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Proposed Residential Development Shepley Road, Stocksmoor

Noise Impact Assessment

For:
Newett Homes

5th April 2024

Ref: NIA-10692-23-10857-v2 Shepley Road
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1 Introduction

1.1 Overview

Environmental Noise Solutions Ltd (ENS) has been commissioned by Newett Homes to undertake a noise survey and assessment for a proposed residential development at land to the north-east of Shepley Road, Stocksmoor (hereafter referred to as 'the site').

The objectives of the noise impact assessment were to:

- Determine external noise levels at the site
- Assess the potential impact of the external noise climate on the proposed residential development with reference to relevant guidelines
- Provide recommendations for a scheme of sound attenuation works, as necessary, to protect future occupants of the proposed residential development from a loss of amenity due to noise

This report details the methodology and results of the assessment and provides recommendations for the building envelope (fenestration and ventilation) and boundary treatments as necessary. It has been prepared to accompany a planning application to be submitted to Kirklees Council.

The report has been prepared for Newett Homes for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties referring to the report should consult Newett Homes and ENS as to the extent to which the findings may be appropriate for their use.

A glossary of acoustic terms used in the main body of the text is contained in Appendix 1.

1.2 Site Description and Development Proposals

The site is located in a semi-rural environment on the eastern fringe of Stocksmoor and currently consists of an open farmland, as shown (highlighted in red) in Figure 1.1.

Figure 1.1: Location of Proposed Development

The site is bound by:

- Penistone Line railway line to the north
- Woodland to the east
- Shepley Road to the south
- Existing residential dwellings to the west

The noise environment at the site is characterised by train passes on the Penistone Line, infrequent vehicle passes on Shepley Road and distant road traffic noise on the surrounding road network.

With respect to the adjacent railway line, consultation with the online resource 'Realtime Trains' indicates that the line typically has the following usage:

- 33 passenger trains between 0700 and 2300 hours
- 4 passenger trains between 2300 and 0700 hours

The proposed residential development consists of the construction of 50 no. residential dwellings with associated access roads and landscaping.

2 Policy Context and Assessment Guidance

2.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF)[1] was updated in December 2023 and sets out the Government's planning policies for England and how these are expected to be applied.

Where issues of noise impact are concerned the NPPF provides brief guidance in paragraph 180 where it states that planning policies and decisions should contribute to and enhance the natural and local environment by:

'preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of…..noise pollution'.

Paragraph 191 advises that:

'Planning policies and decisions should also 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…..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'.

The NPPF also refers to the 2010 DEFRA publication, the Noise Policy Statement for England (NPSE) which reinforces and supplements the NPPF.

2.2 Noise Policy Statement for England

The Noise Policy Statement for England[2] (NPSE) sets out the long-term vision of promoting good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development. This long-term vision is supported by the following aims:

- Avoid significant adverse impacts on health and quality of life
- Mitigate and minimise adverse impacts on health and quality of life
- Where possible, contribute to the improvement of health and quality of life

The NPSE describes the following levels at which noise impacts may be identified:

- NOEL – No Observed Effect Level. This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise
- LOAEL – Lowest Observed Adverse Effect Level. This is the level above which adverse effects on health and quality of life can be detected
- SOAEL – Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur

According to the explanatory notes in the statement, where a noise level falls between the lowest observable adverse effect level (LOAEL) and a level which represents a significant observable adverse effect level (SOAEL):

'….all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur.'

1 National Planning Policy Framework. Ministry of Housing, Communities and Local Government (2023)
2 Government Department for Environment, Food and Rural Affairs. Noise Policy Statement for England. March 2010.

2.3 Planning Practice Guidance on Noise

Planning Practice Guidance[3] (PPG) is an online resource which provides additional guidance and elaboration on the NPPF. It advises that the Local Planning Authority should consider the acoustic environment in relation to:

- Whether or not a significant adverse effect is occurring or likely to occur
- Whether or not an adverse effect is occurring or likely to occur
- Whether or not a good standard of amenity can be achieved

In line with the Explanatory Note of the NPSE, the PPG references the LOAEL and SOAEL in relation to noise impact. It also provides examples of outcomes that could be expected for a given perception level of noise, plus actions that may be required to bring about a desired outcome. However, in line with the NPSE, no objective noise levels are provided for LOAEL or SOAEL although the PPG acknowledges that:

'...the subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation'.

The PPG also provides general advice on the typical options available for mitigating noise, suggesting that Local Plans may include noise standards applicable to proposed developments within the Local Authority's administrative boundary, although it states that:

'Care should be taken, however, to avoid these being implemented as fixed thresholds as specific circumstances may justify some variation being allowed'.

The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation. The following guidance documents provide some meaningful context.

2.4 ProPG Planning and Noise: New Residential Development

ProPG Planning and Noise: New Residential Development (ProPG)[4] was published in 2017 by the Association of Noise Consultants, Institute of Acoustics and the Chartered Institute of Environmental Health.

Stage 2: Element 2 of ProPG sets indoor ambient noise levels for residential dwellings based on the guidance contained in British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'[5] (BS 8233), see Table 2.1.

Table 2.1: Indoor Ambient Noise Levels in Dwellings

Activity	Location	Good Indoor Ambient Noise Levels	
Resting	Living Room	35 dB $L_{Aeq\ (0700\text{-}2300)}$	-
Dining	Dining Room/Area	40 dB $L_{Aeq\ (0700\text{-}2300)}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq\ (0700\text{-}2300)}$	30 dB $L_{Aeq\ (2300\text{-}0700)}$ 45 dB $L_{AFMax\ (2300\text{-}0700)}$

3 Planning Practice Guidance on Noise: http://planningguidance.planningportal.gov.uk/blog/guidance/noise/

4 'ProPG Planning and Noise: New Residential Development (ProPG)', 2017. Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH)

5 British Standards Institution (2014). *British Standard 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings.*

Note 4 to the above table states:

'A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night.'

Note 5 to the above table states:

'Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded, subject to the further advice in Note 7'.

This is consistent with the guidance contained within the PPG, which states that:

'... consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations'.

On the basis of the above, the following criteria (with windows closed and an alternative means of ventilation provided) are considered appropriate for the proposed residential development and considered to represent good resting and sleeping conditions:

- ≤ 35 dB $L_{Aeq\ (0700\text{-}2300)}$ during the daytime
- ≤ 30 dB $L_{Aeq\ (2300\text{-}0700)}$ and 45 dB L_{AFMax} not regularly exceeded during the night-time

With regard to external amenity, ProPG reflects the advice given in BS 8233 as follows:

'The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50–55 dB $L_{Aeq,16hr}$.'

2.5 Approved Document O

Approved Document O, 2021 is written in support of Part O of Schedule 1 to the Building Regulations 2010. The approved document details methods of addressing overheating of residential dwellings and is applicable only across England.

The approved document has the following relevant guidance in Section 3 regarding noise ingress into buildings:

'*In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).*

Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.

- *40dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am)*
- *55dB L_{Amax}, more than 10 times a night (between 11pm and 7am)'*

3 Noise Survey

3.1 Overview

In order to determine the level of external noise affecting the proposed development, noise monitoring was carried out on Tuesday 20th December 2022.

The adopted noise monitoring positions (shown in Appendix 2) were as follows:

- MP1 was located at the northern site boundary at circa 20 metres from the nearside railhead
- MP2 was located at the southern site boundary at circa 10 metres from Shepley Road

Noise measurements were undertaken in free field conditions at 4 metres above ground level using Bruel & Kjaer 2250 Type 1 integrating sound level meters. Each meter was connected to a windshield covered microphone positioned at the locations detailed above.

The measurement system calibration was verified immediately before and after the survey period using a Bruel & Kjaer Type 4231 calibrator. No drift in calibration levels greater than 0.5 dB was noted.

Measurements consisted of A–weighted broadband parameters including L_{Aeq}, L_{A10} L_{A90}, and L_{AFmax} together with linear octave band data.

The noted weather conditions during the survey were dry with wind speeds < 5 m/s. Weather conditions were therefore considered appropriate for noise monitoring.

3.2 Summary

Table 3.1 presents a summary of the noise data for each measurement session, at each measurement position, rounded to the nearest decibel.

Table 3.1: Summary of Noise Measurement Data

Position	Date	Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{A10} (dB)	L_{AFMax} (dB)	Comment
MP1	20/12/2022	0812–0912	46	40	45	71	4 no. passenger trains
		0912–1012	46	40	46	69	3 no. passenger trains
		1012–1112	47	41	46	67	3 no. passenger trains
		1134–2300	45	38	43	73	19 no. passenger trains
MP2	20/12/2022	0854–0954	45	36	49	62	Intermittent vehicles on Shepley Road, distant road traffic
		0954–1054	44	36	47	60	

3.3 Analysis

Train noise at Northern Boundary (MP1)

Noise levels at the northern boundary of the site (MP1) were due to intermittent rail movements along the adjacent railway line.

In order to assess the impact of rail movements, the Sound Exposure Level (SEL) is used. The SEL of a single discrete noise event is the level which if maintained constant for a period of one second would contain as much A-weighted sound energy as is contained in the actual noise event.

The typical SEL of a passenger train pass at MP1 was **77 dB(A)**.

The following formula may be used for calculating the daytime and night-time L_{Aeq} level from the SEL:

$L_{Aeq,\,T} = 10 * \log_{10} [\ (n \times 10^{SEL/10}) / T\ ]$ where:

- SEL is the measured Single Event Level (dB (A))
- n is the number of occurrences
- T is the time period in seconds

Based on a typical SEL of 77 dB(A) and typical usage as detailed in Section 1.2, the daytime ambient noise level at the northern site boundary is calculated at **45 dB $L_{Aeq\ (0700\text{-}2300)}$**. This correlates well with the measured level.

The night-time ambient noise level is calculated at **38 dB $L_{Aeq\ (2300\text{-}0700)}$** based on 4 no. train passes per night.

As there are only 4 no. train passes during the night, there are an insufficient number of events to warrant consideration of discrete event maxima from train passes.

Road Traffic at Southern Boundary (MP2)

Noise levels at the southern boundary of the site (MP2) were due to intermittent vehicle passes on Shepley Road.

Daytime ambient noise levels at MP2 were measured at circa **45 dB $L_{Aeq\ (1\ hour)}$** with maximum noise levels of up to **62 dB L_{AFMax}**. Such levels are relatively low.

4 Noise Assessment

4.1 Design Noise Levels

Noise levels throughout the site are as follows:

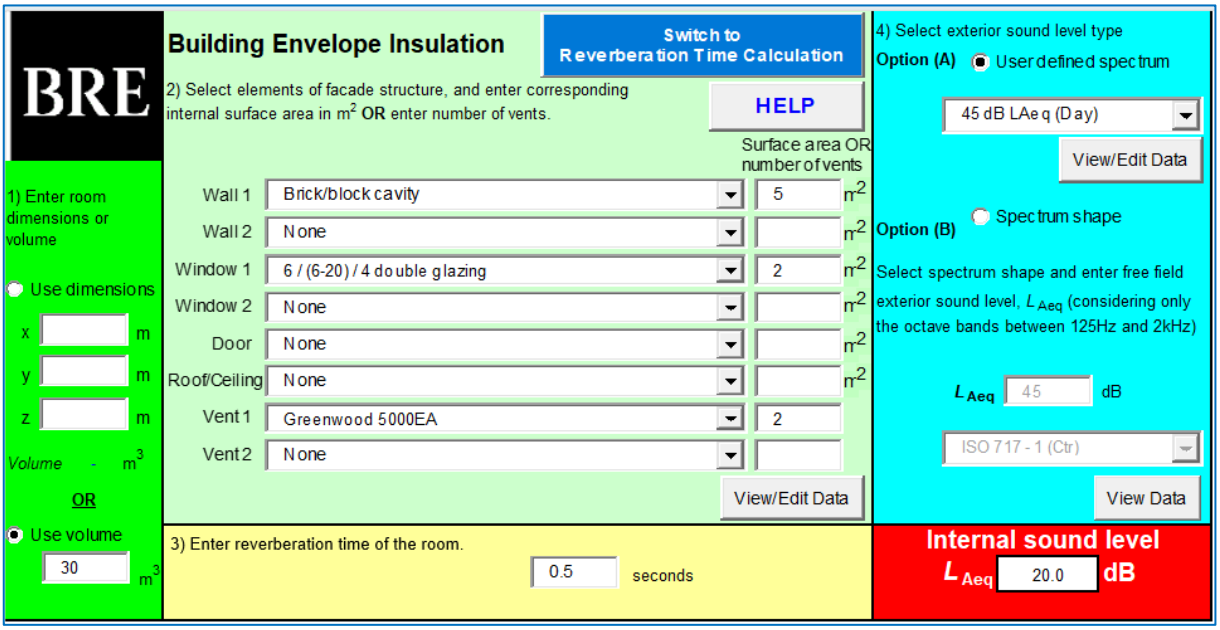
- **≤ 45 dB $L_{Aeq\ (0700\text{-}2300)}$** during the daytime
- **≤ 38 dB $L_{Aeq\ (2300\text{-}0700)}$** during the night-time
- **≤ 62 dB L_{AFMax}** during the night-time

4.2 Scheme of Sound Attenuation

In order to calculate the sound insulation requirements of the building envelope for habitable rooms throughout the development, the Building Research Establishment (BRE) building envelope insulation calculation spreadsheet was used. This spreadsheet is based on the calculation methodology advocated in BS 8233. The spreadsheet allows input of external noise levels, typical room dimensions and reverberation time together with parameters for the various elements of the building envelope and calculates the internal noise level in terms of the external noise level metric (L_{Aeq} and L_{AFMax} in this case).

As evidenced in the calculation sheet below, a typical standard double-glazed window rated at least **28 dB R_w+C_{tr}** (such as 6 mm glass / 12 mm cavity / 4 mm glass) in conjunction with 2 no. standard trickle vents rated at least **32 dB $D_{n,e,w}$** per 5000 mm² EA vent open (such as the Greenwood 5000EA, or equivalent) will provide circa 25 dB(A) sound insulation from external to internal at the site.

Figure 4.1: Example BRE Calculation Spreadsheet



The resultant internal noise levels are set out in the table below.

Table 4.1 – External Noise Levels and Resultant Internal Noise Levels

External Noise Level	Reduction	Resultant Internal Level
≤ 45 dB $L_{Aeq\ (0700\text{-}2300)}$ ≤ 38 dB $L_{Aeq\ (2300\text{-}0700)}$ ≤ 62 dB L_{AFMax}	–25 dB	≤ 20 dB $L_{Aeq\ (0700\text{-}2300)}$ ≤ 13 dB $L_{Aeq\ (2300\text{-}0700)}$ ≤ 37 dB L_{AFMax}

On the basis of the above, standard double glazing and standard trickle vents are appropriate throughout the development.

4.3 External Amenity

Daytime ambient noise levels across the site are circa **45 dB $L_{Aeq\ (0700–2300)}$.**

Such levels are comfortably below the desirable value described in ProPG/BS 8233 for gardens. On this basis, there is no issue with respect to external amenity.

4.4 Consideration of Overheating

ADO states that for moderate risk locations (i.e. outside of London) the minimum free area of the open window should be at least 4% of the floor area of the room.

Building in some allowance, this equates to an assumed window opening (S_{open}) area of at least 5% of the floor area. As the open area varies as a function of the floor area, for a typical floor-to-ceiling height of 2.4m, a window open area of 5% of the floor area equates to an external to internal noise reduction of 9 dB.

With reference to the internal targets contained in ADO, it is assumed that open windows can form the overheating mitigation strategy with no additional ventilation or cooling, providing the external noise levels outside bedrooms at night do not exceed **49 dB $L_{Aeq\ (2300\text{-}0700)}$** and **64 dB L_{AFMax}** (more than 10 times).

As detailed above, external night-time noise levels across the site are ≤ **38 dB $L_{Aeq\ (2300\text{-}0700)}$** and ≤ **62 dB L_{AFMax}.**

As such, windows of plots throughout the site may be opened to the minimum open area of 5% of the floor area, meaning that the overheating mitigation strategy at the site is not constrained by acoustics.

In accordance with ADO, the maximum stroke length should not exceed 650 mm to minimise the risk of falling.

5 Summary and Conclusions

A noise impact assessment has been undertaken for the proposed residential development at land to the north-east of Shepley Road, Stocksmoor.

The noise environment at the site is characterised by train passes on the Penistone Line, infrequent vehicle passes on Shepley Road and distant road traffic noise on the surrounding road network.

Ambient noise levels throughout the site are relatively low. As a consequence, standard double glazing and standard trickle vents are appropriate throughout the development, and the overheating mitigation strategy at the site is not constrained by acoustics.

Appendix 1 – Abbreviations and Definitions

Sound Pressure Level (L_p)
The basic unit of sound measurement is the sound pressure level. As the pressures to which the human ear responds can range from 20 μPa to 200 Pa, a linear measurement of sound levels would involve many orders of magnitude. Consequently, the pressures are converted to a logarithmic scale and expressed in decibels (dB) as follows:

$L_p = 20 \log_{10}(p/p_o)$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_o = reference sound pressure (20 μPa).

A-weighting
A frequency filtering system in a sound level meter, which approximates under defined conditions the frequency response of the human ear. The A-weighted sound pressure level, expressed in dB(A), has been shown to correlate well with subjective response to noise.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq, T}$
The value of the A-weighted sound pressure level in decibels of continuous steady sound that within a specified time interval, T, has the same mean-square sound pressure as a sound that varies with time. $L_{Aeq, 16h}$ (07:00 to 23:00 hours) and $L_{Aeq, 8h}$ (23:00 to 07:00 hours) are used to qualify daytime and night time noise levels.

$L_{A10, T}$
The A-weighted sound pressure level in decibels exceeded for 10% of the measurement period, T. $L_{A10, 18h}$ is the arithmetic mean of the 18 hourly values from 06:00 to 24:00 hours.

$L_{A90, T}$
The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T. L_{A90} is typically taken as representative of background noise.

$L_{AF\ max}$
The maximum A-weighted noise level recorded during the measurement period. The subscript 'F' denotes fast time weighting, slow time weighting 'S' is also used.

Single Event Level / Sound Exposure Level (SEL or L_{AE})
The energy produced by a discrete noise event averaged over one second, regardless of the event duration. This allows for comparison between different noise events which occur over different lengths of time.

Weighted Sound Reduction Index (R_W)
Single number quantity which characterises the airborne sound insulation properties of a material or building element over a defined range of frequencies (R_W is used to characterise the insulation of a material or product that has been measured in a laboratory).

Appendix 2 – Noise Measurement Positions