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NOISE IMPACT ASSESSMENT FOR PROPOSED RESIDENTIAL REDEVELOPMENT CO-OPERATIVE STREET AND VICTORIA STREET, GOLDTHORPE, BARSNLEY

1.00 INTRODUCTION

1.01 Environmental Noise Solutions has been commissioned by Barnsley Metropolitan Borough Council (BMBC) to carry out a noise impact assessment for a proposed residential redevelopment at Co-operative Street and Victoria Street, Goldthorpe, Barnsley (hereafter referred to as 'the site').

1.02 The objectives of the noise impact assessment were to:

- Determine the ambient noise level at the site
- Assess the potential impact of the ambient noise climate on the proposed development with reference to relevant guidelines
- Provide recommendations for a scheme of sound attenuation works, as necessary, to ensure that the future occupants of the proposed 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 treatments.

1.04 This report has been prepared for BMBC 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 aforementioned parties 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 RESIDENTIAL DEVELOPMENT

2.01 Development proposals are for the demolition of terraced properties in Goldthorpe (Nos. 1–23 Co-Operative Street, Nos. 8–18 Co-Operative Street and Nos. 4–26 Victoria Street) and for the erection of 9 no. replacement new build dwellings (see Appendix 3 for site plan).

2.02 The ambient noise climate at the site is due to intermittent vehicle passes on Co-Operative Street and Victoria Street, and distant road traffic noise on Doncaster Road.

2.03 Also in the vicinity is the Golden Nugget WMC, which has a function room situated immediately to the north of No. 8 Co-Operative Street (and directly opposite Nos. 1–27 Co-Operative Street). Following discussion with the owner, it is understood that the function room is used for sporadic events such as birthday parties.

2.04 The external seating area at the WMC is situated to the rear of the premises and is screened from the site by the building itself.

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3.00 BASELINE NOISE SURVEY

3.01 In order to establish external noise levels at the site, a noise survey was undertaken during the daytime and night-time on Monday 21st March 2022. The Golden Nugget WMC was noted to be operating normally on the evening of the survey.

3.02 The following noise monitoring positions were adopted (the approximate locations of the noise monitoring positions are shown in Appendix 2 for reference):

- MP1 was located at 1 metre from the existing façade of No. 11 Co-Operative Street (fronting towards the Golden Nugget WMC)
- MP2 was located at 1 metre from the existing façade of No. 16 Victoria Street
- MP3 was located on the footpath running between Co-Operative Street and Victoria Street at 1 metre from an existing boundary wall

3.03 Noise measurements were undertaken at 1.5 metres above ground level using a Bruel & Kjaer 2250 Type 1 integrating sound level meter. 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 The following table contains a summary of the measurement data for each measurement session, at each measurement position, rounded to the nearest decibel. As noise measurements were made at 1 metre from existing façades, a –3 decibel façade enhancement correction has been applied to the measured levels in order to establish the free field level.

Table 3.1 – Summary of Noise Measurement Data

Position	Date	Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{A10} (dB)	Comment
MP1	21/03/22	0945-1045	51	39	50	Intermittent vehicles along Co-Operative Street and distant road traffic on Doncaster Road
	21/03/22	2238-2300	46	39	49	
	21/03/22	2300-2339	43	38	45	
MP2	21/03/22	1146-1246	51	37	52	Intermittent vehicles along Victoria Street and distant road traffic on Doncaster Road
	21/03/22	2219-2234	37	31	38	
MP3	21/03/22	2201-2216	44	34	46	Local road traffic

3.05 The noise environment at the site was due to intermittent vehicle passes on Co-Operative Street and Victoria Street, and distant road traffic noise on Doncaster Road. No significant noise was noted from the Golden Nugget WMC or any other sources.

3.06 Daytime and night-time ambient noise levels at the site were measured at **≤ 51 dB $L_{Aeq, T}$** and **≤ 43 dB $L_{Aeq, T}$** respectively. Typical maximum noise levels were measured at up to **61 dB L_{AFMax}** during the night-time period. Such levels are relatively low.

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4.00 NATIONAL PLANNING POLICY FRAMEWORK AND OTHER RELEVANT GUIDANCE

National Planning Policy Framework

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

4.02 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'.

4.03 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'.

4.04 With regard to extant community noise sources and the potential to affect proposed new developments, Paragraph 193 states that:

'Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.'

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

Noise Policy Statement for England

4.06 The Noise Policy Statement for England (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.

4.07 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.

Planning Practice Guidance – Noise

4.08 Planning Practice Guidance (PPG) is an online resource (last updated 2019) 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.

4.09 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'.

4.10 The PPG also provides general advice on the typical options available for mitigating noise. It goes on to suggest 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'.

British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'

4.11 British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' 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 below.

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

Activity	Location	0700–2300	2300–0700
Resting	Living room	35 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

4.12 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 dB and reasonable internal conditions still achieved.*'

ENS note: It is evident that BS 8233 considers that **reasonable** resting and sleeping conditions are achieved with indoor ambient noise levels of ≤ 40 dB $L_{Aeq\ (0700–2300)}$ and ≤ 35 dB $L_{Aeq\ (2300–0700)}$.

4.13 Note 5 to the above table states:

'If relying on closed windows to meet the guide values, there needs to be an 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.'

4.14 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'.

4.15 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 $L_{Aeq\ (2300\text{-}0700)}$ during the night time

4.16 With regard to external 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.'

Approved Document O

4.17 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.

4.18 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)'*

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5.00 SOUND ATTENUATION SCHEME PROPOSALS

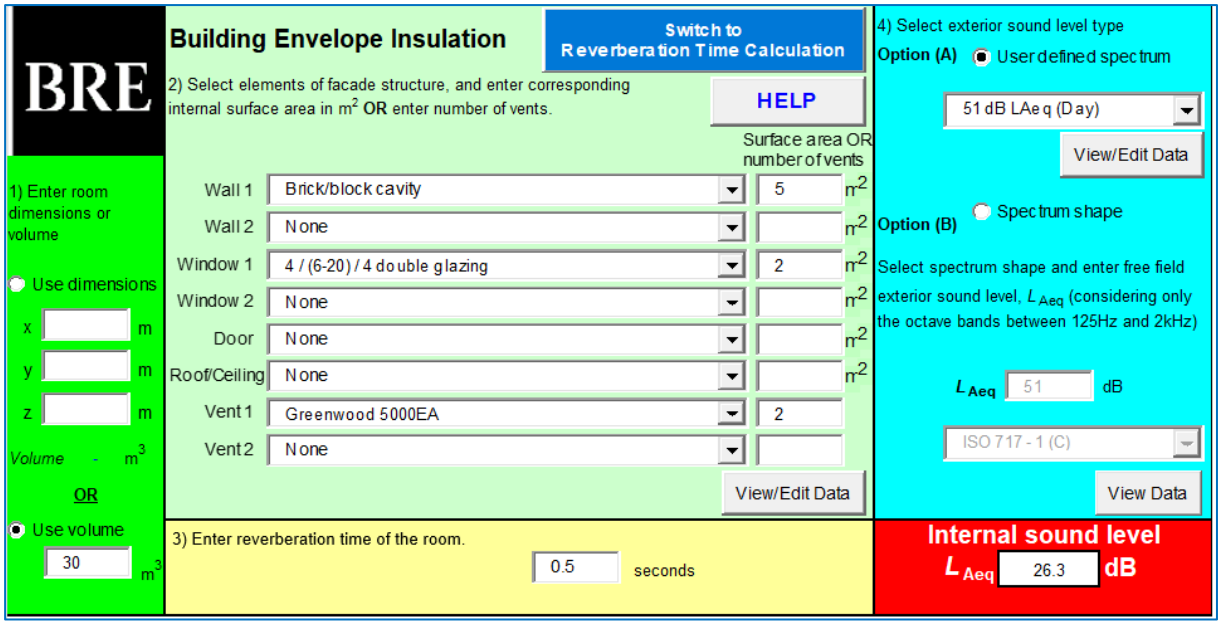
External Noise Ingress

5.01 Daytime and night-time ambient noise levels at the site were measured at **≤ 51 dB $L_{Aeq,\ T}$**, and **≤ 43 dB $L_{Aeq,\ T}$** with maximum noise levels measured at up to and **61 dB L_{AFMax}**.

5.02 The sound insulation requirements of habitable rooms at the development have been calculated using the methodology advocated in BS 8233, based on the external noise levels, room/glazing dimensions and reverberation time, together with parameters for the various elements of the building envelope.

5.03 As evidenced in the calculation sheet below, a typical standard double-glazed window rated at least 25 dB R_w+C_{tr} (such as 4 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 5.1: Example BRE Calculation Spreadsheet



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

Table 5.1: External Noise Levels and Resultant Internal Noise Levels

External Noise Level	Reduction	Resultant Internal Level	Comment
≤ 51 dB $L_{Aeq\ (0700\text{-}2300)}$ ≤ 43 dB $L_{Aeq\ (2300\text{-}0700)}$ ≤ 61 dB L_{AFMax}	–25 dB	≤ 26 dB $L_{Aeq\ (0700\text{-}2300)}$ ≤ 18 dB $L_{Aeq\ (2300\text{-}0700)}$ ≤ 36 dB L_{AFMax}	Very good internal noise levels with closed windows

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

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Feasibility of Open Windows

5.06 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.

5.07 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.

5.08 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).

5.09 As detailed above, external night-time noise levels at the site are ≤ **43 dB $L_{Aeq\ (2300\text{-}0700)}$** and ≤ **61 dB L_{AFMax}**.

5.10 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.

External Amenity (gardens)

5.11 Daytime ambient noise levels throughout the site have been measured at ≤ 51 dB $L_{Aeq\ (0700\text{-}2300)}$, which is within the target criteria contained in ProPG/BS 8233.

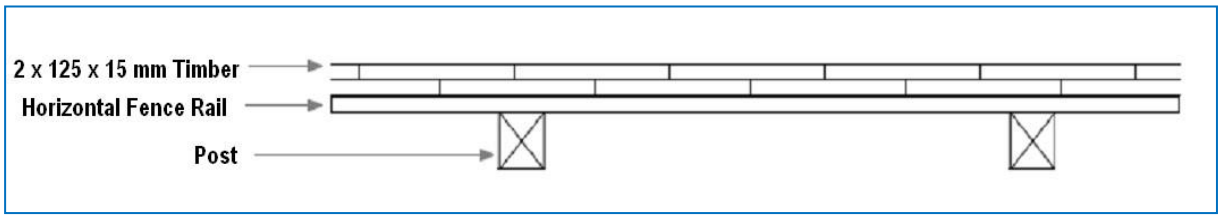
5.12 Further to this, the site layout indicates that dwellings will front onto surrounding roads, such that gardens throughout will be screened from the roads by the dwellings themselves. On this basis, there is no issue with respect to external amenity.

5.13 However, as a precautionary measure, it is recommended that the garden of Plot 9 is enclosed with a 1.8-metre-high solid timber fence to protect against potential noise associated with the Golden Nugget WMC (see Appendix 3 for fence location).

5.14 The fence should have a mass per unit area of ≥ 10 kg/m^2, should have no gaps or holes, and should be fully sealed at the ground (i.e. include a gravel board).

5.15 An indicative acoustic fence detail is illustrated in Figure 5.2 below. The double-thickness solid timber construction is considered robust and appropriate.

Figure 5.2: Indicative Acoustic Fence Detail



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Noise Break-Out from the Golden Nugget WMC

5.16 In relation to potential live music breakout from the Golden Nugget WMC, ENS has previously measured internal reverberant music noise levels of up to 90 dB $L_{Aeq\ (15\ min)}$ within a comparable function room during a busy live music event. This is robustly adopted as a worst-case internal reverberant noise level within the Golden Nugget WMC function room.

5.17 The weakest acoustic element of the function room is the windows. It is noted that there is circa 6 m^2 of glazing on the eastern elevation, with no windows on the southern gable end. The eastern elevation is set back circa 12 metres from the site footprint. The function room is lobbied internally.

5.18 The predicted noise break-out level from the venue during a live music event at the nearest proposed dwellings is predicted using the following formula (which is commonly referred to as 'Woods' formula and its use is commonplace and its accuracy widely accepted):

SPL2 = SPL1 – R + [10 log Sp] – [20 x log d] – 14

Where:

SPL2	=	Noise level at the receptor
SPL1	=	Internal reverberant noise level (taken as 90 dB $L_{Aeq\ (15\ min)}$)
R	=	Sound reduction of double-glazed window (typically 30 dB R_w)
Sp	=	Total area of glazing (circa 6 m^2)
d	=	Distance between source and receptor (10 m)
– 14	=	Diffusivity correction (reverberant field to free field)

5.19 Processing the above formula, the predicted noise breakout level at the site footprint associated with a live music event is calculated at circa 34 dB $L_{Aeq\ (15\ min)}$.

5.20 Such levels are significantly (at least 9 dB) below the night-time road traffic noise level at the development footprint. It is evident that the mitigation measures required to control road traffic noise ingress will readily mitigate occasional music noise breakout from the Golden Nugget WMC.

5.21 It is also noted that the proposed residential dwellings will not be in closer proximity to the WMC compared to the existing dwellings (to be demolished) and thus would not represent an additional constraint on the premises. The proposals are therefore in keeping with Paragraph 193 of the NPPF, namely, to avoid placing unreasonable restrictions on existing businesses as a result of the proposed development.

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6.00 CONCLUSIONS

6.01 A noise impact assessment has been undertaken for a proposed residential redevelopment at Co-operative Street and Victoria Street, Goldthorpe, Barnsley.

6.02 The ambient noise climate at the site is due to intermittent vehicle passes on Co-Operative Street and Victoria Street, and distant road traffic noise on Doncaster Road. Potential noise breakout from the neighbouring Golden Nugget WMC has also been considered.

6.03 Ambient noise levels throughout the application site are relatively low. As a consequence, double glazing and trickle vents are appropriate throughout the development and there are no issues with respect to external amenity.

6.04 It is further considered that the proposed residential development will not place any unreasonable constraints on the Golden Nugget WMC and therefore development proposals are in keeping with the aims of the NPPF.

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

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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 Location Plan / Noise Monitoring Positions

Appendix 3
Site Plan and Proposed Boundary Treatments