

LAND OFF CHAPEL LANE, WIDNES - PROPOSED RESIDENTIAL DEVELOPMENT

NOISE IMPACT ASSESSMENT

On behalf of:
Taylor Wimpey

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1.0 INTRODUCTION

- 1.1 Hepworth Acoustics Ltd was commissioned by Taylor Wimpey to carry out a noise impact assessment in connection with a planning application for residential development at Chapel Lane, Widnes.
- 1.2 The location of the proposed residential development is shown in Figure 1. The development site comprises a large area between Chapel Lane in the west and Queensbury Way in the east, which is currently farm grazing land. Sandy Lane and Old Upton Lane are not through roads and therefore the main sources of traffic noise, on localised areas of the site, are Queensbury Way and Chapel Lane. The majority of the land is not affected by traffic noise.
- 1.3 Outline planning application (with all matters other than access reserved) (to be determined by Halton Borough Council only) for the development of up to 350 dwellings, public open space, landscaping and associated infrastructure works. Full details for site access arrangements via a new junction on Chapel Lane (to be determined by Knowsley Borough Council only) and emergency access via Sandy Lane (to be determined by Halton Borough Council). The proposed outline masterplan of the development is shown in Figure 2.
- 1.4 The noise assessment has included:
- An inspection of the site and surrounding area;
 - Measurement of noise levels over a 24 hour period on a weekday;
 - Recommendation of appropriate mitigation measures.
- 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 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 8233:2014

- 2.3 No specific guidance is given in the NPPF on acoustic design criteria, therefore, the guidance discussed below has been used for acoustic design purposes.
- 2.4 Guidance on acceptable noise levels in habitable rooms and private gardens is set out in British Standard 8233: 2014, ‘Guidance on sound insulation and noise reduction for buildings’. BS 8233 recommends that it is desirable that noise from external sources does not exceed the guidelines values that are shown in Table 1 inside habitable rooms for daytime (07:00 – 23:00 hours) and night-time (23:00 – 07:00 hours) periods.

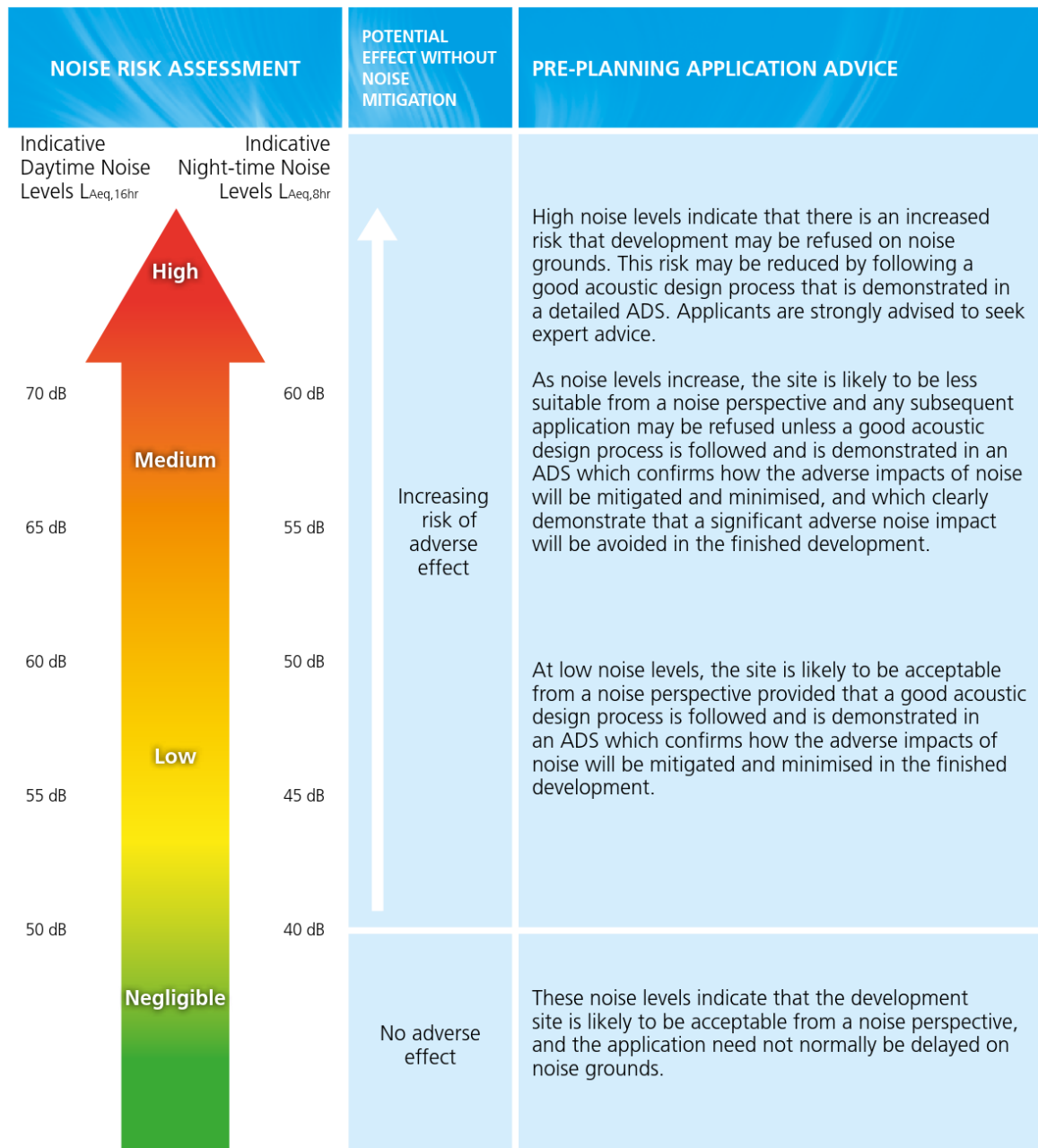
Table 1: BS 8233:2014 recommended acoustic design criteria (dB $L_{Aeq,T}$)

Activity	Location	Daytime 07:00 – 23:00 hours	Night-time 23:00 – 07:00 hours
Resting	Living room	35	-
Dining	Dining room/area	40	-
Sleeping (daytime resting)	Bedroom	35	30

- 2.5 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_{AFmax} values and these can be highly variable and unpredictable.

ProPG

- 2.6 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.
- 2.7 The ProPG initial site noise risk assessment criteria are shown in Chart 1.

Chart 1: ProPG Stage 1: Initial Site Noise Risk Assessment Criteria**Figure 1 Notes:**

- Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures.
- Indicative noise levels are the combined free-field noise level from all sources of transport noise and may also include industrial/commercial noise where this is present but is "not dominant".
- $L_{Aeq,16hr}$ is for daytime 0700 – 2300, $L_{Aeq,8hr}$ is for night-time 2300 – 0700.
- An indication that there may be more than 10 noise events at night (2300 – 0700) with $L_{Amax,F} > 60$ dB means the site should not be regarded as negligible risk.

2.8 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'.

- 2.9 The guidance states that these noise levels *“should be interpreted flexibly having regard to the locality, the project and the wider context”*.
- 2.10 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.
- 2.11 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

- 2.12 For this development we therefore recommend that the following noise criteria be adopted in respect of road traffic noise with windows closed and trickle ventilation provided:
- Daytime noise not exceeding 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_{AFmax} in bedrooms (i.e. no more than 10 times per night).
- 2.13 For private outdoor amenity spaces of the new houses (e.g. rear gardens) BS 8233 states that *“it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,16hr}$ with an upper guideline value of 55 dB $L_{Aeq,16hr}$ which would be acceptable in noisier environments”*. In our experience, most local planning authorities have traditionally adopted, or accepted, the 55 dB(A) guideline value for rear gardens of proposed new residential developments near busy roads. However, the standard also recognises that these guideline values are not achievable in all circumstances where development might be desirable and in such cases, for sites near to the ‘strategic transport network’ higher noise levels than 55 dB $L_{Aeq,16hr}$ in gardens may be acceptable. Nevertheless, for this development, we have adopted a design criterion of 55 dB $L_{Aeq,16hr}$ in gardens as far as is practicable.
- 2.14 Our outline noise mitigation recommendations to achieve the adopted acoustic design criteria are described in Section 4.0.

3.0 NOISE SURVEY

- 3.1 Noise measurements were taken at locations representative of the nearest proposed dwellings on the site to road traffic noise on Chapel Lane and Queensway.
- 3.2 Noise measurements were carried out at two locations on the site. The measurement locations are indicated in Figure 1 and are described below:
- Location 1: 20 metres from Chapel Lane (western boundary);
 - Location 2: 40 metres from Queensway (eastern boundary).
- 3.3 The noise survey was carried out in terms of a series of consecutive 5-minute measurements from approximately 09:30 on Thursday 12 until 09:30 hours on Friday 13 May 2022 using automated noise monitoring instrumentation. The noise measurements were taken at a microphone height of approximately 1.4m above the ground. Calibration checks were carried out both before and after the measurement periods with no variance in levels noted. Frequency analysis and audio recording (for the identification of noise sources) was also carried out.
- 3.4 The weather conditions during the noise survey were suitable for the purposes of the survey and subsequent assessment.
- 3.5 The overall daytime (07:00 - 23:00 hours) and night-time (23:00 - 07:00 hours) noise levels are shown in Table 2, and the full results along with details of the equipment used, and the weather conditions during the survey, are shown in Appendix II.

Table 2: Summary of Noise Levels (dB)

Location	Daytime $L_{Aeq,16\text{ hr}}$	Night-time $L_{Aeq,8\text{ hr}}$
1. 20 metres from Chapel Lane	57	53
2. 40 metres from Queensway	55	53

- 3.6 The prevailing noise source in the area was road traffic on either Chapel Lane or Queensway. Short-term peaks of noise at Location 1 during the night-time were modest, with the 10th highest value being 70 dB $L_{Amax,F}$. At Location 2 the 10th highest short-term peak of noise during the night was 67 dB $L_{Amax,F}$.
- 3.7 The results of the noise survey have been used to determine the type and extent of any noise mitigation measures necessary to achieve the adopted noise design criteria.

4.0 NOISE ASSESSMENT & MITIGATION SCHEME

Initial Noise Risk Assessment

- 4.1 The road traffic noise exposure levels on the western and eastern boundaries of the site fall into 'Low' risk category of ProPG in the daytime and between the 'Low' to 'Medium' risk categories at night.
- 4.2 Therefore, it is considered that traffic noise levels do not impose any significant constraints to residential development of the site, but traffic noise levels in areas nearest to Chapel Lane and Queensway do need to be taken into account and noise mitigation provided where necessary.
- 4.3 Our outline noise mitigation recommendations are described below.

Noise Mitigation Scheme

- 4.4 Daytime noise levels in gardens that back onto Chapel Lane will be just above 55dB $L_{Aeq16hr}$ therefore acoustic fences should be installed to the garden boundaries.
- 4.5 We therefore recommend the following outline measures, as indicated in Figure 2;
- Any rear gardens with a line of sight towards the Chapel Lane should be protected by the installation of a 1.8 metre high acoustic fence;
 - Standard thermal double glazing would be suitable for all dwellings on this site. However, acoustically treated ventilation will be necessary for exposed bedrooms in this area of the site. Initial calculations show that bedrooms should be fitted with acoustic vents achieving a sound insulation rating of $> 40 \text{ dB } D_{n,e,w}$.
- 4.6 Dwellings and rear gardens away from the western and eastern site boundaries are expected to benefit from a significant degree of screening of road traffic noise by intervening dwellings, and therefore should not require any specific noise mitigation measures.
- 4.7 'Good acoustic design' has already been incorporated into this development with the inclusion of buffer zones to the nearby roads. At this early stage further 'good acoustic design' elements can be achieved in a number of ways other than sound insulating the building envelope, such as building layout and orientation; the shape and scale of the buildings; and the inclusion of noise barriers which could be obtained or enhanced via landscaping. However, it should be noted that good acoustic

design must be considered with all the other non-acoustic factors that influence the proposed scheme layout.

- 4.8 Demonstrating that 'good acoustic design' has been considered from the outset can be beneficial in impressing upon the Local Authority the suitability of this site for development. The noise mitigation measures we have outlined in this report would constitute 'good acoustic design'.
- 4.9 It is recommended that our initial recommendations should be reviewed and revised if necessary at the detailed design stage.

Planning Condition

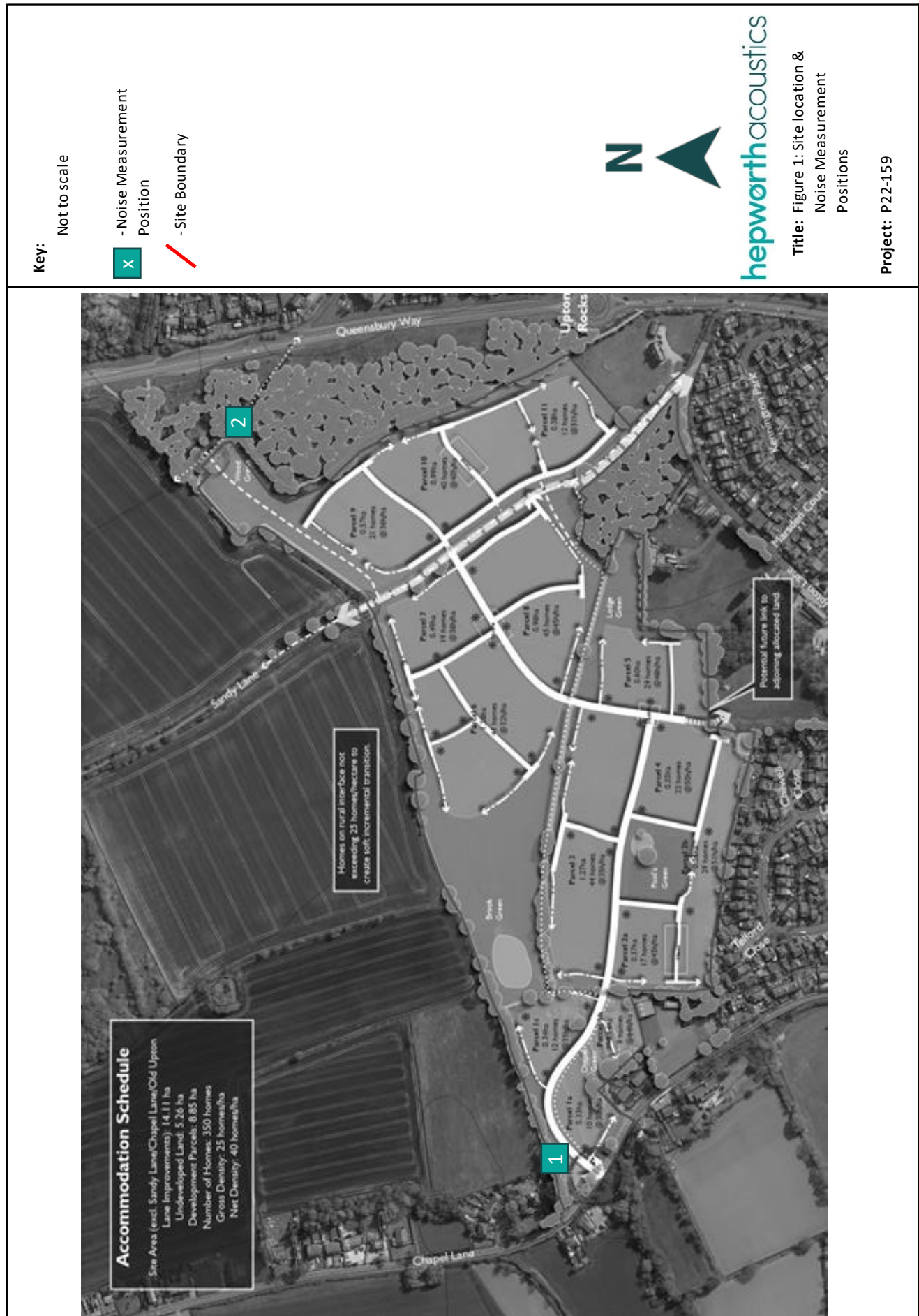
- 4.10 The need to ensure that an adequate scheme of noise mitigation is implemented can be formalised by an appropriately worded planning condition that requires a scheme of noise mitigation measures to be submitted at the reversed matters application (i.e. detailed design) stage.

Conclusion

- 4.11 Subject to the outline recommendations for mitigation measures which should be incorporated into the design or brought forward under a planning condition (as set out above), we conclude that potential noise impact from road traffic would not result in any unacceptable harm to residential amenity by reason of noise disturbance.
- 4.12 Furthermore, 'significant adverse impacts' would be avoided and 'adverse impacts' would be mitigated/minimised, bringing the development in line with the aims of the Noise Policy Statement for England (NPSE) 2010. As stated in ProPG following 'good acoustic design' is an implicit part of the NPSE and government guidance on design as part of the planning process.

5.0 SUMMARY

- 5.1 The impact of noise has been assessed for a proposed outline residential development on land off Chapel Lane, Widnes.
- 5.2 The assessment has included the measurement of road traffic noise levels from Chapel Lane and Queensway at appropriate locations on the site.
- 5.3 In order to protect the amenity of the new residents we have recommended an outline scheme of noise mitigation for the development including appropriate acoustic ventilation of the nearest habitable rooms to the Chapel Lane and Queensway.
- 5.4 No detailed plans were available at the time of assessment so our initial recommendations should be reviewed and revised, if necessary, at the detailed design stage. The requirement to implement an appropriate scheme of sound insulation measured can be ensured at this stage by a suitably worded planning condition.



Key:

Not to scale

- Acoustic Ventilation
Bedrooms



hepworthacoustics

Title: Figure 2: Proposed Site
Masterplan

Project: P22-159



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.

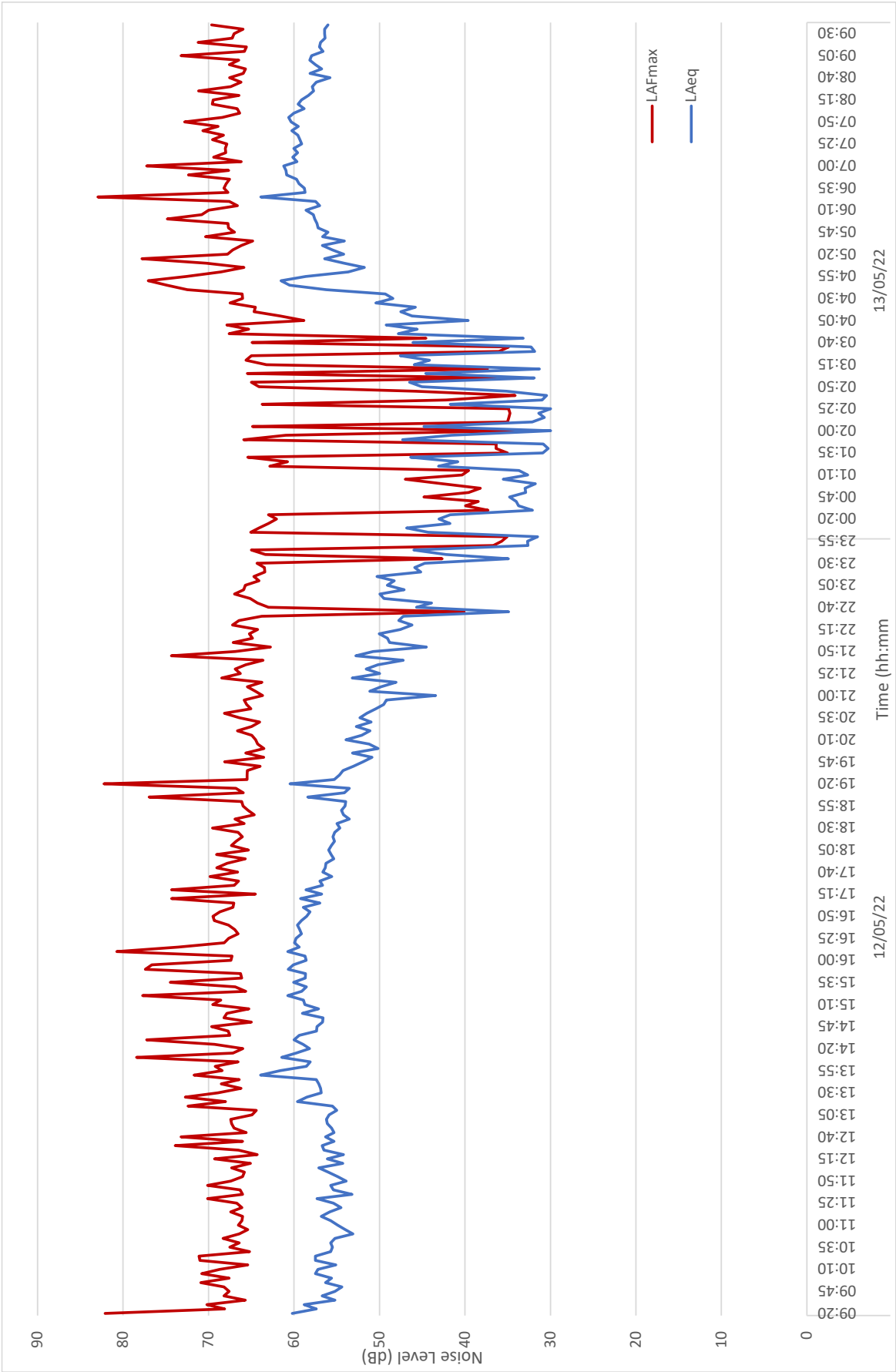
- C_{tr} This is an A-weighted urban traffic noise spectrum, which can be added to $D_{nT,w}$ or R_w in some standards to take into account different source spectra such as low frequency sound.
- R This is the 'Sound Reduction Index' as measured in a laboratory, and is a measure of the sound insulation properties of an building element in a stated frequency band.
- R_w This is the 'Weighted Sound Reduction Index', and is a single figure quantity of R , the laboratory measured Sound Reduction Index.
- $D_{n,e,w}$ This is the weighted element normalized level difference as measured in a laboratory, and is a measure of the sound insulation properties of small building elements such as ventilators.
- $L_{Aeq,T}$ 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.

Appendix II: Noise Survey Results

Date(s):	Thursday/Friday 12/13 May 2022
Equipment	NTi XL2 'Class 1' sound level meters (s/n: A2A-20361-E0 & A2A-20228-E0) with associated calibrator and environmental outdoor monitoring kit
Weather	Dry, ~9°C, clear skies and calm <3 m/s

All levels in dB(A)

Location 1: 20m from Chapel Lane



Location 2: 40m from Queensway

