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Mr. Matthew Young
Property Services
Place Directorate
Regeneration & Culture Business Unit
Gateway
Barnsley MBC
S70 9GG

By email only: matthewyoung@barnsley.gov.uk

NOISE IMPACT ASSESSMENT FOR A PROPOSED RESIDENTIAL DEVELOPMENT FORMER GOLDTHORPE MARKET SITE, MARKET STREET, GOLDTHORPE

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 development at the former Goldthorpe Market Site, Market Street, Goldthorpe (hereafter referred to as 'the application site').

1.02 The objectives of the noise impact assessment were to:

- Determine the ambient noise level at the application 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. It has been prepared to accompany a planning application to be submitted to BMBC.

1.04 This report has been prepared for Barnsley Metropolitan Borough Council 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 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 within a mixed-use setting within Goldthorpe town centre and is bound by (see Appendix 2 for site location):

- Market Street to the west
- Rears of properties on Doncaster Road to the north (retail units with dwellings above)
- Golden Nugget working men club (WMC) to the east
- Existing residential dwellings to the south

2.02 Development proposals are for the demolition of the existing structures associated with Goldthorpe Market, and for the erection of 9 no. dwellings with associated landscaping.

2.03 The Golden Nugget WMC has an external seating area adjacent to the eastern boundary of the application site. The premises also has an external speaker within the external area. Following discussion with the owner, it is understood that the speaker may be in use between 1100 and 2230 hours every day (whilst patrons have access to the external areas until 0000 hours).

3.00 NOISE SURVEY

3.01 In order to establish external noise levels at the application site, a noise survey was undertaken on Tuesday 12th October through to the early hours of Wednesday 13th October 2021. The Golden Nugget WMC was operating normally on the evening of the survey, and the external speaker was operated for a brief period post 2230-hours in order to corroborate the daytime level only.

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 along the western boundary of the application site, at circa 3.5 metres from the nearside kerb of Market Street
- MP2 was located on the eastern boundary of the application site in the vicinity of the Golden Nugget WMC external area
- MP3 was located on the eastern boundary of the application site in the vicinity of the Golden Nugget WMC smoking shelter

3.03 Noise measurements were made in free field conditions using a Bruel & Kjaer 2250 Type 1 integrating sound level meter at 1.5 metres above ground level (AGL). A windshield was fitted for all measurements. The calibration of each measurement system was verified immediately before and after the survey 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 octave band L_{eq} levels. Table 3.1 presents a summary of the measurement data for each measurement session, at each measurement position, 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)	Comment
MP1	12/10/21	1350-1450	53	42	56	Road traffic on Doncaster Road and intermittent traffic on Market Street
	12/10/21	1450-1550	54	44	58	
	12/10/21	1550-1650	53	45	55	
	12/10/21	2338-0000	48	33	50	
	13/10/21	0000-0030	46	30	44	
	13/10/21	0030-0100	44	30	46	
MP2	**12/10/21**	**1326-1338**	**64**	**59**	**67**	**Music on and dominant**
	12/10/21	1338-1348	49	43	53	Music off, distant road traffic
	12/10/21	2300-2309	44	34	47	Music off, distant road traffic
	12/10/21	**2310-2313**	**64**	**49**	**68**	**Music on and dominant**
	12/10/21	2313-2320	46	36	50	Music off, distant road traffic
MP3	12/10/21	2321-2337	42	32	45	Distant road traffic

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3.05 During the survey, it was noted that the noise environment during the daytime period at the application site is characterised by road traffic on Doncaster Road and (to a lesser extent) Market Street, as well as music associated with The Golden Nugget WMC to the east. During the night time period the noise environment throughout the application site is characterised by local and distant road traffic.

3.06 Daytime and night time ambient noise levels on the Market Street boundary (MP1) were circa **53 dB $L_{Aeq, T}$** and **46 dB $L_{Aeq, T}$** respectively, with maximum levels of typically **69 dB L_{AFMax}** during the night time. Such levels are relatively low.

3.07 Daytime ambient noise levels at the eastern boundary (MP2) were dominated by music associated with The Golden Nugget WMC and were measured at up to **64 dB $L_{Aeq, T}$**. The following table contains the octave band frequency data for the music measurement at MP2, rounded to the nearest decibel.

Table 3.2 – MP2 Octave Band Frequency Data – Golden Nugget WMC Music

Octave Band L_{eq}								dB L_{Aeq}
63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
60	64	56	61	61	55	52	47	64

3.08 In the absence of music noise, daytime and night time ambient noise levels at the eastern boundary were circa **49 dB $L_{Aeq, T}$** and **45 dB $L_{Aeq\ (0700–2300)}$** respectively. Such levels are relatively low.

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 July 2021 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 174 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 185 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 187 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'.

ProPG Planning and Noise: New Residential Development

4.11 ProPG Planning and Noise: New Residential Development (ProPG) was published in May 2017 by the Association of Noise Consultants, Institute of Acoustics and the Chartered Institute of Environmental Health.

4.12 Stage 2: Element 2 of ProPG sets indoor ambient noise levels for residential dwellings based on the guidance contained in British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' (BS 8233) (see table below).

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Table 4.1 – Indoor Ambient Noise Levels in Dwellings

Activity	Location	Good Indoor Ambient Noise Levels	
Resting	Living Room	35 dB $L_{Aeq\ (0700–2300)}$	-
Dining	Dining Room/Area	40 dB $L_{Aeq\ (0700–2300)}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq\ (0700–2300)}$	30 dB $L_{Aeq\ (2300–0700)}$ 45 dB $L_{AFMax\ (2300–0700)}$

4.13 Note 4 to the above table states:

'A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night.'

4.14 Note 5 to the above table states:

'Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded, subject to the further advice in Note 7'.

4.15 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'.

4.16 The NPPF PPG requires that the character of the noise is taken into account. In relation to commercial noise impacting on the development, Annex B of BS 8233 describes methods for assessing the acceptability of a noise spectrum for a given application through the use of Noise Rating (NR) curves. This is a graphical method for assigning a single-number rating to a noise spectrum, and many local authorities have a requirement to comply with **NR30** in habitable rooms in the daytime where commercial noise (in this case, entertainment / music) is present.

4.17 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 $L_{Aeq\ (0700-2300)}$ and NR30 (entertainment / music noise) during the daytime
- ≤ 30 dB $L_{Aeq\ (2300-0700)}$
- 45 dB $L_{AFMax\ (2300-0700)}$ not normally exceeded during the night time

4.18 With respect to external amenity, ProPG reflects the advice contained in BS 8233, as follows:

'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.'

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5.00 SOUND ATTENUATION SCHEME PROPOSALS

5.01 Music noise levels associated with the Golden Nugget WMC were measured at up to **64 dB $L_{Aeq,\,T}$** at MP2.

5.02 The design noise levels on the western boundary of the application site are as follows:

- **≤ 53 dB $L_{Aeq,T}$** during the daytime
- **≤ 46 dB $L_{Aeq,T}$** during the night time
- **≤ 69 dB L_{AFMax}** during the night time

5.03 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.

5.04 For the purpose of the assessment, worst-case room dimensions (i.e. rooms with the highest ratio of glazing area to room volume) have been adopted. Reference has been made to the drawings and site plan supplied by the developer (DR-A-020 Prop Sketch Site Plan)

5.05 It is recommended that habitable rooms adjacent to/overlooking the external area at the Golden Nugget WMC are provided with a mechanical ventilation strategy (due to sensitivity to noise from the external speaker in the late evening (and also compliance with NR30)). Appropriate ventilation solutions include:

- A fully ducted mechanical ventilation system with heat recovery (MVHR)
- A System 3 mechanical extract ventilation (MEV) system
- A whole house positive input ventilation (PIV) system (e.g. Nuaire Drimaster 365)
- An individual room ventilator, such as the Titon Sonair unit (or equivalent)

5.06 Where the designed air permeability is tighter than (<) 5 $m^3/(h.m^2)$, 2500 mm^2 EA background ventilators may be required where MEV or PIV systems are proposed (1 no. vent per habitable room – to be confirmed with the developer). In order to maintain the sound insulation properties of the façade, any trickle vents should be rated at least **42 dB $D_{n,e,w}$** per 2500 mm^2 EA (vent open), such as the Greenwood 2500EAW.AC1, or equivalent.

5.07 The scheme of sound insulation for the application site is set out in Table 5.1 (see Appendix 3 for annotated glazing/ventilation markup).

Table 5.1 – Scheme of Sound Insulation Works

Location	Noise Level	Internal Criteria	Glazing
Habitable rooms adjacent to/facing towards the Golden Nugget WMC	≤ 64 dB $L_{Aeq,\,day}$	≤ 35 dB $L_{Aeq\,(0700\text{-}2300)}$ *	Enhanced glazing rated at 29 dB $R_w + C_{tr}$ i.e. 8 / (6-20) / 6 and mechanical ventilation
Remaining habitable rooms	≤ 53 dB $L_{Aeq,\,day}$ ≤ 46 dB $L_{Aeq,\,night}$ ≤ 69 dB L_{AFMax}	≤ 35 dB $L_{Aeq\,(0700\text{-}2300)}$ ≤ 30 dB $L_{Aeq\,(2300–0700)}$ ≤ 45 dB $L_{AFMax\,(2300–0700)}$	Standard glazing rated at 25 dB $R_w + C_{tr}$ i.e. 4 / (6-20) / 4 and standard trickle vents rated at **32 dB $D_{n,e,w}$** per 5000 mm^2 EA (vent open), such as the Titon Trimvent Select Xtra S13, or equivalent

* *NR30 compliance also required as music noise is dominant (see below)*

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5.08 The following table demonstrates that bedrooms throughout the development will achieve NR30 compliance with the provision of glazing and ventilation as specified.

Table 5.2 – NR30 Assessment for Bedroom (34 m³)

	Octave Frequency Band (Hz)							L_{Aeq}
	63	125	250	500	1000	2000	4000	
External Music Noise Level	60	64	56	61	61	55	52	64
Masonry Building Envelope (5.2 m²)	40	40	44	45	51	56	56	
8 mm glass / 12 mm cavity / 4 mm glass (2.0 m²)	16	22	21	28	38	40	47	
Greenwood 2500EAW.AC1 acoustic vent	35	41	40	38	48	44	44	
Total Façade Reduction	-21	-27	-26	-32	-41	-41	-42	
10 log (S/A)	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8	
External to Internal Correction	+3	+3	+3	+3	+3	+3	+3	
INTERNAL NOISE LEVEL	40	38	31	31	21	16	11	30
NR30	59	48	40	34	30	27	25	
Compliant	✓	✓	✓	✓	✓	✓	✓	

5.09 The following points should be noted:

- The glazing recommendations apply to the window within a sealed unit. It is the responsibility of the window supplier to ensure that the window frame does not compromise the performance of the glazing.

- When selecting a glazing system to satisfy the requirements outlined above, it is important to ensure that the $R_w + C_{tr}$ value is achieved (rather than simply the R_w value). Published R_w values tend to be higher than corresponding $R_w + C_{tr}$ values; therefore, incorrect selection could result in an overestimation of sound reduction performance which in turn could result in higher internal noise levels.

- Internal noise levels due to mechanical ventilation plant should not exceed 26 dB(A) in bedrooms and 30 dB(A) in living rooms

- Trickle ventilation sound reduction requirements apply to the vent in the open position and calculations assume 1 no. vent required per habitable room

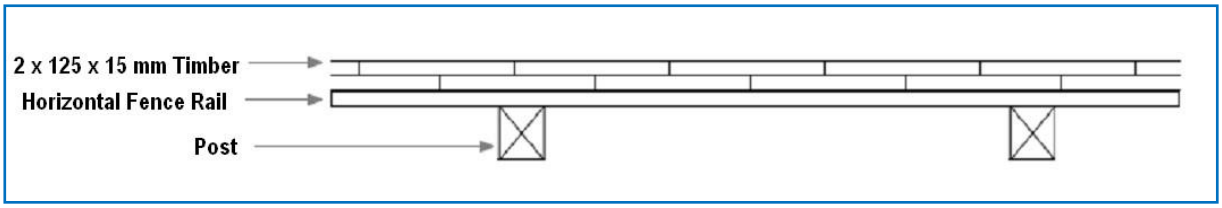
- The opening and free area of the ventilation unit should be checked by a mechanical service engineer before designs are finalised. Should the equivalent open area be insufficient to meet the minimum requirements of ADF, it may be necessary to increase the number of units per habitable room. Where this applies, the required sound reduction of the ventilation units should be increased accordingly (3 dB per doubling of required no. of vent units)

5.10 It is considered that, with the provision of glazing and ventilation as specified, the proposed residential development will not place any unreasonable constraints on the neighbouring commercial uses, and is therefore in keeping with the aims of Paragraph 187 of the NPPF.

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5.11 In order to protect the gardens of Plots 1–6 from noise associated with The Golden Nugget WMC, it is recommended that a 2.4-metre-high acoustic fence is installed along the eastern boundary of the application site. In order to protect the garden of Plot 4 from road traffic noise it is recommended that the garden is enclosed with a 1.8-metre-high acoustic fence. See Appendix 4 for locations of the fences.

5.12 The acoustic fence should be built in double-thickness solid timber construction as illustrated below. The fence should have no gaps or holes and should be fully sealed at the ground (i.e. include a gravel board).



6.00 CONCLUSIONS

6.01 A noise impact assessment has been undertaken for a proposed residential development at the former Goldthorpe Market Site, Market Street, Goldthorpe.

6.02 The noise environment during the daytime period at the application site is characterised by oad traffic on Doncaster Road and (to a lesser extent) Market Street, and music associated with The Golden Nugget WMC to the east. During the night time period the noise environment is characterised by local and distant road traffic.

6.03 A scheme of sound insulation works has been developed to protect the proposed residential development from the ambient noise climate.

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 Whitaker BSc Hons
MIOA, Diploma in Acoustics & Noise Control
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 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 / Noise Monitoring Positions



Appendix 3
Glazing Mark-Up



Appendix 4
Boundary Treatments

