



**Woodgate Centre
Oak Tree Lane
Woodgate**

Noise Assessment Report

6 August 2021

For
Pye Homes Ltd
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Contents

SUMMARY	2
1.0 INTRODUCTION	3
2.0 DESCRIPTION OF SITE AND PROPOSALS	3
3.0 ARUN DISTRICT COUNCIL REQUIREMENTS	4
3.1 Internal Noise Levels with Dwellings	4
3.2 External Noise Levels in Gardens	7
4.0 NOISE SURVEY METHODOLOGY	7
5.0 NOISE SURVEY RESULTS	8
6.0 SITE NOISE MODEL	9
7.0 EXTERNAL NOISE INTRUSION	12
7.1 External Façade Constructions	12
7.2 Open Windows and Overheating	12
8.0 GARDENS	12
APPENDIX A – ACOUSTIC TERMINOLOGY	13
APPENDIX B – TIME HISTORY GRAPH	14

SUMMARY

A new residential development is proposed on land at the Woodgate Centre on Oak Tree Lane in Woodgate.

A noise assessment has been requested as part of the planning submission for the proposals.

auricl has therefore undertaken an assessment of external noise affecting the proposed residential development site in relation to Arun District Council's requirements.

Based on noise measurements and noise modelling, calculations have been undertaken to assess the acoustic requirements of the residential façades as well as the impact of external noise levels on garden areas.

It was concluded that suitable internal noise levels can be achieved using standard, non-specialist constructions for the external façade elements.

When assessing the effect on internal noise levels when windows are open, it has been concluded that *"use of opening windows as a primary means of mitigating overheating is not likely to result in adverse effect"*.

In addition, external noise levels at the site are an acceptable level in the proposed gardens.

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1.0 Introduction

A new residential development is proposed on land at the Woodgate Centre on Oak Tree Lane in Woodgate.

A noise assessment has been requested as part of the planning submission for the proposals.

This report presents the methodology and results of a noise survey to determine the existing noise levels affecting the site, as well as an assessment in relation to Arun District Council's requirements.

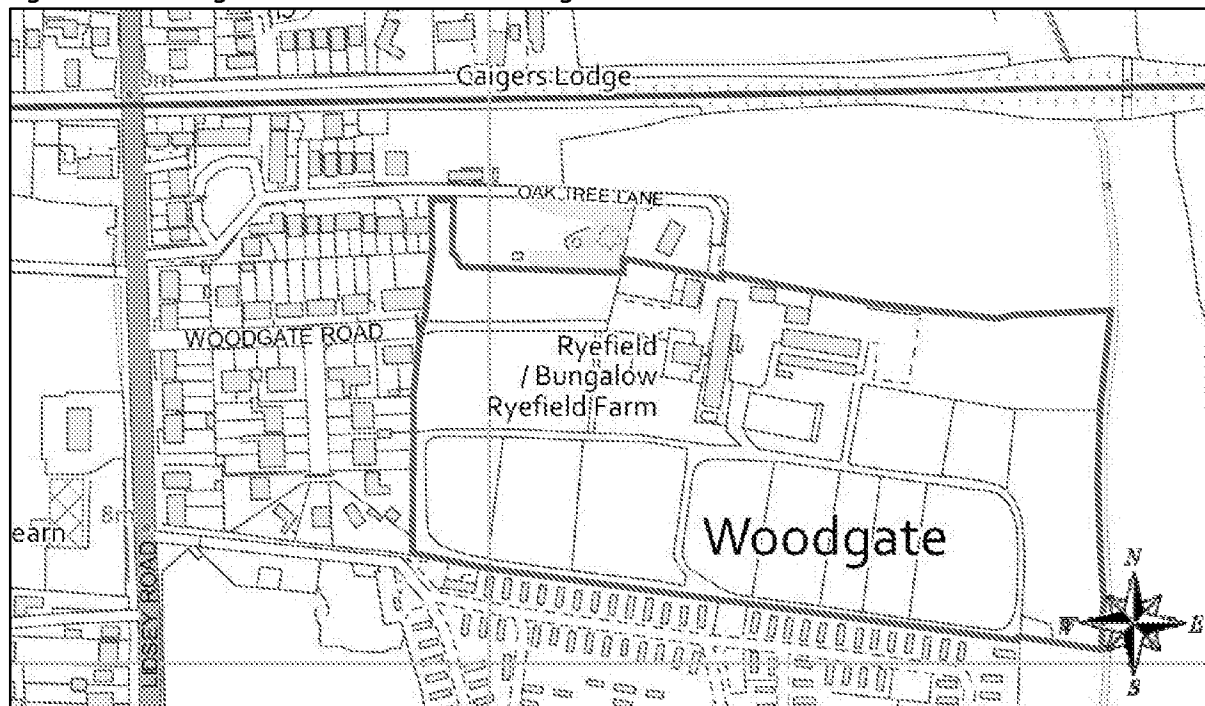
2.0 Description of Site and Proposals

The proposed development site is located to the south-east of Oak Tree Lane on the eastern side of Woodgate.

The site is occupied by a residential property, small storage buildings and open farmland and is bounded by open farmland to the north and east, a holiday park to the south and residential properties to the west/north-west. A railway line runs roughly parallel to the northern site boundary, at a distance of approximately 100m from the site.

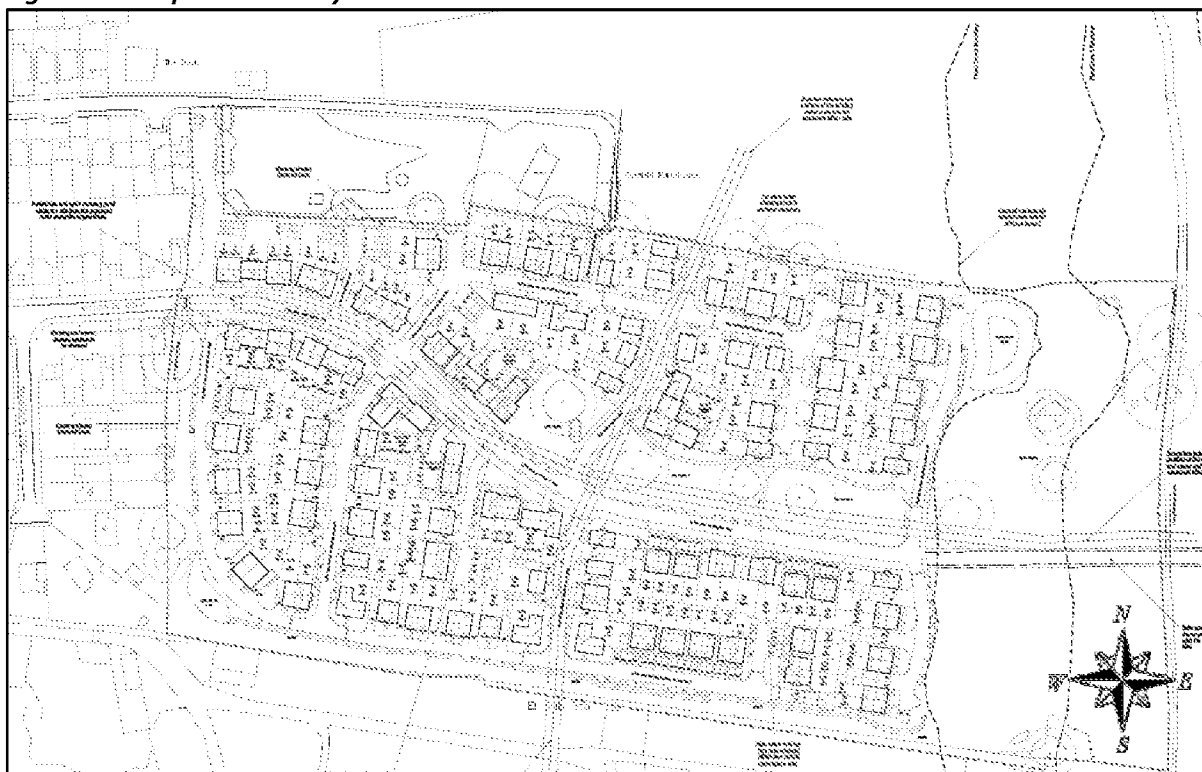
Figure 2.1 shows the approximate existing site extent in red in relation to the surrounding area.

Figure 2.1 Existing Site Extent and Surroundings



It is proposed to develop the site to create 180 new residential dwellings. Figure 2.2 shows the proposed site layout.

Figure 2.2 Proposed Site Layout



3.0 Arun District Council Requirements

We have considered the following standards in our measurements and assessments.

3.1 Internal Noise Levels with Dwellings

We understand Arun District Council typically require internal noise levels within residential dwellings to conform to the guideline values specified in Table 4 of Section 7.7.2 of BS 8233: 2014.

British Standard 8233: 2014 “Guidance on sound insulation and noise reduction for buildings” is the current industry standard document specifying internal noise levels in residential dwellings and presents the ‘desirable’ internal noise levels shown in Table 3.1.

Table 3.1 BS 8233 Recommended Internal Noise Levels

Activity	Location	07:00 to 23:00 hours	23:00 to 07:00 hours
Resting	Living room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

In addition, the World Health Organisation (WHO) document “Guidelines for Community Noise” (1999) advises the following:

“For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB L_{Amax} more than 10-15 times per night (Vallet & Vernet 1991).”

We have also considered the guidance present in the “Acoustics, Ventilation and Overheating Residential Design Guide”, published in January 2020, which states that “it is considered reasonable to allow higher levels of internal ambient noise for transport sources when higher rates of ventilation are required in relation to the overheating condition”.

A two-stage noise risk assessment is then proposed, based upon the levels of external noise affecting the site as shown in Figure 3. and the subsequent internal noise levels shown Figure 3.2.

Figure 3.1 Level 1 Noise Risk Assessment – External Noise Levels

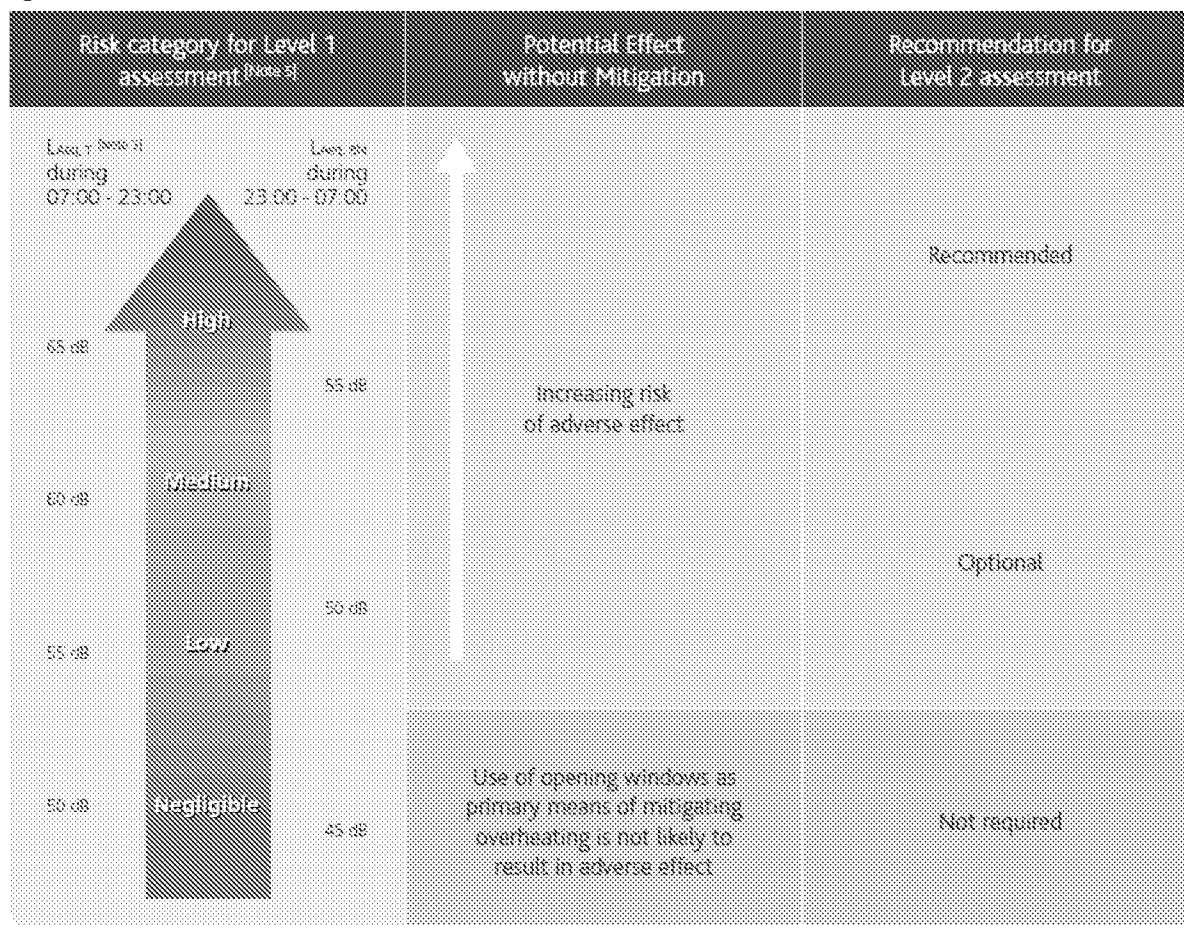
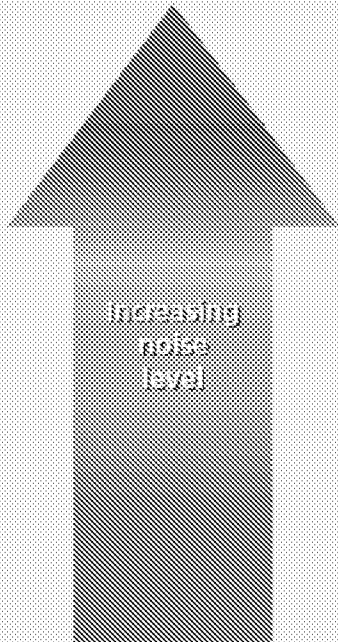


Figure 3.2 Level 2 Noise Risk Assessment – Internal Noise Levels

Internal ambient noise level ^(Note 1)			Examples of Outcomes ^(Note 2)	
$L_{Aeq,T}$ ^(Note 3) during 07:00 – 23:00 ^(Note 4)	$L_{Aeq,8h}$ during 23:00 – 07:00	Individual noise events during 23:00 – 07:00 ^(Note 4)		
> 50 dB	> 42 dB	Normally exceeds 65 dB L_{Amax}	Noise causes a material change in behaviour e.g. having to keep windows closed most of the time	Avoiding certain activities during periods of intrusion. Having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.
			Increasing likelihood of impact on reliable speech communication during the day or sleep disturbance at night	At higher noise levels, more significant behavioural change is expected and may only be considered suitable if occurring for limited periods. As noise levels increase, small behaviour changes are expected e.g. turning up the volume on the television; speaking a little more loudly; having to close windows for certain activities, for example ones which require a high level of concentration. Potential for some reported sleep disturbance. Affects the acoustic environment inside the dwelling such that there is a perceived change in quality of life. At lower noise levels, limited behavioural change is expected unless conditions are prevalent for most of the time. ^(Note 5)
≤ 35 dB	≤ 30 dB	Do not normally exceed L_{Amax} 45 dB more than 10 times a night	Noise can be heard, but does not cause any change in behaviour	Noise can be heard but does not cause any change in behaviour, attitude, or other physiological response ^(Note 6) . Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.

Figures 3.1 and 3.2 are related by the 13 dB attenuation typically provided by an open window.

For noisier sites, the risk of an adverse effect increases with increasing noise level and further consideration may be required.

3.2 External Noise Levels in Gardens

We understand Arun District Council typically require external noise levels within gardens of residential dwellings to conform to the upper guideline value of 55 dB $L_{Aeq,T}$ as specified in Section 7.7.3.2 of BS 8233: 2014.

4.0 Noise Survey Methodology

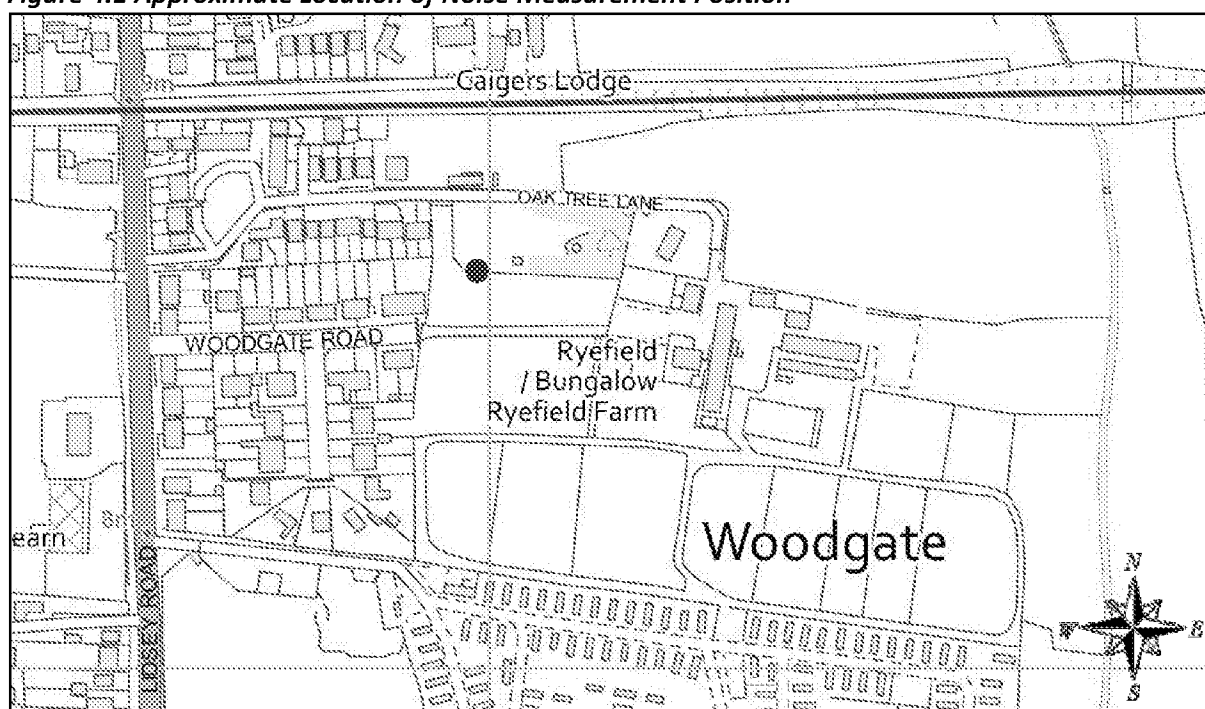
An unmanned environmental noise survey was undertaken at the site over a 4-day period between Thursday 19 November 2020 and Monday 23 November 2020. This period was selected to assess typical daytime and night-time noise levels over weekday and weekend periods, when the proposed dwellings will be occupied.

Noise measurements were captured at one worst-case measurement position, with the measurement microphone attached to the top of an open wire fence in free-field on the northern site boundary towards the north-western corner of the site.

The measurement position is considered to represent a worst-case in terms of environmental noise affecting the proposed development site, being the closest point at the site to the main transportation noise sources nearby – the railway to the north of the site and the A29/Lidsey Road to the west of the site.

The approximate location of the measurement position is shown in purple on Figure 4.1

Figure 4.1 Approximate Location of Noise Measurement Position



The equipment used for the noise survey is summarised in Table 4.1.

Table 4.1 Description of Equipment used for Noise Survey

Item	Make & Model	Serial Number
Type 1 automated logging sound level meter	SVAN 945A	11906
Type 1 ½" microphone	GRAS 40AN	56012
Calibrator	01dB CAL31	86020

L_{Aeq} and L_{Amax} sound pressure levels were measured throughout the noise survey over contiguous 15-minute intervals.

The noise monitoring equipment was calibrated before and after the survey. No significant change was found. Laboratory equipment calibration certificates can be provided upon request.

Due to the nature of the noise survey, i.e. unmanned, we are unable to comment on the weather conditions throughout the entire noise survey period, however at the beginning and end of the survey period, there was noted to be no rainfall, a clear sky and only light wind. These conditions are understood to be representative of the majority of the survey period and are considered appropriate for undertaking environmental noise measurements.

5.0 Noise Survey Results

Appendix B presents a time history graph showing the L_{Aeq} and L_{Amax} sound pressure levels measured throughout the noise survey.

As a result of the Covid-19 pandemic during 2020/21 and subsequent government restrictions, motor vehicle use across the UK (and hence road traffic noise) has been affected. To assess the potential effect of this, the Department for Transport (DfT) are currently publishing daily transport use data, relative to more typical conditions in early 2020.

The DfT data for all motor vehicle use during the noise survey period (Thursday 19 November 2020 to Monday 23 November 2020) indicates that usage was at 73% of typical conditions on average, resulting in current road traffic noise levels being 1.4 dB less than typical. This is a negligible change in noise levels that is unlikely to be subjectively noticeable. Nonetheless, we have applied this correction to the measured noise levels to approximate 'typical' conditions.

Table 5.1 presents a summary of the main noise parameters which will be used for subsequent assessments of internal and external noise, including the correction described above.

Table 5.1 Measured External Noise Levels

Daytime L_{Aeq} (16 hour) (dB)	Night-time L_{Aeq} (8 hour) (dB)	Night-time L_{Amax} (dB)*
53	43	60

* 10th highest

During our site visits, the dominant noise sources affecting the measurement position were noted to be distant road traffic noise and occasional distant passing trains on the railway line to the north.

We would consider the measured noise levels to be reasonable, taking into account the location of the measurement position and the dominant nearby noise sources.

6.0 Site Noise Model

Figures 6.1 to 6.6 show noise modelling images of the existing and proposed site, based on the measured noise data.

Figure 6.1 Existing Site – Daytime L_{Aeq} (16 hour)



Figure 6.2 Existing Site – Night-time L_{Aeq} (8 hour)



Figure 6.3 Existing Site – Night-time L_{Amax}



Figure 6.4 Proposed Site – Daytime L_{Aeq} (16 hour)

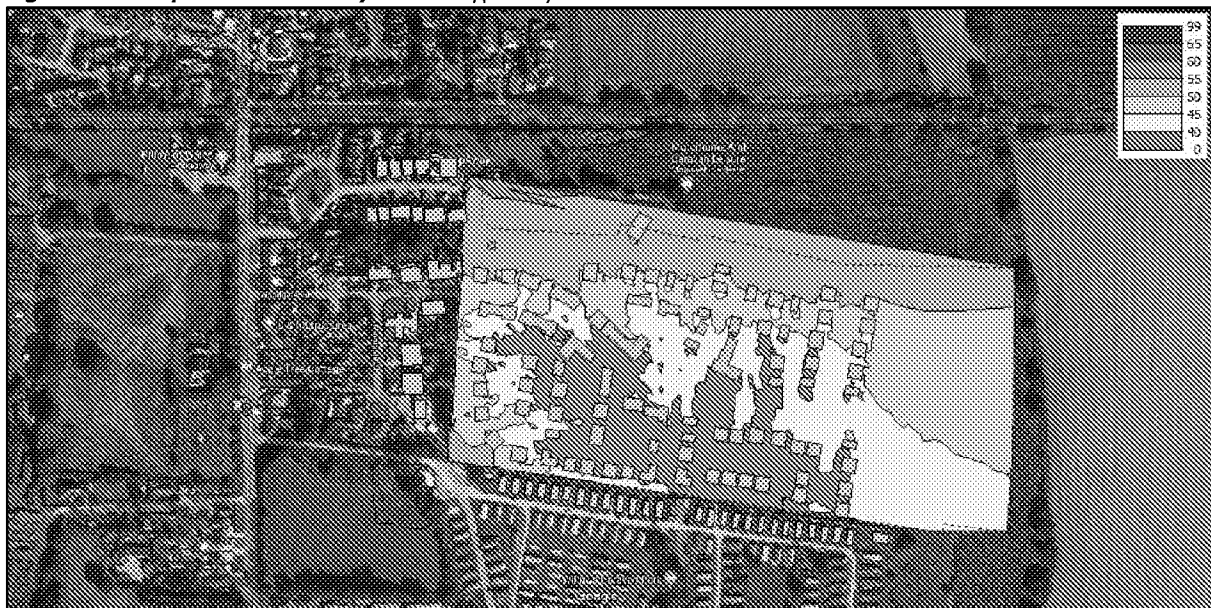


Figure 6.5 Proposed Site – Night-time L_{Aeq} (8 hour)

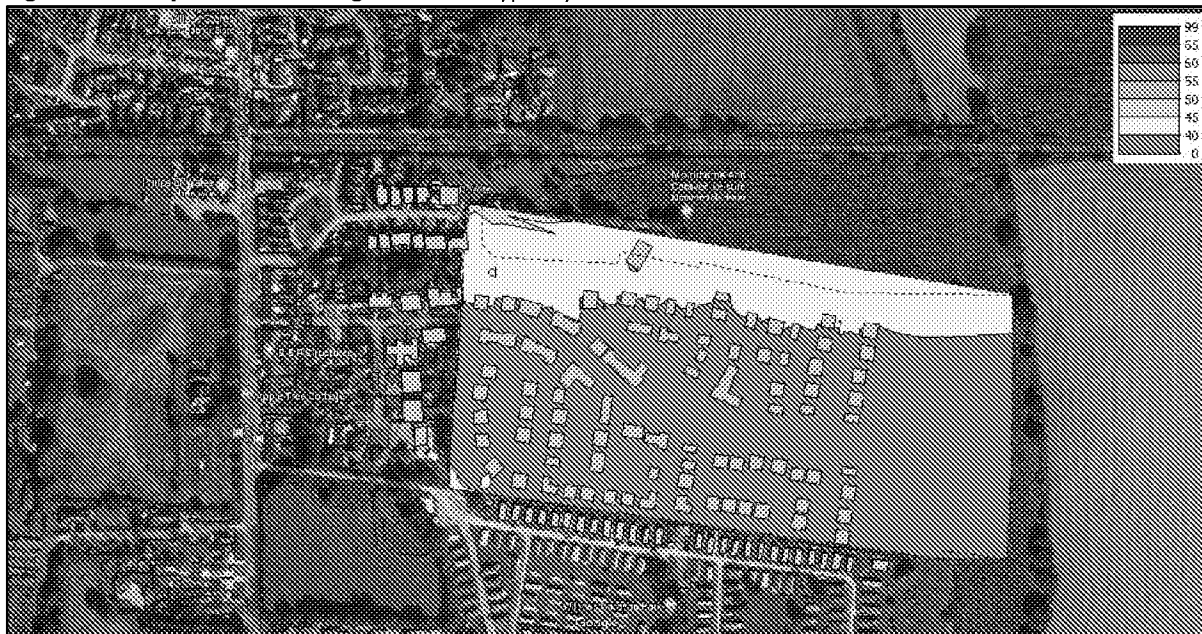
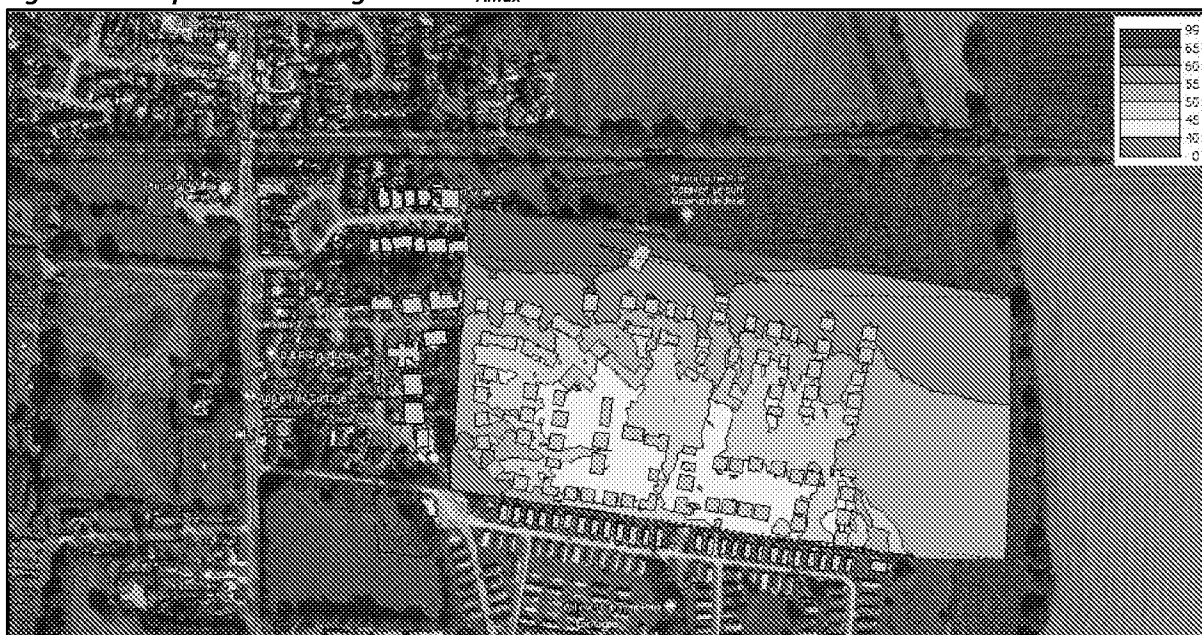


Figure 6.6 Proposed Site – Night-time L_{Amax}



The modelling results therefore indicate the following:

- * Daytime noise levels for the existing and proposed site are generally less than 55 dB L_{Aeq} (16 hour)
- * Night-time noise levels for the existing and proposed site are generally less than 45 dB L_{Aeq} (16 hour) and less than 60 dB L_{Amax}

7.0 External Noise Intrusion

7.1 External Façade Constructions

Our calculations indicate that the target BS 8233: 2014 internal noise levels specified by Arun District Council are achievable in the proposed residential dwellings through the use of suitable external façade constructions, described as follows:

- * **Glazing** specified to achieve a laboratory sound insulation performance of at least R_w 31 dB – typically non-acoustic thermal double glazing e.g. 4mm glass / 12mm cavity / 4mm glass
- * Background **ventilators** to achieve a laboratory sound insulation performance of at least $D_{ne,w}$ 37 dB – typically non-acoustic trickle ventilators fitted into the window frame
- * Non-glazed **façade** areas achieve at least R_w 52 dB (e.g. brick/block cavity wall)

The above constructions are conventional, non-specialist materials and the specified sound insulation values should not be difficult to achieve.

7.2 Open Windows and Overheating

Comparing the measured external noise levels with the ANC criteria in Section 3.1 above gives the daytime and night-time noise risk categories shown in Table 7.1.

Table 7.1 Noise Risk Categories

Period	Measured External Noise Level	Noise Risk Category
Daytime	53 dB L_{Aeq} (16 hour)	Negligible
Night-time	43 dB L_{Aeq} (3 hour)	Negligible

When assessing the effect on internal noise levels when windows are open, it can therefore be concluded that no further consideration is required and “*use of opening windows as a primary means of mitigating overheating is not likely to result in adverse effect*”.

8.0 Gardens

It can be seen from the noise modelling figures in Section 6 that daytime noise levels across the existing and proposed site are less than 55 dB L_{Aeq} (16 hour), which achieves the BS 8233: 2014 standard specified by Arun District Council.

It is therefore concluded that external noise levels at the site are an acceptable level in the proposed gardens.

Appendix A – Acoustic Terminology

Parameter	Description
Decibel (dB)	A logarithmic scale representing the sound pressure or power level relative to the threshold of hearing (20×10^{-6} Pascals).
Sound Pressure Level (L_p)	The sound pressure level is the sound pressure fluctuation caused by vibrating objects relative to the threshold of hearing.
A-weighting (L_A or dBA)	The sound level in dB with a filter applied to increase certain frequencies and decrease others to correspond with the average human response to sound.
L_{Amax}	The A-weighted maximum noise level measured during the measurement period.
$L_{Aeq,T}$	The A-weighted equivalent continuous noise level over the time period T (typically T = 16 hours for daytime periods, T = 8 hours for night-time periods). This is the sound level that is equivalent to the average energy of noise recorded over a given period.
R_w	The weighted (w) sound reduction index (R), a single figure rating of the laboratory airborne sound insulation performance of a construction, usually measured across the frequency range 100-3150Hz. The higher the value, the greater the sound insulation, and the more onerous the requirement.
$D_{n,e,w}$	The weighted (w) element (e) normalised (n) level difference (D), a single figure indicator of the ability of a small building element (such as a trickle ventilator) to reduce sound. The higher the value, the greater the sound reduction, and vice versa.

Appendix B – Time History Graph

