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Noise and Vibration Consultants

# PROPOSED RESIDENTIAL DEVELOPMENT AT 20-24 WOOD STREET, MANCHESTER

## NOISE IMPACT ASSESSMENT

**On behalf of:**

**Roundhouse Properties LLP. and Mr & Mrs R C W Parkinson**

Report No. 21249.01
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# 20-24 WOOD STREET, MANCHESTER

## NOISE IMPACT ASSESSMENT

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On behalf of:
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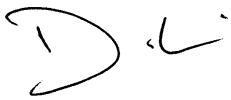
| Report checked by:<br>Donald Quinn BSc MIOA – Principal Consultant  |

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## 1.0 INTRODUCTION

1.1 Hepworth Acoustics Ltd was commissioned by Roundhouse Properties LLP and Mr & Mrs R C W Parkinson to carry out an assessment of the potential impact of existing noise sources on the proposed residential development at 20-24 Wood Street, Manchester.

1.2 The noise impact assessment has therefore included:

i) An inspection of the site and surroundings;

ii) Noise measurements from a Friday through until a Monday;

iii) Consideration of noise control measures required to maintain acceptable noise levels within the proposed dwellings.

1.3 The site is a currently an unoccupied three story building. The proposals are to provide residential accommodation at basement, ground, first, second and third floor level. All windows on the Wood Street elevation will lead on to non habitable rooms, with the exception of the windows on the new third floor level. The windows at third floor level, which are set back from the front elevation of the building, will open in to bedrooms.

1.4 The area is a mixed use nature with other residential and commercial properties in the vicinity of the site. Wood Street to the front of the building is lightly trafficked throughout the daytime and night. The rear of the building backs onto the rear of The Bridge pub and there is an entrance to the pub from Wood Street. The John Rylands library is opposite the site on Wood Street.

1.5 The various noise units and indices referred to in this report are described in Appendix I. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible.

## 2.0 NOISE SURVEYS

2.1 Continuous noise measurements were carried out using logging sound level meters between Friday 7th October and Monday 10th October 2011 to determine the daytime $L_{Aeq,(16\ Hour)}$ and night time $L_{Aeq,(8\ Hour)}$ values.

2.2 During the surveys, weather conditions were mild and generally calm and dry although there were short periods of light rain and gusting winds.

2.3 Noise levels were measured at the following locations (as shown in Figure 1):

i. Location 1 – 1 metre outside 1st floor window facing Wood Street
ii. Location 2 – 1 metre outside 1st floor window at the rear facing the rear of properties on Bridge Street

2.4 The noise measurements were carried out using a Rion NL-31 'Type 1' Integrating Sound Level Meter (serial no. 01120845) and a Brüel & Kjær 2260 'Type 1' Integrating Sound Level Meter (serial no. 2467015) Calibration checks were carried out both before and after the measurements with no variance observed. Some additional attended octave band noise measurements were also taken during the afternoon of 7th October 2011 to assist with the design of noise mitigation measures. It was not possible to carry out noise measurements at the location of the proposed 3rd floor bedroom windows on the Wood Street elevation, because of the existing roof construction.

2.5 The results of the noise surveys are shown in Appendix II and the daytime $L_{Aeq\ (16\ hour)}$ and night-time $L_{Aeq\ (8\ hour)}$ values are summarised in Table 1. The implications of the results are discussed in section 3.0.

**Table 1: Daytime and Night-time External Façade Noise Levels at 1st floor level**

| Location | Daytime $L_{Aeq}$ (0700-2300 hrs) | Night-time $L_{Aeq}$ (2300-0700 hrs) |
|---|---|---|
| 1. Wood Street | 62 dB | 61 dB |
| 2. Rear of the building | 59 dB | 53 dB |

2.6 The corresponding free-field noise levels (without the effects of façade reflection) were 59 dB $L_{Aeq,16hour}$ and 58 dB $L_{Aeq,16hour}$ at Location 1 during the daytime and night-time respectively, and at Location 2 the free-field noise levels were 56 dB $L_{Aeq,16hour}$ and 50 dB $L_{Aeq,8hour}$ during the daytime and night-time respectively.

2.7 Night-time maximum noise levels on the Wood Street elevation at night were generally in the range 58 – 86 dB $L_{Amax}$, with a small number of peaks above 90 dB which we attribute to emergency services vehicle sirens. At the rear, night-time maximum noise levels were in the range 56 – 80 dB $L_{Amax}$. The maximum noise levels at the upper end of the range are likely to be due to activities at the rear of the Bridge public house.

## 3.0 ASSESSMENT OF NOISE IMPACT

3.1 The ambient noise climate at the site is predominantly due to road traffic on local roads, Deansgate and Bridge Street, although there is also some noise from the Bridge public house. Therefore the noise assessment has been based upon the noise exposure categories in the Department of the Environment guidance, PPG 24 'Planning and Noise' HMSO, 1994 for mixed noise sources.

**Table 2: PPG 24 Noise Exposure Categories for Mixed Noise Sources**

| | **Noise Exposure Category (dB $L_{Aeq}$)** | | | |
|---|---|---|---|---|
| | **A** | **B** | **C** | **D** |
| Daytime (0700-2300 hrs) | <55 | 55-63 | 63-72 | >72 |
| Night-time (2300-0700 hrs)* | <45 | 45-57 | 57-66 | >66 |

[* sites where noise events regularly exceed 82 dB $L_{Amax}$ several times in any hour at night should be treated as being in Category C]

Category A - Noise need not be considered as a determining factor in granting planning permission.

Category B - Noise should be taken into account and steps taken to ensure an adequate level of protection against noise

Category C - Planning permission should not normally be granted. Where development is permitted, steps should be taken to ensure a commensurate level of protection against noise.

Category D - Planning permission should normally be refused.

3.2 Table 2 relates to free-field noise levels, therefore the rear elevation of the development falls into Category B of PPG 24 during the day and night respectively. The noise measurements for the Wood Street elevation were carried out at first floor level, but the windows on the ground, first and second floor on this elevation are to non habitable rooms. It is predicted that noise levels the

proposed 3rd floor windows on the Wood Street elevation will be at least 5 dB lower than the levels measured at first floor level. Therefore, the bedrooms (the only habitable rooms on the Wood Street elevation) fall into Category B of PPG 24 for the night-time period.

3.3 It will be possible to achieve acceptable noise levels within the proposed development and appropriate noise mitigation measures are recommended in Section 4.0 of this report.

## 4.0 RECOMMENDED NOISE MITIGATION SCHEME

4.1 Guidance on acoustic design levels inside different types of buildings is set out in British Standard 8233: 1999, 'Sound insulation and noise reduction for buildings – Code of Practice'. The criteria for residential properties are summarised in Table 3.

**Table 3: BS 8233 Recommended Acoustic Design Criteria**

| Location | Internal Noise Levels |
|---|---|
| Inside Living Rooms | Good Standard 30 dB $L_{Aeq}$<br>Reasonable Standard 40 dB $L_{Aeq}$ |
| Inside Bedrooms | Good Standard 30 dB $L_{Aeq}$<br>Reasonable Standard 35 dB $L_{Aeq}$<br>(45 dB $L_{Amax}$) |

4.2 For this development we recommend the following noise criteria be adopted: daytime levels not exceeding 35 dB $L_{Aeq}$ inside living rooms; and night-time noise levels not exceeding 30 dB $L_{Aeq}$ and generally not exceeding 45 dB $L_{Amax}$ in bedrooms. Our recommendations to achieve these criteria are set out below.

***Glazing***

4.3 Acoustic double glazing will be necessary for all bedrooms. We recommend double glazing comprising one pane of 10mm glass and one pane of 6.4mm pvb laminated glass separated by a nominal cavity (10-20mm) to meet the noise criteria.

4.4 All living rooms on the rear elevation facing the rear of properties on Bridge Street may be fitted with standard thermal double glazing.

***Ventilation***

4.5 For all bedrooms, acoustically treated ventilation must be installed. The acoustically treated ventilation should be in the form of either Silavent SM2/P Permanent Ventilator or a ducted ventilation system with in line silencers where required, with duct terminations in a shielded location on the roof.

4.6 For all living rooms, acoustically treated ventilation must also be installed. The acoustically treated ventilation could be in the form of Silavent Acoustic Airbrick or ducted ventilation with duct terminations in a shielded location on the roof.

4.7 Ventilation details will need to be agreed with the Council at an early stage.

## 5.0 SUMMARY AND CONCLUSIONS

5.1 A noise assessment has been carried out for a proposed residential development at 20-24 Wood Street, Manchester.

5.2 The assessment has identified that the site is within Noise Exposure Category B PPG 24 during the daytime and at night. The proposed noise mitigation scheme will achieve acceptable noise levels within the dwellings.

5.3 Our recommendations have been made to achieve acceptable noise levels as defined in British Standard 8233 and thus safeguard residential amenity.

5.4 The implementation of an adequate scheme of noise mitigation measures can be ensured by the use of an appropriately worded planning condition.

## Appendix I – Noise Units and Indices

### a) Sound Pressure Level and the decibel (dB)

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120 dB (threshold of pain).

### b) Frequency and hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kilohertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20,000 Hz. However, the upper frequency limit gradually reduces as a person gets older.

### c) Glossary of Terms

When a noise level is constant and does not fluctuate over time, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB(A) value. In order to describe noise where the level is continuously varying, a number of other indices, including statistical parameters, are used. The indices used in this report are described below.

$L_{Aeq}$ This is the A-weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period. In other words, $L_{Aeq}$ is the level of a continuous noise which has the same total (A-weighted) energy as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for all forms of environmental noise.

$L_{Amax}$ This is the maximum A-weighted noise level that was recorded during the monitoring period.

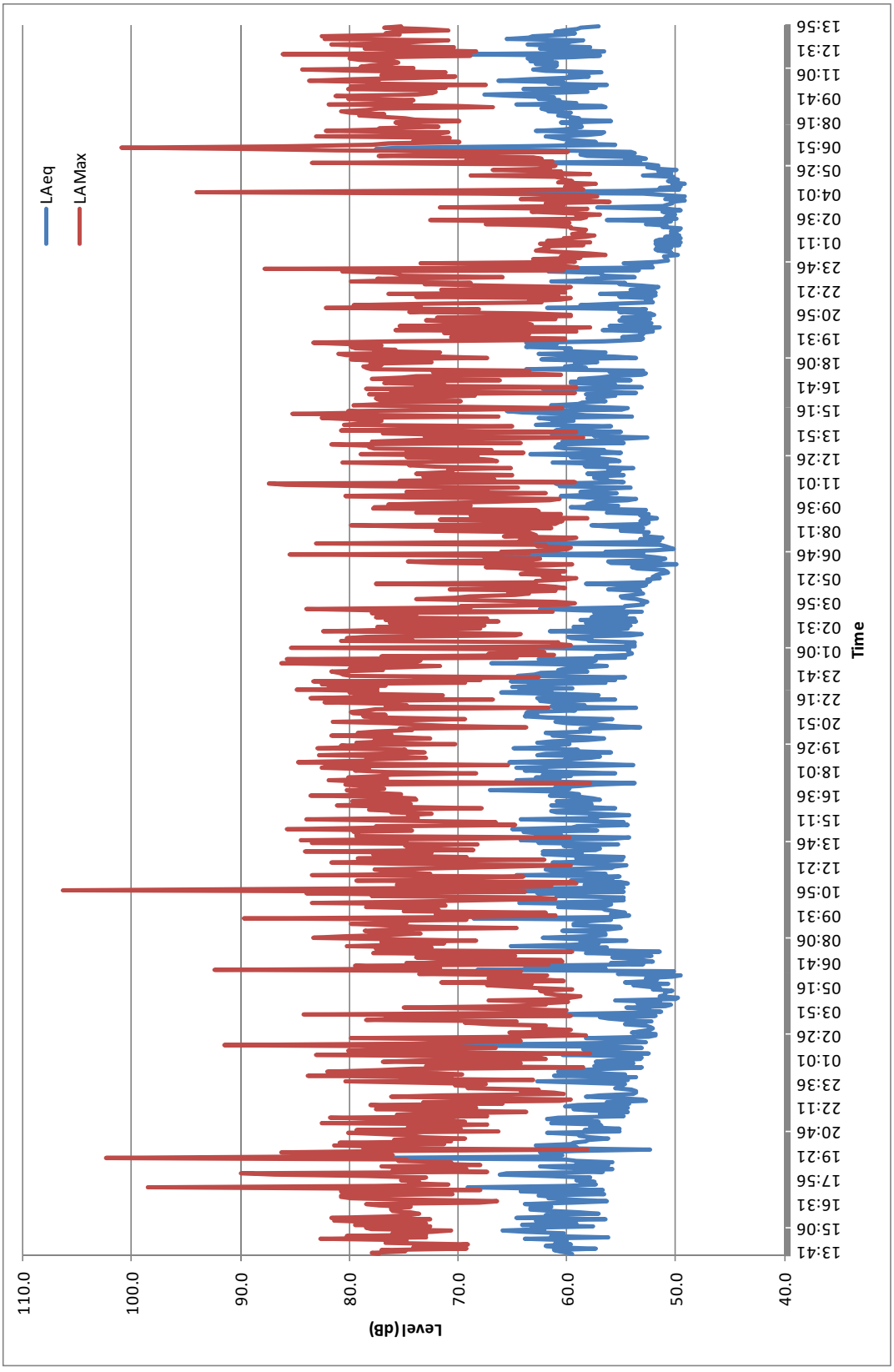
$L_{A90}$ This is the A-weighted noise level exceeded for 90% of the time period. $L_{A90}$ is used as a measure of background noise.

$L_{A10}$ This is the A-weighted noise level exceeded for 10% of the time period and is often used in the assessment of road traffic noise.

**Appendix II – Results of Noise surveys**

| | |
|---|---|
| Date | Friday 7th – Monday 10th October 2011 |
| Equipment: | Rion NL-31 'Type 1' Integrating Sound Level Meter (serial no. 01120845) |
| | Brüel & Kjær 2260 'Type 1' Integrating Sound Level Meter (serial no. 2467015) |
| Weather: | Dry (occasional showers), Mild, Light Breeze <5 m/s |

**Location 1: Wood Street**



**Location 2: Rear elevation**

