STRATA HOMES LTD

PROPOSED RESIDENTIAL DEVELOPMENT

BARNSLEY ROAD, WOMBWELL, BARNSLEY

NOISE IMPACT ASSESSMENT

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SECTION 1 INTRODUCTION

1.1 Environmental Noise Solutions Limited (ENS) has been commissioned by Strata Homes Ltd to undertake an assessment of the impact of the ambient noise climate on a proposed residential development at land off the A633 Barnsley Road, Wombwell, Barnsley (hereafter referred to as the application site).

1.2 For reference, outline planning permission for the residential development of the application site was granted conditionally by Barnsley Metropolitan Borough Council (BMBC) in August 2007 (Local Planning Authority Reference 2006/1172). Condition 10 relates to the control of noise as follows:

Details submitted pursuant to this permission shall include specific details of noise mitigation measures. The report, endorsed by a competent engineer experienced in noise issues, shall:

Assess predicted noise levels at main habitable room windows (e.g. bedrooms and living rooms) and gardens;

Demonstrate that the good standard detailed in BS8233 can be met;

Demonstrate that noise levels will be no higher than 55 dB LAeq (16 hr) on any balconies, terraces or in any garden between the hours of 23:00 and 07:00 (sic).

Reason: To safeguard the amenities of future residents.

1.3 The objectives of the assessment were, therefore, to:

i. Determine noise levels at the application site during representative periods of the daytime;

ii. Determine the ambient noise climate at the application site over the entire daytime and night time period by calculation with reference to pertinent guidelines;

iii. Assess the potential impact of the ambient noise climate on the proposed residential development with reference to Planning Policy Guidance Note 24 'Planning and Noise' (PPG 24) and other pertinent guidelines; and

iv. Provide recommendations for a scheme of sound attenuation works, as necessary, to ensure that future occupants of the proposed residential development do not experience a loss of amenity due to noise.

1.4 This report details the methodology and results of the assessment and, where appropriate, provides recommendations for the building envelope construction (fenestration and ventilation) and boundary screening. It has been prepared to accompany a planning application to be resubmitted to BMBC for the residential development of the application site.

1.5 This report has been prepared for Strata Homes 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 ENS and/or Strata Homes Ltd as to the extent to which the findings may be appropriate for their use.

1.6 A glossary of acoustic terms used in the main body of the text is contained in Appendix 1.

SECTION 2 SITE SETTING

2.1 The application site is roughly rectangular in shape and is located to the south of the A633 Barnsley Road, Wombwell, approximately 3 miles south east of Barnsley town centre. A site location plan is attached in Appendix 2.

2.2 The application site is located in a mixed use residential and light industrial / commercial area. It is bound by:

i. The A633 Barnsley Road to the north east, across which lie light industrial / commercial uses within the Aldham Industrial Estate;

ii. Aldham House Lane to the west, across which lies a distribution depot (understood to be occupied by YEDL) and residential development; and

iii. Residential development (beyond an embankment) to the south east and south west.

2.3 The ambient noise climate at the application site was characterised by road traffic noise from the A633 Barnsley Road, with a lesser contribution from Aldham House Lane. Noise from the nearby light industrial / commercial uses was not noted to be significant during the course of the survey.

2.4 Adjacent to the application site, the A633 Barnsley Road is single carriageway in each direction with a 40 miles per hour speed restriction in place. During the course of the noise survey, traffic movements along the road were generally observed to be steady. A manual shortened daytime traffic count indicated that around noon, the volume of traffic on this road was around 1,250 to 1,350 vehicles per hour, with roughly equal traffic volumes on each carriageway. It was estimated that Heavy Goods Vehicles (HGVs) accounted for around 8 percent of the traffic volume. Later in the afternoon (c. 14:00 hours), the volume of traffic had increased slightly to around 1,500 vehicles per hour; the proportion of HGVs remained constant at around 8 percent.

2.5 Adjacent to the application site, Aldham House Lane is also single carriageway in each direction, with traffic calming measures in place. During the course of the noise survey, this road was observed to carry of the order of 200 vehicles per hour, including around 6 percent HGVs.

2.6 A number of light industrial / commercial uses (including windows, doors and conservatory manufacturing units and a children's play centre) are located within the Aldham Industrial Estate to the north east of the application site, with a distribution depot located to the west. During the course of the noise survey, no significant noise generating activities were observed from these premises.

2.7 In summary, the primary noise source at the application site is considered to be road traffic noise from A633 Barnsley Road.

2.8 The proposed residential development consists of 93 residential dwelling units. An illustrative site layout is contained in Appendix 2 for reference.

2.9 The proposed residential development along the A633 Barnsley Road will provide extensive screening from road traffic noise to the remainder of the development.

SECTION 3 ENVIRONMENTAL NOISE SURVEY

3.1 In order to assess the ambient noise climate at the application site and obtain design data for the sound attenuation scheme, noise measurements were taken between approximately 11:50 and 15:44 hours on Tuesday 22nd February 2011.

3.2 For the purpose of this assessment, the following monitoring positions (MPs) were adopted:

i. MP1 was located towards the mid point of the north eastern site boundary at approximately 8 metres to the road kerb (note: MP1 representative of the A633 Barnsley Road frontage of the proposed residential development). Additional measurements were also taken at varying distances from the road kerb to assess attenuation of noise with distance.

ii. MP2 was located at the south western corner of the application site (note: MP2 used to assess road traffic noise from Aldham House Lane); and

iii. MP3 was located in the south eastern region of the application site.

3.3 All measurements were taken in a free field environment at approximately 3.5 metres above ground level. The approximate location of the monitoring positions is reproduced in Appendix 2 for reference.

3.4 Noise measurements were undertaken using a Bruel & Kjaer 2260 sound level meter. Monitoring sessions consisted of logged measurements (logging intervals of 60 seconds) over a period of at least 10 minutes. A–weighted broadband parameters and linear third octave band L_{eq} levels were measured. Basic frequency analysis illustrates that the external noise climate did not have any tonal characteristics and was consistent with the spectrum for road traffic noise.

3.5 A 90 mm windshield was fitted for all measurements. The measurement system calibration was verified immediately before the commencement of the measurement sessions and again at the end, with no drift in calibration level noted. Weather conditions throughout the measurement sessions were considered suitable for surveying.

3.6 For the prediction of daytime road traffic noise, The Department of Transport's Memorandum on the Calculation of Road Traffic Noise (CRTN) explains that the following shortened measurement procedure may be used. Measurements of L_{A10} are made over any three consecutive hours between 10:00 and 17:00 hours. Using $L_{A10\ (3\ hour)}$ as the arithmetic mean of the three consecutive values of hourly L_{A10}, the current value of $L_{A10,\ 18\ hour}$ can be calculated from the equation:

(i) $L_{A10\ (18\ hour)} = L_{A10\ (3\ hour)} - 1\ dB$

3.7 PPG 24 further states that for road traffic noise:

(ii) $L_{Aeq\ (16\ hour)} \approx L_{A10\ (18\ hour)} - 2\ dB$

3.8 Substituting (ii) into (i) gives the following approximation:

(iii) $L_{Aeq\ (16\ hour)} \approx L_{A10\ (3\ hour)} - 3\ dB$

3.9 Although the procedure contained in CRTN has not been strictly adopted (shorter reference time intervals have been used rather than the three consecutive 1-hour time intervals stipulated in CRTN), given the limited variation in road traffic noise observed during the course of the noise survey, the estimation of the daytime equivalent continuous noise level ($L_{Aeq\ (07:00-23:00)}$) from the $L_{A10\ (3\ hour)}$ is still considered valid for the purpose of establishing the Noise Exposure Category of the application site.

3.10 Based on experience from other urban sites affected by road traffic noise, for the purpose of this assessment, the 8–hour night time noise level has been taken as 6 dB(A) less than the corresponding 16–hour daytime noise level.

3.11 The following tables contain a summary of the noise measurement data, rounded to the nearest decibel. Where appropriate, any unrepresentative events have been excluded by post processing the data using Bruel and Kjaer Evaluator Type 7820 *software. The typical maximum noise levels associated with vehicle movements* on the A633 Barnsley Road have been based on time history plots for the noise measurements.

Table 3.1 – Noise Measurements at MP1 (north east boundary, ≈ 8 metres to kerb)

Date	Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{A10} (dB)	Comments
22/02/11	11:50–12:20	72	64	75	Road traffic noise from the A633 (circa 1,200 vehicles/hr), typical vehicle pass L_{AFmax} ≈ 77 dB; two blue light events excluded
22/02/11	14:07–14:25	72	65	75	Road traffic noise from the A633 (circa 1,500 vehicles/hr), typical vehicle pass L_{AFmax} ≈ 78 dB
22/02/11	14:32–14:50	72	66	74	Road traffic noise from the A633 (circa 1,500 vehicles/hr), typical vehicle pass L_{AFmax} ≈ 77 dB
22/02/11	12:23–12:47	70	65	73	MP1A 16m to road kerb; Road traffic noise from the A633 (circa 1,350 vehicles/hr), typical vehicle pass L_{AFmax} ≈ 75 dB
22/02/11	12:50–13:17	66	61	68	MP1B 32m to road kerb; Road traffic noise from the A633 (circa 1,250 vehicles/hr), typical vehicle pass L_{AFmax} ≈ 70 dB
22/02/11	13:20–14:04	60	56	62	MP1C 64m to road kerb; Road traffic noise from the A633 (circa 1,500 vehicles/hr), typical vehicle pass L_{AFmax} ≈ 65 dB
Daytime ambient noise level at 8m to road kerb ≈ 72 dB $L_{Aeq,T}$ based on CRTN methodology **Night time ambient noise level at 8m to road kerb ≈ 66 dB $L_{Aeq,T}$ based on 6 dB(A) reduction from daytime** **Typical maximum noise level at 8m to road kerb ≈ 78 dB L_{AFmax}**					

Table 3.2 – Noise Measurements at MP2 (south west corner)

Date	Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{A10} (dB)	Comments
22/02/11	15:06–15:27	59	54	62	Local road traffic on Aldham House Lane and distant road traffic noise from the A633, typical vehicle pass L_{AFmax} ≈ 67 dB
Daytime ambient noise level ≈ 59 dB $L_{Aeq,T}$ based on CRTN methodology **Night time ambient noise level ≈ 53 dB $L_{Aeq,T}$ based on 6 dB(A) reduction from daytime** **Typical maximum noise level ≈ 67 dB L_{AFmax}**					

Table 3.3 – Noise Measurements at MP3 (south east corner)

Date	Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{A10} (dB)	Comments
22/02/11	15:34–15:44	52	48	54	Distant road traffic noise from the A633, typical vehicle pass $L_{AFmax} \approx 59$ dB
Daytime ambient noise level ≈ 52 dB $L_{Aeq,T}$ based on CRTN methodology					
Night time ambient noise level ≈ 46 dB $L_{Aeq,T}$ based on 6 dB(A) reduction from daytime					
Typical maximum noise level ≈ 59 dB L_{AFmax}					

3.12 In summary, the ambient noise climate at the application site is dominated by road traffic noise from the A633 Barnsley Road, with no significant noise emissions from the nearby light industrial / commercial uses noted.

3.13 The ambient daytime noise level at MP1 (approximately 8 metres to the A633 Barnsley Road kerb) has been measured at 72 dB $L_{Aeq,T}$. As expected, the ambient noise level decreases with increased distance from the road (line source propagation with a circa 3 decibel reduction per doubling of distance).

3.14 It is considered that any potential noise associated with the nearby light industrial / commercial uses will be addressed by the attenuation measures required for the mitigation of road traffic noise.

SECTION 4 PPG 24 ASSESSMENT

4.1 Principles and specific guidelines on noise and planning issues are given in Planning Policy Guidance 24, 'Planning and Noise' (PPG 24), published by the Department of the Environment in 1994. This document deals with the introduction of new residential development near to existing noise sources, as is the case with this proposed development.

4.2 PPG 24 defines four Noise Exposure Categories (NECs), which indicate to what extent noise should be considered in the granting of planning permission. PPG 24 also defines noise levels for each category, for a variety of noise sources. The following table shows a summary of the recommended noise exposure categories for new residential development near to existing noise sources in line with PPG 24.

Table 4.1 – Summary of PPG 24 Noise Exposure Categories for New Dwellings

Noise levels corresponding to the NECs for new dwellings $L_{Aeq,T}$ dB				
Noise source	Noise Exposure Category			
	A	B	C	D
Road traffic				
07:00 – 23:00	<55	55 – 63	63 – 72	>72
23:00 – 07:00	<45	45 – 57	57 – 66	>66
Advice	Noise need not be considered a determining factor in granting planning permission.	Noise should be taken into account when determining planning applications and where appropriate conditions imposed to ensure an adequate level of protection against noise.	Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.	Planning permission should normally be refused.

Note: Night time noise levels (23:00–07:00) – sites where individual noise events regularly exceed 82 dB L_{AMax} (slow time weighting) several times in any hour should be treated as being in NEC C, regardless of the $L_{Aeq,8h}$ (except where the $L_{Aeq,8h}$ already puts the site in NEC D).

4.3 Although a PPG24 categorisation of the application site is not required since outline planning permission for residential development has been granted, the following PPG 24 categorisation is considered appropriate:

i. The A633 Barnsley Road frontage of the proposed residential development is located at the boundary of Noise Exposure Category C and D;

ii. (Unscreened) areas between 10 and 50 metres of the road kerb are located within Noise Exposure Category C; and

iii. The majority of the remainder of the development footprint is located within Noise Exposure Category B, although the south east corner is located within Noise Exposure Category A.

SECTION 5 SOUND ATTENUATION SCHEME PROPOSALS

5.1 INTRODUCTION

5.1.1 In the interests of the amenity of the future occupants of the proposed residential development, the local planning authority requires that a sound attenuation scheme should be designed in accordance with the following criteria, with windows shut and other means of ventilation provided:

i. 35 dB L_{Aeq} or less within living rooms between 07:00 and 23:00 hours;

ii. 30 dB L_{Aeq} or less within bedrooms between 23:00 and 07:00 hours;

iii. 45 dB L_{AF1} or less within bedrooms between 23:00 and 07:00 hours; and

iv. 55 dB L_{Aeq} or less within gardens between 07:00 and 23:00 hours.

5.1.2 The internal criteria above are commensurate with good resting and sleeping conditions (for bedrooms) in accordance with British Standard 8233:1999 'Sound Insulation and Noise Reduction for Buildings – Code of Practice' (BS 8233).

5.1.3 The following sound attenuation scheme proposals are based on the requirements above and with reference to the proposed site layout. Should layout changes be considered, ENS should be consulted with regards to the effect on the sound attenuation scheme proposals.

5.2 INDICATIVE GLAZING REQUIREMENTS

5.2.1 The following table summarises the indicative glazing requirements for the proposed residential development.

5.2.2 The indicative glazing specification is based solely on the sound insulation requirements and does not consider the thermal insulation requirements.

Table 5.1 – Indicative Glazing Requirements

Plots / Façades	External Noise Level	Glazing Specification
Façades directly overlooking & in close proximity to A633 Barnsley Road (Plots 1–4, 12–19, 57–73 & 82–93)	72 dB $L_{Aeq\ (07:00–23:00)}$ 66 dB $L_{Aeq\ (23:00–07:00)}$ & 78 dB L_{AFmax}	37 dB R_{TRA} Specialist acoustic double glazing 10 mm float glass / (16 mm air gap) / 8.8 mm SGG STADIP
Façades perpendicular to & in close proximity to A633 Barnsley Road (Plots 1–4, 12–19, 57–73 & 82–93)	69 dB $L_{Aeq\ (07:00–23:00)}$ 63 dB $L_{Aeq\ (23:00–07:00)}$ & 75 dB L_{AFmax}	34 dB R_{TRA} Specialist acoustic double glazing 6 mm float glass / (16 mm air gap) / 8.4 mm SGG STADIP Silence
Façades perpendicular to & moderately close proximity to A633 Barnsley Road (Plots 20–23 & 78–81)	66 dB $L_{Aeq\ (07:00–23:00)}$ 60 dB $L_{Aeq\ (23:00–07:00)}$ & 72 dB L_{AFmax}	31 dB R_{TRA} Enhanced double glazing 10 mm float glass / (16 mm air gap) / 6 mm float glass
All other façades (screened from and/or set back from A633 Barnsley Road)	< 60 dB $L_{Aeq\ (07:00–23:00)}$ < 55 dB $L_{Aeq\ (23:00–07:00)}$ & 70 dB L_{AFmax}	25 dB R_{TRA} Standard double glazing 4 mm float glass / (16 mm air gap) / 4 mm float glass

5.3 VENTILATION REQUIREMENTS

5.3.1 The internal noise levels are generally taken to be with windows shut and other means of ventilation provided.

5.3.2 Acoustically treated wall vents are recommended to provide background ventilation to all habitable rooms within Plots 1–4, 12–19, 57–73 & 82–93 overlooking the A633 Barnsley Road. The wall vents should be compliant with the Noise Insulations Regulations 1975, such as the Greenwood MA3051 Acoustic Wall Ventilator or the Silavent MKII Acoustic Airbrick.

5.3.3 Acoustically treated window vents are recommended to provide background ventilation to all habitable rooms within Plots 20–23 and 78–81. The weighted normalised level difference of the window vent should be ≥ 40 dB $D_{n,e,w}$. Example suitable acoustic vents include the Greenwood Acoustic Humidity Control Vent.

5.3.4 For all other habitable rooms within the remainder of the development (with standard double glazing), standard through–frame (slot) window ventilators are considered appropriate.

5.4 **ROOF CONSTRUCTIONS (2½ & 3½ STOREY DWELLING HOUSES)**

5.4.1 Roof constructions are commonly weak acoustically. In order to control road traffic noise, it is recommended that the ceiling of the upper floor of the 2½ and 3½ storey dwelling house fronting onto the A633 Barnsley Road should consists of two layers of dense plasterboard (fixed to the rafters via a metal resilient bar) with a 100 mm sound absorbing layer above (e.g. 10 kg/m^3 mineral wool insulation).

5.5 **BOUNDARY SCREENING TO GARDEN AREAS**

5.5.1 The gardens associated with the proposed residential dwellings along the A633 Barnsley Road are located to the rear of these dwellings and, as a consequence, will be extensively screened from road traffic noise. Notwithstanding this, in order to minimise the impact of road traffic noise on these and other gardens, it is recommended that a circa 1.8 to 2.0 metre high solid timber fence should be erected in the locations illustrated in Appendix 2.

5.5.2 The solid timber fence should have a superficial mass of at least 10 kg/m^2 and the panels should be rigidly mounted and there should be no gaps between adjacent panels, or the fence and the ground. The fence should be designed (e.g. through the use of cover strips) so that gaps do not develop between abutting panels through warping or shrinking.

5.5.3 Alternatively, a circa 1.8 to 2.0 metre high masonry (brick) wall may be provided in the locations illustrated in Appendix 2.

SECTION 6 CONCLUSIONS

6.1 A noise impact assessment has been undertaken for a proposed residential development at land off the A633 Barnsley Road, Wombwell, Barnsley. The main aim of the assessment was to determine the potential impact of the ambient noise climate on the future occupants of the development.

6.2 The principal noise source at the application site was considered to be road traffic on the A633 Barnsley Road.

6.3 In accordance with Planning Policy Guidance 24: the A633 Barnsley Road frontage of the proposed residential development is located at the boundary of Noise Exposure Category C and D; (unscreened) areas between 10 and 50 metres from the road kerb are located within Noise Exposure Category C; and the majority of the remainder of the development footprint is located within Noise Exposure Category B, although the south east corner is located within Noise Exposure Category A.

6.4 An indicative scheme of sound attenuation works has been developed to protect the future occupants of the proposed residential development from road traffic noise. On this basis, the ambient noise climate is not considered to represent a constraint to the proposed residential development of the application site.

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APPENDIX 1 ▪ Glossary of Acoustic Terms

APPENDIX 1 GLOSSARY OF 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).

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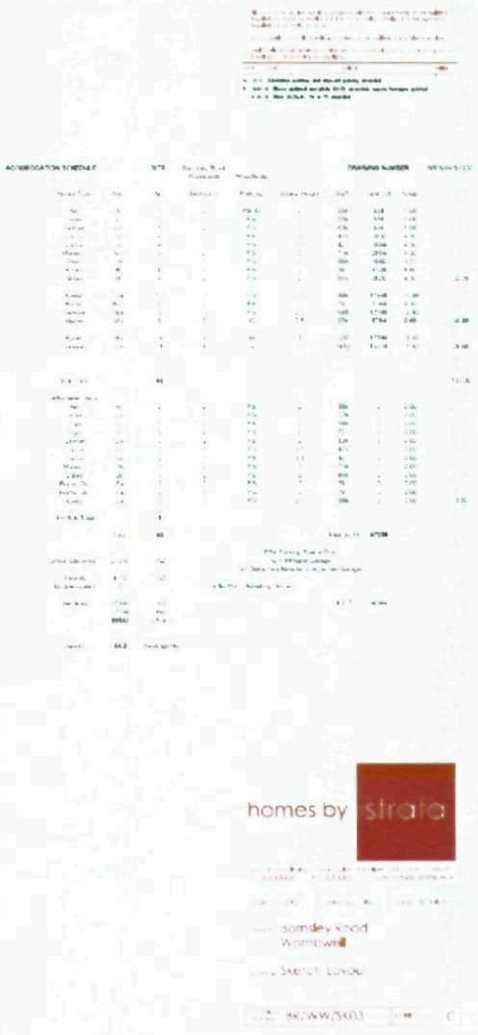
APPENDIX 2 ▪ Drawings

SITE LOCATION AND LAYOUT WITH APPROXIMATE MONITORING POSITIONS

homes by strata

SITE LOCATION AND LAYOUT WITH BOUNDARY SCREENING TO GARDENS



Key ····· Boundary Screening