



BETTER SOLUTIONS, INTELLIGENTLY ENGINEERED

ENVIRONMENT

Avant Homes (Yorkshire) Ltd

Hawshaw Lane Hoyland

LDP2129

Noise Impact Assessment

ENVIRONMENT

Avant Homes (Yorkshire) Ltd

Hawshaw Lane Hoyland

LDP2129

Noise Impact Assessment

Birmingham
Livery Place, 35 Livery Street, Colmore Business District, Birmingham, B3 2PB
T: 0121 233 3322

Cambridge
14-16 High Street, Histon, Cambridge
CB24 9JD
T: 01223 235 173

Leeds
Whitehall Waterfront, 2 Riverside Way, Leeds
LS1 4EH
T: 0113 233 8000

London
11 Borough High Street
London, SE1 9SE
T: 0207 407 3879

Manchester
4th Floor Carvers Warehouse, 77 Dale Street
Manchester, M1 2HG
T: 0161 233 4260

Market Harborough
12a Woodcock House, Compass Point Market Harborough, Leicestershire, LE16 9HW
T: 01858 455020

Nottingham
Waterfront House, Station Street, Nottingham NG2 3DQ
T: 0115 924 1100

July 2018

DOCUMENT ISSUE RECORD

Revision	Date of Issue	Status	Author:	Checked:	Approved:
0	03/07/2018	01	Lewis Stonehouse BA(Hons), MSc, MIOA	Mike Barrett BSc, PgDip(IOA), MIOA	Mike Barrett BSc, PgDip(IOA), MIOA

Notice

This document has been prepared for the sole use of the Client in accordance with the terms of the appointment under which it was produced. BWB Consulting Limited accepts no responsibility for any use of or reliance on the contents of this document by any third party. No part of this document shall be copied or reproduced in any form without the prior written permission of BWB.

EXECUTIVE SUMMARY

BWB Consulting Ltd is appointed by Avant Homes (Yorkshire) Ltd to undertake an environmental noise assessment for a proposed residential development at Hawshaw Lane in Hoyland.

The existing noise environment is dominated by distant road traffic on Hawshaw Lane.

A baseline noise survey was undertaken at the Site in June 2018. The survey, and subsequent assessment work, have been undertaken in accordance with current standards and guidance.

The noise assessment indicates that, with the provision of appropriate glazing and ventilators, an appropriate level of protection could be afforded to future noise sensitive receptors on the Site.

Preliminary sound reduction performance specifications and indicative configurations have been provided for windows and ventilators. It should be noted that these should not be included within the final design tender documents and detailed (octave-band) sound reduction performance specifications for windows and ventilators should be produced at detailed design stage.

Noise in outdoor living spaces has been assessed and has been found to be below the upper guideline value outlined in BS 8233:2014.

Based on the results of the assessment, it has been demonstrated that the Site is suitable for residential development. It is therefore considered that noise need not be a determining factor in the granting of planning approval for the Proposed Development.

CONTENTS

EXECUTIVE SUMMARY	iii
1. INTRODUCTION	1
Appointment & Background	1
Site Setting	1
Proposed Development	2
2. STANDARDS AND GUIDANCE	1
National Planning Policy Framework (NPPF)	1
BS 8233:2014: Guidance On Sound Insulation and Noise Reduction for Buildings	1
World Health Organisation (WHO) 1999: Guidelines for Community Noise	2
3. BASELINE NOISE SURVEY	3
Summary	3
Survey Methodology	3
Measurement Equipment	4
Meteorological Conditions	4
Measurement Results	4
4. NOISE ASSESSMENT	6
Overview	6
Noise Model	6
Internal Noise Levels within Dwellings	7
Noise Levels in Outdoor Spaces	7
5. CONCLUSION AND RECOMMENDATIONS	8
Noise	11
Acoustic Terminology	12

FIGURES

Figure 1.1: Site Context Plan

Figure 3.1 Noise Monitoring Position

APPENDICES

APPENDIX A: Glossary of Terms

APPENDIX B: Development Proposals

APPENDIX C: Time History Graph

1. INTRODUCTION

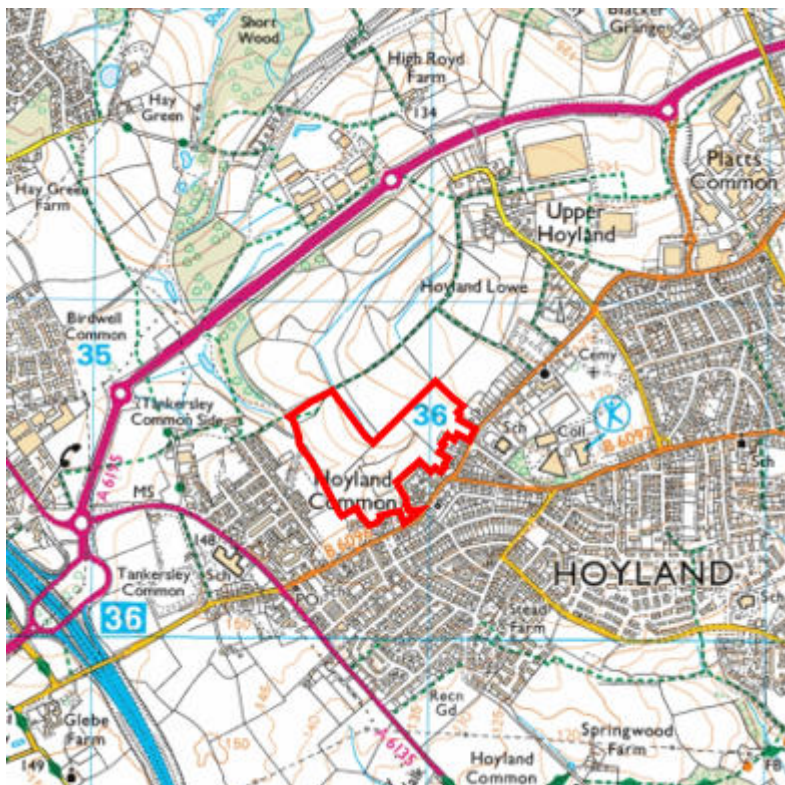
Appointment & Background

- 1.1. BWB Consulting Ltd is appointed by Avant Homes (Yorkshire) Ltd to undertake an environmental noise assessment for a proposed residential development at Hawshaw Lane in Hoyland.
- 1.2. This assessment has been undertaken based on the results of a baseline noise survey on the Site. The results of the survey have been assessed in accordance with current standards and guidance.
- 1.3. This report is necessarily technical in nature, so to assist the reader, a glossary of acoustic terminology can be found in Appendix A.

Site Setting

- 1.4. The proposed development Site currently comprises green space/arable land and is bounded by existing residential uses along Hoyland Road, Hawshaw Lane and Tinker Lane to the south and west. There is green space / arable land to the north and east. **Figure 1.1** below shows the Site location.

Figure 1.1: Site Location Plan



Proposed Development

- 1.5. The proposed development comprises the construction of a total of 167No. new dwellings with associated infrastructure.
- 1.6. An indicative site plan is provided in **Appendix B**.

2. STANDARDS AND GUIDANCE

National Planning Policy Framework (NPPF)

- 2.1. Published in March 2012, this document sets out the Government's planning policies for England and supersedes a number of previous Planning Policy Guidance Notes and Planning Policy Statements (amongst other documents). It makes the following references to noise in the section entitled Conserving and enhancing the natural environment:

"The planning system should contribute to and enhance the natural and local environment by... [a number of points including]...preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability".

And

- 2.2. "123. Planning policies and decisions should aim to:

avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;

mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;

recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and,

identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."

BS 8233:2014: Guidance On Sound Insulation and Noise Reduction for Buildings

- 2.3. This standard provides guidance for the control of noise in and around buildings. The guidance provided within the document is applicable to the design of new buildings, or refurbished buildings undergoing a change of use, but does not provide guidance on assessing the effects of changes in the external noise levels to occupants of an existing building.
- 2.4. The guidance provided includes appropriate internal and external noise level criteria which are applicable to dwellings for steady external noise sources. It is stated that it is

desirable that the internal ambient noise level does not exceed the following criteria set out in **Table 2.1**.

Table 2.1: Summary of Internal Ambient Noise Levels to be achieved in Habitable Rooms when Assessed in Accordance with BS 8233

Activity	Location	Period	
		07:00 to 23:00 Hours, i.e. Daytime	23:00 to 07:00 Hours, i.e. Night-time
Resting	Living Room	35 dB LAeq, 16 Hour	-
Dining	Dining Room/area	40 dB LAeq, 16 Hour	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq, 16 Hour	30 dB LAeq, 8 Hour

- 2.5. Whilst BS 8233:2014 recognises that a guideline value may be set in terms of SEL or L_{AFmax} for the assessment of regular individual noise events that can cause sleep disturbance during the night-time, a specific criterion is not stipulated. Accordingly, reference has been made in this assessment to the World Health Organisation (WHO) 1999: Guidelines for Community Noise below.
- 2.6. With respect to external amenity space such as gardens and patios it is stated that it is desirable that the 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. It is then confirmed that higher external noise criteria may be appropriate under certain circumstances such as within city centres urban areas, and locations adjoining the strategic transportation network, where it may be necessary to compromise between elevated noise levels and other factors such as convenience of living, and efficient use of land resource.

World Health Organisation (WHO) 1999: Guidelines for Community Noise

- 2.7. As with the 'good' and 'reasonable' criteria in BS8233, the L_{AFmax} criterion in BS8233 is largely concordant with the World Health Organisation (WHO) guidance: 1999: *Guidelines for community noise*. This document draws upon guidance from Vallet and Vernay, which states:

"For 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".

3. BASELINE NOISE SURVEY

Summary

- 3.8. A baseline noise survey has been undertaken to determine the prevailing noise climate across the site. During the survey, monitoring was undertaken at the positions identified in **Figure 3.1**. Details of monitoring undertaken at each position are provided below and overleaf.

Figure 3.1: Baseline noise survey positions



Survey Methodology

- 3.9. Monitoring at Position 1 was undertaken over a 24-hour period commencing at 17:00hrs on Monday 24th June 2018. Measurement equipment was established in free-field conditions at a height of 1.8m above local ground level. The noise environment at Position 1 was dominated by distant road traffic from the A6195 circa. 575m to the north, and from the B6067 (Hoyland Road) circa. 235m to the south east.
- 3.10. Attended monitoring at Position 2 was undertaken from 14:00hrs – 17:00hrs on Tuesday 25th June 2018. Measurement equipment was established at 10m from the nearside carriageway of the B6096 (Hoyland Road) in free-field conditions at a height of 1.5m above local ground level, and circa 2m above carriageway height. The noise environment was typically dominated by road traffic on Hoyland Road. Traffic was noted

to be free-flowing throughout the survey period. Monitoring at Position 2 was undertaken in accordance with the shortened measurement procedure outlined in CRTN.

Measurement Equipment

- 3.11. The baseline noise survey was undertaken using the Class 1 specification noise measurement equipment detailed in **Table 3.1**. Equipment was calibrated using a portable calibrator immediately before and after the measurements with no significant drift in calibration observed. The sound level meters, pre-amplifiers and microphones were calibrated to traceable standards at an accredited laboratory within the 24 months prior to the measurements. The portable calibrators were calibrated within 12 months of the date of the survey.

Table 3.1: Noise monitoring equipment

Position	Equipment	Make & Model	Serial Number	Calibration due Date
1	Sound Level Meter	01 dB Fusion	11327	April 2019
	Pre-Amplifier	01 dB PRE 22	1605201	
	Microphone	Grass 40CE	259479	
2	Sound Level Meter	SVAN 971	60745	August 2019
	Pre-amplifier	SVAN SV18	64535	
	Microphone	ACO Pacific 7052E	66815	
1 & 2	Calibrator	01dB-Stell CAL 21	34675335	August 2018

Meteorological Conditions

- 3.12. The weather throughout the survey remained conducive to environmental noise measurement, it being dry with negligible winds (<5ms⁻¹). Temperatures ranged between 18 – 29 degrees Celsius and there was no cloud cover.

Measurement Results

- 3.13. A summary of measured noise levels at each position is presented below. Full results from the automated survey at Position 1 are presented on Time History Graph LDP2174/TH1 in **Appendix C**.

Table 3.2 – Summary of measured sound pressure levels at Position 1

Start Time	Period	dB LAeq,T	dB LA90,T	dB LAfmax ¹
15:00 24/06/2018	Daytime (07:00 – 23:00)	48	39	-
23:00 24/06/2018	Night-time (23:00 – 07:00)	42	34	63

¹ 10th highest discrete event (LAfmax) measured between 23:00hrs – 07:00hrs. Discrete events assumed to be separated by a period of at least 5-minutes

Table 3.4 – Summary of measured sound pressure levels at Position 2 & derivation of $L_{Aeq,16hr}$ noise levels

Start Time	Period	dB $L_{Aeq,T}$	dB $L_{A,F,max}^1$	dB $L_{A10,T}$
26/06/2018 14:00	1-hour	63	70 - 73	64
26/06/2018 15:00	1-hour	61		65
26/06/2018 16:00	1-hour	61		66
dB $L_{A10,3hr}^2$				65
dB $L_{A10,18hr}^3$				64
dB $L_{Aeq,16hr}^4$				62
¹ typical events (car pass-bys) ² arithmetic average of $L_{A10,1hr}$ sound pressure levels over 3 consecutive hours ³ $L_{A10,18hr} = L_{A10,3hr} - 1$ (from CRTN) ⁴ $L_{Aeq,16hr} = L_{A10,18hr} - 2$ (from BS 8233:2014)				

4. NOISE ASSESSMENT

Overview

- 4.14. This section aims to assess the impact of road traffic noise on the residential development and summarises the recommended acoustic performance specifications for critical residential façade elements.
- 4.15. We have reviewed the results of the environmental noise survey at Positions 1 & 2 and the most onerous requirement is achieving the daytime internal noise levels.
- 4.16. The development may be subject to design changes. The specifications presented herein are therefore indicative at this stage. Detailed acoustic specifications must be produced during the detailed design stage. The specifications herein must therefore not be adopted within the final design tender documents.
- The calculations are based on BS 8233:2014 procedures. In the absence of detailed internal layout drawings, the following assumptions have been made:
 - Typical house bedroom/living room dimensions (W4m x L5m x H3m) and window sizes (25% window, 75% wall);
 - A reverberation time of circa 0.5 seconds;
 - External walls will provide a sound reduction performance that is at least 5 dB better than the specified glazing; and
 - A 2No. trickle ventilators (circa 4,000 mm²) per habitable room.
- 4.17. The guidance contained herein on ventilation solutions is based on the understanding that the preferred approach is ADF System 1 i.e. trickle ventilators and intermittent extract fans. Purge ventilation (i.e. fumes/odours) will be provided via openable windows.

Noise Model

- 4.18. A detailed noise model has been generated in order to calculate the daytime and night-time noise propagation across the site from the surrounding roads. The following prediction methodologies were adopted for the modelling exercise.
- The noise model was set up to apply the noise prediction methodology set out in the 1988 Department of Transport and the Welsh Office document *Calculation of Road Traffic Noise* for road traffic noise sources;
 - The noise data presented herein was used to calibrate the road traffic noise sources;
 - Mapping of the Site and the surrounding area was calibrated into the noise model based on known Ordinance Survey grid reference points;
 - Indicative ground topography was approximated using the LIDAR Composite 1m DTM information freely available from the data.gov website;
 - Off-site buildings which would provide screening to the Site have been incorporated as reflective façades;
 - To reflect the local ground cover, ground absorption was set to $G = 0.5$ (50% acoustically absorptive ground); and
 - The model was set to include second order reflected noise from solid structures.
- 4.19. The proposed site layout, shown in **Appendix B**, has been incorporated into the model, and the free-field level at each façade has been calculated. Noise contours have been

calculated showing the external free-field noise levels in external areas, across the site. The predicted noise levels have been used to inform the assessment.

Internal Noise Levels within Dwellings

- 4.20. Provision exists to provide appropriate sound insulation solutions as required, including where necessary uprated acoustic glazing and attenuated ventilators. Based on the environmental noise survey results and calculation methods/assumptions discussed above, preliminary minimum sound reduction performance specifications for windows and ventilators to habitable rooms in order to satisfy BS 8233 noise limits have been prepared and are presented in **Table 4.1** below.

Table 4.1: Preliminary minimum sound reduction performance specifications

Preliminary minimum sound reduction performance specification		Example configurations (for guidance only)
Windows (dB, $R_w + C_{tr}$)	Ventilators (dB, $D_{n,e,w} + C_{tr}$)	
26	32	<ul style="list-style-type: none"> 6 / 16 / 6 mm thermal double glazing. Standard trickle vent e.g. Titon SF3300.

- 4.21. Detailed (octave-band) sound reduction performance specifications for windows shall be produced at detailed design stage.

Noise Levels in Outdoor Spaces

- 4.22. With reference to the noise model, the predicted noise levels are within the range of guideline levels for outdoor living areas as outlined in BS 8233: 2014. It is therefore considered that no further noise mitigation is required for outdoor living areas on the development Site.

5. CONCLUSION AND RECOMMENDATIONS

- 5.23. BWB Consulting Ltd is appointed by Avant Homes (Yorkshire) Ltd to undertake an environmental noise assessment for a proposed residential development at Hawshaw Lane, Hoyland.
- 5.24. A baseline noise survey was undertaken at the Site in June 2018. The surveys, and subsequent assessment work, have been undertaken in accordance with current standards and guidance.
- 5.25. The noise assessment indicates that, with the provision of appropriate glazing and ventilation, an appropriate level of protection could be afforded to future noise sensitive receptors on the Site.
- 5.26. Preliminary sound reduction performance specifications and indicative configurations have been provided for windows and ventilators. It should be noted that these should not be included within the final design tender documents and detailed (octave-band) sound reduction performance specifications for windows should be produced at detailed design stage.
- 5.27. Noise in outdoor living spaces has been assessed and has been found to be below the upper guideline value outlined in BS 8233:2014.
- 5.28. Based on the results of the assessment, it has been demonstrated that the Site is suitable for residential development. It is therefore considered that noise need not be a determining factor in the granting of planning approval for the Proposed Development.

APPENDICES

APPENDIX A: Glossary of Terms

Noise

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq} , L_{A90} etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

Acoustic Terminology

Term	Description
dB (decibel)	The scale on which sound pressure level is expressed. Sound pressure level is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2×10^{-5} Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' - weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq,T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
L_{Amax}	L_{Amax} is the maximum A - weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{Aeq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L_{10} and L_{90}	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time, and the L_{90} is the level exceeded for 90% of the time.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally, as measured outside and away from buildings.
Façade Level	A sound field determined at a distance of 1m in front of a large sound reflecting object such as a building façade.

APPENDIX B: Development Proposal

Notes:

This drawing design and concepts are copyright of STEN Architecture.

All Dimensions are to be verified on site before any work commences. If any discrepancies, errors or omissions are noted, these are to be reported to STEN architecture immediately.

If any other drawings are reference within this layout, please refer to the specific detailed drawing for design, materials and specific working practices.

PLANNING LAYOUT KEY

- 1.8m Timber screen fence
- 1.2m Post & rail divisional fence
- 1.8m Brick & timber panel fence
- Timber knee rail
- Herringbone Block Pavers
Brindle and charcoal in colour
- G** Timber gate location
- Existing drainage easement
- * Affordable
- Bin collection point
(bin collection day only)

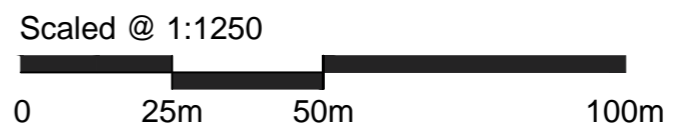
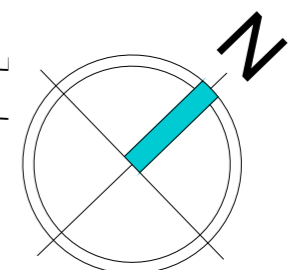
STEN ARCHITECTURE		PHASE 1				AVANT homes	
Name	Floor Area Sq Ft	Beds	Total Units	Total	Mix	Requested	
Lorton Detached	995	3	2	1990	3.8%		
Lorton Semi	995	3	4	3980	7.5%	5.0%	
Melton	1026	3	7	7182	13.2%	10.0%	
Holbury	1226	4	8	3808	15.1%	15.0%	
Modbury	1415	4	6	8490	11.3%	15.0%	
Overbury	1463	4	8	11704	15.1%	20.0%	
Sudbury	1503	4	8	12024	15.1%	15.0%	
Ramsbury	1502	4	10	15020	18.9%	20.0%	
Sub Total			53	70198	100.0%	100.0%	
Beckbridge	656	2	6	3936	12.8%		
Fenbridge	773	3	0	0	0.0%		
Lymbidge	883	3	8	7064	17.0%		
Irttonbridge	858	3	0	0	0.0%		
Queensbridge	932	3	14	13048	29.9%		
Seabridge	932	3	6	5592	12.8%		
Trowbridge	1073	4	3	3219	6.4%		
AFFORDABLE							
Cranford	722.74	2	8	5782	17.0%	65.0%	
Kempton	997.65	3	2	1995	4.3%	35.0%	
Sub Total			47	40636	100.0%	100.0%	
Overall Phase Total			100	110834			

Please refer to future separate full application for the residential development of 68NO. dwellings (plots 101-168) in the pursuant of application ref details.

King George's Field (recreation ground)

Holly Grange

Hoyland Com



REV.	DESCRIPTION:	BY:	DATE:
------	--------------	-----	-------

STEN ARCHITECTURE

Suite 4, Unit 1, Benton Office Park, Bennett Avenue, Horbury, Wakefield, WF4 6RA
 Tel: 01924 669424

Web: www.sten-architecture.co.uk
 Twitter: @STEN_arch
 Facebook: [stenarchitecture](https://www.facebook.com/stenarchitecture)
 LinkedIn: [Sten Architecture](https://www.linkedin.com/company/sten-architecture)

CLIENT: **AVANT homes**

SITE: **Hoyland Road Hoyland**

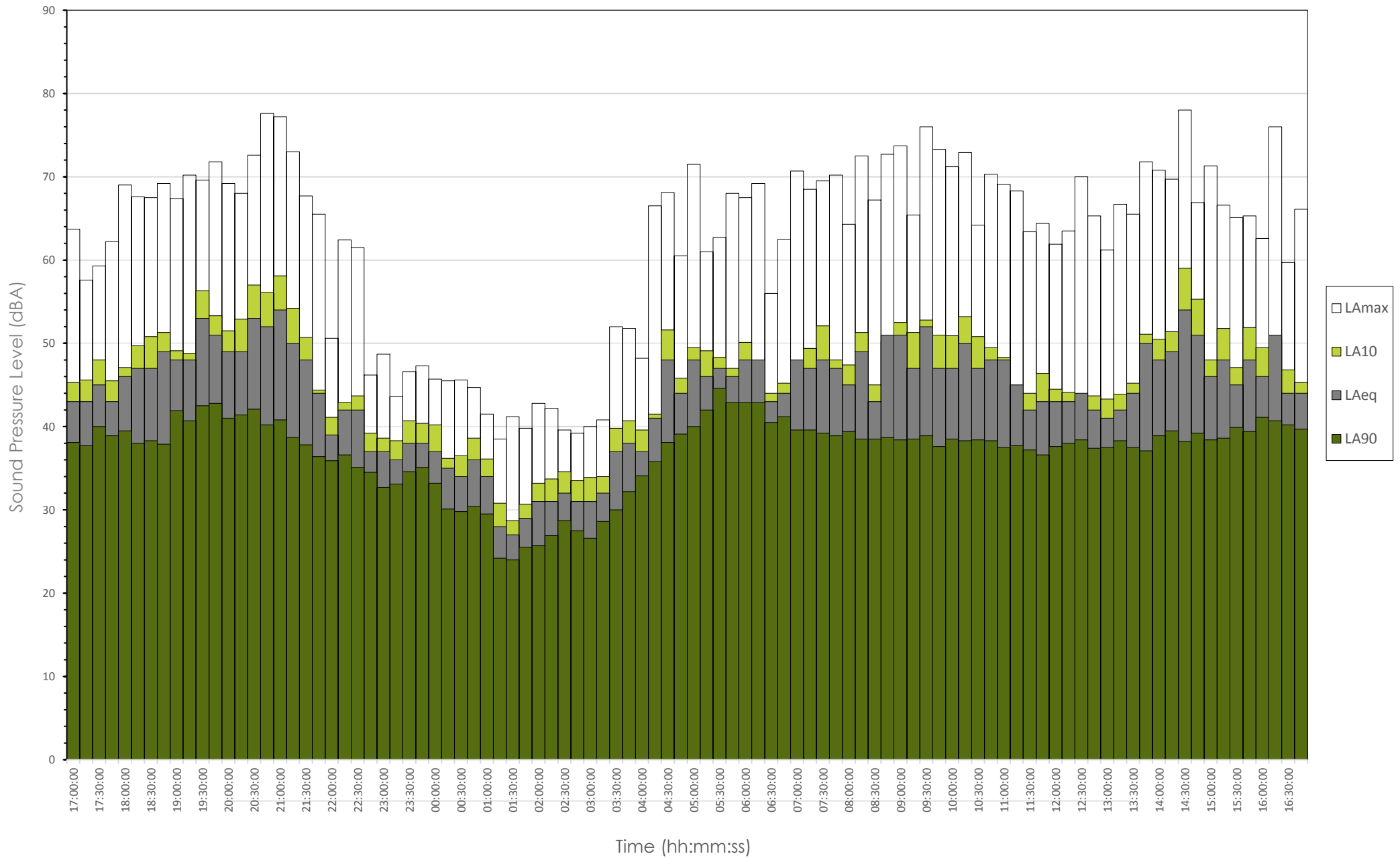
TITLE: **Planning layout**

SCALE AT A2:	DATE:	DRAWN:	CHECKED:
1:1250	24.09.18	TS	--
PROJECT NO:	DRAWING NO:	REVISION:	
1821	1821.101	--	

APPENDIX C: Time History Graph

Hawshaw Lane, Hoyland

Position 1 - Time History Graph
25 June to 26 June 2018





BETTER SOLUTIONS, INTELLIGENTLY ENGINEERED

