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10092/DR
08 June 2010

PLANNING AND BUILDING CONTROL
21 JUN 2012

New Mall, retail units & office entrance, Manchester House, Bridge Street

Acoustic planning report (rev 1)

1 Introduction

Sandy Brown Associates LLP (SBA) have been appointed by Allied London Properties Ltd to provide acoustic advice in relation to the planning application for new mall, retail units and office entrances located at Manchester House, Bridge Street, Manchester.

This report describes the site and its surroundings in relation to environmental noise sources and nearby sensitive premises. The results of an environmental noise survey are also included together with proposals for the control of noise emission from building services plant and amplified music.

2 The site and its surroundings

2.1 Site description

An aerial photograph of the site is shown in Figure 1. There are existing retail premises on the ground floor of the Manchester House that are currently empty and are to be refurbished as part of the development. There are offices from, and including, the first floor upwards which are also currently empty.

The site is situated on Bridge Street with Dolefield to the west and Wood Street to the south.

Commercial and public properties surround the site. Nearby properties include the Crown Court to the west, the Freemason's Hall to the east, the Magistrates' Court to the South and offices to the north on Bridge Street.

The approximate distances to these nearby noise sensitive premises are provided below.

- Crown Court - 10 metres
- Freemasons' Hall - 6 metres

- Magistrates' Court - 10 metres
- Offices across Bridge Street - 25 Metres

There are no residential properties in the immediate vicinity of the proposed building.

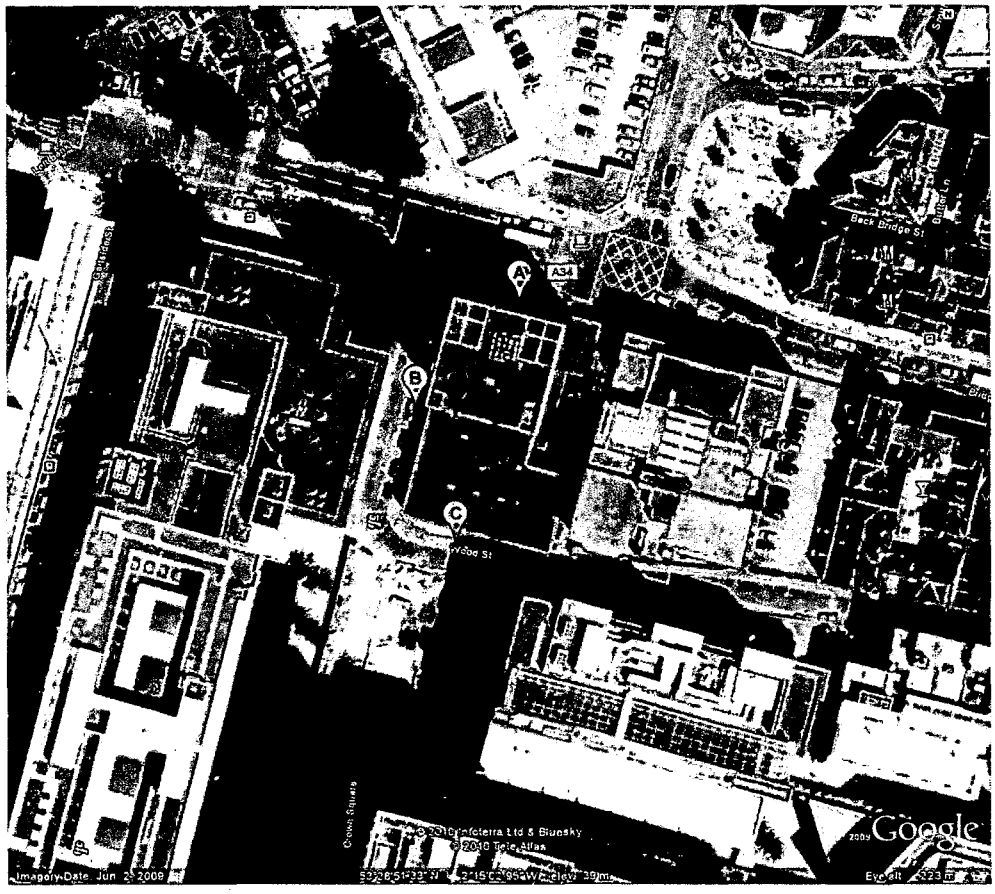


Figure 1 Aerial photograph of site showing measurement positions

2.2 Proposed development

The proposed development will include new mall, retail units and office/reception entrance on ground floor level of the building with car parking, retail storage and plant in the basement.

3 Environmental noise criteria

Manchester City Council (MCC) stipulates the following noise related conditions:

> "Before the development hereby approved is occupied, the building, together with any externally mounted ancillary equipment, shall be acoustically insulated in accordance with the scheme submitted to and approved in writing by the City Council as local planning authority in order to secure a reduction in the level of noise emanating from the site/property.
>
> Externally mounted ancillary plant, equipment and servicing shall be acoustically treated in accordance with a scheme designed so as to achieve a

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

4 Environmental noise survey

4.1 Sample noise measurements

Sample noise measurements were undertaken around the site to establish the existing noise climate. These measurements were in positions A, B and C in Figure 1.

The measurements were conducted on Wednesday 28 April 2010 between 15:55 hrs and 17:04 hrs.

Measurements were taken at least 1.5 m from ground level and at least 1.5 m from any other reflective surface.

4.2 Logging noise measurements

A logging meter was used to continuously log sound levels from 14:30 hrs on Wednesday 16 May to 14:45 hrs on Thursday 17 May 2007.

The measurements were taken from level 8 of Manchester House with the microphone protruding approximately 0.5 m from the north facade. A photo of the measurement position is shown in Figure 2 and the location is shown at position L in Figure 1.

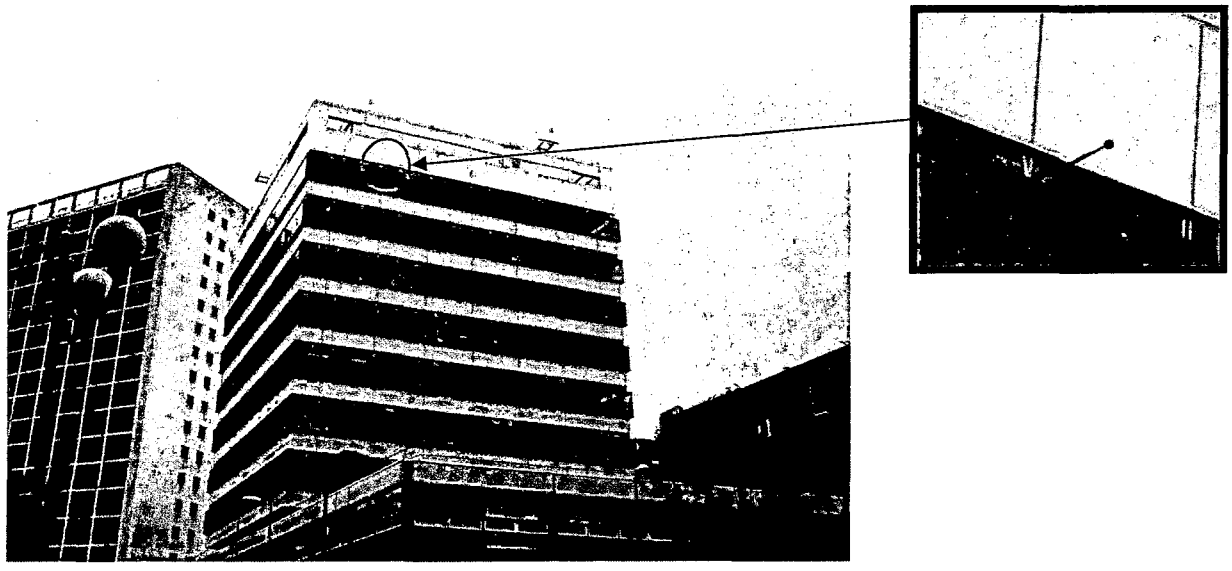


Figure 2 Photo showing location of logging equipment

4.3 Instrumentation

The following instruments were used to perform the sound level measurements:

- Svantek 949 logging meter with a type SV22 microphone;
- Norsonic N118 sound level meter with a type 1225 microphone.

Microphones were fitted with windshields during the measurements.

The sound level meters and microphones were calibrated at the beginning of the measurements and checked immediately after the measurements. No significant calibration deviation occurred.

4.4 Noise indices

The logging meter was set to record a continuous series of broadband sound pressure levels averaged over 15 minute periods. The sample noise measurements were taken over 5 minute periods. All measurements were taken using 'fast' response. Noise indices recorded included the following:

- $L_{Aeq,T}$ The A-weighted equivalent continuous sound pressure level over a period of time, T.
- $L_{Amax,T}$ The A-weighted maximum sound pressure level that occurred during a given period. Measured using the fast time weighting in accordance with the requirements of BS 8233 : 1999.
- $L_{A90,T}$ The A-weighted sound pressure level exceeded for 90% of the measurement period. Indicative of the background noise level.

The L_{A90} parameter is considered most representative of the background noise level for the purposes of complying with Manchester City Council's requirements for noise emission from the proposed new development. This parameter was measured in octave bands.

Sound pressure level measurements are normally taken with an A-weighting (denoted by a subscript 'A', eg L_{A90}) to approximate the frequency response of the human ear.

A more detailed explanation of these quantities can be found in BS7445: Part 1: 1991 ISO 1996-1: 1982 *'Description and measurement of environmental noise, Part 1. Guide to quantities and procedures'*

4.5 Weather conditions

During the sample noise measurements the weather conditions were sunny and dry. Wind speeds varied from 0 m/s to 5 m/s and the temperature was approximately 18°C.

During the logging measurements temperatures varied between approximately 8°C at night and 16°C during the day. Occasional rain occurred during the logging measurements.

These conditions were suitable for representative measurements.

5 Results of survey measurements

5.1 Observations

The main sources of environmental noise witnessed at the site during the survey are summarised below.

- Road traffic on Bridge Street. This included buses, cars and vans.

- Occasional road traffic from Wood Street and Dolefield. This includes car park access to New Magistrates and Coroner's Courts and Manchester House.
- People walking and cycling; includes footfall, talking and shouting.
- Occasional building construction noise from within Manchester House and plot 104. This included drilling, banging and shouting from site personnel. Measurements were taken when these noises stopped to be representative of the typical conditions.

5.2 Background noise measurements

The results from logging measurement position L are shown graphically in Figure 3.

The minimum measured L_{90} octave band sound pressure levels are shown in Table 1.

Table 1 Minimum L_{90} octave band sound pressure levels measured at position L

Time period	Octave band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Daytime 07:00 – 23:00 hrs	60	64	56	56	51	48	41	36
Night time 23:00 – 07:00 hrs	55	55	50	47	43	42	34	26

5.3 Sample noise measurements

The measured L_{Aeq}, L_{Amax} and L_{A90} levels at the three sample noise measurement positions around the site are shown in Table 2. All of the measurements were carried out on the 28 April 2010.

Table 2 Sample noise measurement results

		A-weighted Sound Pressure Level (dB)		
Position	Time (hrs)	$L_{Aeq,5mins}$	$L_{Amax,5mins}$	$L_{A90,5mins}$
A	15:55 to 16:00	70	89	58
	16:14 to 16:19	69	82	59
	16:32 to 16:37	68	80	58
B	16:01 to 16:06	64	81	56
	16:38 to 16:43	60	74	53
	16:51 to 16:56	61	74	53
C	16:07 to 16:12	61	77	57
	16:26 to 16:31	60	73	57
	16:59 to 17:04	60	74	54

6 Assessment of noise egress from building services

6.1 Criteria

To comply with MCC criteria described in section 3.1, building services plant is to be controlled to achieve the criteria given in Table 3 at 1 m from facades of the nearest noise sensitive buildings. These criteria have been determined by subtracting 5 dB from minimum measured L_{90} octave band values given in Table 1.

Table 3 Maximum sound pressure levels 1 m from nearest noise sensitive buildings

Time period	Octave band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Daytime 07:00 – 23:00 hrs	55	59	51	51	46	43	36	31
Night time 23:00 – 07:00 hrs	50	50	45	42	38	37	29	21

Noise egress criteria will be set for individual retail tenants to ensure that the levels provided in Table 3 are not exceeded.

6.2 Attenuation measures

The design of the new plant is currently not sufficiently advanced for full details of all mechanical plant and equipment to be available.

Appropriate measures will be adopted to ensure that the noise criterion outside the nearest affected premises is achieved. Measures under consideration include:

- Low noise equipment;
- Double-skin casings to air-handling plant;
- In-duct attenuators;
- Acoustic lagging and lining to ductwork;
- Screening/acoustic louvres;
- Acoustic enclosures to generators.

In order to control the transmission of vibration to the building, suitable anti-vibration mountings will be installed along with flexible couplings to vibration generating plant and ductwork/pipework, where appropriate. Ductwork/pipework connected to this plant will be supported from resilient brackets.

7 Noise egress from amplified music

The retail facilities are proposed to be A1 (shops), A2 (financial and professional services), A3 (restaurants and cafes), A4 (drinking establishments) or A5 (hot food takeaways).

Until tenants have been fully identified for the retail units, it is difficult to accurately assess the likely noise implications of the proposals.

The facilities will operate independently of the building and will be used for day and evening trading. As there are no nearby residential premises, evening noise from the development is unlikely to be problematic.

The facade will be designed to provide a minimum sound insulation (including doors) of $R_w + C_{tr}$ 20 dB. The facade will comprise hermetically sealed single glazing as a minimum and the entrance doors will incorporate perimeter seals.

The tenants may want to have amplified music, which will be the principal issue in this instance. With regard to appropriate noise limits, the typical minimum measured background noise level around the site during the daytime is L_{A90} 53-59 dB. It is therefore proposed to limit noise egress from amplified music in the retail premises between 07:00 hrs and 19:00 hrs to the following levels:

- L_{Aeq} 53 dB to Dolefield and Wood Street
- L_{Aeq} 58 dB to Bridge Street.

These limits would mean that any amplified music may be audible close to the retail premises and would be 10 dB below the typical background noise levels at the Crown Court, Magistrates' Court and Free Masons Hall and 14 dB below the typical background noise level at the offices across Bridge Street.

Internal noise levels from amplified music will be set for individual retail tenants in order to meet the external noise criteria described above. Where required, electronic noise limiters will be utilised in order to prevent music noise levels from exceeding this maximum level.

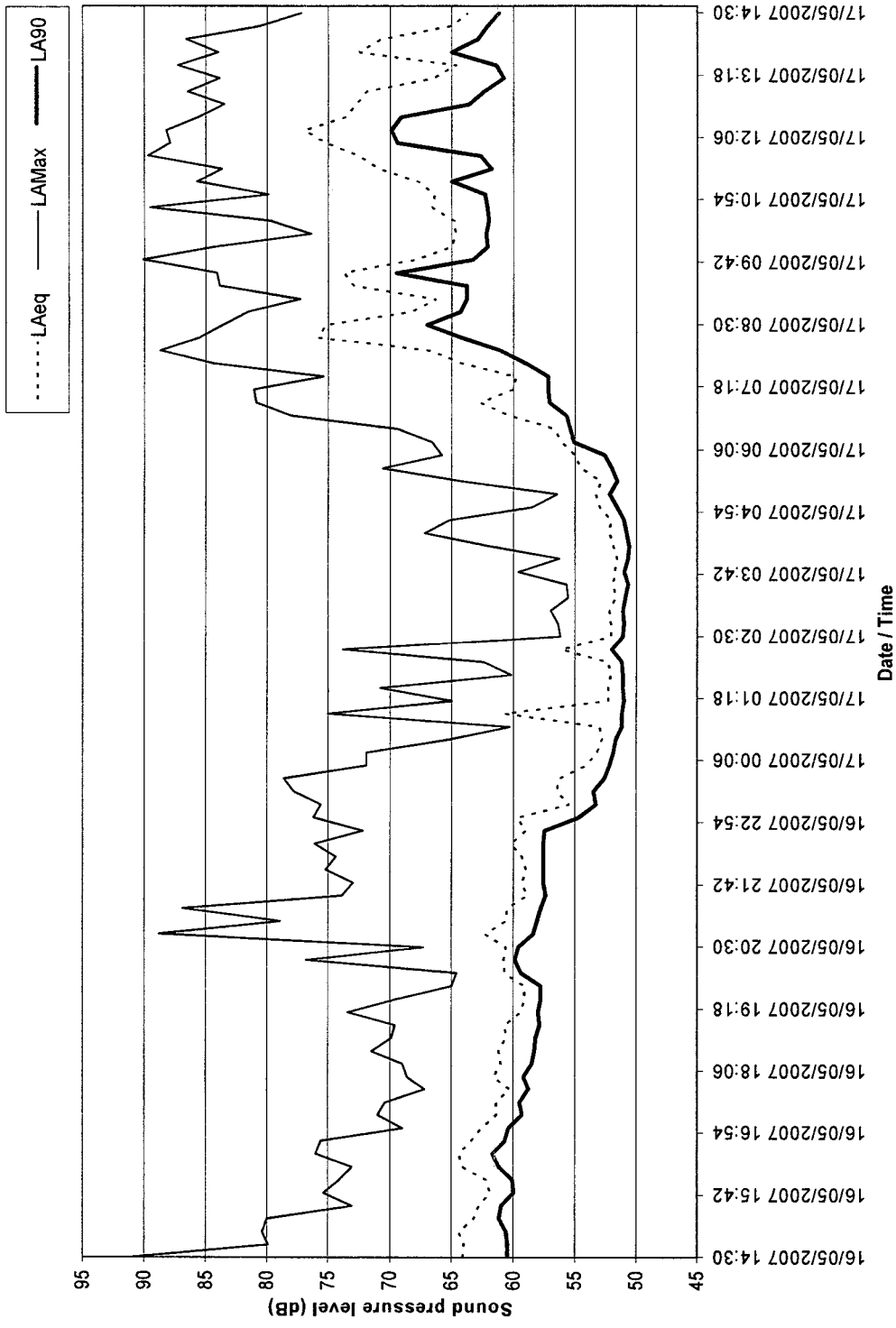


Figure 3 Logged results from level 8 of Manchester House
Taken from 14:30 hrs on 16 May 2007 to 14:45 hrs 17 May 2007

SANDY BROWN

Consultants in Acoustics, Noise & Vibration

Memo:	M001-A	**Date:**	9 May 2012
Project:	12071	**Issue:**	Email
From:	James Atha	**Pages:**	4

PLANNING AND BUILDING CONTROL
01 JUN 2012

Tower 12 retail, Manchester House

Podium retail – change of use

Restaurant (A3/A4) type retail units are proposed at ground, first and second floor levels to the podium at Manchester House. I provide the following comments.

Building services noise

Building services associated with each of the retail units would need to meet the limits provided in Tables 1 and 2. These limits have been based on meeting the external noise criteria for plant associated with the development that are set out in SBA report *10092 Acoustic Planning Report (rev1)* dated 08 June 2010.

Table 1 Maximum sound pressure levels 1m from window

		Octave band (Hz) sound pressure levels, L_p dB							
Receptor	Time	63	125	250	500	1 k	2 k	4 k	8 k
Free Masons Hall	Day	48	52	44	44	39	36	29	24
	Night	43	43	38	35	31	30	22	14
Manchester House offices	Day & Night	61	55	47	51	56	51	57	55

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The following building services noise egress levels are not to be exceeded at ground floor level within the Manchester House mall.

Table 2 Maximum sound pressure levels at Mall ground floor level

		Octave band (Hz) sound pressure levels, L_p dB							
Receptor	Time	63	125	250	500	1 k	2 k	4 k	8 k
Manchester House Mall	Day & night	60	49	42	36	33	30	27	26

Operational noise limits

The sound insulation between retail units and to offices above and to the environment has been measured and upgrades have been recommended where required.

The operational noise limits provided in Table 3 would apply in the retail units to minimise disturbances to occupants of adjacent units/offices in Manchester house and meet the external noise criteria provided in SBA report *10092 Acoustic Planning Report (rev1)* dated 08 June 2010.

Table 3 Operational noise limits

	Octave band centre frequency (Hz)						
	63	125	250	500	1k	2k	4k
L_{eq} (dB)	76	72	72	71	69	67	64

Retail units with loud amplified music

If tenants of the retail units wish to have loud amplified music (eg, similar to those requested for The Alchemist), the sound insulation currently provided (and with upgrades recommended above) would not be sufficient to control noise transfer to adjacent offices and retail and to environment.

Depending on the level of amplified music, significant upgrades could be required to the existing structure to control noise transfer to noise sensitive adjacencies and environment from the retail units. This would be typical of most shell retail units.

Possible typical upgrades that may need to be considered would be:

- Sound insulating ceiling to underside of waffle slab on level 2 to control noise transfer from level 2 to offices above. This would typically require a mass of at least 25 kg/m^2 on resilient hangers with 250 mm cavity and insulation.

- Sound insulating ceilings to units on ground and first floor levels to prevent noise transfer into the building structure.
- Plasterboard linings to the underside of the lightweight roof system on level 2 to control noise egress to the environment and offices above.
- Heavy floated floor systems (weight in region of 130 kg/m^2) on isolation mounts to control impact noise and bass noise transfer into the building structure.
- Secondary glazing systems to control noise break-out from retail units to the environment and to control flanking via the cladding to adjacent retail units/offices.
- Attenuation measures may be required to control amplified music breakout via ventilation ductwork.
- Independent plasterboard linings to improve the sound insulation of retail to retail partitions.
- Independent plasterboard linings to columns.
- Independent ventilation system and service risers.

Please note that I would need to carry out detailed calculations on the upgrades to provide the exact noise limits.

External terraces

External dining areas are proposed to terrace areas on second floor, to the mall walkway and to the new garden area facing the Crown Court. No amplified music is recommended in these areas to help prevent disturbance to occupants of tower offices, the retail units and nearby noise sensitive premises.

The tower offices rely upon opening windows for ventilation. Therefore, when the windows are open and the external terrace at level 2 is being used, noise transfer is expected to be heard in the offices from dining activities on the terrace. Noise from the external areas will therefore need to be carefully managed to minimise potential disturbances.

If the doors are proposed to be held open (ie, the folding doors proposed between ground floor unit and mall walkway), the internal amplified music level in each unit will need to be limited to meet a maximum level of L_{Aeq} 48 dB externally. The acceptable internal levels of amplified music would depend on the positioning of loudspeakers and open area to the facade. In practice, I would expect that loudspeakers near to the doors would need to be switched off.

Doors

It is recommended that the following doors be acoustically rated:

- Doors to stairwells shared with office floors
- Doors to the terraces
- Doors to the bridges
- Entrance doors.

Please call if you wish to discuss.

Regards

James