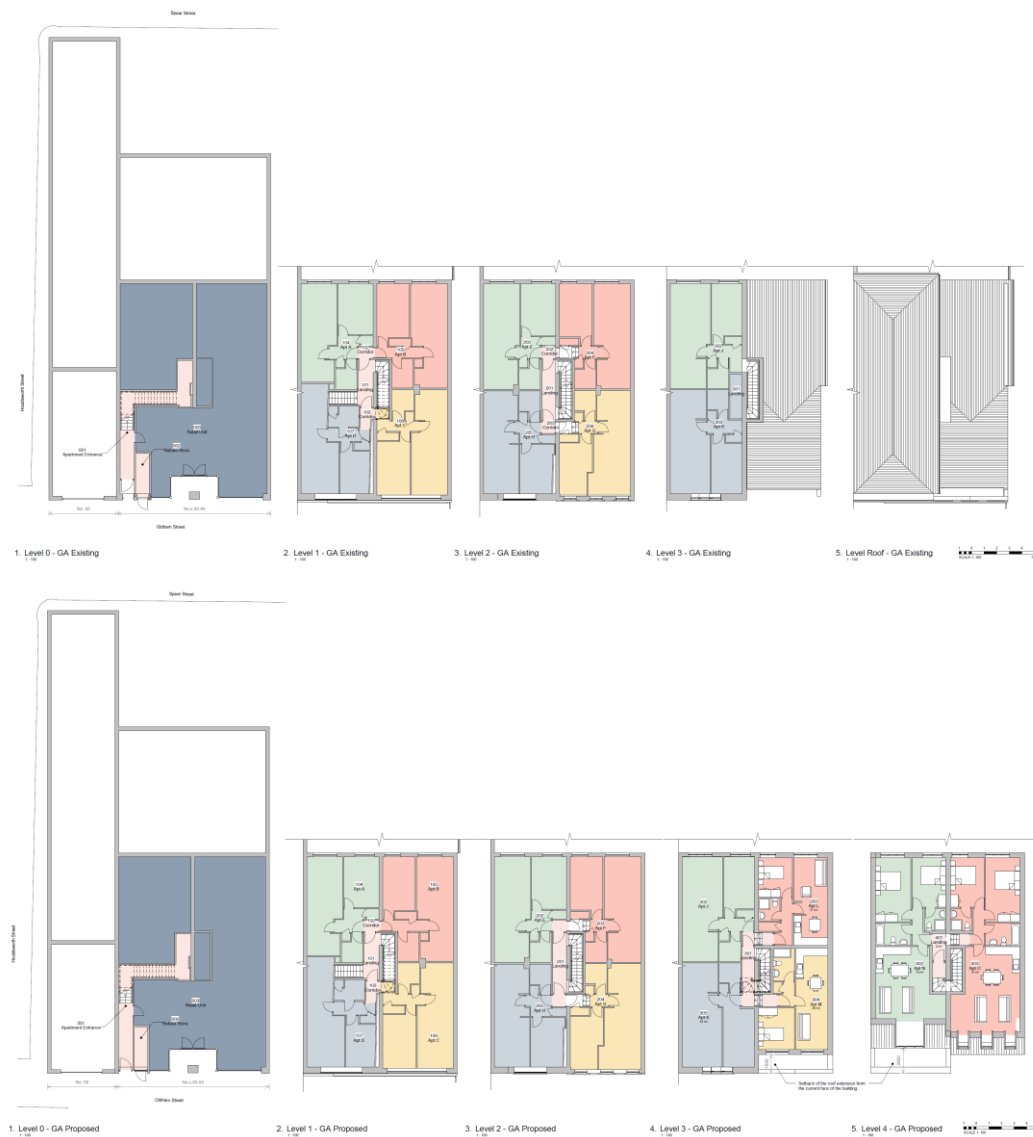


Figure 4
Existing and proposed floor layouts

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 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.

3.2.1 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.

3.2.2 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 $L_{Amax,P}$ depending on the character and number of events per night. Sporadic noise events could require separate values.



3.3 COUNCIL CRITERIA

It is usual that the noise levels given in BS 8233 are adhered to.

The noise criteria this assessment will follow are:

L_{Aeq} 30 dB 8 hours – indoors, night-time (23.00-07.00)

*L_{Aeq} 35 dB 16 hours – indoors, daytime **all** living areas (07.00-23.00)*

4 MONITORING DETAILS

It has not been possible to taken direct noise environmental noise measurements due to unnaturally quiet ambient noise levels because of the Government's lockdown. However, historic noise data along Oldham Street has been used for the front elevation and is certainly relevant to this acoustic study.

Noise measurements focussed on the adjacent road noise and any potential noise from late-night establishments.

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.

The microphone was placed 1m from a first floor window.

Weather conditions were suitable for noise monitoring.

4.2.1 Results

Date	Time		Duration	Time Period	L _{A90} dB	L _{Aeq} dB	L _{Amax} dB
	Start	Finish					
Thu 17/08/2017	15:34:27	23:00:00	07:25:33	day	55.5	67.5	106.9
	23:00:00	07:00:00	08:00:00	night	46.7	60.7	83.7
	07:00:00	09:47:42	02:47:42	day	54.9	67.7	91.3

Table 2
Summary of visit 1 - front

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



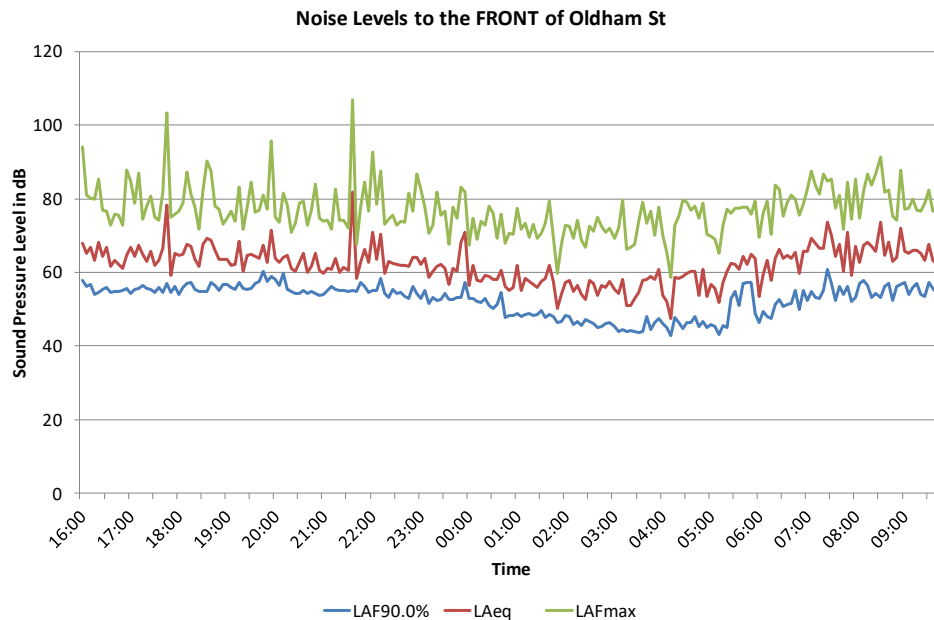


Figure 5
Time history

L_{Aeq} (night) 61 dB(A)

L_{Aeq} (day) 68 dB(A)

4.3 VISIT TWO - FRONT

A further visit to monitor the noise levels on Oldham Street was required in order to assess potentially the busiest time of week.

Monitoring was undertaken on a Saturday during the summer.

Weather conditions were suitable for noise monitoring.

4.3.1 Results

Date	Time		Duration	Time Period	L_{A90} dB	L_{Aeq} dB	L_{Amax} dB
	Start	Finish					
Sat 28/08/2017	19:09:58	23:00:00	03:50:02	day	62.5	67.9	98.3
	23:00:00	07:00:00	08:00:00	night	48.7	67.2	89.6
	07:00:00	14:08:22	12:46:04	day	50.9	63.1	87.5

Table 3
Summary of visit 3 – front (Saturday night)



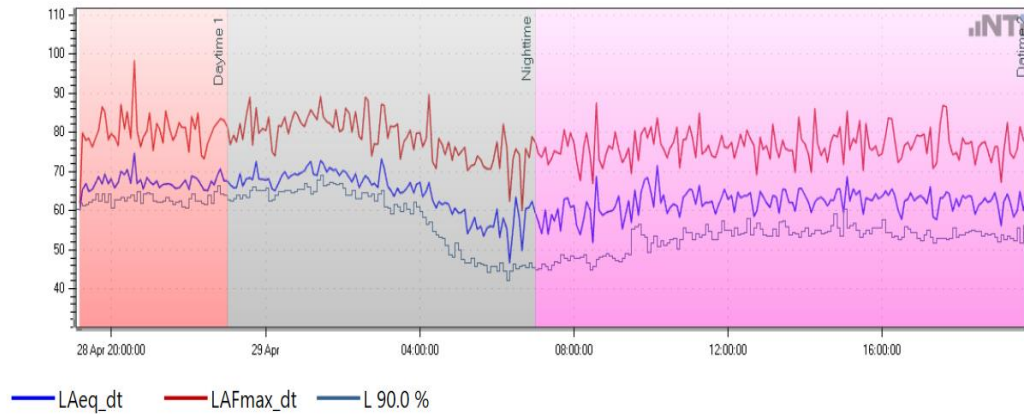


Figure 6
Time history

L_{Aeq} (night) 67 dB(A)

L_{Aeq} (day) 68 dB(A)

The daytime level excludes the Sunday monitoring as it gives a lower daytime noise level. The Saturday evening level of 68 dB(A) is in line with the daytime level given in Table 2.

5 ACOUSTIC ASSESSMENT

The following assessment and recommendations apply to the new accommodation only.

5.1 BS 8233 ASSESSMENT – INTERNAL NOISE LEVELS

The required internal noise levels are given in Section 3.3 and 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 level¹.

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

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 67 – 3 = 64 dB(A)

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

The front and side elevations shall be assessed using the data above. The rear elevation will be 10dB less due to shielding from road noise.

The weakest structural element is the glazing. The required glazing was calculated using recommended internal values and the external façade noise levels above. The Table below shows the required Sound Reduction Indices (SRI) for the bedrooms (night) and living areas (day) on each relevant elevation.

¹ When the measured levels are façade levels, then 3dB is deducted to obtain the free field levels.



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 ²
Front /side	night	bedroom	64	--	30	--	34	12 (16) 6
	day	lounge	65	--	35	--	30	6 (16) 8
Rear	night	bedroom	54	--	30	--	24	4 (12) 4
	day	lounge	55	--	35	--	20	4 (12) 4

Table 4
Calculated SRI values and recommended glazing

The front will require uprated glazing with Sound Reduction Index of at least 30 dB $R_w + C_{tr}$ for daytime living spaces and 34 dB $R_w + C_{tr}$ for bedrooms. The rear will suffice with standard 4mm double glazed units.

5.1 VENTILATION

Due to high noise levels at the front, additional ventilation maybe required during warming weather to obviate the need to open the window and thus elevating noise levels above those recommended.

Additional ventilation will be required for bedrooms to minimise sleep disturbance.

A suitable ventilator is the Greenwood Airvac AAB Acoustic Airbrick.

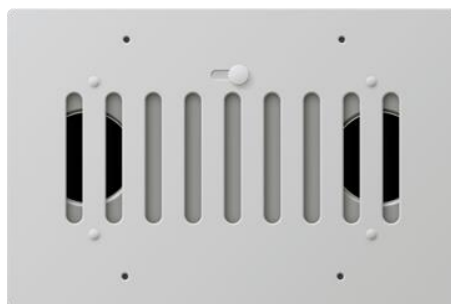


Figure 7
Greenwood Airvac AAB Acoustic Airbrick

The sound reduction index of the AAB is 46 dB $D_{n,e,w}$ which is sufficient for even the most exposed habitable rooms.

6 CONCLUSION

An acoustic survey has taken place at the 84 - 86 Oldham Street, Manchester to support a planning application for the erection of apartment dwellings.

An additional noise survey during a Saturday night has revealed an increase in night time noise mitigation measures. A summary of the noise level is now as follows:

Front

⇒ night time (23.00-07.00) L_{Aeq} is 64 dB(A)

⇒ day time (07.00-23.00) L_{Aeq} is 65 dB(A)

² Example glazing build up and performance from Saint Gobain – table in Appendix. Other glazing build-ups available.



Rear

⇒ night time (23.00-07.00) L_{Aeq} is 54 dB(A)

⇒ day time (07.00-23.00) L_{Aeq} is 55 dB(A)

It is recommended to have upgraded glazing at the front to ensure adequate internal noise levels. The following Saint Gobain glazing is an example of how the rated sound insulation can be achieved.

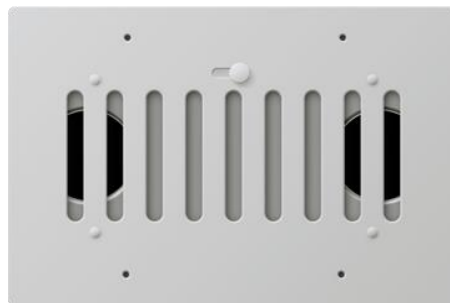
FRONT

Daytime living spaces 12 (16) 6

Bedrooms 8 (16) 6

Additional ventilation should be installed in the bedrooms to the front to ensure noise levels are not elevated when a window is open.

A suitable ventilator is the Greenwood Airvac AAB Acoustic Airbrick.



Implementing these recommendations will ensure compliance with the Council's noise criteria and ensure the amenity of future tenant will be safeguarded.

7 REFERENCES

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



Appendix

A1 GLAZING TYPES FROM PILKINGTON



SAINT-GOBAIN

GLASS



SAINT-GOBAIN

GLASS

Glass	Thickness	R _w	R _a	R _{a,10}	63Hz	125H	250H	500H	1000H	2000H	4000H	R _w	R _{w+C}	R _{w+C,T}	R (C;C ₁)
6 (12) 10	20	37	36	34	30	30	28	34	41	39	48	37	36	34	37(1;-3)
12 (16) 6	34	37	36	34								37	36	34	37(1;-3)
4 (10) 8.6A	20	37	37	34								37	37	34	37(4;-3)
4 (10) 8.6A	28	39	38	34								39	38	34	39(1;-5)
4 (10) 8.6A	28	39	38	34	24	26	27	38	47	55		39	38	34	39(1;-5)
5 (12) 6.6A	29	39	38	34	25	25	26	34	45	43	50	39	38	34	39(1;-5)
6 (10) 6.6A	20	38	37	34								38	37	34	38(1;-4)
6 (10) 6.6A	20	38	37	34	23	26	28	31	40	44	50	38	37	34	38(1;-4)
6 (10) 6.6A	28	40	38	34	24	25	30	38	44	47		40	38	34	40(2;-5)
8 (10) 8.6A	27	39	38	34	23	26	26	34	43	46	53	39	38	34	39(1;-5)
12 (10) 13.5	41	39	38	34	24	31	32	39	58	45	58	39	38	34	39(1;-5)
6 (10) 8.6A	29	40	38	34	24	24	30	38	43	48		40	38	34	40(2;-5)
6 (10) 10.8	29	37	36	34	0	25	27	34	41	41	50	37	36	34	37(1;-3)
8 (10) 12.4	36	38	37	37								38	37	34	38(1;-4)
10 (10) 6.8	33	39	38	34								39	38	34	39(1;-5)
10 (10) 12.8	29	37	36	34	23	33	28	35	39	43	56	37	36	34	37(1;-3)
12 (16) 6.4	34	38	37	34								38	37	34	38(1;-4)

SAINT-GOBAIN GLASS																SAINT-GOBAIN GLASS															
Glass	Thickness	R _w	R _a	R _{a,10}	63Hz	125H	250H	500H	1000H	2000H	4000H	R _w	R _{wH}	R _{wC} T	R (C;C ₁)																
4 (10) 6	16	32	32	30	21	23	25	27	37	39	42	32	32	30	32(0;-2)																
4 (10) 6	20	33	32	30	20	24	23	28	38	40	42	33	32	30	33(1;-3)																
4 (10) 6	26	34	34	30	17	22	21	29	41	44	45	34	34	30	34(0;-4)																
4 (10) 8	18	32	32	30	23	25	24	29	38	42	45	32	32	30	32(0;-2)																
6 (10) 6	18	32	32	30	23	27	25	28	36	35	42	32	32	30	32(0;-2)																
6 (12) 6	24	33	32	30	0	24	22	29	38	33	38	33	32	30	33(1;-3)																
6 (10) 8	30	34	31	30								34	31	30	34(1;-4)																
4 (12) 8.6A	22	34	33	30	20	24	22	28	40	44	46	34	33	30	34(1;-4)																

