

**5 CROMPTON STREET BURY – PERMITTED DEVELOPMENT
NOISE IMPACT ASSESSMENT**

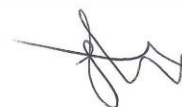
**On behalf of:
Crompton Living Ltd**

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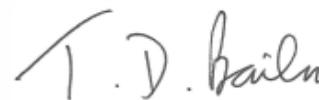
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1.0 INTRODUCTION

- 1.1 Hepworth Acoustics Ltd was commissioned by Crompton Living Ltd to carry out a noise assessment in connection with a Prior Approval application for the conversion of 5 Crompton Street in Bury, from office use to residential use.
- 1.2 The assessment has been commissioned in connection with the proposed development for compliance with The Town and Country Planning (General Permitted Development) Order 2021 (as amended).
- 1.3 Thus, in accordance with the General Permitted Development legalisation, it is necessary to consider noise impact from nearby commercial premises only. Other sources, such as road traffic, need not be considered.
- 1.4 Therefore, the aim of this report is to assess the likely impacts of any noise from neighbouring commercial premises on the intended occupiers of the development and to give outline advice on noise mitigation measures where required.
- 1.5 The development comprises a three-storey former nursery located on the corner of Crompton Street and South Back Rock in Bury town centre. Both Crompton Street and South Back Rock are not through roads and are both thus lightly trafficked. On the opposite side of Crompton Street are the front elevations of various retail stores, none of which have any external plant to this elevation.
- 1.6 To the rear of the building are the rear elevations of retail units on The Rear and Union Street, some of which have externally mounted plant on these elevations.
- 1.7 The ground floor of the building was formerly partially a soft play centre as well as children's nursey, and the upper floors were entirely occupied by the nursey. The building is of substantial construction with a masonry building envelope. The existing windows are non-opening double-glazed units which is assumed to be standard thermal specification (i.e. 4mm glass – nominal (10-20mm) cavity – 4mm glass). The glazing appears to be fairly new and in good condition.
- 1.8 From our site inspection it was also determined that the rear elevation of the building is most exposed to commercial noise from the aforementioned premises.
- 1.9 The noise assessment has therefore included:
 - i. An inspection of the site and surrounding area;

- ii. Measurement of noise levels at an appropriate location outside the rear elevation facing towards rear elevations of the nearby businesses, in order to quantify the extent of any commercial noise incident upon the building;
- iii. Assessment of the potential commercial noise impact on the development; and
- iv. If necessary, recommendation of appropriate noise mitigation measures.

1.10 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 PLANNING GUIDANCE AND BRITISH STANDARD

Town and Country Planning (General Permitted Development) (England) (Amendment) Order 2021

- 2.1 We understand that the development is applying to proceed under Class MA of the General Permitted Development scheme. This includes the following condition with regards to noise:

‘Development under Class MA is permitted subject to the following conditions.

(2) Before beginning development under Class MA, the developer must apply to the local planning authority for a determination as to whether the prior approval of the authority will be required as to—

(d) Impacts of noise from commercial premises on the intended occupiers of the development.

- 2.2 Based on the above, we understand that whilst noise from commercial premises impacting on the development must be taken into consideration, noise originating from sources other than commercial premises, such as road traffic, does not need to be considered in regard of this legislation.

BS 4142:2014+A1:2019 ‘Methods for rating and assessing industrial and commercial sound’

- 2.3 British Standard 4142:2014+A1:2019 ‘Methods for rating and assessing industrial and commercial sound’ (referred to hereafter as BS 4142) provides methods for rating and assessing sound of an industrial and/or commercial nature. BS 4142 requires the ‘rating’ sound level for the operation to be compared with the L_{A90} background sound level in the absence of the operational noise. The rating level ($L_{Ar,Tr}$) is derived based on the ‘specific’ ($L_{Aeq,Tr}$) sound level attributable to the operation, corrected for ‘residual’ sound if necessary, and a ‘character correction’ added for any sound sources where ‘certain acoustic features can increase the significance of impact’.
- 2.4 An initial estimate of the impact of the operation is determined by subtracting the background level from the rating level. BS 4142 states that:
- Typically, the greater this difference, the greater the magnitude of the impact;

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context;
- The lower the rating level is relative to the measured background level, the less likely it is that the operation will have an adverse impact or a significant adverse impact.
- Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

2.5 Where the initial estimate of the impact needs to be modified due to the context, BS 4142 states that all pertinent factors should be taken into account in determining whether the initial estimate of the impact needs to be modified, including:

- The absolute level of sound, including “where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds background. This is especially true at night.”
- The character and level of the residual sound.
- The sensitivity of the receptor and whether dwellings will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as façade sound insulation treatment.

BS 8233:2014 ‘Guidance on Sound Insulation and Noise Reduction for Buildings’

2.6 British Standard 8233: 2014 ‘Guidance on sound insulation and noise reduction for buildings’, (referred hereafter as BS 8233) recommends guidance on design criteria for acceptable noise levels within residential accommodation. BS 8233 guidelines for the daytime (07:00-23:00) and night-time (23:00-07:00) periods are summarised in Table 1.

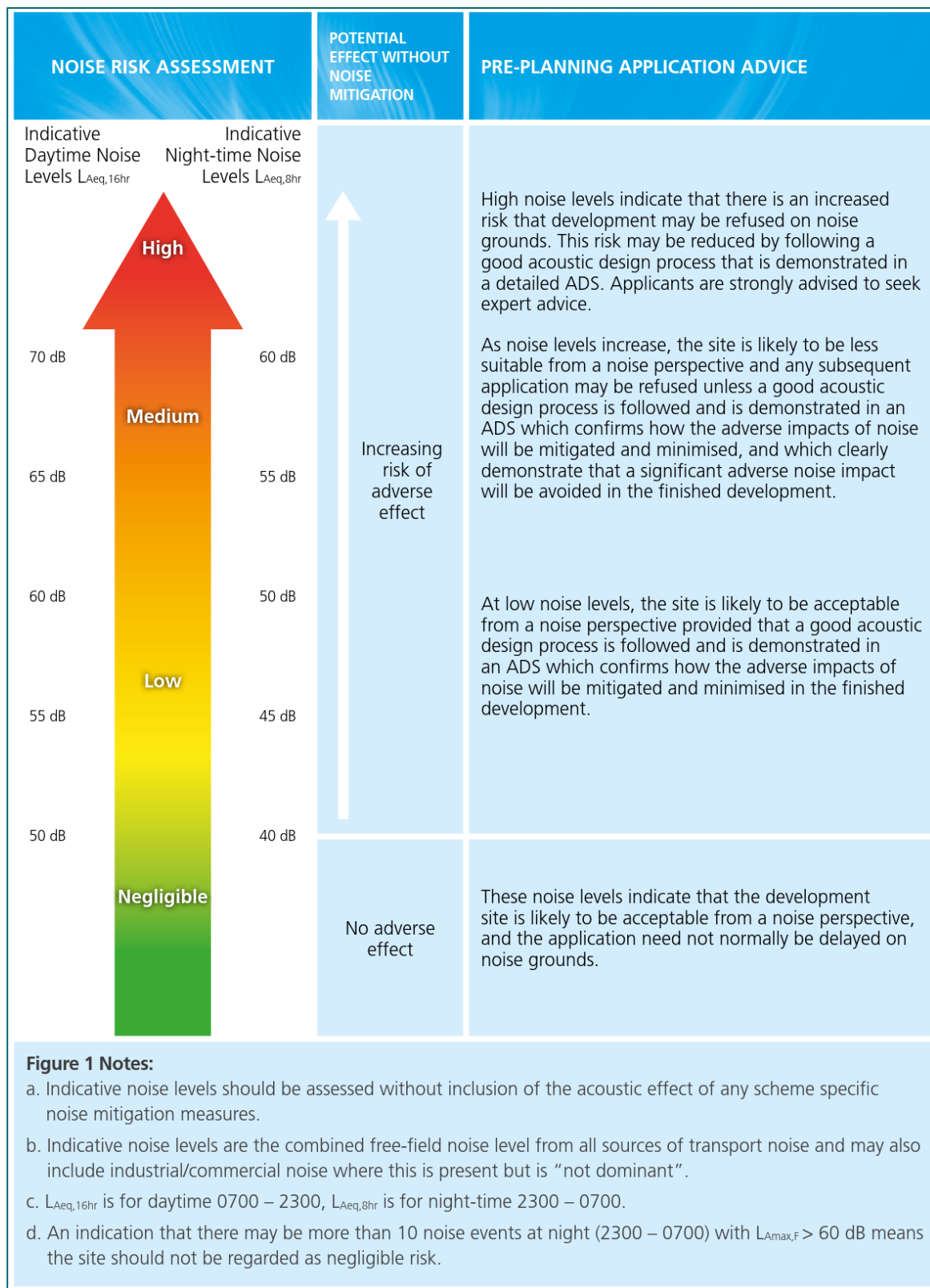
Table 1: BS 8233:2014 Recommended Acoustic Design Criteria

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

- 2.7 BS 8233 also states that, “where development is considered necessary or desirable ... the internal target levels [i.e. those in Table 1] may be relaxed by up to 5 dB and reasonable internal conditions still achieved”.
- 2.8 BS 8233 clarifies that the above guidance relates only to noise without specific character (e.g. such as that which has a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content) and that where such characteristics are present, lower noise limits might be appropriate.
- 2.9 Further, BS 8233 states that if there is a reliance on closed windows to meet the guide values, *“there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level”*. Further, it is stated that assessments should be based on a room with *“adequate ventilation provided (e.g. trickle ventilators should be open)”*.
- 2.10 BS 8233 also recognises that regular individual noise events at night can cause sleep disturbance. Peaks of noise from individual events are usually described in terms of L_{Amax} values. These can be highly variable, so for design purposes it is usual to take into account the findings of research described in WHO Community Noise Guidelines. These states, “for a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{Amax} more than 10-15 times per night”.

ProPG: Planning & Noise

- 2.11 There is also guidance in ‘ProPG: Planning & Noise – New Residential Development’ (2017), although this guidance does not constitute official government guidance and has no legal standing. The ProPG describes a staged approach to the assessment of noise impact on proposed new residential development sites. Stage 1 is an initial site noise risk assessment, indicating whether the proposed site is considered to pose a negligible, low, medium or high risk from a noise perspective.
- 2.12 The scope of the ProPG is restricted to sites that are exposed predominantly to noise from transportation sources. However, the recommended approach is also stated as being suitable where some industrial or commercial noise contributes to the acoustic environment provided that it is *“not dominant”*.
- 2.13 The ProPG initial site noise risk assessment criteria are shown in Chart 1.

Chart 1: ProPG Stage 1: Initial Site Noise Risk Assessment Criteria

2.14 Chart 1 broadly sets out indicative noise levels that define the element of risk of noise impact on proposed residential development land, ranging from 'Negligible' to 'High'.

- 2.15 The guidance states that these noise levels *“should be interpreted flexibly having regard to the locality, the project and the wider context”*.
- 2.16 Stage 2 of the ProPG approach is a more detailed assessment in the form of an Acoustic Design Statement (ADS). However, the acoustic design criteria that are specified in ProPG, and which form the basis of the ADS, are essentially the same as those recommended in BS 8233, as summarised previously in Table 1 of this report.
- 2.17 Similarly, to BS 8233, ProPG recognises that regular individual noise events at night can cause sleep disturbance. The ProPG guidance suggests that for design purposes, wherever practicable, peaks of noise inside bedrooms from external sources should not exceed 45 dB L_{AFmax} more than 10 times per night.

Acoustic Design Criteria

- 2.18 Therefore, we recommend the following noise criteria be adopted with windows closed and mechanical ventilation provided:
- Daytime noise below 35 dB $L_{Aeq,16hr}$ inside living rooms and bedrooms, 40 dB $L_{Aeq,16hr}$ inside dining rooms; and
 - Night-time noise levels not exceeding 30 dB $L_{Aeq,8hr}$ and generally not exceeding 45 dB L_{AmaxF} in bedrooms (i.e. no more than 10 times per night).
- 2.19 Our noise mitigation recommendations are described in Section 4.0.

3.0 NOISE SURVEY

- 3.1 Our assessment has focussed on any potential commercial noise incident upon the southern elevation of the building.
- 3.2 Noise measurements were carried out at the site over a period between approximately 11:00 on Wednesday 1st February and 11:00 on Thursday 2nd February 2023. The noise survey location was as follows:
- Location 1: One metre from outside of the southern elevation of the building on the 1st floor
- 3.3 The noise survey was carried out using a NTi Audio XL2 'Class 1' sound level meter (serial number: A2A-20228-E0).
- 3.4 The microphone of the sound level meter was mounted onto a pole protruding approximately 1m outside the building façade on the flat roof of the first floor. Calibration checks of the sound level meter were carried out both before and after the measurements with no variance in levels noted. Octave band frequency analysis was also carried out to assist with the design of sound insulation measures where required.
- 3.5 In addition to noise measurements, audio recording was also carried out. Weather conditions during the surveys were cold, mostly dry, and with a light breeze (<5 m/s).
- 3.6 The full results of the noise surveys are shown in Appendix II. The daytime and night-time noise levels are shown in Table 2 below.

Table 2: Summary of Measured Noise Levels in dB(A)

Location	Daytime (07:00 - 23:00)	Night (23:00 - 07:00)	
	$L_{Aeq,16hr}$	$L_{Aeq,8hr}$	$L_{Amax,f}$
1. Rear Elevation	52	46	58-69

- 3.7 The main source of noise was distant road traffic and the noise from commercial or industrial noise sources was not significantly audible at the site. Although at times the air conditioning condensers located at the rear of nearby commercial premises was just audible.
- 3.8 Peaks of noise (L_{Amax}) during the night time period ranged between 58 dB and 55 dB L_{Amax} .

4.0 NOISE ASSESSMENT

4.1 The overall noise levels set out in Table 2 fall into the 'low' risk category as set out in the Stage 1 guidance of ProPG.

4.2 As set out in Section 2.0, consideration of the road traffic noise is not necessary under Class O of the General Permitted Development scheme. However, consideration of the overall (commercial and traffic) noise levels provides a highly robust basis in this case for taking account of any noise associated with the adjacent commercial uses.

Glazing

4.3 Windows of standard well-fitted thermal double glazing (4mm glass – 4mm glass) have a typical sound reduction performance of 25 dB $R_w + C_{tr}$. Therefore, where external noise levels exceed 60 dB $L_{Aeq,(16 \text{ hour})}$ during the daytime and/or 55 dB $L_{Aeq,(8 \text{ hour})}$ and/or 70 dB L_{Amax} at night, higher specification glazing will be necessary. (Note $R_w + C_{tr}$ is sometimes notated as R_{tra})

4.4 Therefore, for all apartments on the development, standard double glazing of 4mm glass - nominal (8-20mm) cavity - 4mm glass (25 dB $R_w + C_{tr}$) will suffice.

4.5 Based on the client's intention to retain the existing double-glazed windows, it is recommended that, in all areas where these will form part of the fenestration for habitable rooms, these are checked to ensure they are in good condition with all panes intact, and that they are well fitting in their frames.

Ventilation

4.6 In order to provide alternative means of ventilation with windows closed, we recommend that for habitable rooms specialist acoustic vents are fitted instead of standard window frame slot vents.

4.7 Various types of acoustic vents are commercially available. However, in terms of acoustic performance, instead of standard window frame slot vents, we would recommend either:

- Aereco EHA2 Acoustic Trickle Ventilator with acoustic canopy and sleeve (44 dB $D_{n,e,w}$); or
- Rytons AAC125HP Super Acoustic Controllable LookRyt AirCore Ventilator (43 dB $D_{n,e,w}$); or
- Alternative ventilation system with a good acoustic performance (i.e. above 42 dB $D_{n,e,w}$).

4.8 By following the above recommendations, we conclude that suitable protection from commercial and industrial noise sources can be achieved for the new residents of the proposed flats.

5.0 SUMMARY

- 5.1 Hepworth Acoustics has undertaken a noise assessment relating to a Prior Approval application for converting the existing commercial building at 5 Crompton Street in Bury to residential use.
- 5.2 The assessment considers the potential impact of noise from nearby commercial premises on the future occupiers of the development, in compliance with the requirements of The Town and Country Planning (General Permitted Development) (England) (Amendment) Order 2021.
- 5.3 A noise survey has been undertaken at the site and daytime and night-time noise levels have been determined. The noise impact from commercial and industrial noise sources has been found to be negligible.
- 5.4 Based on the results of the noise survey, the noise levels at the site have been assessed with reference to relevant British Standards and guidance documents and are considered to be low impact. By following the recommendations in this report, the building is capable of providing suitable levels of protection from commercial and industrial noise sources for the occupants of the new dwellings.

Figure 1 – Site Location & Noise Measurement Position



Appendix I: Noise Units & Indices

Sound and the decibel

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).

Due to the logarithmic nature of decibels, when two noises of the same level are combined together, the total noise level is (under normal circumstances) 3 dB(A) higher than each of the individual noise levels e.g. 60 dB(A) plus 60 dB(A) = 63 dB(A). In terms of perceived 'loudness', a 3 dB(A) variation in noise level is a relatively small (but nevertheless just noticeable) change. An increase in noise level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in noise level of 10 dB(A) generally corresponds to a halving of perceived loudness.

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the 'A' weighting, which is built into sound level meters. Noise levels measured using the 'A' weighting are denoted dB(A) or dBA.

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 kHz. However, the upper frequency limit gradually reduces as a person gets older.

Glossary of Terms

When a noise level is constant and does not fluctuate, 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 can be used. The indices used in this report are described below.

$L_{Aeq,T}$ 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, $L_{Aeq,T}$ 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_{AFmax} This is the maximum A-weighted noise level that was recorded during the measurement period in terms of 'Fast' time weighting.

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

Appendix II: Noise Survey Results

Date(s):	Wednesday 1 st - Thursday 2 nd February 2023
Equipment	NTi XL2 'Class 1' sound level meters (s/n: A2A-20228-E0) with associated calibrator and environmental outdoor monitoring kit
Weather	Daytime – Mostly dry, ~9°C, mostly cloudy and moderate breeze <5 m/s Night-time – Dry, ~7-8°C, cloudy and light breeze <4 m/s

All levels in dB(A)

Location 1: Rear of 5 Crompton Street