Our ref: NIA/5313/14/5077/v1 Hunningley Close

23rd July 2014

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Dear Sir,

NOISE IMPACT ASSESSMENT FOR PROPOSED RESIDENTIAL DEVELOPMENT
LAND OFF HUNNINGLEY CLOSE (FORMER MEDICAL CENTRE), STAIRFOOT, BARNSLEY

1.00 INTRODUCTION

1.01 Environmental Noise Solutions Ltd (ENS) has been commissioned by White Agus Partnership, on behalf of it client Mason Horner Limited, to undertake a noise impact assessment for a proposed residential development at land off Hunningley Close, Stairfoot, Barnsley (hereafter referred to as the application site).

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

- Determine the ambient noise climate at the application site;
- Assess the potential noise impact of the ambient noise climate at the application site with reference to the National Planning Policy Framework (NPPF) and other pertinent guidelines;
- Provide recommendations for a scheme of sound attenuation works, as necessary, to ensure that the future occupants of the proposed residential development do not experience any unacceptable loss of amenity due to noise.

1.03 This report details the methodology and results of the assessment and provides recommendations for the building envelope (fenestration and ventilation) and boundary treatment.

1.04 This report has been prepared for Mason Horner 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 Mason Horner Limited, White Agus Partnership (planning agent / project architect) 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 DEVELOPMENT

2.01 The application site is located on the site of a former medical centre to the east of Hunningley Close, to the east of Barnsley town centre. It is bound by:

- Existing residential dwellings to the north
- A light industrial unit (currently occupied by a vehicle repair garage) to the south
- A light industrial unit (currently occupied by a joinery firm) to the east
- Hunningley Close to the west with existing residential dwellings on the opposite side of the road

2.02 During the daytime period, the principal noise sources at the application site were occasional vehicle movements along Hunningley Close and continuous running fixed plant at the joinery firm to the east. During the course of the night time period (early morning), the principal noise source was noted to be distant road traffic.

2.03 The application site currently houses a former medical centre which is to be demolished to allow for the construction of 10 new build dwelling houses (comprising of 2 terraces of 5 no. 2-storey dwelling houses). The dwellings are to front onto Hunningley Close with a large land holding (32 metres in length) to the rear continuing up to the eastern boundary of the application site (note: it is understood that the local planning authority normally consider up to circa 10 metres from a dwelling house to be outdoor amenity space).

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 early morning (circa 06:30 onwards) and daytime on Friday 6th June 2014.

3.02 For the purpose of the assessment, the following noise monitoring positions were adopted (the approximate location of the noise monitoring positions is contained in Appendix 2 for reference):

- MP1 was located (at a height of approximately 1.5 metres above ground level) at a distance of circa 10 metres from the western boundary of the application site
- MP2 was located (at a height of approximately 1.5 metres above ground level) at a distance of circa 10 metres from the eastern boundary of the application site (with a direct line of sight to the service yard to the joinery firm)
- MP3 was located (at a height of approximately 1.5 metres above ground level) at a distance of circa 10 metres from the eastern boundary of the application site

3.03 It should be noted that MP3 had a direct line of sight to the efflux point of a (presumably) dust extraction system at the joinery firm (however was screened from the service yard at the joinery firm and the majority of other low level plant).

3.04 Noise measurements were undertaken in a free field environment, using Bruel & Kjaer 2260 and 2250 Type 1 integrating sound level meters. Windshields were fitted for all measurements.

3.05 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.

3.06 Measurements consisted of A–weighted broadband parameters, together with linear octave band L_{eq} levels. Table 3.1 contains a summary of the measurement data for each measurement session, at each measurement position, rounded to the nearest decibel.

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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	06/06/14	06:33-07:00	54	47	56	74	Local and distant traffic
MP1	06/06/14	07:00-07:33	53	46	56	72	Local and distant traffic
MP1	06/06/14	09:49-10:49	57	56	58	72	Local and distant traffic in addition to distant noise associated with dust extraction plant at joiners firm to the east
MP1	06/06/14	10:49-11:49	57	56	58	74	
MP1	06/06/14	11:49-12:49	57	56	58	69	
Typical daytime ambient noise level circa 57 dB L_{Aeq}							
MP2	06/06/14	06:56-08:29	50	44	50	78	Local and distant traffic, joiners firm from 07:30
MP2	06/06/14	09:46-10:55	66	66	67	71	Dust extraction plant at joiners firm
Typical daytime ambient noise level circa 66 dB L_{Aeq}							
MP3	06/06/14	07:39-08:29	52	48	54	76	Local and distant traffic, joiners firm from 07:30
MP3	06/06/14	08:44-09:42	61	60	62	69	Dust extraction plant at joiners firm
Typical daytime ambient noise level circa 61 dB L_{Aeq}							

3.07 The measured ambient noise level of circa 57 dB $L_{Aeq\ (3\ hours)}$ at MP1 is considered to be representative of the (worst case) daytime ambient noise levels at the proposed dwelling houses (during the working hours of the joinery firm to the east).

3.08 The measured ambient noise level of circa 66 dB L_{Aeq} / 66 dB L_{A90} at MP2 is considered to be representative of the (worst case) daytime ambient noise levels at the eastern boundary of the application site. This location is subject to noise associated with the dust extraction system and in particular its efflux and other low level plant.

3.09 The measured ambient noise level of circa 61 dB L_{Aeq} / 60 dB L_{A90} at MP3 is considered to be representative of the (worst case) daytime ambient noise levels at the eastern boundary of the application site (when screened from other low level plant i.e. the noise associated with the dust extraction system and in particular its efflux alone).

3.10 The proposed residential dwellings are to be located at a distance of circa 32 metres from the eastern boundary of the application site (and circa 47 metres from the dust extraction system). Assuming point source propagation (between MP2 at circa 25 metres to the system and 47 metres to the proposed residential dwelling facade), the predicted noise level at the proposed residential facades (in the absence of any additional boundary screening) is calculated to be circa 61 dB L_{Aeq} (during the working hours of the joinery firm to the east). With additional boundary screening (as discussed later) it is considered that noise levels would reduce by circa 6 decibels (comparison of L_{A90} between MP2 and MP3).

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4.00 NOISE IMPACT ASSESSMENT CRITERIA

4.01 The National Planning Policy Framework (NPPF), came into force on 27 March 2012 and is a material consideration in planning decisions. At the heart of the NPPF is a presumption in favour of sustainable development, and the policies in Paragraphs 18 to 219 of the NPPF, taken as a whole, constitute the Government's view on what sustainable development in England means in practice for the planning system.

4.02 The NPPF states that there are three dimensions to sustainable development, which include an economic role (contributing to building a strong, responsive and competitive economy), a social role (providing the supply of housing required to meet the needs of present and future generations) and an environmental role (which includes minimising waste and pollution).

4.03 The NPPF supersedes Planning Policy Guidance Note 24 (PPG 24). The main policy statement in relation to noise is Paragraph 123 of the NPPF, which states:

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;*

- *Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;*

- *Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established (note: subject to the provisions of the Environmental Protection Act 1990 and other relevant law); and*

- *Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*

4.04 In relation to 'adverse impacts', the NPPF refers to the Explanatory Note to the Noise Policy Statement for England (NPSE) for guidance.

4.05 The Noise Policy Statement for England (NPSE) and associated Explanatory Note were published by DEFRA in 2010 and set out the Government's noise management strategy to enable noise management decisions to be made within the wider context (i.e. guiding principles of sustainable development), in a cost-effective manner and in a timely fashion.

4.06 Fundamental to this approach is '*there is a need to integrate consideration of the economic and social benefit of the activity or policy under examination with proper consideration of the adverse environmental effects, including the impact of noise on health and quality of life. This should avoid noise being treated in isolation in any particular situation, i.e. not focussing solely on the noise impact without taking into account other related factors'*.

4.07 The noise policy aims of NPSE are to (i) avoid significant adverse impact on health and quality of life, (ii) mitigate and minimise adverse impacts on health and quality of life, and (iii) where possible, contribute to the improvement of health and quality of life. The policy aims are always to be considered within the context of the Government's policy on sustainable development.

4.08 In relation to the mitigation and minimisation of adverse impacts, NPSE considers that '*in reality, although not always stated, the aim has tended to be to minimise noise 'as far as is reasonably practical'*. This is reinforced in Paragraph 2.24 of the Explanatory Note, which requires that '*all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur'*.

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4.09 In relation to explaining the 'significant adverse' and 'adverse' effects quoted in the NPPF, NPSE uses the two established concepts from toxicology that are currently being applied to noise impacts, for example by the World Health Organisation (WHO), these are:

- 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 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.

4.10 No specific criteria are presented in the NPSE, to provide the necessary policy flexibility until further evidence and suitable guidance is available. In lieu of specific criteria, for residential development, ENS makes reference to existing guideline documents, which are summarised in the following paragraph(s).

4.11 BS 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' (BS 8233) supersedes the 1999 version of the Standard, which has been withdrawn. BS 8233 sets guideline indoor ambient noise levels for dwellings, for steady external noise sources, which it is desirable are not exceeded. These levels are reproduced in Table 4.1 and are based on guidelines issued by the World Health Organisation (WHO). BS 8233 also states that 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.

Table 4.1 – BS 8233:2014 Indoor Ambient Noise Levels in Dwellings

Activity	Location	07:00 – 23:00	23:00 – 07:00
Resting	Living room	35 dB $L_{Aeq,16\ hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16\ hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16\ hour}$	30 dB $L_{Aeq,\ 8\ hour}$

4.12 For traditional external areas that are used for amenity space, such as gardens and patios, BS 8233 considers that it is desirable that the external noise level does not exceed 50 dB $L_{Aeq\ (0700–2300)}$ with an upper guideline value of 55 dB $L_{Aeq\ (0700–2300)}$ which would be acceptable in noisier environments. BS 8233 also states '*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'.*

4.13 With reference to the BS 8233 guidelines, by definition, 'reasonable internal conditions' cannot represent a significant adverse impact (the prevention of which is the 1st aim of NPSE). With cognisance to the 2nd aim of NPSE (to minimise noise impact), the internal ambient noise levels detailed in Table 4.1 are considered appropriate.

4.14 On the basis of the above, for residential development of the subject site, the following criteria are considered to be in keeping with the aims of the NPPF:

- 35 dB $L_{Aeq\ (0700\text{-}2300)}$ in habitable rooms (living rooms and bedrooms) during the daytime
- 30 dB $L_{Aeq\ (2300\text{-}0700)}$ in bedrooms during the night time
- 45 dB L_{AFmax} not normally exceeded in bedrooms during the night time
- Circa 55 dB $L_{Aeq\ (0700\text{-}2300)}$ during the daytime

5.00 RECOMMENDATIONS FOR SOUND ATTENUATION SCHEME PROPOSALS

5.01 Based on the noise measurements at MP2, it is calculated that the provision of a circa 3.0 metres high solid barrier (comparable to the eaves height of the (beige coloured) workshop at the joinery firm) along the eastern boundary across the rear landholding of Plots 5, 6 and 7 would provide circa 6 decibels of attenuation (comparison of LA90 between MP2 and MP3). reducing the noise levels at the rear garden areas of the proposed dwelling houses to circa 55 dB LAeq (during the operating hours of the joinery firm).

5.02 This is considered acceptable within the rear garden areas. Furthermore, the proposed boundary screening works would also afford benefits to the ambient noise climate to the other existing residential dwellings in the locale

Glazing and Ventilation Specification

5.03 British Standard 4142:1997 'Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas' (BS 4142:1997) describes methods for determining, at the outside of a building, noise levels from factories or industrial premises and a method for assessing whether the noise is likely to give rise to complaints from people residing in the building.

5.04 BS 4142 states that it 'may be used in conjunction with recommendations on noise levels and methods of measurement published elsewhere' (for example, World Health Organisation (WHO) guidelines on Community Noise (1999) and BS 8233:2014 objective guidance criteria). The actual BS 4142 assessment methodology is a comparative assessment only (i.e. it compares the noise level of the source with the background noise level and does not take into account the absolute noise level).

5.05 BS 4142 does not have the flexibility to consider attenuation measures to noise sensitive development which have been constructed with existing industrial noise sources in place (such as the application site) as it uses external measurements to determine the likelihood of complaints from inside the building. It assumes in effect, standard forms of existing housing and not specifically designed forms of housing that have taken the existing noise sources into account. Consequently, it is not considered an appropriate tool for assessing the noise impact within newly constructed / converted residential dwellings.

5.06 It is therefore recommended that an alternative method of ventilation is provided within the proposed dwelling houses to enable residents to keep windows closed whilst still receiving an adequate level of ventilation (note: alternative methods of ventilation are accepted and supported by the Noise Planning Guidance Note which has recently been published in accompaniment to the NPPF).

5.07 An alternative means of ventilation requires either an individual room system or a 'whole house' ducted system. The choice of system is, however, primarily dependant on the ventilation requirements of the development. An example individual room system is the Titon Sonair unit, with a single unit required within each habitable room. A whole house system may be a ducted heat recovery unit providing supply and extract ventilation (an example system is the Nuaire HRAV unit) or a System 3 Mechanical Extract Ventilation (MEV) system fitted with a boost function.

5.08 In order to calculate the sound insulation requirements of the building envelope for habitable rooms, 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, 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).

5.09 Based on a noise level of circa 55 dB L_{Aeq} during the daytime, it is calculated that standard double glazing rated at 25 dB R_w+C_{tr} (i.e. two panes of 4 mm glass separated by a nominal 20 mm cavity) may be provided to all habitable rooms as the corresponding internal noise levels would be well below 55 dB L_{Aeq}.

5.10 Although a maximum noise level of up to 74 dB L_{AFmax} was measured on the proposed western façade overlooking Hunningley Close at just before 07:00 hours, it is considered that vehicle movements along this residential road during the night time are likely to be extremely low. It is therefore considered that standard glazing and trickle ventilation will provide suitable protection against maximum noise levels at night.

6.00 CONCLUSIONS

6.01 A noise impact assessment has been undertaken for a proposed residential development at land off Hunningley Close, Stairfoot, Barnsley.

6.02 The ambient noise climate across the application site is due to fixed plant at the adjacent joinery firm and distant road traffic (with occasional movements along local roads).

6.03 The recommendations contained in this report have been provided to protect the proposed residential development from the ambient noise climate in accordance with the requirements of the National Planning Policy Framework. On this basis, the ambient noise climate is not considered to represent a constraint to the proposed 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

Anthony Harper
MIOA, Diploma in Acoustics & Noise Control, BSc(Hons)
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).

Appendix 2
Drawings (Approximate Noise Monitoring Positions)

