

Our ref: NIA/7326/17/7193/v3/Lynton Place, Kexbrough

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Mr Lee Forster
ABS
17 Keresforth Hall Road
Barnsley
S70 6NE



Sent by email only: leef1922@gmail.com

Dear Sirs,

**NOISE IMPACT ASSESSMENT FOR PROPOSED RESIDENTIAL DEVELOPMENT,
LAND AT LYNTON PLACE, KEXBROUGH, BARNSELY, S75 5JU**

1.00 INTRODUCTION

1.01 Environmental Noise Solutions Limited has been commissioned by Mr Lee Forster to carry out a noise impact assessment for a proposed residential development at Lynton Place, Kexbrough, Barnsley, S75 5JU (hereafter referred to as the application site).

1.02 The pre-application enquiry to Barnsley Metropolitan Borough Council received the following comments:

Due to the fact the site is located next to the M1, noise will likely impact on the proposed development. As such, any application submitted for this site will need to be supported with a Noise Survey, to show the site is suitable for residential development. This survey will need to assess the noise levels across the day from the motorway, and consider what mitigation measures might be required to ensure both internal and external noise levels can be achieved.

1.03 The objectives of the noise impact assessment were therefore to:

- Determine the ambient noise climate at the application site
- Assess the ambient noise climate with respect to pertinent guidelines
- Provide recommendations for a scheme of sound attenuation works to protect the noise amenity of the proposed residential development

1.04 This report details the methodology and results of the assessment and provides recommendations for the building envelope (fenestration and ventilation) and boundary treatments. It has been prepared to accompany a planning application for the proposed residential development on the application site to be submitted to Barnsley MBC.

1.05 This report has been prepared for Mr Lee Forster 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 Mr Lee Forster (applicant), White Agus Partnership (applicant's agent) and ENS as to the extent to which the findings may be appropriate for their use.

1.06 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 on the eastern side of Kexbrough village in a residential setting. It is bounded by (see Appendix 2):

- The M1 motorway to the east
- Existing residential dwellings (bungalows) to north, south and west

2.02 The ambient noise climate at the application site was due to the M1 motorway.

2.03 The proposed residential development consists of three (3) dormer bungalows as illustrated in Appendix 3.

3.00 BASELINE NOISE SURVEY

- 3.01 In order to establish the ambient noise levels at the application site, a baseline noise survey was carried out on the afternoon of Wednesday 19th April 2017.
- 3.02 For the purpose of the assessment, the following noise monitoring positions were adopted (in a free field environment at 1.5 metres above ground):
- MP1 was located in the eastern half of the application site (representative of the eastern façade of Plot 1 i.e. adjacent to the M1 motorway)
 - MP2 was located in the western half of the application site (representative of Plots 2 and 3 i.e. set back from the motorway)
- 3.03 Noise measurements were undertaken using Bruel & Kjaer 2260 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.
- 3.04 Measurements consisted of A-weighted broadband parameters, together with linear one-third octave band L_{eq} levels. Table 3.1 contains a summary of the noise measurement data, 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 _{A1} (dB)	L _{AMax} (dB)	Comment
MP1	19/04/17	14:00–15:00	67	65	69	71	71	M1 motorway
		15:00–16:00	67	65	69	71	71	
		16:00–17:00	68	66	70	71	72	
		17:00–18:00	68	66	70	71	72	
		18:00–19:00	68	65	70	71	72	
		19:00–19:40	67	62	69	71	72	
Daytime ambient noise level 67 dB LAeq (0700–2300) based on CRTN Night time ambient noise level 63 dB LAeq (2300–0700) based on TRL (and 72 dB LAMax)								
MP2	19/04/17	16:00–17:00	56	55	58	59	60	M1 motorway (more distant)
		17:45–18:30	55	54	57	59	60	
Daytime ambient noise level 55 dB LAeq (0700–2300) based on CRTN Night time ambient noise level 50 dB LAeq (2300–0700) based on TRL (and 60 dB LAMax)								

- 3.05 The ambient noise climate throughout the application site was associated with road traffic on the M1 motorway with no other significant noise sources noted.
- 3.06 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:

$$(i) \quad L_{A10(18 \text{ hour})} = L_{A10(3 \text{ hour})} - 1 \text{ dB}$$

$$(ii) \quad L_{Aeq(0700-2300)} \approx L_{A10(0600-0000)} - 2 \text{ dB}$$

- 3.07 Substituting (ii) into (i) gives the following approximation:

$$(iii) \quad L_{Aeq(0700-2300)} \approx L_{A10(3 \text{ hour})} - 3 \text{ dB}$$

- 3.08 Based on the above formula, the daytime ambient noise levels are measured / calculated at **67 dB L_{Aeq} (0700–2300) at MP1** and **55 dB L_{Aeq} (0700–2300) at MP2**.
- 3.09 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 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) $L_{Aeq} (23:00-07:00) \approx 0.87 * L_{A10, 18 \text{ hour}} + 4.24$ (for motorways)
- 3.10 Based on the above formula, the night ambient noise levels are measured / calculated at **63 dB L_{Aeq} (2300–0700) at MP1** and **50 dB L_{Aeq} (2300–0700) at MP2**.
- 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 acoustically treated trickle ventilators are appropriate. Furthermore, some developers prefer mechanical ventilation to acoustically treated trickle ventilators although this is not mandatory under Building Regulations or the National Planning Policy Framework Planning Practice Guidance on Noise.

- 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 to L_{Aeq} as it would be to L_{AFMax}).
- 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 Note 7 to the above table states '*Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 decibels and reasonable internal conditions still achieved*'.
- 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 daytime
 - ≤ 30 dB L_{Aeq} (2300-0700) in bedrooms during the night time
- 4.16 These internal ambient noise levels represent good resting and sleeping conditions.
- 4.17 With respect to garden amenity, BS 8233 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 It is considered that the provision of a circa 2 metre high solid timber fence around the garden of Plot 1 would achieve the lowest practicable levels in the garden. It is also noteworthy that there are existing residential dwellings immediately to the north and south of the application site.

5.00 SOUND ATTENUATION SCHEME PROPOSALS

5.01 The scheme of sound insulation for the application site is summarised in the table below:

Table 5.1 – Glazing and Ventilation Scheme

Location	Noise Level	Internal Criteria	Reduction Required	Glazing and Ventilation
Plot 1 North/South/East Façade	67 dB L _{Aeq} (0700–2300) 63 dB L _{Aeq} (2300–0700) 72 dB L _{AFMax} (0700–2300)	≤ 35 dB L _{Aeq} (0700–2300) ≤ 30 dB L _{Aeq} (2300–0700) ≤ 45 dB L _{AFMax} (0700–2300)	33 decibels (L _{Aeq} night time)	Double glazing rated ≥ 33 dB Rw+C i.e. 10mm glass / 12mm cavity / 6mm glass Acoustic window vents rated ≥ 42 dB D _{new} per 5000 mm ² ** or mechanical***
Plot 1 West Façade*	52 dB L _{Aeq} (0700–2300) 48 dB L _{Aeq} (2300–0700) 57 dB L _{AFMax} (0700–2300)	≤ 35 dB L _{Aeq} (0700–2300) ≤ 30 dB L _{Aeq} (2300–0700) ≤ 45 dB L _{AFMax} (0700–2300)	18 decibels (L _{Aeq} night time)	Standard double glazing and standard window vents
Plots 2 & 3	55 dB L _{Aeq} (0700–2300) 50 dB L _{Aeq} (2300–0700) 60 dB L _{AFMax} (0700–2300)	≤ 35 dB L _{Aeq} (0700–2300) ≤ 30 dB L _{Aeq} (2300–0700) ≤ 45 dB L _{AFMax} (0700–2300)	20 decibels	Standard double glazing and standard window vents

* Based on measurements at other sites, noise levels at the façade wholly screened from the road are at least 15 decibels lower than the façade overlooking the road

** Such as Greenwood 5000EAW.AC2

*** Such as Titon Sonair

5.02 The ceilings to any rooms-in-roof to Plot 1 should be double plasterboard (this is normally achieved with one layer of insulated plasterboard (for thermal performance) boarded to the underside of the rafters and any side walls and an additional layer of plasterboard boarded over). The top and side cheeks to any dormer windows should also be double boarded (as above).

6.00 CONCLUSIONS

6.01 A noise impact assessment has been undertaken for a proposed residential development at land at Lynton Place, Kexbrough, Barnsley.

6.02 The ambient noise climate was due to the M1 motorway.

6.03 A scheme of sound insulation works has been developed to protect the proposed residential development from the ambient noise climate in accordance with pertinent guidelines. The ambient noise climate does not pose 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



Thomas Crabb
MIOA, Diploma in Acoustics and Noise Control
Environmental Noise Solutions Limited

cc File
Robert Agus, White Agus Partnership robert@whiteaguspartnership.co.uk

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.

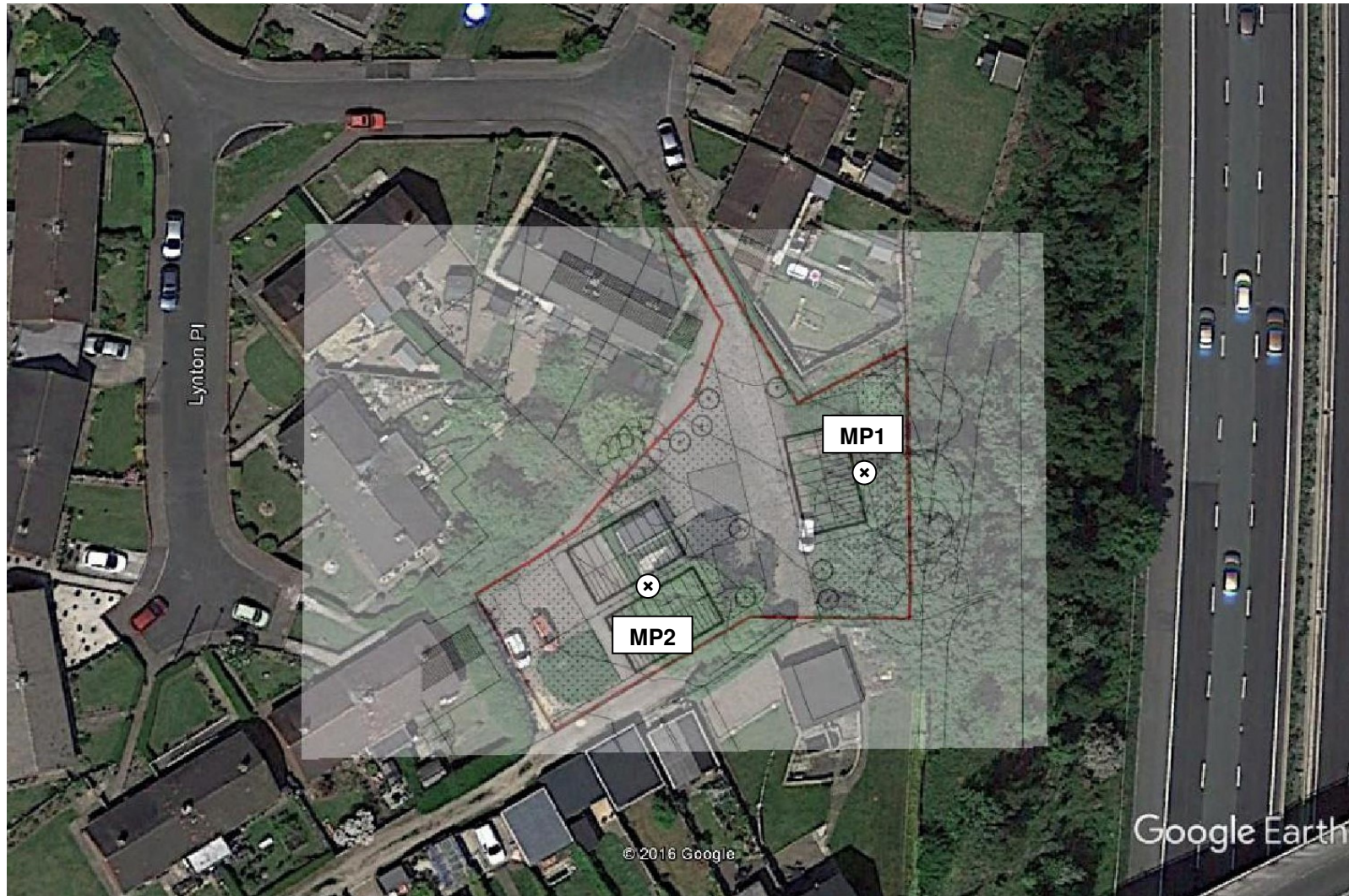
Sound Exposure Level (SEL or L_{AE})

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).

Appendix 2
Site Layout Plan and Noise Monitoring Positions



Appendix 3
Site Layout Plan and Internal Floor Layouts

