
Our ref: NIA/5277/14/4974

5 June 2014

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Dear Mr Wainwright

**NOISE IMPACT ASSESSMENT FOR PROPOSED RESIDENTIAL DEVELOPMENT
LAND TO THE NORTH OF SAVILLE LANE, THURLSTONE, PENISTONE**

1.00 INTRODUCTION

- 1.01 Environmental Noise Solutions Ltd (ENS) has been commissioned by HTC Architects, on behalf of its client James Durrans & Sons Ltd, to undertake a noise impact assessment for the proposed residential development of a parcel of land to the north of Saville Lane, Thurlstone, Penistone (hereafter referred to as the application site).
- 1.02 The objectives of the noise impact assessment were to:
- Determine the ambient noise climate at the application site during representative periods of the daytime and night time;
 - Assess the potential impact of the ambient noise climate on the proposed residential development (with reference to the National Planning Policy Framework and other pertinent guidelines); and
 - 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 external noise.
- 1.03 This report details the methodology and results of the assessment and provides recommendations for the residential building envelope (fenestration and ventilation). It has been prepared to accompany a planning application to be submitted to the local planning authority for the proposed residential development of the application site.
- 1.04 This report has been prepared for HTC Architects and James Durrans & Sons Ltd 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 the parties above 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 SITE SETTING AND PROPOSED DEVELOPMENT

- 2.01 The application site is located to the north of Saville Lane in Thurlstone and is currently occupied by the former office buildings (to be demolished) of the James Durrans & Sons Phoenix Works. A site location plan is contained in Appendix 2.
- 2.02 The site lies in a mixed use environment and is bound by:
- Existing residential development to the north, with the A628 beyond at approximately 50 metres up gradient from the site;
 - Existing residential development to the east;
 - Saville Lane to the south, with a warehouse of the Phoenix Works further south;
 - Elements of the Phoenix Works to the west (access road and canteen).
- 2.03 James Durrans & Sons Ltd supplies carbonaceous material to the manufacturing industry and the Phoenix Works extends to the south and west of the application site. The goods vehicle access to the works is understood to be off the A628 to the west of the application site, not via Saville Lane.
- 2.04 During the manned element of the noise survey, the noise climate was noted to consist of a combination of distant road traffic from the A628 and non-specific general industrial noise from the works. Forklift truck movements were audible from the warehouse to the south of Saville Lane, which had an open northern elevation (note: it is understood that as part of the redevelopment of the wider Phoenix Works site, this warehouse will be reduced in height and the open façade blocked up).
- 2.05 It is understood that the Phoenix Works site is a 24 hour operation, but that fork lift truck movements in the warehouse area are restricted to between 07:00 to 21:00 hours and the access gates off Saville Lane are locked between 16:45 and 07:00 hours.
- 2.06 The development proposals consist of the construction of seven dwellings, with garages at ground floor level and gardens to the rear (north). An illustrative layout is contained in Appendix 2.

3.00 BASELINE NOISE SURVEY

- 3.01 In order to determine the ambient noise climate at the application site, a baseline noise survey was undertaken between Friday 16 May and Monday 19 May 2014.
- 3.02 For the purpose of the noise impact assessment, the following noise monitoring positions (MPs) were adopted (the approximate locations are identified on an annotated plan in Appendix 2):
- MP1 was located in a reflective field environment by extending a boom 1 metre from the 1st floor southern façade of one of the existing buildings (representative of the southern façade of the proposed dwellings).
 - MP2 was located in a reflective field environment by extending a boom 1 metre from the 1st floor northern façade of one of the existing buildings (representative of the northern façade of the proposed dwellings).
- 3.03 Noise measurements were undertaken using a Bruel & Kjaer 2260 and a 2250 Type 1 integrating sound level meter. Measurements consisted of A-weighted broadband parameters, together with linear third octave band L_{eq} levels (logging interval of 1 minute at the southern façade and 5 minutes at the northern facade).
- 3.04 The measurement systems 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. A windshield was fitted for all measurements. Measurements consisted of a combination of manned and unmanned survey periods.

- 3.05 The following tables contain a summary of the measurement data for each measurement session, at each measurement position, rounded to the nearest decibel. A -3 dB façade reflection correction has been applied to the measured data. The data has been post processed using Bruel & Kjaer Evaluator software to present daytime (07:00 to 19:00 hours), evening (19:00 to 23:00 hours) and night time (23:00 to 07:00 hours) data sets.

Table 3.1 – Summary of noise measurement data at MP1

Position	Date	Time	L _{Aeq,T} (dB)	L _{AFmax} (dB)	L _{AF10} (dB)	L _{AF90} (dB)	Comment
MP1	16/5/14	09:40-19:00	56	90	55	42	Friday. Noise climate consisting of distant traffic and general industrial activity noise from the Phoenix Works. Occasional impacts audible from the warehousing area of the Phoenix Works. Typical L _{AFmax} < 77 dB, L _{AF1} 68 dB.
MP1	17/5/14	07:00-19:00	51	86	51	41	Saturday. Typical L _{AFmax} < 77 dB, L _{AF1} 63 dB.
MP1	18/5/14	07:00-19:00	47	77	49	39	Sunday. L _{AF1} 56 dB.
MP1	19/5/14	07:00-08:40	56	91	55	46	Monday. Noise climate consisting of distant traffic and general industrial activity noise from the Phoenix Works. Occasional impacts audible from the warehousing area of the Phoenix Works. Typical L _{AFmax} < 77 dB, L _{AF1} 67 dB.
MP1	16/5/14	19:00-23:00	43	65	46	37	Friday. L _{AF1} 52 dB.
MP1	17/5/14	19:00-23:00	43	71	45	37	Saturday. L _{AF1} 52 dB.
MP1	18/5/14	19:00-23:00	43	72	46	35	Sunday. L _{AF1} 53 dB.
MP1	16/5/14	23:00-07:00	44	74	47	36	Friday. Typical L _{AFmax} < 67 dB, L _{AF1} 53 dB.
MP1	17/5/14	23:00-07:00	43	72	46	36	Saturday. Typical L _{AFmax} < 67 dB, L _{AF1} 52 dB.
MP1	18/5/14	23:00-07:00	47	79	49	34	Sunday. Typical L _{AFmax} < 67 dB, L _{AF1} 57 dB.

Table 3.2 – Summary of noise measurement data at MP2

Position	Date	Time	L _{Aeq,T} (dB)	L _{AFmax} (dB)	L _{AF10} (dB)	L _{AF90} (dB)	Comment
MP2	16/5/14	09:54-19:00	52	76	54	43	Friday. Noise climate consisting of distant traffic and general industrial activity noise from the Phoenix Works. Occasional impacts audible from the warehousing area of the Phoenix Works. Typical L _{AFmax} < 72 dB, L _{AF1} 61 dB.
MP2	17/5/14	07:00-19:00	50	76	49	41	Saturday. Typical L _{AFmax} < 72 dB, L _{AF1} 64 dB.
MP2	18/5/14	07:00-15:40	48	80	49	40	Sunday. L _{AF1} 61 dB.
MP2	16/5/14	19:00-23:00	44	70	46	34	Friday. L _{AF1} 54 dB.
MP2	17/5/14	19:00-23:00	43	69	46	34	Saturday. L _{AF1} 54 dB.
MP2	16/5/14	23:00-07:00	43	65	46	31	Friday. Typical L _{AFmax} < 67 dB, L _{AF1} 53 dB.
MP2	17/5/14	23:00-07:00	43	74	46	31	Saturday. Typical L _{AFmax} < 67 dB, L _{AF1} 56 dB.

3.06 During the course of the noise survey average ambient noise levels were generally low (low to mid 50s L_{Aeq,T} during the daytime), with occasional high discrete event maxima (L_{AFmax}). Evening and night time average ambient noise levels were generally low, although the average noise level was noted to increase gradually from approximately 03:30 hours up to circa. 50 dB L_{Aeq,T} towards the end of the night time period.

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; 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'*.
- 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.
- 4.10 The NPSE then extends these concepts to lead to a SOAEL – Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur.
- 4.11 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 this assessment, ENS makes reference to existing guideline documents, which are summarised in the following paragraph(s).
- 4.12 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). The Standard 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 dB and reasonable internal conditions still achieved. The Standard considers that for regular individual noise events, a guideline value may be set in terms of SEL or L_{AFmax} depending on the character and number of events per night. The WHO Guidelines on Community Noise (1999) considers that

if negative effects on sleep are to be avoided, noise events exceeding 45 dB L_{Amax} should be limited.

Table 4.1 – Indoor Ambient Noise Levels in Dwellings (as recommended in BS 8233:2014)

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

- 4.13 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 $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments.
- 4.14 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.
- 4.15 Likewise, for external amenity space, a design range of 50 to 55 dB $L_{Aeq,T}$ is considered appropriate to comply with the requirements of the NPPF. Furthermore, the BS 8233 guidance in certain circumstance that *'development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited'*, is considered to be in keeping with the NPSE 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'*.
- 4.16 On the basis of the above, for the proposed development, the following criteria are considered to be in keeping with the aims of the NPPF:
- 35 dB $L_{Aeq(0700-2300)}$ in living rooms during the daytime.
 - 30 dB $L_{Aeq(2300-0700)}$ in bedrooms at night.
 - 45 dB L_{AFmax} not normally exceeded in bedrooms at night.
 - 50 - 55 dB $L_{Aeq(0700-2300)}$ in gardens during the daytime.

5.00 SOUND ATTENUATION SCHEME PROPOSALS

- 5.01 On the basis of the noise measurement data detailed in Section 3.00 and the design criteria in Section 4.00, the following double glazing specification is considered appropriate for the application site dwellings:
- Living rooms on the south, east and west facades: 6 mm float glass (6-20 mm air gap) 4 mm float glass.
 - Bedrooms on the south, east and west facades: 8 mm float glass (6-20 mm air gap) 4 mm float glass.
 - Living rooms on the north facades: 4 mm float glass (6-20 mm air gap) 4 mm float glass.
 - Bedrooms on the north facades: 6 mm float glass (6-20 mm air gap) 4 mm float glass.
- 5.02 In order to provide background and rapid ventilation without the need to open windows (and to provide a measure of protection against future changing work practices at the Phoenix Works), it is recommended that dwellings are provided with a mechanical ventilation strategy. Appropriate ventilation solutions include:
- A fully ducted mechanical ventilation system with heat recovery (MVHR).

- A System 3 mechanical extract ventilation (MEV) system. Note: where make up air is provided by trickle vents, these should have a $D_{n,e,w}$ of 37 dB vent open, 2500 mm² equivalent area.

5.03 Garden areas are located to the north of the dwellings and no specific attenuation measures are considered necessary.

6.00 CONCLUSIONS

6.01 A noise impact assessment has been undertaken for the proposed residential development of a parcel of land to the north of Saville Lane, Thurlstone, Penistone.

6.02 A scheme of sound insulation works has been developed in accordance with the requirements of the National Planning Policy Framework. On this basis, noise 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,



Richard Pennell
For 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 μ Pa 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 μ Pa).

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)

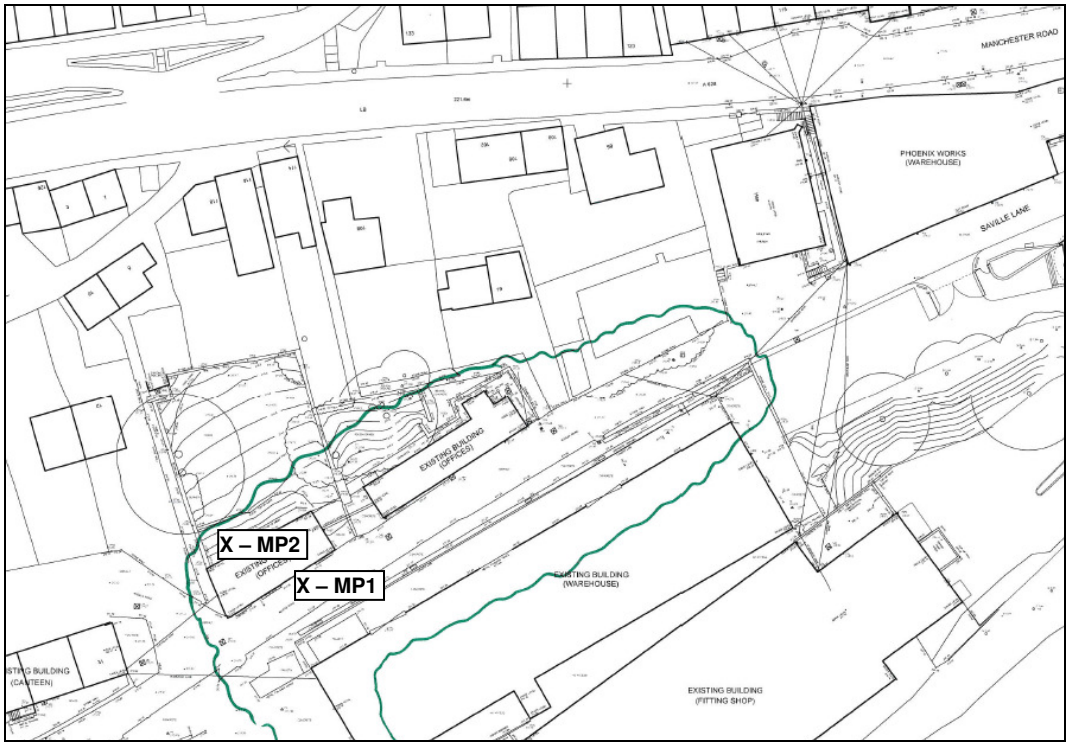
Single number quantity which characterises the airborne sound insulation properties of a material or building element over a defined range of frequencies (R_w is used to characterise the insulation of a material or product that has been measured in a laboratory).

Weighted Airborne Sound Insulation ($D_{nT,w}$)

Single number quantity which characterises the airborne sound insulation between rooms.

Appendix 2
Drawings

Site Location Plan



Annotated Illustrative Layout

