



Stubbs Mews, Ancoats

Noise Impact Assessment

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19012-R02b-BT Stubbs Mews, Piercy St.

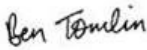
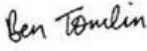
Client: Urban Splash

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Contents

Introduction	3
Site Description	5
Environmental Noise Survey	7
Building Envelope Sound Insulation	11
Building Services Noise Emissions	13
Conclusions	13
Appendix A – Glossary of Acoustic Terminology	14

Revision History

Revision	Date	Revision Details	Author	Checked
R02	21/6/2019	Original Issue (DRAFT)	 Ben Tomlin BSc MIOA	 Susan Witterick BSc MIOA
R02A	25/6/2019	Final Issue	 Ben Tomlin BSc MIOA	 Susan Witterick BSc MIOA
R02B	25/6/2019	Updated to correct typos and amend report number	 Ben Tomlin BSc MIOA	 Susan Witterick BSc MIOA

Introduction

dBx Acoustics Ltd has been appointed by Urban Splash to carry out noise surveys and a noise impact assessment for the proposed Stubbs Mews residential development off Carruthers Street, Ancoats, Manchester, M4.

The development comprises 18 Mews Houses, as shown on Figure 2, below.

A glossary of acoustic terminology has been supplied in Appendix A in order to assist the reader.

Basis of Noise Assessment

The principal aims of the assessment are summarised below:

- Assess the suitability of the site for residential accommodation;
- Control noise breakout from building services and any noise generating uses associated with the proposed development to nearby sensitive receptors.

The noise impact assessment is based on the following:

- Manchester City Council – Planning & Noise Technical Guidance (December 2015);
- BS 8233:2014 ‘*Guidance on sound insulation and noise reduction for buildings*’;
- World Health Organisation (2000) ‘*Guidelines for Community Noise*’; and
- BS 4142:2014 ‘*Methods for Rating and Assessing Industrial and Commercial Sound*’.

Manchester City Council: ‘*Planning & Noise Technical Guidance*’ (December 2015)

This document sets out Manchester City Council’s requirements with regard to current guidance and policy, with the aspiration that new developments achieve the highest standards without compromising the health and wellbeing of residents. The guidance refers to the WHO Guidelines for Community Noise 1999, BS 8233:2014, BS 4142:2014, NPPF and NPSE as described below.

MCC has adopted the following internal noise limits for residential properties:

- Bedrooms (night time 23:00-07:00) 30 dB L_{Aeq} (individual noise events should not normally exceed 45 dB L_{Amax} more than 15 times);
- Living Rooms (daytime – 07:00-23:00) 35 dB $L_{Aeq,16h}$; and
- Gardens and terraces (daytime) 55 dB L_{Aeq} .

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 5 dB L_{Aeq} below the typical background L_{A90} level at the nearest noise sensitive location.

BS 8233:2014: 'Guidance on sound insulation and noise reduction for buildings'

Internal Noise Level Limits

BS 8233 gives guidance for noise levels within residential properties. It discusses appropriate criteria for reasonable rest and sleep conditions and provides noise levels which are considered to provide appropriate conditions in accordance with WHO guidelines. The guidance on limits from the standard is reproduced below:

Table 1 – Internal Ambient Noise Limits, Bs8233

Activity	Location	07:00 – 23:00 hrs	23:00 – 07:00 hrs
Resting	Living room	35 dB $L_{Aeq,16h}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16h}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16h}$	30 dB $L_{Aeq,8h}$

It should be noted that these levels represent the average noise level over the 16-hour day or 8-hour night period. This potentially means that higher noise levels may be experienced internally over a shorter period of time (e.g. individual passing trams or vehicles). These equivalent noise levels over a period of time are the best representation of the average noise level and are generally the main focus when it comes to evaluating noise exposure.

Under the updates to BS 8233 in 2014, for both day and night time cases, a relaxation of up to 5 dB is considered to provide "reasonable internal conditions" where development is considered necessary or desirable.

To assess the maximum noise levels, the World Health Organisation (WHO) document "Guidelines for Community Noise: 1999" recommends that maximum noise levels ($dB L_{Amax,F}$) do not exceed $45dB L_{Amax,F}$ more than 10-15 times a night.

Site Description

Site Description

The application site is located on Piercy Street in Ancoats, Manchester M4, as outlined in red on Figure 1, below. The site is currently car parking space.

Figure 1 – Site Location Plan



The Ashton canal is directly to the south of the site, with a large residential block (Milliners Wharf) on the opposite side of the canal.

To the north of the site is a row of terraced houses, with Piercy Street beyond.

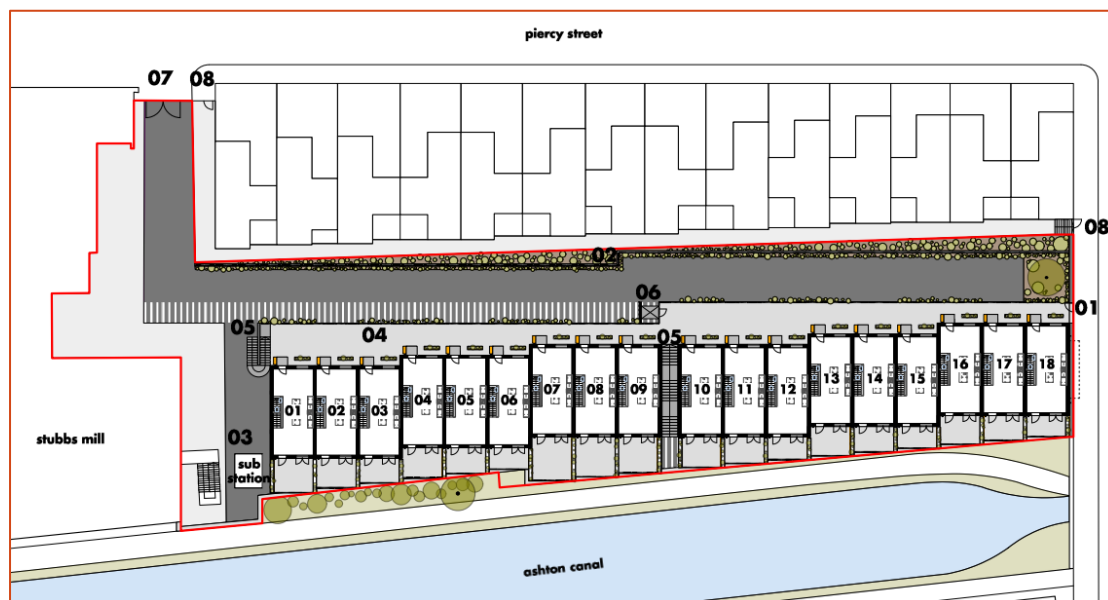
To the east of the site is Carruthers Street with open grass area beyond. It is understood that this site will be subject to a separate planning application by Urban Splash.

To the west of the site is Stubbs Mill, a commercial office block.

Proposed Development

The proposed development comprises 18 new build mews houses, as shown on Figure 2, below.

Figure 2 – Proposed Site Location Plan



Noise Sources

The dominant noise source at this site is road traffic on Carruthers Street, with the occasional vehicle movement on Piercy Street also observed. There were no other significant noise sources noted.

Nearby Noise Sensitive Receptors

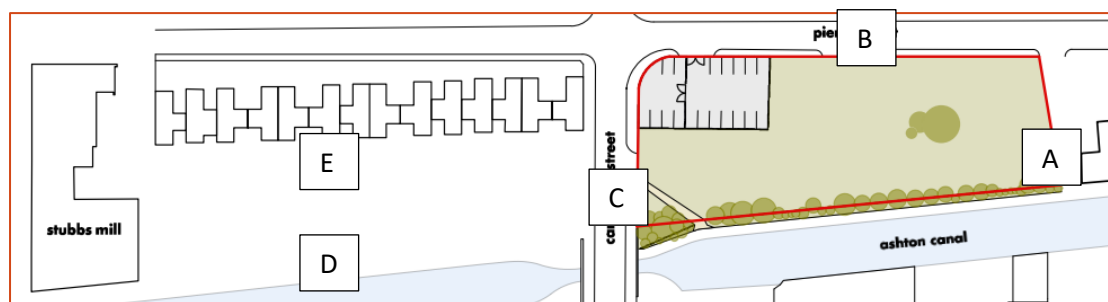
The nearest noise sensitive receptors are the terraced houses along Piercy Street directly to the north of the site.

Environmental Noise Survey

Methodology

To assess the noise environment at the site, attended noise surveys were carried out on Thursday 13th June 2019 (daytime), and Thursday - Friday 6th-7th June 2019 (night-time). Unattended noise measurements were made at five locations around the site and in the surrounding community, as indicated as locations A-E on Figure 3, below.

Figure 3 – Site Location Plan Showing Measurement Locations



The daytime measurements were carried out generally in accordance with the shortened measurement procedure detailed in the Calculation of Road Traffic Noise (CRTN) document (Department of Transport (Welsh Office), 1988).

Night-time measurements were carried out between 23:00 and 01:00h, representative of the noisiest period at night. Although night time noise levels will reduce further in the period 01:00-07:00h, these levels have been considered representative of the entire 8-hour period, in order to provide a robust, worst-case assessment.

Weather Conditions

Weather conditions during the measurement periods were generally cloudy, warm and dry, although brief periods of drizzle occurred. Wind speeds were within suitable parameters for the measurement of environmental noise (i.e. generally under 5 ms^{-1}). All microphones were protected with a windshield for the duration of the survey.

Equipment

The equipment used during the environmental noise survey is detailed in Table 2, below.

Table 2 – Equipment used in the environmental noise survey

Equipment	Manufacturer & Part No.	Serial Number
Sound Level Meter	Casella C633C	3921025
Pre-amplifier	CEL 495	001773
Microphone	CEL 251	000847
Calibrator	CEL 120/1	2045151
Sound Level Meter	Cirrus CR:171C	G300656
Pre-amplifier	Cirrus Pre-amp	9136F
Microphone	Cirrus MK:224	211733D
Calibrator	Cirrus CR:515	87921

The sound level meters were calibrated before and after measurements, with no significant drift recorded. An accredited laboratory calibrated the equipment not more than two years prior to the measurements being made, with the exception of the calibrators, which had been calibrated not more than one year prior to the survey.

Environmental Noise Survey Results

Daytime Noise Levels

A summary of the daytime noise levels measured are presented in Table 3, below. Measurements were taken over 15-minute periods, in 3 consecutive hours between 10:00 and 17:00h, generally in accordance with the shortened measurement procedure in CRTN.

Table 3: Summary of daytime measured noise levels

Location	Period, h	L_{Aeq} (dB)	L_{A10} (dB)	L_{A90} (dB)
C	11:32-11:47	65	69	52
	12:21-12:36	67	70	50
	13:12-13:27	66	71	49
	13:59-14:14	68	71	54
D	11:49-12:04	55	56	49
	12:39-12:54	55	59	47
	13:28-13:43	55	57	52
	14:15-14:30	52	55	55
E	12:05-12:20	50	52	46
	12:56-13:11	50	53	43
	13:44-13:59	53	56	46
	14:31-14:46	48	51	44

All measurements were free-field.

Based on the CRTN methodology, the data shown in Table 3, above, can be used to determine the 16-hour daytime ambient noise level.

The logarithmic average of the dBL_{A10} values provides the 3-hour average, $dBL_{A10,3hour}$. This is converted to the 18-hour $dBL_{A10,18hour}$ value by subtracting 1dB. This is then converted to the 16-hour ambient noise level, $dBL_{Aeq,16hour}$, by subtracting a further 2dB. The results of these calculations are shown in Table 4, below, compared with the logarithmic average of the ambient noise levels measured. The higher value of the two has been used in the assessment.

Table 4 – Assessment of Daytime Ambient Noise Levels

Location	Average Ambient Noise Level, $dBL_{Aeq,T}$	CRTN Ambient Noise Level, $dBL_{Aeq,16hour}$	Value Used in Assessment, $dBL_{Aeq,16hour}$
C	67	67	67
D	54	54	54
E	49	50	50

Night-Time Noise Levels

A summary of the night-time noise levels measured are presented in Table 5, below. The measurements were carried out between 23:00 and 01:00h, representative of the noisiest period at night. Although night-time noise levels will reduce further in the period 01:00-07:00h, these levels have been considered representative of the entire 8-hour period, in order to provide a robust, worst-case assessment.

Due to access and security concerns, it was not possible to measure at Locations D and E at night. Noise measurements made in the community during both day and night time periods have therefore been used to inform calculations of night time noise levels across the site.

Table 5: Summary of night-time measured noise levels

Location	Period, h	$L_{Amax,F}$ (dB)	$L_{Aeq,15min}$ (dB)	L_{A90} (dB)
A	23:00-23:15	65	48	43
	23:52-00:07	79	55	40
B	23:17-23:32	79	60	42
	00:09-00:24	71	45	40
C	23:35-23:50	58	45	41
	00:25-00:40	77	53	38

All measurements were free-field.

Predicted Noise Levels

Based on the measured data presented above, calculations including distance and angle of view corrections have been carried out in order to predict how sound will propagate across the developed site. The derived noise levels used in our break-in noise assessment are confirmed in Table 6, below for each façade identified in Figure 3.

Figure 3: Façade Key

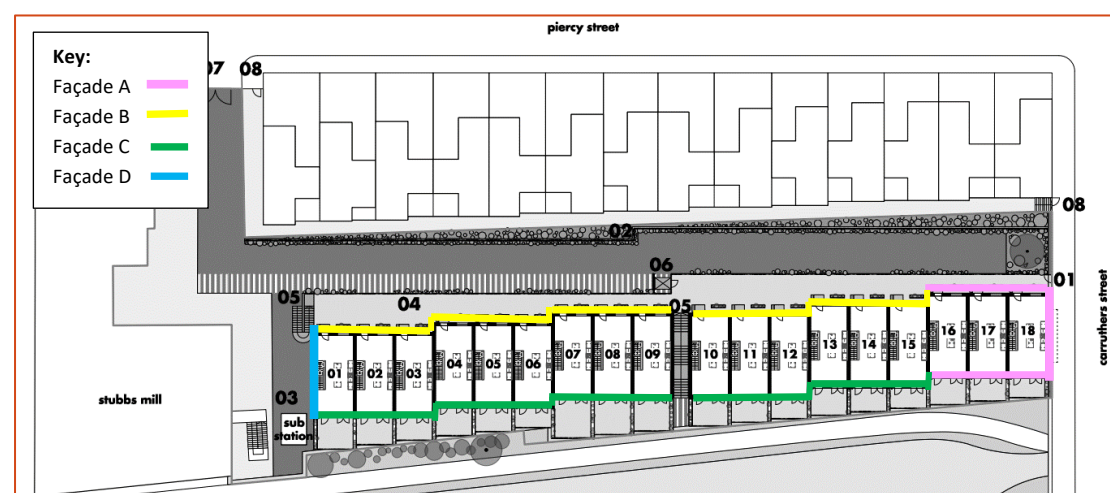


Table 6 –Noise Levels per Façade

Façade	Day, dBL _{Aeq,16hour}	Night dBL _{Aeq,8hour}	Night, dBL _{Amax,F}
A	68	53	77
B	55	40	64
C	51	36	60
D	51	36	60

Building Envelope Sound Insulation

Internal Ambient Noise Criteria

The internal noise criteria which have been adopted for the proposed development using BS 8233:2014 and WHO guidelines are outlined in Table 7, below. Achieving these limits will also ensure compliance with Manchester City Council's requirements.

Table 7 – Internal ambient noise criteria

Daytime (07:00 – 23:00 hrs)	Night-time (23:00– 07:00 hrs)	
L _{Aeq, 16h}	L _{Aeq, 8h}	L _{Amax}
35 dB	30 dB	45 dB ¹
¹ It is generally agreed that this limit would not apply to atypical night-time maximum events. The previous version of BS 8233:1999 stated that, "...individual noise events should not normally exceed 45 dB L _{Amax} ."		

External Noise Break-In Assessment

It is generally understood that ventilation will be provided by means of a whole house MVHR system and that windows will not need to be opened to provide ventilation.

When considering the effect of opening windows at user discretion or for purge ventilation, based on a reduction in external noise levels to internal noise levels of 15dB for a partially opened window (based on WHO guidance), allowable external noise levels are therefore 50dBL_{Aeq,T} outside living rooms in the day, and 45dBL_{Aeq,T} and 60dBL_{Amax,F} outside bedrooms at night.

With reference to Table 6, above, it can be seen that natural ventilation can be considered for the bedrooms on Facades C and D. Noise levels affecting Living Rooms on these facades are marginally (1dB) higher than the allowable level.

On the basis that BS8233 allows up to 5dB tolerance where development is considered necessary or desirable, it may be possible to agree a slight relaxation in the criteria with the Local Authority given the benefits of natural ventilation. A difference of 1dB is imperceptible.

On façades A and B, the required internal ambient noise levels can only be achieved with closed windows. Ventilation will therefore need to be provided via alternative means.

Based on the predicted noise levels on each elevation, the requirements for the glazing and ventilators required to achieve the internal ambient and maximum noise level limits have been calculated, as detailed in Table 8, below. It is understood that ventilation is to be provided via a MVHR system.

Table 8 – Glazing Sound Insulation Requirements

Facade	Room	Glazing Sound Insulation Performance, dBR_w (Ctr)	Example Glazing Construction, mm
A	Living Rooms	36 (-7)	10/TC/4
A	Bedrooms	36 (-7)	10/TC/4
B	Living Rooms	31 (-6)	10/TC/4
B	Bedrooms	31 (-6)	4/TC/4
C/D*	Living Rooms	31 (-6)	4/TC/4
C/D	Bedrooms	31 (-6)	4/TC/4

TC = Thermal Cavity

Proposed Glazing

It is assumed that the building envelope is capable of providing a significantly higher level of sound insulation and that glazing is the most significant acoustic factor in the design of the houses.

The proposed window (i.e. glass and frame) has a tested sound insulation performance of 35 (-5) $\text{dBR}_w + C_{tr}$. This is therefore marginally better than the 36 (-7) $\text{dBR}_w + C_{tr}$ glazing requirement specified in Table 8, above. However, the suitability of the proposed glazing will need to be confirmed once full octave band test data can be provided. dBx Acoustics Ltd has requested this information from the suppliers.

Building Services Noise Emissions

Manchester City Council require that the rated plant noise levels are controlled to 5dB below the background noise level during the periods in which the plant operates.

This therefore relates to limits of $38\text{dB}_{\text{LA},\text{T}}$ in the daytime, and $33\text{dB}_{\text{LA},\text{T}}$ at night at the nearest noise sensitive receptors.

It is understood that the properties will be ventilated using a whole-house MVHR system with the plant located within the building. No noise emissions are therefore anticipated.

Conclusions

dBx Acoustics Ltd has been appointed by Urban Splash to carry out noise surveys and a noise impact assessment for the proposed Stubbs Mews residential development off Carruthers Street, Manchester.

Based on the measured noise levels, the acoustic requirements of the building glazing and facades have been calculated in order to meet MCC requirements with regard to noise ingress. It is demonstrated that the proposed constructions are appropriate to comply with these requirements.

No noise emissions from building services plant are anticipated, as all MVHR equipment will be located internally to the properties.

On this basis, noise should not be a limiting factor in any planning application.

Appendix A – Glossary of Acoustic Terminology

Decibel, dB	A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. For sound pressure level (L_p) the reference quantity is $2 \times 10^{-5} \text{ N/m}^2$. The sound pressure level existing when microphone measured pressure is $2 \times 10^{-5} \text{ N/m}^2$ is 0 dB, the threshold of hearing.
L	Instantaneous value of Sound Pressure Level (L_p) or Sound Power Level (L_w).
Frequency	Number of cycles per second, measured in hertz (Hz), related to sound pitch.
A weighting	Arithmetic corrections applied to values of L_p according to frequency. When logarithmically summed for all frequencies, the resulting single "A weighted value" becomes comparable with other such values from which a comparative loudness judgement can be made, then, without knowledge of frequency content of the source.
$L_{eq,T}$	Equivalent continuous level of sound pressure which, if it actually existed for the integration time period T of the measurement, would possess the same energy as the constantly varying values of L_p actually measured.
$L_{Aeq,T}$	Equivalent continuous level of A weighted sound pressure which, if it actually existed for the integration time period, T, of the measurement would possess the same energy as the constantly varying values of L_p actually measured.
$L_{n,T}$	L_p which was exceeded for n% of time, T.
$L_{An,T}$	Level in dBA which was exceeded for n% of time, T.
$L_{max,T}$	The instantaneous maximum sound pressure level which occurred during time, T.
$L_{Amax,T}$	The instantaneous maximum A weighted sound pressure level which occurred during time, T.