
Our ref: NIA/7713/17/7602/v1/Former William Freeman site

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Dear Sirs

**NOISE IMPACT ASSESSMENT FOR PROPOSED RESIDENTIAL DEVELOPMENT (OUTLINE)
FORMER WILLIAM FREEMAN SITE, LAND EAST OF THE A61 WAKEFIELD ROAD,
MAPPLEWELL, BARNSELY**

1.00 INTRODUCTION

- 1.01 Environmental Noise Solutions Limited (ENS) has been commissioned by Netherton Building and Construction Limited to undertake a noise impact assessment for a proposed residential development (outline application for circa 82 dwellings) at the former William Freeman site at land east of the A61 Wakefield Road, Mapplewell, Barnsley (hereafter referred to as the application site).
- 1.02 An application for outline planning permission is to be submitted to Barnsley Metropolitan Borough Council (BMBC) for the residential development of the application site. The objectives of the noise impact assessment were therefore to:
- Determine the ambient noise climate at the application site
 - Assess the potential impact of the ambient noise climate on the proposed residential development with reference to pertinent guidelines
 - Provide preliminary recommendations with respect to layout considerations, outline sound attenuation works and boundary treatments, as necessary.
- 1.03 This report details the methodology and results of the assessment and provides outline recommendations with respect to layout considerations, building envelope specification (fenestration and ventilation) and boundary treatments. It has been prepared to accompany an application for outline planning permission to be submitted to BMBC.
- 1.04 This report has been prepared for Netherton Building and Construction Limited for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties making reference to the report should consult Netherton Building and Construction Limited (applicant), JRP Associates (applicant's agent) and ENS as to the extent to which the findings may be appropriate for their use.
- 1.05 A glossary of acoustic terms used in the main body of the text is contained in Appendix 1.

2.00 APPLICATION SITE SETTING AND PROPOSED RESIDENTIAL DEVELOPMENT

- 2.01 The application site is located in a residential area, roughly rectangular in shape and bound by:
- Residential dwellings and open fields to the north
 - A vacant site (earmarked for a Lidl food store) to the south
 - Open fields to the east
 - The A61 Wakefield Road to the west (residential dwellings on opposite side of road)

- 2.02 Outline planning permission is sought for residential development (circa 82 dwellings) with all matters reserved. The purpose of the noise impact assessment is therefore to identify whether there are any significant noise related constraints. An indicative master plan is shown in Appendix 2.

3.00 BASELINE NOISE SURVEY

- 3.01 In order to establish the ambient and background noise levels at the application site, a baseline noise survey was undertaken during the daytime and night time on Wednesday 7th December 2017.
- 3.02 For the purpose of the assessment, the following noise monitoring positions were adopted in a free field position at 1.5 metres above ground during the daytime and 4.0 metres above ground during the night time (see Appendix 2):
- MP1 was located at the south west corner of the application site at 16 metres from the nearside kerb of the A61 Wakefield Road (note: MP1a at double distance to assess distance attenuation)
 - MP2 was located at the north west corner of the application site at 16 metres from the nearside kerb of the A61 Wakefield Road
 - MP3 was located at the western boundary of the application site at 16 metres from the nearside kerb of the A61 Wakefield Road
 - MP4 was located at the south east corner of the application site
 - MP5 was located at the north east corner of the application site
- 3.03 Noise measurements were undertaken using Bruel & Kjaer 2250 Type 1 integrating sound level meters. The measurement system calibration was verified immediately before the commencement of the measurement sessions and again at the end, using a Bruel & Kjaer Type 4231 calibrator. No drift in calibration level was noted. Weather conditions throughout the survey were appropriate for monitoring. Noise measurements consisted of A-weighted broadband parameters, together with linear one third octave band L_{eq} levels. The following table contains a summary of the noise measurement data, rounded to the nearest decibel.

Table 3.1 – Noise Measurement Data

[illegible]

- 3.04 Noise levels across the application site were dominated by road traffic noise.
- 3.05 For the prediction of daytime road traffic noise, the Department of Transport's Memorandum on the Calculation of Road Traffic Noise (CRTN) explains that the following shortened measurement procedure may be used. Measurements of L_{A10} are made over any three consecutive hours between 10:00 and 17:00 hours. Using $L_{A10 (3 \text{ hour})}$ as the arithmetic mean of the three consecutive values of hourly L_{A10} , the $L_{A10 (18 \text{ hour})}$ can be calculated from the equation:
- (i) $L_{A10 (18 \text{ hour})} = L_{A10 (3 \text{ hour})} - 1 \text{ dB}$
- (ii) $L_{Aeq (0700-2300)} \approx L_{A10 (0600-0000)} - 2 \text{ dB}$
- 3.06 Substituting (ii) into (i) gives the following approximation:
- (iii) $L_{Aeq (0700-2300)} \approx L_{A10 (3 \text{ hour})} - 3 \text{ dB}$
- 3.07 Based on the above formula, the daytime ambient noise levels are measured / calculated at **60 dB $L_{Aeq (0700-2300)}$ at MP1 (16 metres to the nearside kerb of the A61 Wakefield Road; indicative of the development footprint).**
- 3.08 A study prepared by TRL Limited on behalf of the Department for Environment, Food and Rural Affairs (DEFRA) entitled 'Converting the UK Traffic Noise Index $L_{A10 (18 \text{ hour})}$ to EU Noise Indices for Noise Mapping' presents a methodology for calculating night time road traffic noise levels based on daytime road traffic noise level based on the following formula:
- (iv) $L_{Aeq (23:00-07:00)} \approx 0.90 * L_{A10, 18 \text{ hour}} - 3.77 \text{ (for non-motorways)}$
- 3.09 Based on the above formula, the night time ambient noise levels are measured / calculated at **52 dB $L_{Aeq (2300-0700)}$ at MP1 (16 metres to the nearside kerb of the A61 Wakefield Road; indicative of the development footprint).**
- 3.10 ProPG Planning and Noise: New Residential Development (published in May 2017 by the Association of Noise Consultants, Institute of Acoustics and the Chartered Institute of Environmental Health) provides practitioners with guidance on a recommended approach to the management of noise within the planning system in England.
- 3.11 Based upon ambient noise levels of 60 dB $L_{Aeq (0700-2300)}$ and 52 dB $L_{Aeq (2300-0700)}$ at MP1 (16 metres to the nearside kerb of the A61 Wakefield Road; indicative of the development footprint), the application site (adjacent to the road) is considered to be subject to low noise levels and is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and demonstrated in an Acoustic Design Statement (ADS) which confirms how the adverse impacts of noise will be minimised in the finished development.
- 3.12 In summary the ambient noise climate across the application site is road traffic, albeit at relatively low levels.

4.00 NATIONAL PLANNING POLICY FRAMEWORK PLANNING PRACTICE GUIDELINES ON NOISE AND OTHER RELEVANT GUIDANCE

- 4.01 In terms of noise impact assessment criteria, Paragraph 123 of the National Planning Policy Framework states that planning policies and decisions should aim to *'avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development'*.
- 4.02 Planning Practice Guidance specifically dealing with noise was uploaded to the Government's Planning Portal in March 2014 as an accompaniment to the National Planning Policy Framework. This guidance was further updated in December 2014.
- 4.03 The guidance states *'... 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'*.
- 4.04 Building Regulations Approved Document F 'Ventilation' (2010 version incorporating 2013 amendments) states *'For mainly naturally ventilated buildings, it is common to use a combination of ventilators (e. g. for dwellings it is common to use intermittent extract fans for **extract ventilation**, trickle ventilators for **whole dwelling ventilation** and windows for **purge ventilation**). ... Purge ventilation throughout the building to aid the removal of high concentrations pollutants and water vapour released from occasional activities such as painting and decorating and or accidental releases such as smoke and burnt food or spillage of water. Purge ventilation is intermittent i.e. required only when such activities occur. Purge ventilation provisions may also be used to improve thermal comfort, although this is **not controlled** under Building Regulations'*.
- 4.05 It is therefore evident that whilst ventilation may also provide a means to control thermal comfort this is not controlled under Building Regulations. Part L addresses minimising energy use due to the effects of solar gain in summer.
- 4.06 It is noteworthy that modern dwellings in the UK are well insulated. Insulation acts as a barrier to heat loss and heat gain. This makes a dwelling warmer in winter and cooler in summer. In a warm summer, the temperature outside a well insulated dwelling is higher than that inside the dwelling. Rather than providing thermal comfort, opening a window, simply lets warm air in thus raising the internal ambient temperature. In such a situation, the most effective means of thermal comfort is to keep windows shut.
- 4.07 It is therefore evident that trickle ventilators for whole dwelling ventilation are considered an alternative means of ventilation under Building Regulations Approved Document F 'Ventilation' (2010 version incorporating 2013 amendments).
- 4.08 In areas with higher ambient noise levels, enhanced double glazing and/or acoustically treated trickle ventilators may be appropriate.
- 4.09 British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' (BS 8233) sets indoor ambient noise levels from residential dwellings (see table below).

Table 4.1 – Indoor Ambient Noise Levels in Dwellings (BS 8233)

Activity	Location	Good Indoor Ambient Noise Levels	
Resting	Living Room	35 dB L _{Aeq} (0700–2300)	-
Sleeping (daytime resting)	Bedroom	35 dB L _{Aeq} (0700–2300)	30 dB L _{Aeq} (2300–0700)

- 4.10 Note 4 to the above table states *'Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or L_{AFMax} depending on the character and number of events per night. Sporadic noise events could require separate values'*.

- 4.11 It is evident that BS 8233 considers that night time maxima guideline values relate to discrete, individual noise events (such as aircraft or trains, etc) rather than general road traffic noise. In the case of the application site, however, consideration of the night time maximum noise levels will not have a material impact upon the glazing and ventilation specification (i.e. in order to meet the indoor noise level criterion, a similar reduction is required for L_{AFMax} as is required for L_{Aeq}).
- 4.12 Note 5 to the above table states '*If relying on closed windows to meet the guide values, there needs to be appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level. If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment*'.
- 4.13 It is evident that BS 8233 considers that adequate ventilation is provided by trickle ventilators in an open position. This is consistent with Building Regulations and the National Planning Policy Framework Planning Practice Guidance on Noise.
- 4.14 ProPG Planning and Noise: New Residential Development further confirms the position as follows:
- The internal target noise levels can only be practically achieved with windows closed, which may be the case in urban areas and at sites adjacent to transportation noise sources, special care must be taken to design the accommodation so that it provides good standards of acoustics, ventilation and thermal comfort without unduly compromising other aspects of the living environment.*
- In such circumstances, internal noise levels can be assessed with windows closed but with any façade openings used to provide 'whole dwelling ventilation' in accordance with Building Regulations Approved Document F (e.g. trickle ventilators in the open position).*
- It should also be noted that the internal noise level guidelines are generally not applicable under 'purge ventilation' conditions as defined by Building Regulations Approved Document F, as this should only occur occasionally (e.g. to remove odour from painting and decorating or from burnt food).*
- 4.15 On the basis of the above, the following criteria (with windows closed and trickle vents open) are considered appropriate for the proposed residential development:
- ≤ 35 dB L_{Aeq} (0700-2300) in living rooms and bedrooms during the day
 - ≤ 30 dB L_{Aeq} (2300-0700) and 45 dB L_{AFMax} not normally exceeded in bedrooms during the night
- 4.16 These internal ambient noise levels represent good resting and sleeping conditions.
- 4.17 With respect to external amenity, BS 8233:2014 states ... '*For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.*'
- 4.18 ProPG guidance with respect to external areas (gardens) is consistent with the position adopted in BS 8233:2014.

5.00 OUTLINE LAYOUT CONSIDERATIONS, BUILDING ENVELOPE SPECIFICATIONS AND BOUNDARY TREATMENTS

- 5.01 As outline planning permission is sought for the proposed residential development with all matters reserved, a final detailed layout is not required at this stage. The purpose of the noise impact assessment is therefore to identify whether there are any significant noise related constraints on the application site. An indicative master plan is shown in Appendix 2 for reference.
- 5.02 The indicative master plan layout shows that the residential development footprint is generally set back circa 16 metres from the A61 Wakefield Road.
- 5.03 In terms of the A61 Wakefield Road, the daytime and night time ambient noise levels at MP1 (16 metres to the nearside kerb) have been measured / calculated at 60 dB L_{Aeq} (0700-2300) and 52 dB L_{Aeq} (2300-0700), respectively (with night time maximum noise levels of 72 dB L_{AFMax}).
- 5.04 In accordance with ProPG, these are low noise levels and the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed (note: this process can be guaranteed by means of an appropriately worded noise related planning condition linked to the Reserved Matters requirement(s) so that the final layout (and any associated noise mitigation measures) can be verified).
- 5.05 Based on measurements taken at numerous sites, a standard double glazing (rated at ≥ 30 dB R_w) with standard trickle vents (rated at ≥ 35 dB $D_{n,e,w}$ per 4000 mm² in an open position) in a building façade for a 'typical' bedroom layout provides circa 27 dB(A) sound attenuation from external to internal) to road traffic noise (see Appendix 3).
- 5.06 With reference to Paragraph 4.15 and the ambient and maximum noise levels set out in Paragraph 5.04, it is evident that the internal noise level criteria will be met with standard double glazing (rated at ≥ 30 dB R_w) with standard trickle vents (rated at ≥ 35 dB $D_{n,e,w}$ per 4000 mm² in an open position) for all residential dwellings located at least 15 metres from the nearside kerb of the A61 Wakefield Road (note: subject to a verification check with respect to the area and volume of the receiving room (which may vary for different dwelling types) when the final planning layout is determined).
- 5.07 Dwellings located closer to the A61 Wakefield Road (or with relatively large areas of glazing) are likely to require enhanced double glazing and/or acoustic trickle vents.
- 5.08 As stated, a detailed building envelope specification can be provided when the detailed layout is determined (as part of a Reserved Matters application). The ambient noise climate at the application site is, however, suitable for residential development.
- 5.09 For reference, the indicative master plan layout is considered to represent good acoustic design as the proposed residential dwellings are set reasonably far back from the road and also 'front-onto' the road. This affords maximum screening to external areas (gardens).
- 5.10 In the event that the indicative master plan layout changes such that gardens 'back onto' the A61 Wakefield Road, in order to protect outdoor amenity, it is likely that gardens in this instance will require a circa 1800 mm high wall / solid timber fence. A detailed boundary treatment plan can be provided when the detailed layout is determined (as part of a Reserved Matters application). The ambient noise climate at the application site is, however, suitable for residential development.

6.00 CONCLUSIONS

- 6.01 A noise impact assessment has been undertaken for a proposed residential development at the former William Freeman site at land to the east of the A61 Wakefield Road, Mapplewell, Barnsley.
- 6.02 The ambient noise climate at the site is due to traffic, albeit at relatively low levels.
- 6.03 Outline recommendations layout considerations, building envelope specification (fenestration and ventilation) and boundary treatments have been provided to protect the proposed residential development from the ambient noise climate in accordance with pertinent guidance.
- 6.04 On this basis, the ambient noise climate is not considered to represent a constraint to the proposed residential development

I trust the foregoing is sufficient for your needs. Should you have any queries regarding the above, please do not hesitate to contact me.

Yours sincerely

Jonathan Rigg
Environmental Noise Solutions Limited

cc File

Appendix 1

Glossary of Acoustic Terms

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:

$$L_p = 20 \log_{10}(p/p_0)$$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_0 = reference sound pressure (20 μPa).

A-weighting Network

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.

Sound Exposure Level (SEL or L_{AE})

The energy produced by a discrete noise event averaged over one second, no matter how long the event actually took. 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).

SKD3 / FEASIBILITY SKETCH LAYOUT



Appendix 3 BRE Building Envelope Sound Insulation Model

A61 Wakefield Road Façade
27 dB(A) reduction with standard glazing (≥ 30 dB R_w) & standard trickle vents (≥ 35 dB D_{new})

BRE		Building Envelope Insulation		Switch to Reverberation Time Calculation	
1) Enter room dimensions or volume ☐ Use x m y m z m Volume m ³ OR ☐ Use volume 30 m ³		2) Select elements of facade structure, and enter corresponding internal surface area in m ² OR enter number of vents.		HELP	
		Surface area OR number of vents			
		Wall 1	None		m ²
		Wall 2	None		m ²
		Window 1	30 dB Rw double glazing	1.5	m ²
		Window 2	None		m ²
		Door	None		m ²
		Roof/ Ceiling	None		m ²
		Vent 1	35 dB Dnew Vent	2	
		Vent 2	None		
		View/ Edit Data			
		3) Enter reverberation time of the room. 0.5 seconds			
		4) Select exterior sound level type Option (A) ☒ User defined spectrum 60 dB LAeq (day) View/ Edit Data Option (B) ☐ Spectrum shape Select spectrum shape and enter free field exterior sound level, L_{Aeq} (considering only the octave bands between 125Hz and 2kHz) L_{Aeq} 60 dB ISO 717 - 1 (C) View Data			
		Internal sound level L_{Aeq} 33.0 dB			