

PROPOSED EXTENSION AT YOULES MOTORCYCLES, MANCHESTER -
NOISE IMPACT ASSESSMENT

On behalf of:
Youles Motorcycles

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1.0 INTRODUCTION

- 1.1 Hepworth Acoustics Ltd was commissioned by Youles Motorcycles to carry out a noise impact assessment in connection with a proposed planning application for the development of existing warehouse units into a Motorcycle showroom and workshop.
- 1.2 The proposed site is located just to the southeast of the existing Youles Motorcycle premises on Fairy Lane and is shown in Figure 1. A Halfords Autocentre adjoins the proposed site to southwest. The nearest dwellings to the proposed showroom are 126/128 Fairy Lane adjoining the site to east. Further to the west is New Bury Road a busy transport route into Manchester City centre.
- 1.3 It is proposed to develop the unit into a motorcycle showroom including a small workshop area, parts store, staff rooms and toilets. The building is of brick construction with a steel framed roof structure with trapezoidal roof cladding.
- 1.4 The proposed new show room will have the same trading hours as the exiting store, i.e. 09:00 to 18:00 hours Monday to Friday, 09:00 to 17:00 hours Saturday and 11:00 to 16:00 hours Sunday. The workshop will operate 09:00 to 18:00 hours Monday to Friday and 09:00 to 17:00 hours Saturday. It will not operate on Sundays.
- 1.5 The proposed layout of the development is shown in Figure 2.
- 1.6 The noise assessment has included:
- An inspection of the site and surrounding area;
 - Measurement of background noise levels on a Saturday morning;
 - Measurement of noise levels associated with the existing workshop;
 - Assessment of the potential noise impact on the nearest dwellings; and
 - Recommendation of appropriate mitigation measures.
- 1.7 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 GUIDANCE AND ACOUSTIC DESIGN CRITERIA

NPPF:2021

- 2.1 Paragraph 185 of the National Planning Policy Framework (NPPF) 2021 states that planning policies and decisions should *“ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should: a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;”*

NPSE:2010

- 2.2 The Noise Policy Statement for England (NPSE) 2010, which is referred to the in NPPF, includes three aims:
- i. Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
 - ii. Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
 - iii. Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

BS 4142:2014+A1:2019

- 2.3 British Standard 4142:2014+A1:2019, ‘Methods for rating and assessing industrial and commercial sound’ is the appropriate guidance for assessing the potential noise impact at residential locations from commercial and industrial sources.
- 2.4 BS 4142 requires a ‘rating’ level ($L_{Ar Tr}$) calculated from the operation of the noise source to be compared with the background sound level (L_{A90}) which is measured in the absence of the noise source. The noise is evaluated over a 1-hour period for daytime operations (i.e. 07:00 - 23:00 hours) and 15-minute period for night-time operations (i.e. 23:00 - 07:00 hours).

- 2.5 The rating level ($L_{Ar,Tr}$) is based on the 'specific' sound level ($L_{Aeq,Tr}$) attributed to the operating noise source, with 'character corrections' added for sound sources where 'certain acoustic features can increase the significance of impact'.
- 2.6 The acoustic character correction applied to the specific sound level in order to obtain the rating level can take into account tonality, intermittency, impulsivity and characteristics otherwise distinctive against the prevailing noise climate in the area.
- 2.7 An initial estimate of the potential noise impact from the operating noise source is determined by comparing the difference between the background level and the rating level.
- 2.8 Regarding the outcome of the initial estimate, BS 4142 states that:
- Typically, the greater this difference, the greater the magnitude of impact;
 - A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
 - A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context; and,
 - 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 is does not exceed the background sound level, this is an indication of the specific sound source having low impact, depending on the context.
- 2.9 BS 4142 also states in respect of background sound levels that *"it is important to ensure that values are reliable and suitably represent the particular circumstances and periods of interest... the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods"*.
- 2.10 BS 4142 states that all pertinent factors must be taken into account regarding the context in which the noise occurs, including but not limited to:
- The absolute level of sound.
 - The character and level of the residual sound compared to the character of the specific sound; and,
 - The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will incorporate design measures that ensure good internal and/or outdoor acoustic conditions such as acoustic screening.

- 2.11 The initial numerical assessment and the context are then both taken into account when determining the potential noise impact.

3.0 NOISE SURVEYS

Environmental Noise Survey

- 3.1 Existing noise levels were measured at a location on the site which is representative of the nearest dwellings at 128 Friary Lane to the east. The noise measurement location is shown in Figure 1.
- 3.2 The assessment of potential noise impact associated with the workshop activities has been carried out for a Saturday morning period when the background sound levels can be expected to be at their lowest during the proposed hours of business, and therefore potential noise impact would be at its highest.
- 3.3 An attended noise survey was carried out on Saturday 31 July 2021 between approximately 09:00 hours to 11:00 hours.
- 3.4 The noise measurements were taken in terms of consecutive 15-minute periods in 'free-field' conditions and at a microphone height of approximately 1.4 m above the ground. Calibration checks were carried out both before and after the measurement period with no variance in levels noted. Frequency analysis was also carried out.
- 3.5 The weather conditions during the noise survey were considered acceptable for the purposes of the survey and subsequent assessment.
- 3.6 The results of the noise survey are summarised in Table 1, the full results along with details of the equipment used and the weather conditions during the survey are shown in Appendix II.

Table 1: Summary of measured Saturday Morning noise levels (dB)

Location	L _{Aeq,15 mins}	L _{A90,15 mins}
128 Friary Lane	55 – 57	46 – 49

- 3.7 During survey, the noise climate of the area was influenced by local road traffic, distant and overhead aircraft and birdsong.
- 3.8 For the purposes of this assessment we have adopted the value of 48 L_{A90,T} as the representative Saturday morning background sound level at the nearest dwellings. This value has been adopted as an appropriate noise design limit in our assessment described in Section 4.0.

Source Noise Measurements

- 3.9 An inspection of the in-situ workshop was undertaken during the same visit and a series of source noise measurements were carried out. This data was required for our subsequent noise calculations for the proposed new development.
- 3.10 The measured $L_{Aeq,T}$ values associated with workshop activities are given below in Table 2. The noise levels were measured at the roller shutter door.

Table 2: Summary of Measured Source Noise Levels (dB)

Description	Noise Level ($L_{Aeq,T}$)
General workshop activities (including radio)	60 – 69
Motorcycle Engine running	74
Zip Gun	71 - 79

- 3.11 The measured noise levels shown in Table 2 have been used to calculate and assess the potential noise impact from workshop activities on the nearest dwellings for the new development. This is discussed in Section 4.

4.0 NOISE ASSESSMENT

- 4.1 In general, all repair and maintenance work carried out on motorcycles is undertaken in the workshop area within the building with the roller door closed. All associated equipment will be located within the building, the fan associated with the exhaust fume extract will be positioned on the western elevation (i.e. away from the dwellings).
- 4.1 The specific sound level from the workshop activities in $L_{Aeq,1hr}$ has been calculated at the nearest dwellings using the measured source noise levels. The activities include use of the radio, hand tools, occasional running of engines, etc. In terms of applicable character corrections, the noise source is neither impulsive nor tonal. However, due to the intermittent nature of the noise, we have included a 3 dB character correction to account for this.
- 4.2 Sound levels within the rear gardens of the nearest dwellings have been calculated taking account of sound attenuation over distance only.
- 4.3 The result of the initial BS 4142:2014 assessment is shown in Table 3.

Table 3: BS 4142 Initial Assessment of workshop activities at the nearest dwellings (dB)

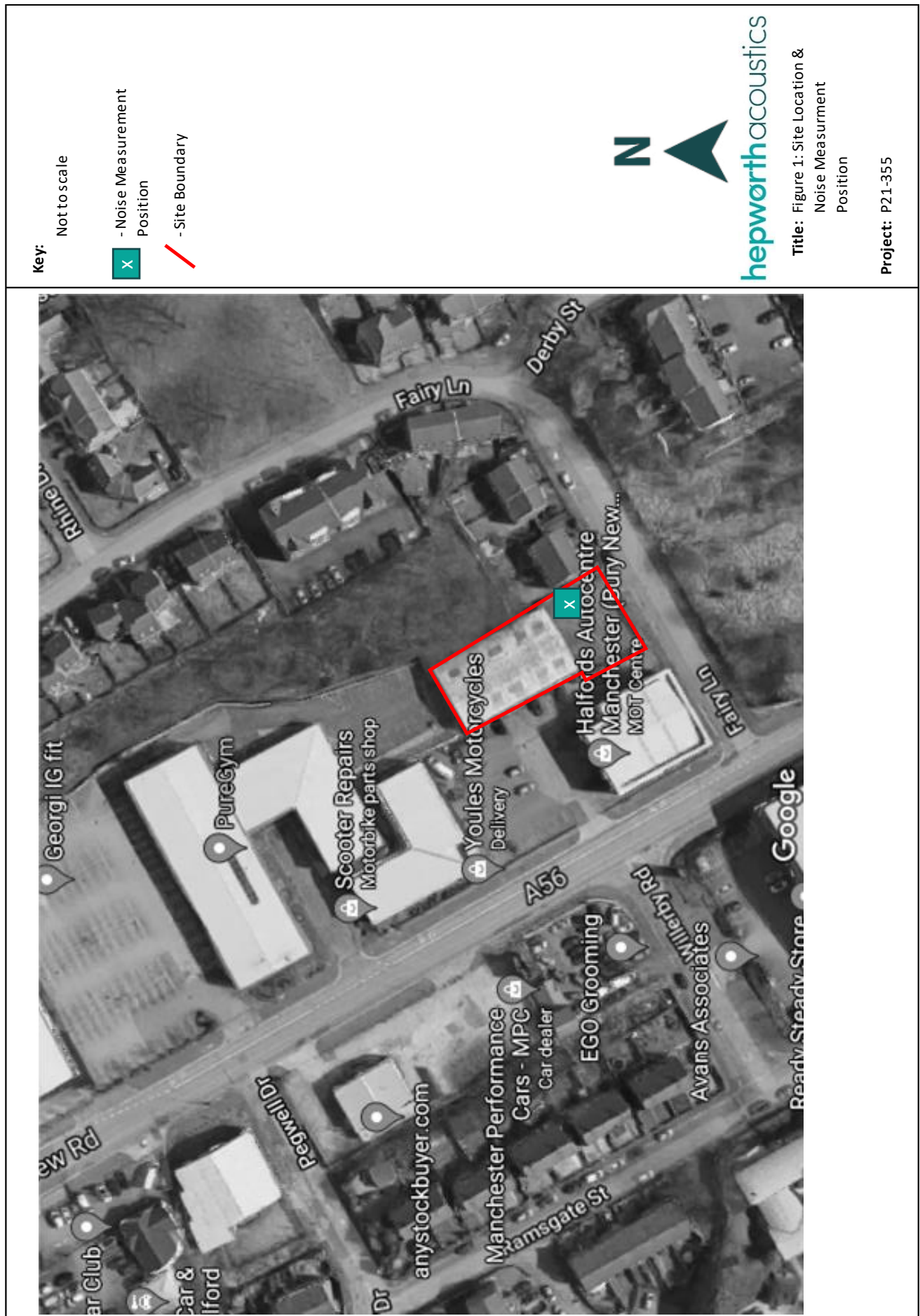
Description	Rear of 128 Fairy Lane
Calculated Specific Sound Level Outside Dwelling	40
Acoustic character correction	+3
Rating Level at Dwelling	43
Representative Background Sound Level	47
Difference	-4
Initial estimate	low impact

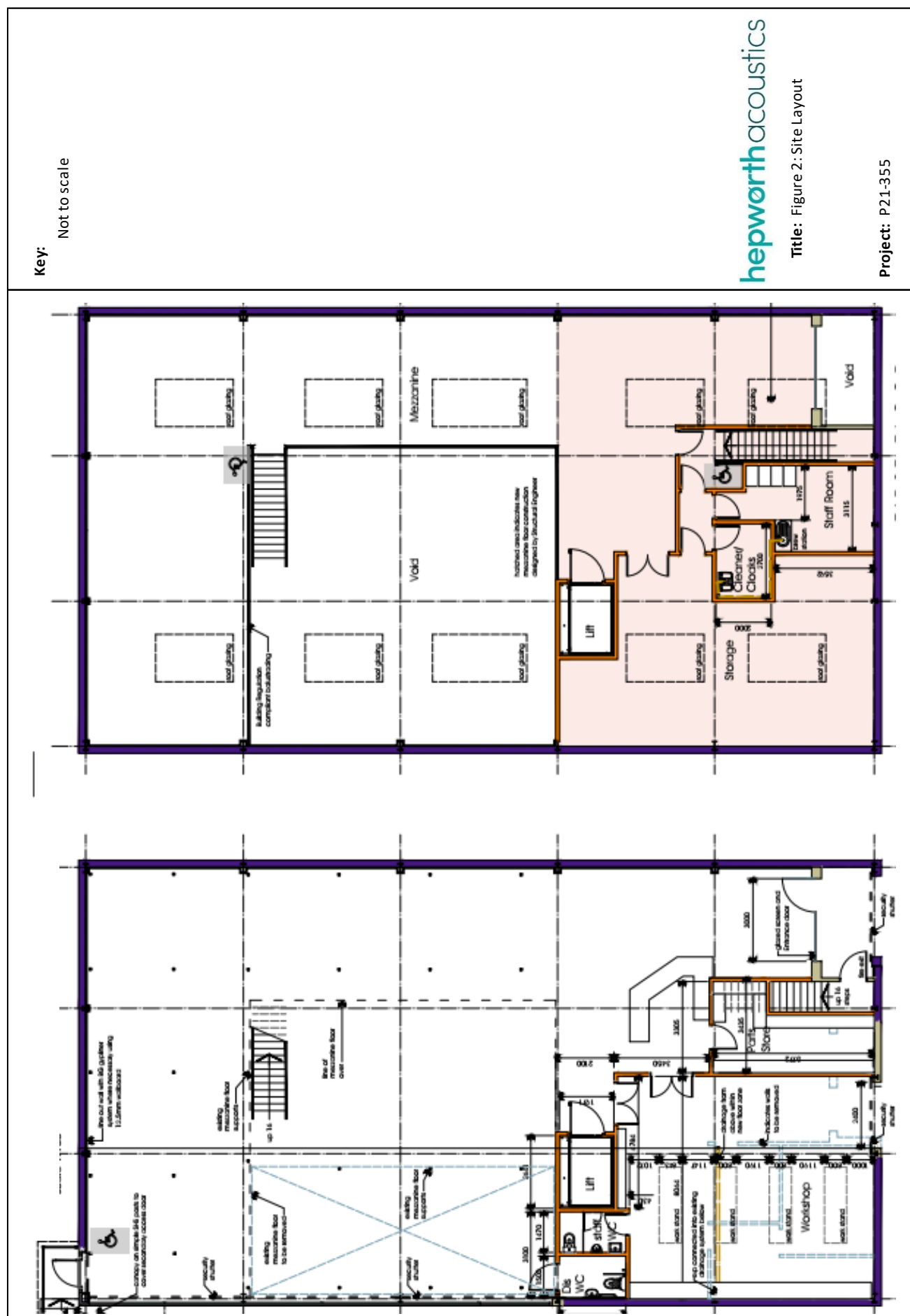
- 4.4 The rated sound level from workshop activities with the roller door closed is calculated to be 4 dB below the representative background sound level outside existing dwellings on a Saturday morning. In terms of BS4142, this indicates 'low impact' and no adverse noise impact. There is no need to modify the outcome of the assessment. Thus the BS 4142 assessment concludes that there will be no adverse noise impact on residential amenity.

- 4.5 Furthermore, 'significant adverse impacts' would be avoided and any 'adverse impacts' would be mitigated/minimised, bringing the development in line with the aims of the Noise Policy Statement for England (NPSE) 2010.

5.0 SUMMARY

- 5.1 Hepworth Acoustics Ltd was commissioned by Youles Motorcycles to carry out a noise impact assessment in connection with a proposed planning application for the development of a new showroom at an existing commercial unit on Friary Lane, Manchester.
- 5.2 The assessment has included measurement of typical workshop source noise levels as well as background noise levels at a location representative of the nearest dwellings.
- 5.3 The results of the surveys have been used to calculate and assess potential noise impact from use of the workshop with respect to BS 4142.
- 5.4 In terms of BS4142, this indicates 'low impact' and no adverse noise impact.





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 120dB (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} 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.

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

Appendix II: Noise Survey Results

Date(s): Saturday 30 July 2021

Equipment: Rion NL-52 'Class 1' sound level meter (serial no. 00242747) with tripod and calibrator

Weather: Dry, mild (~14°C), overcast and calm (<2 m/s)

All levels in dB(A)

Location : 128 Fairy Lane

Time		Measured Noise Levels (dB)			Comments
Start	End	L _{Amax}	L _{Aeq}	L _{A90}	
09:01	09:16	71.0	56.6	47.5	Road traffic on New Bury Road and on Fairy Lane
09:17	09:32	72.8	54.6	45.5	
09:32	09:47	75.3	56.7	49.4	
09:47	10:02	70.6	55.8	48.4	
10:02	10:17	69.1	55.1	47.0	
10:21	10:36	72.9	56.1	48.1	
10:41	10:56	69.2	56.4	48.2	