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Dear Sir,

NOISE IMPACT ASSESSMENT FOR PROPOSED RESIDENTIAL DEVELOPMENT LAND AT MIDLAND ROAD, ROYSTON, BARNSLEY

1.00 INTRODUCTION

1.01 Environmental Noise Solutions Limited has been commissioned by Kier Living to carry out a noise impact assessment for a proposed residential development at land at Midland Road, Royston, Barnsley (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;
- Assess the potential impact of the ambient noise climate on the proposed development (with reference to the National Planning Policy Framework); and
- 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 and that operation of neighbouring businesses is not unreasonably constrained.

1.03 This report details the methodology and results of the assessment and provides recommendations for the building envelope (fenestration and ventilation). It has been prepared to accompany a planning application to be submitted to Barnsley Metropolitan Borough Council (BMBC) for the proposed residential development of the application site.

1.04 This report has been prepared for Kier Living 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 Kier Living 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.

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2.00 APPLICATION SITE SETTING AND PROPOSED RESIDENTIAL DEVELOPMENT

2.01 For reference, the application site is located in a predominantly residential setting in Royston, near Barnsley. It is bound by:

- A community / leisure centre to the west, flanked by residential use to its north and south;
- Residential dwellings and a place of worship to the south;
- ASDA supermarket to the east; and
- Warren Walk (a footpath/cycleway) to the north, with existing residential dwellings beyond.

2.02 The proposed residential development consists of 80 dwellings. A layout plan is contained in Appendix 2 for reference.

2.03 The noise environment across the application site is characterised by:

- Road traffic noise from the surrounding road network.
- Plant noise and intermittent delivery noise from the adjacent ASDA supermarket.
- Plant noise from Royston Leisure Centre / Civic Hall (audible but not significant or loud).

2.04 No other significant noise sources were noted in the vicinity of the application site.

2.05 It is understood that deliveries to the adjacent ASDA supermarket take place from circa 0500 hours, with the last delivery at circa 1700 hours.

3.00 BASELINE NOISE SURVEY

3.01 In order to establish the ambient noise levels at the application site, baseline noise surveys were undertaken during the daytime on Tuesday 11th October, during the daytime and evening on Wednesday 12th October and during the night time (early hours) on Thursday 13th October 2011.

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 the north east corner of the application site, at circa 20 metres to the centre of the ASDA service yard;
- MP2 was located near No. 1 Galway Close to the east of the application site;
- MP3 was located near the road façade of No. 57A Midland Road to the south of the application site;
- MP4 was located along the southern boundary of the application site, at the rear of Moss Rose Cottage (for reference this property fronts onto Midland Road);
- MP5 was located near Nos. 20–22 Well Hill Grove to the west of the application site;
- MP6 was located near the plant room associated with the community / leisure centre to the west of the application site;
- MP7 was located near the gable end of No. 54 Common Lane to the north of the application site; and
- MP8 was located off Ruston Drive to the north east of the application site.

3.03 Noise measurements were undertaken using a Bruel & Kjaer 2260 Type 1 integrating sound level meter. A 90 mm windshield was fitted for all measurements. Measurements were made in a free field environment at 1.5 metres above local ground level.

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3.04 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.

3.05 Measurements consisted of A–weighted broadband parameters, together with linear one-third octave band L_{eq} levels. The following table contains a summary of the measurement data for each measurement session, at each measurement position, rounded to the nearest decibel.

Table 3.1 – Noise Measurement Data

Position	Date	Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{A10} (dB)	L_{A1} (dB)	Comment
MP1	11/10/2011	1610–1725	58	45	59	70	Road traffic noise with occasional noise from activities at ASDA supermarket; typically 83 dB L_{AFMax} associated with delivery event
Daytime ambient noise level circa 58 dB $L_{Aeq, T}$ (maximum noise level typically 83 dB L_{AFMax} during a delivery)							
MP2	12/10/2011	1525–1540	58	44	59	70	Road traffic noise with occasional noise from activities at ASDA supermarket.
MP2	13/10/2011	0100–0120	46	32	42	61	Reduced road traffic noise with underlying 'roar' from distant industrial use.
Daytime ambient noise level circa 58 dB $L_{Aeq, T}$ and night time ambient noise level circa 46 dB $L_{Aeq, T}$							
MP3	12/10/2011	1545–1605	67	54	69	76	Road traffic noise on B6428 Midland Road.
MP3	13/10/2011	0130–0145	47	32	41	54	Reduced road traffic noise with underlying 'roar' from distant industrial use.
Daytime ambient noise level circa 67 dB $L_{Aeq, T}$ and night time ambient noise level circa 47 dB $L_{Aeq, T}$							
MP4	12/10/2011	1615–1630	48	40	51	58	Less exposed to road traffic noise due to buildings.
MP4	13/10/2011	0150–0205	37	28	37	49	Reduced road traffic noise with underlying 'roar' from distant industrial use.
Daytime ambient noise level circa 48 dB $L_{Aeq, T}$ and night time ambient noise level circa 37 dB $L_{Aeq, T}$							
MP5	12/10/2011	1655–1710	46	41	47	58	Distant road traffic noise with some noise from activities at nearby community / leisure centre.
Daytime ambient noise level circa 46 dB $L_{Aeq, T}$							
MP6	12/10/2011	1740–1815	51	48	52	58	Distant road traffic noise with some noise from activities at nearby community / leisure centre (external plant audible though not significant).
MP6	13/10/2011	0215–0240	46	43	48	49	Reduced distant road traffic noise, external plant at nearby community / leisure centre audible though not significant.
Daytime ambient noise level circa 51 dB $L_{Aeq, T}$ and night time ambient noise level circa 46 dB $L_{Aeq, T}$							
MP7	12/10/2011	1830–1845	44	34	45	55	Road traffic noise with some pedestrian activity.
MP7	13/10/2011	0245–0305	41	33	42	54	Reduced road traffic noise with underlying noise from distant industrial use.
Daytime ambient noise level circa 44 dB $L_{Aeq, T}$ and night time ambient noise level circa 41 dB $L_{Aeq, T}$							
MP8	12/10/2011	1900–1925	53	33	58	64	Road traffic noise.
Daytime ambient noise level circa 53 dB $L_{Aeq, T}$							

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3.06 The ambient noise climate throughout the application site was attributable to local and distant road traffic, with localised contributions from the adjacent community / leisure centre and the adjacent ASDA supermarket (predominantly the service yard).

3.07 During a delivery at the ASDA service yard (MP1) typical maximum noise levels of 83 dB L_{AFMax} were measured at circa 25 metres to the centre of the service yard. It is understood that deliveries take place during the night time period (typically from 0500 hours).

4.00 NOISE IMPACT ASSESSMENT CRITERIA

4.01 British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' (BS 8233) sets indoor ambient noise levels from residential dwellings (as reproduced in the table below).

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

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

4.02 Note 4 to the above table states '*Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or L_{AFMax} depending on the character and number of events per night. Sporadic noise events could require separate values'.*

4.03 In terms of maximum noise levels, the WHO Guidelines for Community Noise states *'For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{AFMax} more than 10–15 times per night (Vallet & Vernet 1991)'*.

4.04 Note 5 to the above table states '*If relying on closed windows to meet the guide values, there needs to be appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level. If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment*'.

4.05 Building Regulations Approved Document F 'Ventilation' (2010) states that for mainly naturally ventilated buildings, it is common to use a combination of ventilators (e. g. for dwellings it is common to use intermittent extract fans for **extract ventilation**, trickle ventilators for **whole dwelling ventilation** and windows for **purge ventilation**

4.06 Purge ventilation is used to aid in the removal of high concentrations pollutants and water vapour released from occasional activities such as painting and decorating and or accidental releases such as smoke and burnt food or spillage of water. Purge ventilation is intermittent i.e. required only when such activities occur. Purge ventilation provisions may also be used to improve thermal comfort, although this is **not controlled** under Building Regulations.

ENS note: it is evident that both BS 8233 and Building Regulations Approved Document F 'Ventilation' (2010) consider that adequate ventilation is provided by trickle ventilators in an open position.

4.07 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 $L_{Aeq\ (2300–0700)}$.

4.08 On the basis of the above, for residential development, the following criteria are considered appropriate:

- 35 dB $L_{Aeq\ (0700\text{-}2300)}$ in living rooms and bedrooms during the daytime.
- 30 dB $L_{Aeq\ (2300\text{-}0700)}$ in bedrooms at night.
- 45 dB $L_{AFMax\ (2300\text{-}0700)}$ not normally exceeded in bedrooms at night.

5.00 SOUND ATTENUATION SCHEME PROPOSALS

5.01 Based on external and internal noise measurements undertaken by ENS at other sites, it is considered that a standard double glazed window with standard trickle vents in a building façade will provide of the order of 30 dB(A) sound insulation (from external to internal) to road traffic noise. This statement is also corroborated by Annex 6 of the now superseded Planning Policy Guidance 24 'Planning and Noise' (PPG 24).

5.02 It is therefore considered that standard double glazed windows and standard trickle vents are appropriate throughout the majority of the application site, with the exception of the bedrooms overlooking the ASDA service yard.

Note: It is the control of discrete event maxima from deliveries during the night time period which governs the façade sound insulation requirements in these bedrooms.

5.03 Maximum noise levels adjacent to the ASDA service yard (MP1) have been measured at typically 83 dB L_{AFMax} during a delivery. Plots 1–4 and Plots 6–7 are located circa 25–50 metres from the centre of service yard. Any bedroom windows within these plots which overlook the service yard should have enhanced glazing rated at least 41 dB R_w, such as 6 mm glass / 6–16 mm cavity / 8.8 Pilkington Optiphon (see Appendix 3 for locations of enhanced glazing).

5.04 Trickle ventilation is not appropriate. In order to provide rapid ventilation without the need to open windows, it is recommended that the bedrooms with enhanced glazing 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 (e.g. Airflow Developments Ltd.).
- 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).

5.05 For dwellings which require enhanced double glazing, should there be any room-in-roof constructions, these should have:

- Double boarded ceilings / walls (and also double board 'cheek' walls to dormer windows overlooking the ASDA service yard.

- An equivalent glazing specification to that in Paragraph 5.03 to dormer / roof windows overlooking the ASDA service yard.

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6.00 CONCLUSIONS

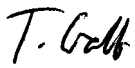
6.01 A noise impact assessment has been undertaken for a proposed residential development at land at Midland Road, Royston, Barnsley.

6.02 The ambient noise climate throughout the application site is attributable to local and distant road traffic, with localised contributions from the adjacent community / leisure centre and ASDA supermarket (predominantly the service yard).

6.03 A scheme of sound insulation has been developed to protect residential amenity from the ambient noise climate. As a consequence, the ambient noise climate is not considered to represent a constraint to the proposed residential development.

I trust the foregoing is sufficient for your needs. Should you have any queries regarding the above, please do not hesitate to contact me.

Yours sincerely,



Thomas Crabb
MIOA, Diploma in Acoustics and Noise Control
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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.

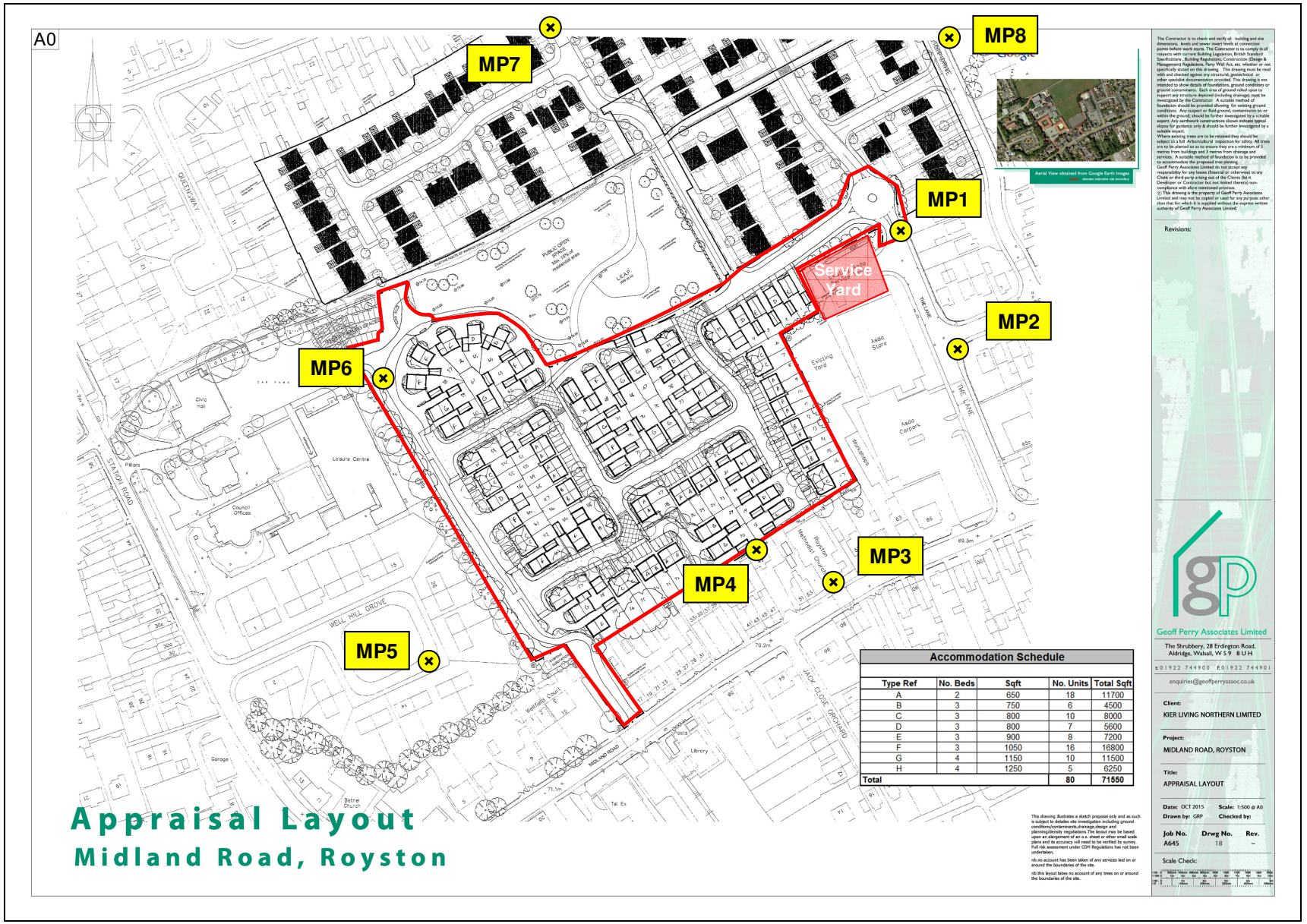
Sound Exposure Level (SEL or L_{AE})

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 Location Plan and Measurement Locations



Appendix 3
Enhanced Glazing/Ventilation Location