



**Land South of Maddoxford Lane, Boorley
Green**

Noise Assessment

Report 28B1.RP.1.2 // 17 February 2026

prepared for

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1.0 Introduction.

1.1 An outline planning application is to be submitted with all matters reserved (except the main points of access) for the demolition of a residential dwelling (Use Class C3), removal of a mobile home, and demolition of existing buildings associated with a motor vehicle storage and scrap material business, and construction of up to 280 dwellings (Use Class C3), including affordable dwellings, associated provision of informal and formal public open space, together with associated highways, landscape, earth works and level changes, foul and surface water drainage facilities, utilities provision and other associated and necessary infrastructure works.

1.2 Noise related local and national planning policy and guidance has been considered, in line with the guidance found in Eastleigh Borough Council's (EBC) Local Plan (2016-2036) policy DM8, Pollution. Noise conditions across the site have been quantified, good acoustic design practices have been considered, and an assessment has been undertaken to inform the noise control strategy for the scheme, as is set out in this report.

2.0 Site Location and Proposals

Site Location and Description

2.1 The proposed development site is located on land to the south of Maddoxford Lane, to the south-east of the existing edge of Boorley Green and falls under the jurisdiction of EBC. The approximate extent of the site can be seen outlined in red on the following **Image 1**.

Image 1. Aerial photograph showing site location

--- Approximate development site boundary



Aerial imagery courtesy of Google

2.2 A residential development is located to the northwest of the site, on Maddoxford Lane, with a further residential development nearing completion to the west neighbouring the site (at time of writing).

2.3 To the south of the site runs a rail line connecting Hedge End and Botley (the Eastleigh Fareham Line). Beyond this is further farmland and farm buildings. A new Botley bypass is to be situated to the south of the site, which has been considered as part of the assessment but at time of writing had not been constructed.

2.4 To the east are farm buildings and a scrap yard, beyond this is residential and a wooded area. To the southeast are dairy buildings.

Development Proposals

2.5 The current development proposals include the construction of up to 280 new homes. Vehicular access will be provided to the site via Maddoxford Lane. The proposals also include areas for Public Open Space (POS) to the northeast of the site, as well as an indicative area outlined for Local Equipment Area for Play (LEAP) centrally within the scheme.

3.0 Design Criteria

Local Authority Consultation

3.1 Pre-application advice was sought from EBC regarding noise and vibration across the development. It is noted that this pre-application advice followed initial survey works and a pre-application noise note prepared by Suono. The following commentary was outlined by the Planning and Environment Team on 1st July 2025 in response to pre-application noise note:

“The Pre-application submission noise note from Suono states the correct noise criteria and I accepted the monitoring locations. I would suggest a longer noise survey including a weekend during a more considerable period of time.

Would be important to give acoustic design advice at this stage following ProPG to make sure the layout of the scheme helps to achieve the external amenity area noise criteria, specially to the properties closer to the main road. We will require to see a solution for the part of the site that cannot use open windows for overheating control.

In conclusion, while we raise no objection in principle to the proposed development, any future planning application will only be supported where it is accompanied by satisfactory technical assessments addressing land contamination, air quality and noise in accordance with relevant national guidance and local policy requirements.”

3.2 Following the above feedback, a discussion was had with the Environmental Health Officer at EBC regarding the duration of the noise survey undertaken. The noise survey was agreed to be acceptable on the basis that a number of corrections be applied to take into account of changes in traffic flows on the local road network due to the Botley Bypass scheme and to take future traffic flows into account as appropriate. The above has been included within the assessment works, as set out later in this report.

3.3 The following further advice was also received from the Planning and Environment Team (PET) on the 19th September 2025:

“A noise and vibration report will be required that must include a noise survey to the north and to the south as well as a vibration survey due to the proximity to the existing railway line. The report must follow BS 8233:2014 Guidance on sound insulation and noise reduction for buildings as well as the noise criteria for external amenity spaces and relevant vibration

criteria. Should also include what mitigation in terms of glazing and ventilation are required to achieve the noise criteria. Additionally, an indicative overheating assessment will also be required to establish what properties can rely on open windows for ventilation specially the properties facing Maddoxford Lane."

3.4 A noise survey has been taken to the north and south of the site, with further spot checks in the middle of the site to further quantify propagation from Maddoxford Lane and determine the prevailing noise climate across the site. Attended measurements have been taken in the southwest corner, to measure noise and vibration from passing passenger and freight rail.

3.5 This report outlines the requirements for the glazing and ventilation to control noise intrusion across the site, and considers external noise levels for amenity areas in line with the requirements set out in BS 8233:2014, as required by PET. An assessment of noise in respect to the control of overheating has also been undertaken, outlining the area of the site where further ventilation requirements are to be considered.

3.6 We stress that this application is outline in nature and therefore details of the scheme in terms of dwelling layout will be confirmed at the reserved matters stage.

Planning Context

3.7 Policy DM8 – Pollution, set out within the EBC local plan (2016-2036), outlines the following acoustic design criteria, which are based upon relevant national standards and guidance documents¹. These have been utilised in the noise assessment works undertaken for the scheme.

Table 1 Noise assessment criteria

Location	Time Period	Single Number Criterion, dB	Noise Index	Note(s)
Habitable rooms (internal)	0700-2300	≤ 35	$L_{Aeq,16hr}$	Bedrooms and living rooms (daytime)
	2300-0700	≤ 30	$L_{Aeq,8hr}$	Bedrooms (night-time)
		≤ 45	$L_{Amax,F}$	Not normally exceeded more than 10 times per night
External amenity areas (or parts thereof)	0700-2300	≤ 55	$L_{Aeq,16hr}$	Noting that it may not be possible to achieve this in a practicable manner in all areas

3.8 Additionally, to satisfy the noise requirements of the Building Regulations Approved Document O (ADO), in locations where external free field noise levels exceed 50 dB $L_{Aeq,8hr}$ and / 65 dB $L_{Amax,f}$ during the nighttime period, it is necessary to provide a building overheating control strategy that does not necessarily rely on partially open windows to bedrooms at night.

4.0 Noise Survey

4.1 An unattended noise survey was undertaken at free-field positions on the site between 1215 on Wednesday 14th and 1330 on Friday 16th August 2024. Full details of the noise survey can be found in the attached **Appendix A**.

4.2 Noise measurements were taken at two locations chosen to represent the noise climate at the northern and southern most points of the site. These positions are denoted as MP1 and MP2 on

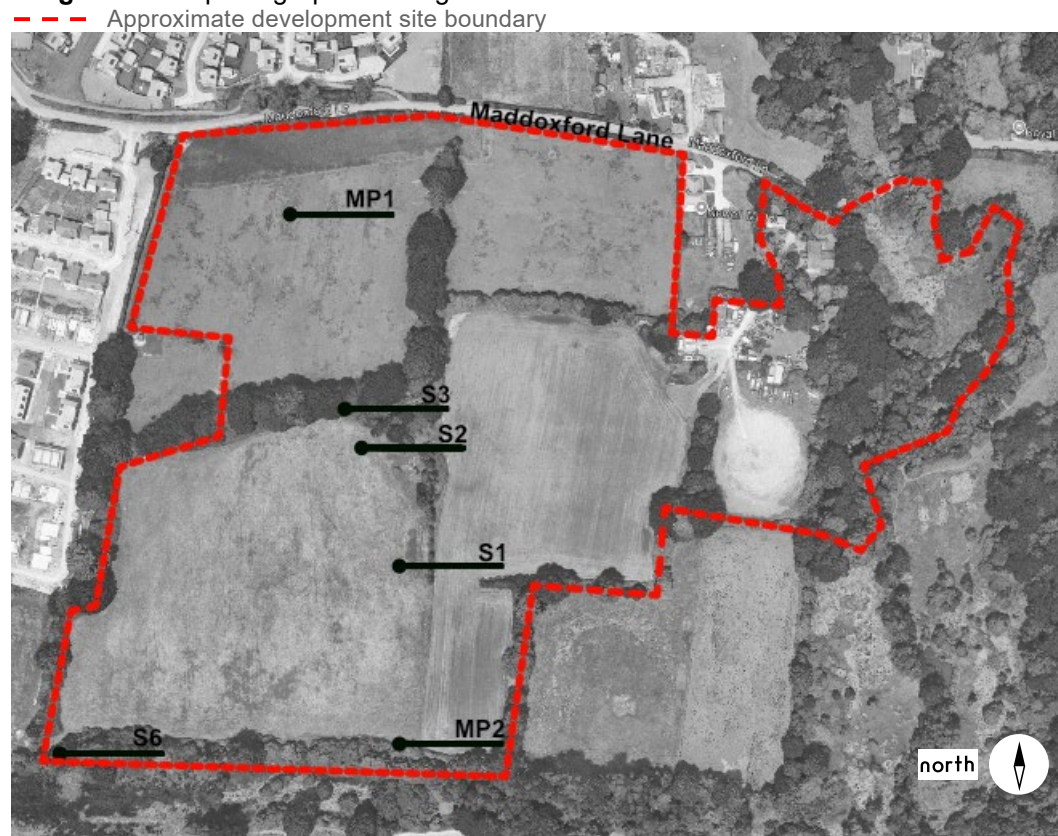
¹ Largely drawn from BS 8233:2014 – “Guidance on sound insulation and noise reduction for buildings” and the ProPG: Planning & Noise 2017.

Image 2 and were selected to best quantify the main sources of noise affecting the site (being local road traffic noise to the north and rail and road traffic noise to the south).

4.3 Additional attended spot-check measurements were also undertaken at the positions labelled S1 to S3 and S6 on the following image. The unattended noise monitors at MP1 and MP2 remained operational during measurements at S1 to S3 to establish differences in noise levels across the site.

4.4 Additional attended noise and vibration measurements, capturing rail activity (including freight), at position S6 to the south of the site, were undertaken between 1130 and 1445 on 14th May 2025.

Image 2. Aerial photograph showing noise measurement locations



Aerial imagery courtesy of Google

Results

4.5 Time history graphs illustrating the results of the unattended noise monitoring are set out within **Appendix A**.

4.6 Daytime $L_{Aeq,16hr}$ and night-time $L_{Aeq,8hr}$ noise levels along with the typical $L_{Amax,f}$ event noise levels recorded over the course of the unattended noise survey are set out within **Table 2**, with the corresponding octave band spectra set out within **Appendix A**. These figures have been used for the purposes of the assessment.

Table 2 Summary period noise levels measured during the unattended noise survey, dB

Measurement Position	Daytime (0700-2300)	Night-time (2300-0700)	
	$L_{Aeq,16hr}$	$L_{Aeq,8hr}$	L_{Amax}
MP1: Maddoxford Lane	48	39	56
MP2: South of Site	45	37	55

4.7 Ambient noise levels across the site were controlled by local traffic noise from Maddoxford Lane and surrounding local and more distant roads. Noise from infrequent rail passbys was also observed but was noted not to control the prevailing noise climate.

5.0 Noise Assessment

Computational Noise Model

5.1 A computational model of the site has been developed to allow for detailed predictions of noise across the site. The model has been created using digital plans of the site and wider area, and 1 m topographical contours produced by DEFRA.

5.2 The noise model has been used to predict day and night-time noise levels in terms of $L_{Aeq,16hr}$, $L_{Aeq,8hr}$ and $L_{Amax,f}$ respectively. All calculations to determine mitigation measures have been based on the octave band noise levels previously referenced within this report and set out within **Appendix A** to ensure a robust approach.

5.3 A description of the noise modelling methodology are set out within **Appendix B**.

Baseline Noise Conditions

5.4 The following **Image 3** and **Image 4** show the predicted day and night-time, baseline noise conditions (in terms of $L_{Aeq,16hr}$ and $L_{Aeq,8hr}$) respectively across the proposed development site, based on the results of the noise survey.

5.5 Baseline noise predictions have also been calculated for L_{Amax} event noise levels at first storey height but are not presented here for the sake of brevity.

Image 3. Daytime baseline noise contour

Daytime $L_{Aeq,16hr}$ noise levels across undeveloped site at ground floor level (1.5m)

--- Approximate development site boundary

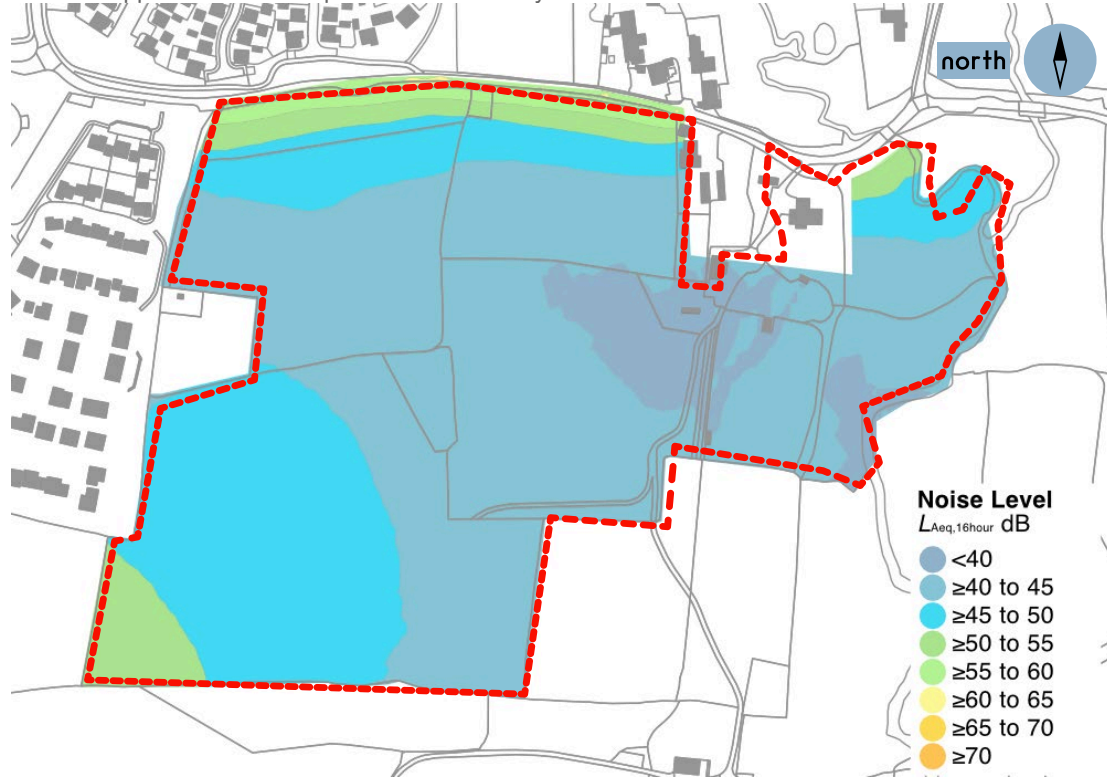
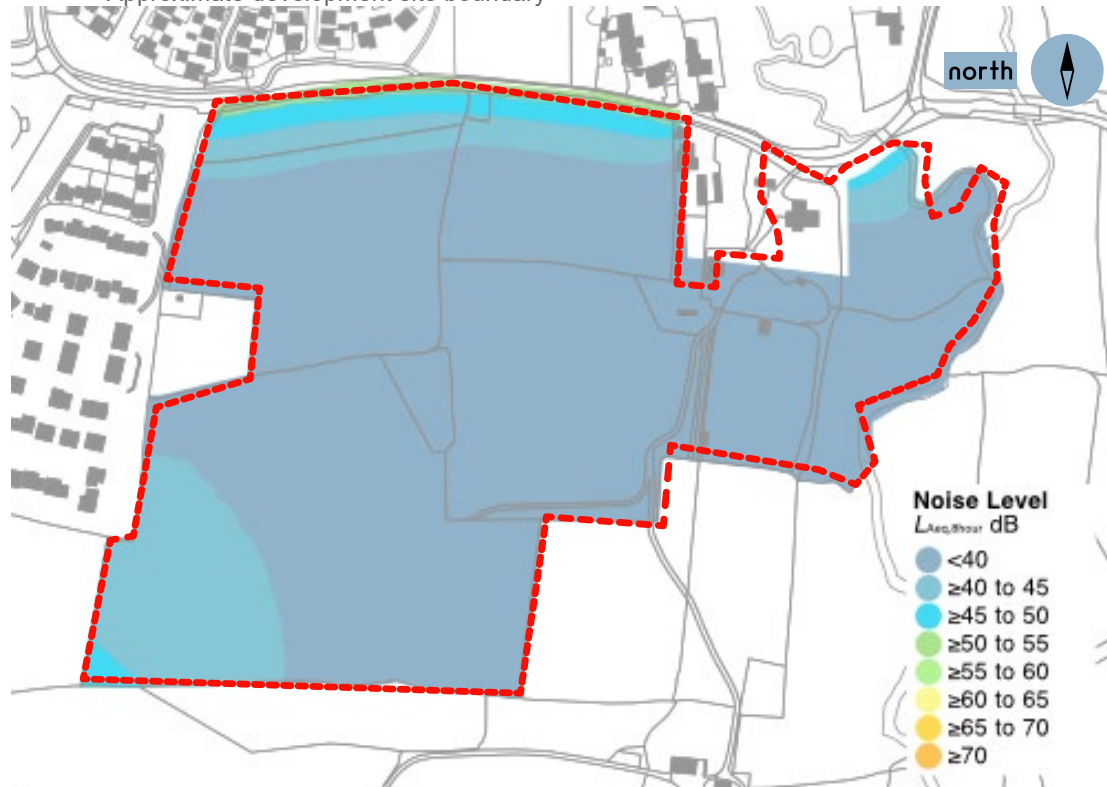


Image 4. Night-time baseline noise contour

Night-time $L_{Aeq,8hr}$ noise levels across undeveloped site at first floor level (4.5m)

--- Approximate development site boundary



Future Noise Conditions

5.6 To consider future traffic conditions, the transport consultant have provided traffic flows from both existing roads and the Botley Bypass. This data was provided in terms of AAWT (Average Annual Weekday Traffic), with percentage HGVs and road speeds. The selected future year provided was 2045, taken to be a reasonable worst case future year, circa 15 years from year of scheme opening. Data has been provided for the 2025 baseline scenarios and a 2045 future scenario, with and without development (the latter inclusive of cumulative developments). The above can be summarised as the following scenarios, with key data set out in **Table 3**:

- Scenario 1 (S1): 2025 Do Nothing (Baseline)
- Scenario 2 (S2): 2045 Do Minimum (Baseline + Cumulative)
- Scenario 3 (S3): 2045 Do Something (Baseline + Cumulative + Proposed Scheme)

Table 3 AAWT road traffic flow data for existing, future and future with development

Road	Traffic Scenario		
	S1	S2	S3
Maddoxford Lane (E of Access)	2,539	3,022	3,123
Maddoxford Lane (W of Access)	2,539	3,328	4,500
Maddoxford Lane (W of Wallace Ave)	4,829	5,953	7,125
Maddoxford Lane (W of Oatlands)	1,577	2,159	3,099
Wallace Ave (N of Maddoxford Lane)	4,258	4,882	4,882
Wallace Ave (W of Kingsman Drive)	4,528	4,882	4,882
Botley Bypass	22,015	26,633	26,781
Wangfield Lane	1,523	1,751	1,769

5.7 It is noted that these figures are indicative only, due to the high number of variables possible between year of opening and the future year. A pessimistic approach is taken, using the difference between S1 and S3 scenarios to determine the potential noise increase with the assumption that the HGV proportion would not change significantly.

5.8 The Botley Bypass, was granted planning approval in January 2025 and will not be operational until later summer 2027 (as publicly reported at time of writing). The traffic flows in **Table 3** have therefore been used to model absolute noise emission levels from this source, drawing from the methodology set out within the Calculation of Road Traffic Noise, 1988 (CRTN).

5.9 A similar process has been adopted to determine the likely uplift in noise between baseline and future conditions, with absolutely noise levels calculated for each road link and then the change in noise level determined and applied to the noise model as appropriate. These changes are set out in **Table 4** below.

Table 4 Approximate changes in road traffic noise from 2025 to 2045 (Do Nothing to Do Something)

Road	Predicted Change for Year of Opening to Future Year, dB
Maddoxford Lane (E of Access)	+ 1.5
Maddoxford Lane (W of Access)	+ 2.7
Maddoxford Lane (W of Wallace Ave)	+ 3.3
Maddoxford Lane (W of Oatlands)	+ 5.4
Wallace Ave (N of Maddoxford Lane)	+ 2.1
Wallace Ave (W of Kingsman Drive)	+ 2.1
Wangfield Lane	+ 2.0

5.10 These corrections have been utilised when considering noise intrusion to dwellings and garden areas across the proposed development site.

5.11 At time of writing there is no publicly available information which suggests and uplift in rail traffic on the Eastleigh Farham line in the future. It is therefore assumed that noise levels from this source will remain relatively unchanged.

5.12 The following **Image 5** and **Image 6** show the predicted future baseline (2045) day and night-time noise conditions across the proposed development site, based on the results of the noise survey, above corrections, and inclusion of the Botley Bypass.

Image 5. Future daytime baseline noise contour

Daytime $L_{Aeq,16hr}$ noise levels across undeveloped site at ground floor level (1.5 m) for 2045

--- Approximate development site boundary

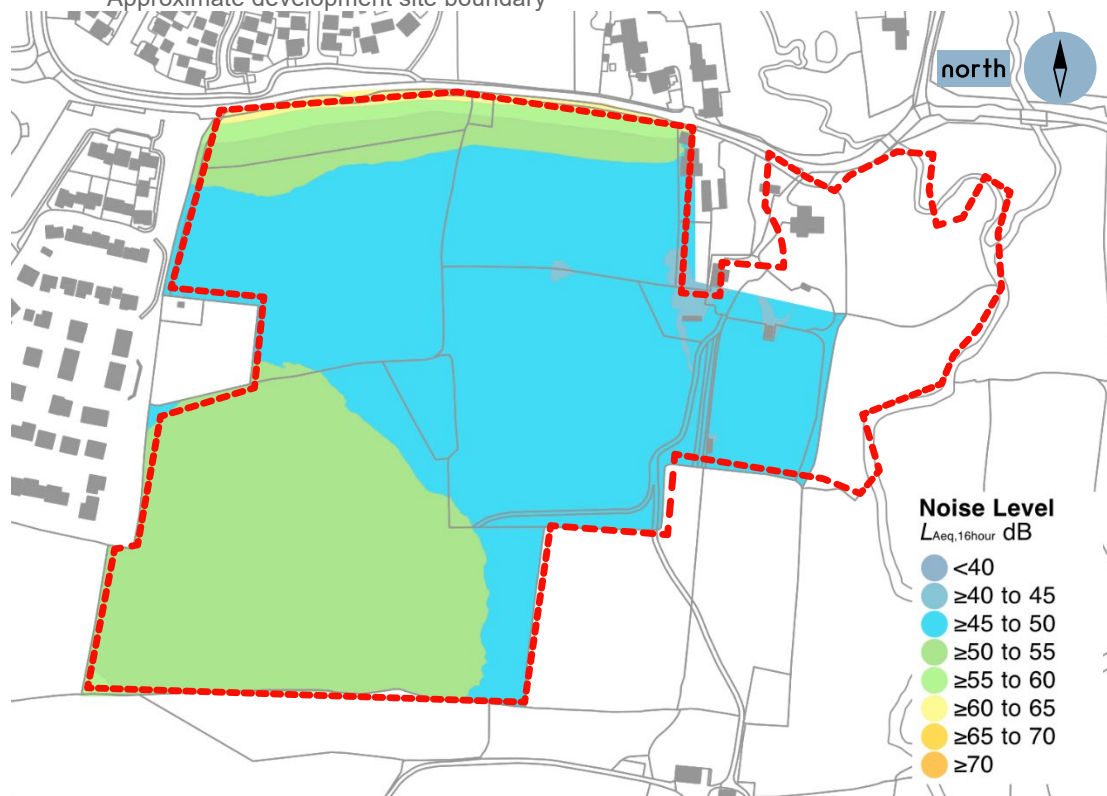
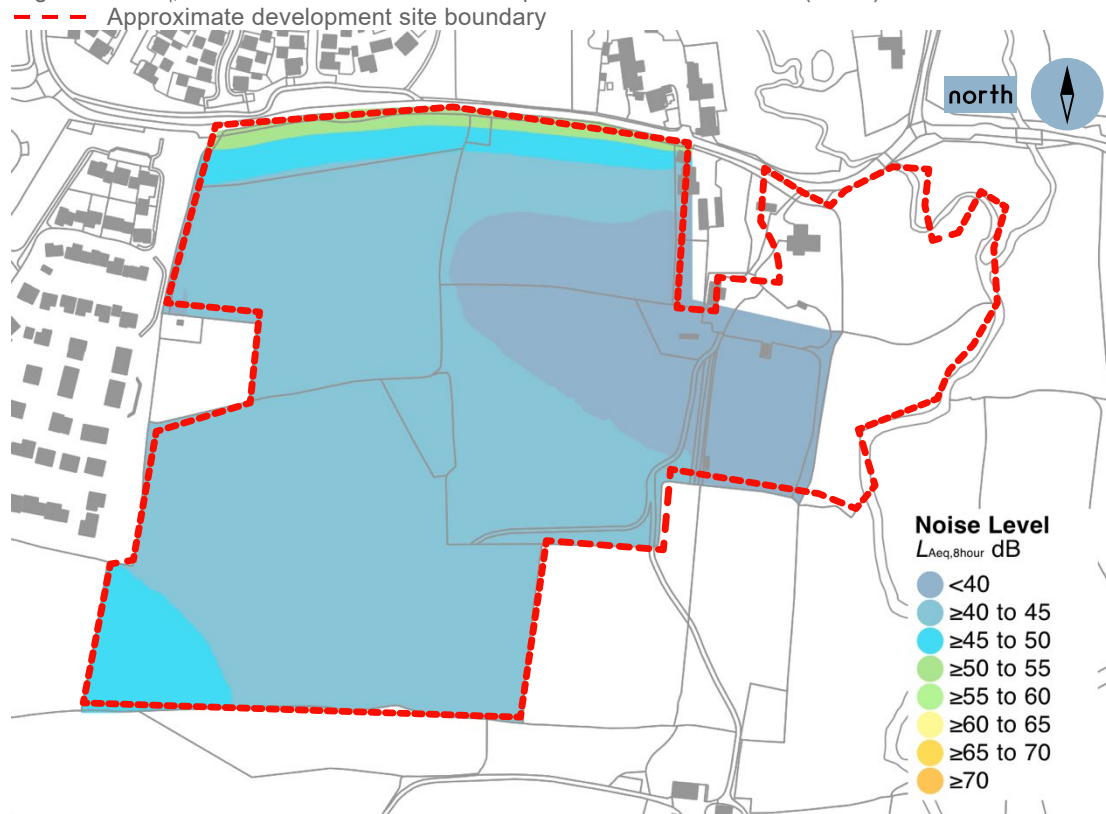


Image 6. Future night-time baseline noise contour

Night-time $L_{Aeq,8hr}$ noise levels across undeveloped site at first floor level (4.5 m) for 2045



5.13 In the future scenario, the Botley Bypass can be seen to control noise levels to the south of the site and more widely elevate noise levels across the proposed development land. It is expected that the Botley Bypass is likely to be more significant a noise source than the railway line in the future scenario.

5.14 Noise from the Botley Bypass in terms of L_{Amax} has also been considered by making use of comparable data from existing dual carriageways and making appropriate corrections for distance, screening and other such effects (noting CRTN does not provide a method for predicted L_{Amax} from traffic data). The bypass is to be located at a considerable distance from the proposed development site and therefore considerable attenuation of L_{Amax} events through distance will be present.

5.15 All further commentary in this report is provided in respect to the future predicted noise conditions, rather than baseline measured conditions. This is to take a more pessimistic approach with respect to good acoustic design and mitigation specification.

Good Acoustic Design Considerations

5.16 Noise levels are relatively low across the site. When considering the noise conditions against the ProPG Initial Site Noise Risk assessment (set out in more detail in **Appendix D**) the site can largely be classified as having a “Low” noise risk.

5.17 A narrow region of the site within 15 metres of the nearest kerb edge of Maddoxford Lane tends toward, but does not reach, a “Medium” noise risk during the night time. ProPG outlines that, within the Low risk range and at low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed.

5.18 Inherent noise mitigation measures will be considered during the development of the residential layout where practicable at the Reserved Matters stage. This can be achieved through the incorporation of good acoustic design practices as described within this section.

5.19 A principle of good acoustic design is seeking to reduce external levels of noise to affected receptors as far as is practicable. As the site can be classified as largely observing a low noise risk, only modest noise mitigation measures are expected to be required. Large scale noise barriers (i.e. tall acoustic fences or walls) adjacent to Maddoxford Lane are not considered to be necessary for this scheme for this reason. Additionally, we understand any such barriers would be visually unacceptable.

5.20 During the development of the layout at the Reserved Matters stage, a buffer zone shall be incorporated where practicable from the northern boundary of the site. The aspiration shall be to avoid placing building facades within 15 metres of Maddoxford Lane, however this should not be viewed as a design constraint and building at a closer distance to the road is entirely practicable (as discussed later).

5.21 This buffer zone would enable a degree of attenuation of road traffic noise from Maddoxford Lane, to ensure that façade noise levels on the development edges are mitigated as far as is practicable without the need for acoustically enhanced façade mitigation.

5.22 Fundamentally, the required noise control measures will be dependent on the detailed site layout, which is to be developed in due course, adopting the principles set out herein where practicable.

External Amenity Areas

5.23 For the vast majority of the site, noise levels will be inherently below the aspirational 55 dB $L_{Aeq,16hr}$ external amenity area noise criterion, before any additional noise mitigation is considered.

5.24 If external amenity areas are to be located within circa 20 metres of the kerb of Maddoxford Lane, localised screening to these areas may be required, or else dwellings will need to be used to provide screening to the attached garden areas.

5.25 Where screening is required, the height will be dependent on the positioning of the external amenity space and is to be confirmed at the reserved matter stage. Only a modest reduction in noise is expected to be required, however, and likely achievable through the implementation of 1.8m tall fences or walls. Where boundary treatments are required to provide a sound reducing function, the material used must:

- Have a mass $\geq 10 \text{ kg/m}^2$
- Be of an imperforate construction
- Have no gaps, holes nor openings (including at the junction with the ground).

5.26 As above, further detailed consideration of external amenity noise can be given at the reserved matters stage; however, it is expected to be entirely possible to provide all gardens with an area meeting the relevant aspirational noise threshold.

Glazing, Ventilation and Control of Overheating

Overview

5.27 To suitably control noise to the proposed dwellings, noise mitigation in the form of acoustically appropriate glazing and ventilation provision has been specified. A detailed acoustic specification for the required mitigation measures is set out in **Appendix C**.

Dwelling Parameters

5.28 The façades of the proposed dwellings are expected to comprise a cavity masonry brick / blockwork construction (based on the developer's typical house types). This does not preclude the use of alternative lightweight or masonry constructions if there is a subsequent preference to do so, but Suono must be consulted to verify that any such proposed construction offers the required sound insulation performance.

5.29 Similarly, the proposed roofs are understood to be of a typical tiled construction, plasterboard ceilings to the rooms below and thermal insulation to the loft spaces.

5.30 Full details of the façade and roof sound insulation performances used as the basis of this assessment are set out within **Appendix C**.

5.31 Typical internal room dimensions have been taken as follows (expected to be suitably representative of the proposed dwellings):

- 5 m x 4 m x 2.7 m for living rooms with 3 m² of glazing;
- 4 m x 3 m x 2.7 m for bedrooms with 1.8 m² of glazing.

5.32 These dimensions should not be taken as limitations, but rather reasonable figures used for the purposes of the assessment.

Partially Open Windows

5.33 Based on the results of the noise modelling, and assuming that the proposed dwellings would offer at least 10 dB of screening attenuation to noise from Maddoxford Lane and the sources to the south, it is expected that dwellings across the majority of the site will meet the internal noise level requirements with partially open windows (taken to offer a loss of approximately 13 dB from free field external level to reverberant internal level).

5.34 Dwellings on the northern and southern boundaries of the site with facades having a direct line of sight to Maddoxford Lane or in the direction of the bypass may not achieve the relevant internal noise criteria with windows partially open.

5.35 The relevant good acoustic design process has been followed, and it is entirely appropriate to consider the fabric of the proposed dwelling to reduce noise and ensure the criteria can be met.

5.36 In all cases, windows must still be openable as desired by the occupants of all the proposed dwellings, and, as discussed in the following sections, noise intrusion can be expected to be comfortably controlled when windows are closed. This approach is in line with the relevant guidance set out within **section 3.0 (Design Criteria)** and **Appendix D**.

5.37 It should be noted that the commentary above should not be read in conjunction with the overheating assessment noise constraints plot set out later in this document as these relate to different considerations using differing losses based on separate assessment methodologies.

Glazing

5.38 For all prospective dwelling across the proposed development site at distance greater than 10 metres from the kerb of Maddoxford Lane, the results of the noise modelling indicate that standard thermal double glazing (expected to provide a single figure sound reduction performance of circa 30 dB R'_w) will be sufficient for all habitable rooms. Full details on the requirements for glazing to be installed across the development are set out in **Appendix C**.

5.39 At distances closer than 10 metres to the kerb of Maddoxford Lane, glazing with an increased acoustic performance requirement would be required. The specification of said glazing will depend on the final layout and will be confirmed at the Reserved Matters stage, as required.

Ventilation

5.40 Based on the developers typical approach, trickle ventilators are expected to be used across the proposed development in a mechanical extract ventilation (MEV) configuration to provide the required background ventilation rates. Ventilation for the purposes of overheating control is discussed later in this report.

5.41 Noise intrusion calculations have included the effects of up to three trickle ventilators in living rooms and two within bedroom areas (noting that fewer would be acoustically acceptable). The ventilation strategy should be confirmed as acceptable by a suitable qualified party, in relation to the requirements of Approved Document F² (ADF).

5.42 It has been assumed that all residences will be of a standard layout, with living rooms on ground floor level, and bedrooms at first floor.

5.43 As with the glazing, for all prospective dwellings across the proposed development site at distance greater than 10 metres from the kerb of Maddoxford Lane, through-wall or -frame non-acoustic trickle ventilators meeting a sound reduction performance of 35 dB $D_{n,e,w}$ will be sufficient for all habitable rooms across the development. The full requirements for these are set out within **Appendix C**.

5.44 At distances closer than 10 metres to the kerb of Maddoxford Lane, ventilation elements with an increased acoustic performance requirement would be required. The specification of said ventilation elements will depend on the final layout and will be confirmed at the Reserved Matters stage, as required.

Overheating

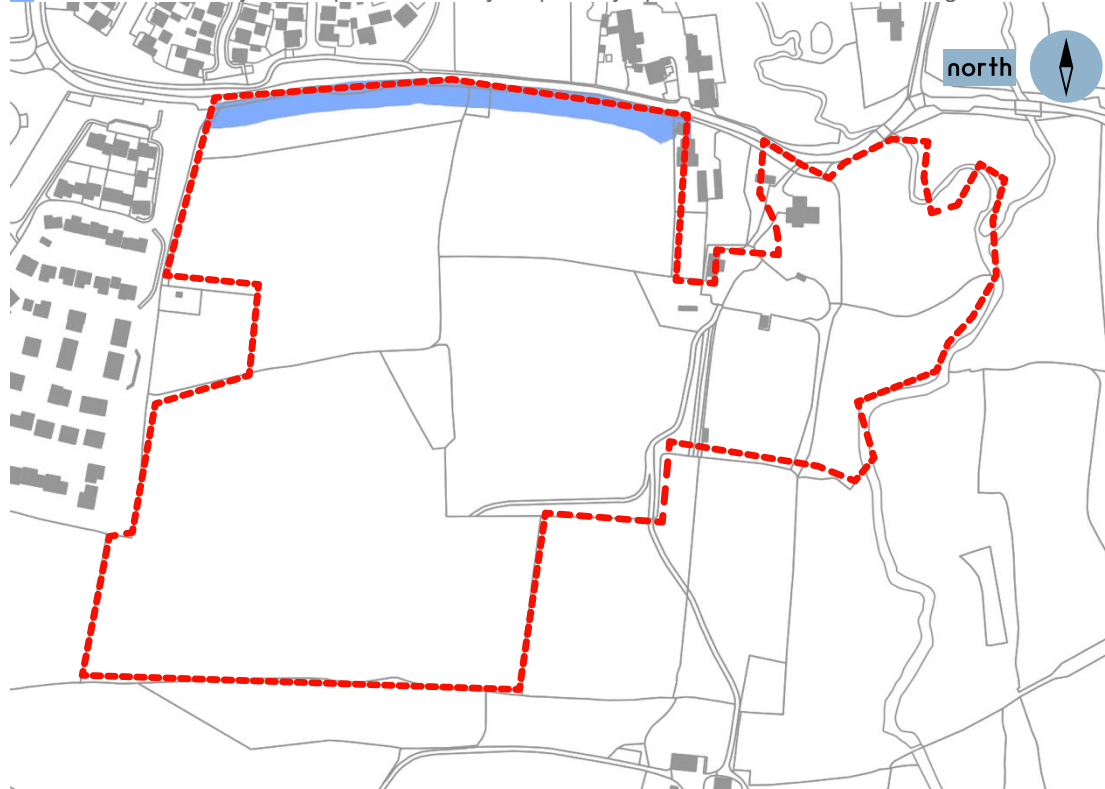
5.45 It is necessary to consider ventilation in the context of overheating (noting this matter is for compliance with the Building Regulations and is not a planning constraint). Considering the guidance set out within **Appendix D** (and taking into account the simplified method of assessing overheating in ADO), it has been determined that it will be possible to provide acceptable internal noise conditions during periods of overheating with partially open windows to all but the front row of dwellings (relative the Maddoxford Lane).

5.46 Based on the above, **Image 7** shows the areas of the site where it will likely **not** be possible to rely on partially open windows to **bedrooms during the night time** to provide relief from building overheating, due to the noise requirements of ADO. The constraints apply to all bedrooms with windows falling within the regions marked in **blue**. It is noteworthy that any constraint can only be confirmed at the Reserved Matters stage when a layout has been confirmed.

² Building Regulations Approved Document F: Ventilation

Image 7. Overheating assessment noise constraints

■ Areas where it may not be possible to rely on partially open windows for overheating control to bedrooms



Based on noise contours at first floor level

5.47 The typical approach adopted by the developer in such instances is to provide appropriately specified boost fans/boosted MEV systems to provide the additional ventilation rates required by ADO to provide relief from overheating where noise levels are such that open windows cannot be used for this purpose.

5.48 The following is an overview setting out to how the requirements of ADO would typically be addressed by the developer, taking into account the scheme's noise constraints:

- A full dynamic simulation will be carried out using the TM59³ methodology as stipulated within Approved Document O (if deemed necessary).
- Guidance provided within the noise report on the extent to which openable windows may be utilised for purge ventilation as a component of the TM59 overheating assessment strategy will be taken into account.
- Alternative means of ventilation will be provided to bedrooms in the identified areas through the use of additional fans, with a flow rate sufficient to meet the TM59 temperature criteria for bedrooms during sleeping hours. A dynamic simulation will be carried out for each plot that has acoustic constraints, in order that the specific overheating mitigation requirements are met.

5.49 For all other areas of the site, it is expected that acceptable internal noise conditions are expected to be provided during periods of overheating, with windows partially open. Again, constraints on the use of openable windows for overheating control will be confirmed as part of the noise assessment works that are to be undertaken at the Reserved Matters stage.

³ TM59 - Design methodology for the assessment of overheating risk in homes (2017)

6.0 Vibration

6.1 The proposed residential areas, as shown in the Land Use and Access Plan, are circa 130 m from the nearest rail head of the South Western railway to the nearest land use zone.

6.2 It is noted that at such distances, groundborne vibration would only very rarely be a material consideration. Localised anomalies in the ground may however allow for more efficient propagation of vibration through the earth, such as unusual terrain makeups, subterranean services such as sewers etc. Should any such anomalies be identified on site, further assessment may be required.

6.3 Despite the above, an attended vibration survey was undertaken at the site between 11:35 and 14:40 on the 14th May 2025 at the previously identified measurement position S6.

6.4 Using this data, the following 16-hour and 8-hour daytime Vibration Dose Values (VDVs) were calculated using publishably available rail timetable data⁴ and the data capture on site during individual train passes. Rail freight was noted to occur over the duration of the survey period, based on observations made on site.

Table 5 Vibration survey results summary

Time Period	Measured Vibration Dose Value $ms^{-1.75}$		
	x-axis	y-axis	z-axis
16-hour daytime $VDV_{b,day}$	0.03	0.03	0.03
8-hour night time $VDV_{b,night}$	0.02	0.02	0.02

6.5 Measured levels of vibration have been compared with the criteria in BS 6472⁵. During both the day and the nighttime, the measured levels of vibration are well below the threshold for a “*low probability of adverse comment*”. BS 6472 advises therefore that at this level “*adverse comment is not expected*”.

6.6 Due to the significant distances involved and low levels of groundborne vibration, there is no requirement for the recommendation of any vibration isolation treatment for the proposed development layout. Vibration related effects are not a material consideration for this scheme.

⁴ As published on realltimetrains.co.uk

⁵ BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting

7.0 Conclusions

7.1 The proposed development site is situated on land south of Maddoxford Lane, Boorley Green. A noise survey has been undertaken at the site to quantify the prevailing noise climate. Traffic data has been used to quantify noise effects relating to the proposed Botley Bypass as well as to allow the consideration of future noise conditions. From this data, an assessment of internal and external noise levels across the development site has been undertaken.

7.2 Good acoustic design practices have been considered. A noise mitigation strategy has been developed to ensure suitable noise conditions for future residents, taking into account noise effects relating to building overheating control measures where appropriate.

7.3 Noise levels in external areas are in inherently expected to fall below the aspirational noise criterion in the vast majority of areas across the site, with only modest noise mitigation measures be required where such areas fall within 20 metres of Maddoxford Lane.

7.4 For the vast majority of the site, standard thermal double glazing and non-acoustic trickle ventilators will be sufficient to suitably control noise to the proposed dwellings. Acoustically enhanced façade noise mitigation measures shall be developed at the Reserved Matters stage, as required.

7.5 From a noise perspective, openable windows will be acceptable to control overheating effects for the majority of the site, with the possible exception of a narrow section of land adjacent to Maddoxford Lane. The noise/overheating control constraints will be confirmed at the Reserved Matters stage.

7.6 It has been demonstrated that it will be entirely possible to ensure a suitable noise climate internally and externally for future residents of the proposed development and a detailed noise mitigation strategy is set out herein for approval by the Local Authority. The requirements of the NPPF and PPG are therefore met.



Appendix A: Noise Survey

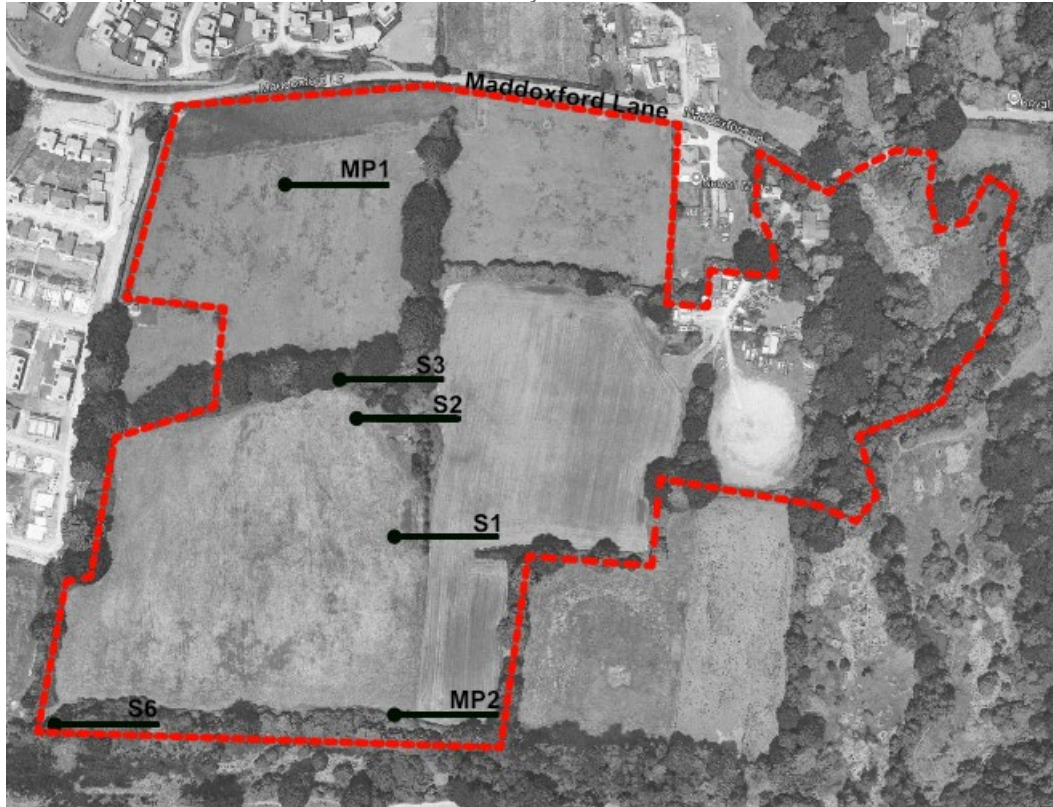
Methodology and Instrumentation

An unattended noise survey was undertaken at positions MP1 – MP2 at the site between 1215 on Wednesday 14th and 1330 on Friday 16th August 2024.

In addition, during the set up of the unattended positions on Wednesday 14th August 2024, spot check measurements were taken at further positions (S1-S3). Further attended noise and vibration measurements were undertaken at position S6, to quantify rail noise and vibration. Measurements were taken at the south west corner on 14th May 2025, 1-minute measurements were taken between 1137-1439. Train passbys were noted to be infrequent, with freight even more so. The survey confirmed the road traffic was the primary noise source affecting the site.

Image A1: Aerial photograph showing noise measurement locations

--- Approximate development site boundary



Aerial imagery courtesy Google

Measurements of the L_{Aeq} , L_{Amax} and L_{A90} indices were recorded over consecutive 15-minute periods for the duration of the unattended survey, spot check measurements were taken over 5-minute periods. Detailed summaries of the measurement positions are set out in the following table.

Noise measurement locations

Location	Detail
MP1	Microphone at 1.5 m above local ground level, in a free field position within the southern parcel on the northern site boundary, approximately 34m from the nearest Maddoxford Lane kerb. Measurements were unattended. The noise climate was dominated by road traffic noise along the Maddoxford Lane.
MP2	Microphone at 1.5 m above local ground level, in a free field position within the southern parcel at the eastern side of the southern boundary of the site. Measurements were unattended. The noise climate had been noted to contain distant road traffic and some construction noise to the west.
S1	Microphone at 1.5 m above local ground level, in a free field position within the southern parcel within a central area of the site. Measurements were attended. The noise climate was dominated by distant road traffic, wildlife and neighbouring construction noise.
S2	Microphone at 1.5 m above local ground level, in a free field position within the southern parcel within a central area of the site. Measurements were attended. The noise climate was dominated by distant road traffic, wildlife and neighbouring construction noise.
S3	Microphone at 1.5 m above local ground level, in a free field position within the southern parcel within a central area of the site. Measurements were attended. The noise climate was dominated by distant road traffic, wildlife and neighbouring construction noise.
S6	Microphone at 1.5 m above local ground level, in a free field position within the southern parcel within a southern area of the site. Triaxial accelerometers at ground level, mounted on a baseplate with a metal steak inserted into the soil. Measurements were attended. The noise climate was influenced by distant road traffic, wildlife, neighbouring construction noise and intermittent rail activity. Vibration was not perceptible by touch and did not appear to be a material consideration during the survey period.

Noise measurements were made using the equipment set out in the following table. The unattended sound level meters were fitted within weatherproof enclosures and the meters calibrated both before and after the survey to confirm an acceptable level of accuracy. No significant drift was noted to have occurred.

Noise and vibration measurement positions

Location	Item	Detail
MP1 & MP2	Sound Level Analyser	Svantek 971
	Outdoor Microphone Kit	Svantek SA 271A
	Acoustic Calibrator	Svantek SV33B
S1-3 & S6 (noise)	Sound Level Analyser	Norsonic Nor118
	Outdoor Microphone Kit	Norsonic Nor1251
	Acoustic Calibrator	Norsonic Nor1217

Weather conditions⁶ when setting up the initial survey equipment was overcast with some drizzle but dry roads and low wind, after setting up the meter this turned to warm sunny weather. When collecting the meter the weather was hot, clear and still with dry roads and low wind. The weather when measurements were taken at S6 was Warm and bright with no breeze.

Historical weather data shows the warm weather, clear of precipitation, had remained throughout the survey period.

Results

The following tables set out the period noise levels captured across the duration of the unattended noise survey.

Measured Noise Levels at MP1

Date (2024)	Day	Noise Level, dB		
		Daytime	Night-time	Night-time Max ⁵
		$L_{Aeq,16hr}$	$L_{Aeq,8hr}$	$L_{Amax,f}$
14 th August	Wednesday	46*	39	58
15 th August	Thursday	48	38	56
16 th August	Friday	48*	-	-

*Partial daytime period due to survey start/end time

Measured Noise Levels at MP2

Date (2024)	Day	Noise Level, dB		
		Daytime Average	Night-time Average	Night-time Max ⁵
		$L_{Aeq,16hr}$	$L_{Aeq,8hr}$	$L_{Amax,f}$
14 th August	Wednesday	40*	37	59
15 th August	Thursday	45	36	55
16 th August	Friday	44*	-	-

*Partial daytime period due to survey start/end time

The following time history graphs present the measured noise levels captured at both unattended measurement positions throughout the survey duration.

⁶ <https://www.wunderground.com/history/weekly/gb/southampton/EGHI/date/2024-8-14>

Image A2: Noise measurement results at position MP1

■ $L_{Aeq,15min}$, ■ $L_{Amax,f}$ and ■ $L_{A90,15min}$ in terms of sound pressure (dB, y-axis) against time (hhmm, x-axis)

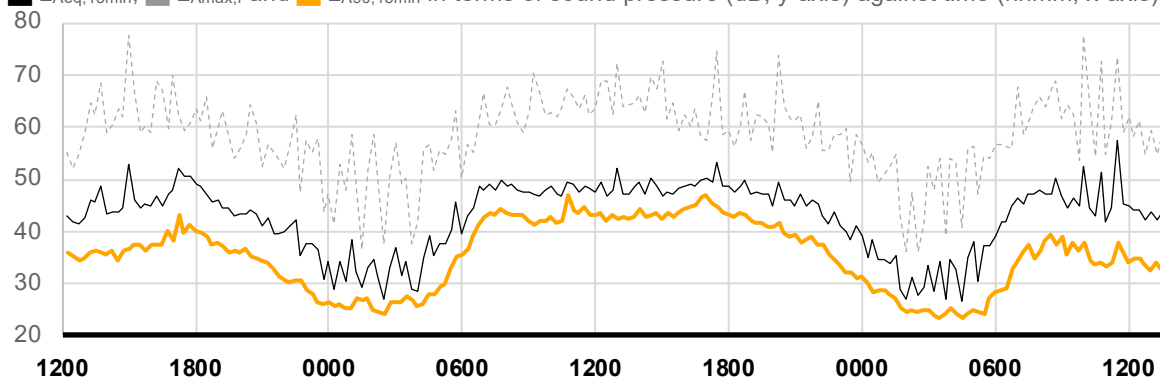
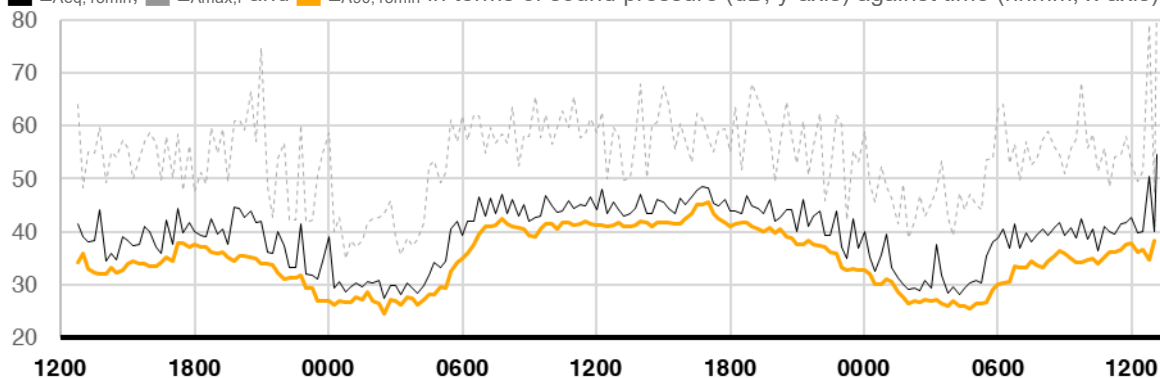


Image A3: Noise measurement results at position MP2

■ $L_{Aeq,15min}$, ■ $L_{Amax,f}$ and ■ $L_{A90,15min}$ in terms of sound pressure (dB, y-axis) against time (hhmm, x-axis)



The following table sets out the measured noise levels at attended positions S1-S5.

Spot check noise measurement results middle of site

Measurement Position	Period	$L_{Aeq,5min}$	$L_{Amax,f}$	$L_{A90,5min}$
S1	1246-1251	35	52	33
S2	1253-1258	36	48	34
S3	1259-1304	37	48	35

Spot check noise measurement results southern boundary

Measurement Position	Period	Average $L_{Aeq,T}$	$L_{Amax,f}$	Minimum $L_{A90,1min}$
S6	1137-1440	46	69	33

Spot check vibration measurement results southern boundary (aggregate of 5-minute periods)⁷

Measurement Position	Time Period	Measured Summary Vibration Dose Value $ms^{-1.75}$		
		x	y	z
S6	1137-1440	0.2	0.2	0.2



⁷ 5 minute VDV data can be provided on request.

Appendix B: Noise Modelling

Noise Modelling Software

A computer-based noise prediction program (*Wölfel* IMMI 2024) has been used to determine the road traffic noise levels generated across the site by this noise source, using CRTN⁸ and ISO 9613⁹ as a basis to determine noise propagation paths throughout the model.

This software allows for the calculation of noise levels at specific points around a model, from a series of noise sources simultaneously, or produce noise contour plots. The noise model used has taken account of the following effects:

- Distance
- Screening
- Surface reflections
- Topography (taken to be flat within the model)
- The surrounding built up area.

Model Input and Calibration

The assessment of noise levels with the proposed development site in place is based on the *Thrive Architects* 'Land Use and Access Plan' drawing (ref: BLOO240103 LUP-01 P6, dated 5th December 2025).

Topographical data has been based on LIDAR information publicly available through DEFRA.

The model uses CRTN to define traffic noise propagation from Maddoxford Road, the new Botley Bypass and further surrounding roads in terms of daytime $L_{Aeq,16hr}$ and night-time $L_{Aeq,8hr}$ period noise levels.

Noise Modelling Assumptions and Limitations

Assumptions have been made to allow for effective noise modelling to be undertaken.

Window heights (to centre of windows) are taken as 1.5 m for ground floor and 4.5 m for first floor.



⁸ Calculation of Road Traffic Noise, Department of Transport, 1988

⁹ ISO 9613-1:1993 – Acoustics – Attenuation of sound during propagation outdoors — Part 1: Calculation of the absorption of sound by the atmosphere

Appendix C: Noise Mitigation Measure Summary

Details of required glazing and ventilation specifications

Façade Mitigation Measures

This appendix sets out specifications for the noise mitigation measures that must be included to control noise intrusion to the dwellings across the proposed development. All numerical performance requirements set out should be treated as minimum values. The product examples and example element configurations are all indicative only; the numerical values form the requirements.

Reference is made to the Building Regulations Approved Document F, Ventilation - Volume 1: Dwellings (ADF) and Approved Document O, Overheating (ADO) which must be adhered to as appropriate. Advice provided by Suono in respect to the above pertains to the control of noise, vibration and other acoustics related matters only. Compliance with other aspects on the above regulations is the responsibility of others.

Building Envelope

The following table sets out the minimum sound insulation requirements for key building envelope elements (except for glazing and ventilation openings, which are discussed later).

Acoustic performance of building envelope elements, dB

Element	Typical Construction	Index	Sound Reduction Index, R dB at Octave Band Centre Frequency, Hz						Single number value, R'_w dB
			125	250	500	1k	2k	4k	
External Walls/Facade	Cavity masonry external wall	R'	40	44	45	51	56	56	51
Roof/Ceiling	Tiled roof with single layer plasterboard ceiling and insulated loft space	R'	28	34	40	45	49	49	44

The typical configurations outlined in the table above are provided for guidance purposes. The octave band losses must be achieved in each octave band for the building fabric element as a whole, in that no aspect of it shall cause the values in the table to not be met.

Glazing Requirements

The necessary glazing requirements and typical configurations expected to achieve these are set out within the following table.

Acoustic performance of glazing elements, dB

Code	Typical Glazing Configuration	Index	Sound Reduction Index, R dB at Octave Band Centre Frequency, Hz						Single number value, R'_w dB
			125	250	500	1k	2k	4k	
G1	Standard Thermal Double Glazing, typically: 4 mm glass, 16 mm air/gas space, 4 mm glass	R'_w	30						

The typical configuration outlined in the table above is provided for guidance purposes only. Standard thermal double glazing can be expected to achieve the single number sound insulation requirement set out above, however this should be verified by the glazing supplier.

The chosen glazing system manufacturer(s) should be expected to be able to provide laboratory (or suitably representative in-situ) test data to prove the above values can be met by their product.

Ventilator Specifications

The required acoustic performance for ventilators and example products expected to achieve these are set out within the following table.

Acoustic performance of trickle ventilator elements, dB

Code	Example Product	Index	Element Normalised Level Difference, dB at Octave Band Centre Frequency, Hz						Single number value, $D_{n,e,w}$ dB
			125	250	500	1k	2k	4k	
V2	Non-acoustic direct air path trickle ventilator	$D_{n,e,w}$	35						

The above $D_{n,e}$ value relates to the noise reduction provide by a single¹⁰ vent, based on its area, standardised to an absorption area of 10 m². Therefore, the figure is higher than the actual insertion loss that will be provided by the ventilator, as it is dependent on the area of the vent.

Most standard non-acoustic direct air path trickle ventilators can be expected to achieve the single number requirement set out above. The ventilation product supplier should however be expected to demonstrate that the above sound reduction figure can be achieved by the product being proposed (in an open position).

The ventilation strategy must be confirmed as acceptable by a suitably qualified party in relation to the requirements of ADF. Trickle ventilators may be used as part of a mechanical extract ventilation (MEV, formerly referred to as System 3 within the previous version of ADF) if required.

¹⁰ The noise intrusion calculation allows for three vents in living rooms and two in bedrooms, however the $D_{n,e}$ values is to be achieved by each vent. If a greater number of trickle vents is required to the areas above, the ventilator specification should be reconfirmed by Suono.

Ventilation for Overheating Control

The Building Regulations ADO requires noise to be considered when seeking to use open windows for the purposes of ventilative cooling to bedrooms during the night-time.

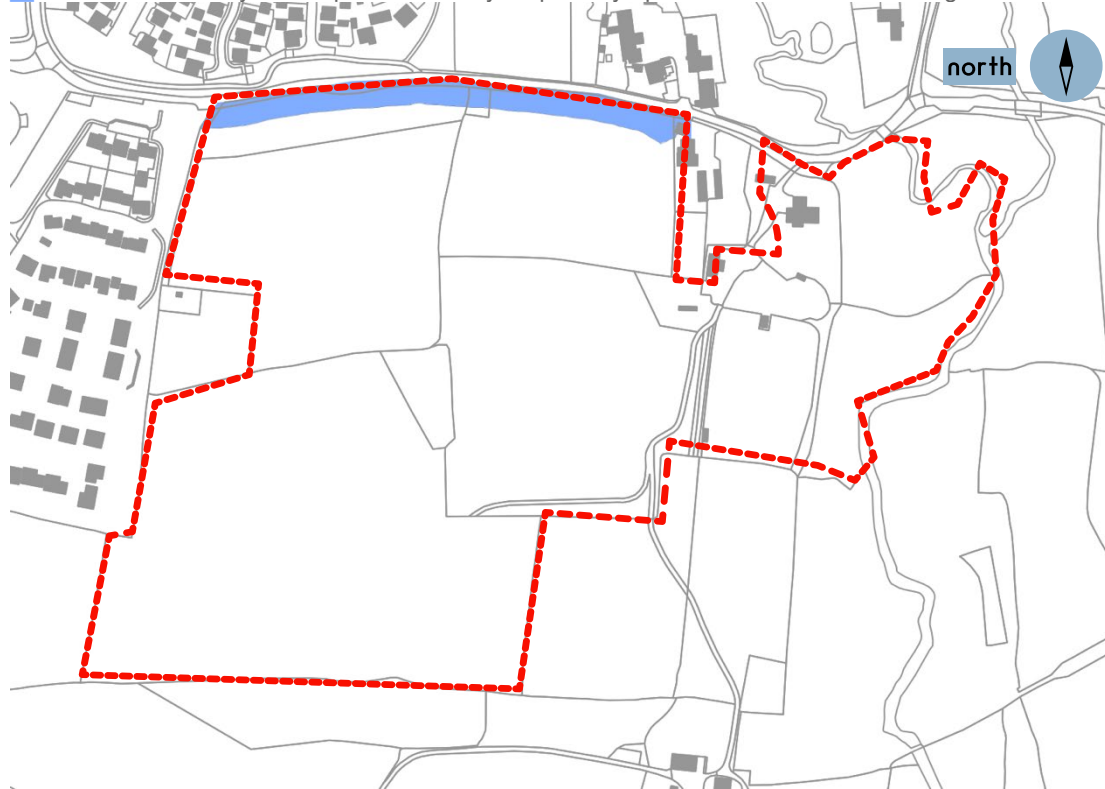
ADO suggests that internal noise levels above specific thresholds are not conducive to an occupant's 'reasonable enjoyment of the residence' on the basis that they would likely shut their windows to control noise intrusion, which would in turn exacerbate building overheating effects. Where the relevant noise thresholds are exceeded, it is necessary to consider methods of building overheating control that either makes use of limited or no window openings (see **Appendix D** for more information).

Image C2 sets out the areas of the development where noise within the proposed dwellings may exceed the ADO internal thresholds with openable windows used for the purposes of overheating control. This information is also summarised in the table below the image.

Where **bedrooms** are located on facades subject to noise levels which may cause the ADO internal thresholds to be exceeded (areas shown in **blue** on **Image C2**) the overheating control strategy for those rooms should **not** rely on open windows during the night-time period (0700 to 2300).

Image C2: Proposed Site Layout with ADO External Noise Thresholds

■ Areas where it may not be possible to rely on partially open windows for overheating control to bedrooms



Based on noise contours at first floor level

It stressed that the above constraints are taken to apply to **bedrooms only** during the **night-time** period and open windows may be used as part of a dwelling's overheating strategy in other habitable rooms and to all areas during the daytime. The constraint should be treated as indicative only at this stage and will be dependant on the layout to be developed at the Reserved Matters stage.

Where external noise levels are such that there is a constraint on the use of open windows to provide relief from overheating, the approach adopted by the developer is to provide appropriately specified boost fans/boosted MEV systems to provide the additional ventilation rates required by ADO.

An example of the type of fans used where boost ventilation is required is the *Vent-Axia Lo-Carbon NBR dMEVc*. These fans are selected for the ventilation rates they can provide and low noise emissions (noting that other suitable alternative fans are available).



Appendix D: Planning Policy & Guidance

National Policy

National Planning Policy Framework

The NPPF is the relevant document for defining the national policy toward noise sensitive development. The document was originally published in March 2012 and most recently updated in December 2024.

Paragraph 135 states that planning policies and decisions should ensure that developments:

“create places that [...] promote health and well-being, with a high standard of amenity for existing and future users...”

Further to this and on the subject of noise, paragraph 187 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 soil, air, water or noise pollution”

Paragraph 198 of the NPPF states:

“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:

- a) 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;*
- b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;”*

Clause “a)” in paragraph 198 makes reference the Noise Policy Statement for England which is discussed in the following section.

The ‘agent of change’ principle is discussed in paragraph 200 of the NPPF. In terms of noise, this principle requires that those proposing a new noise sensitive development incorporate sufficient mitigation such that the operation of existing premises in the area is not unreasonably restricted in order to control noise impact upon the new development:

“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.”

Noise Policy Statement for England

The NPSE (March 2010) also does not set quantitative guidelines for the suitability of noise sensitive development in an area depending on the prevailing levels of noise. Absent, therefore, is reference to specific noise thresholds which determine whether noise sensitive development is suitable and, if so, whether mitigation factors need to be considered.

Instead, the NPSE sets out the principle of “SOAEL, LOAEL and NOEL” which are defined as follows:

Significant Observed Adverse Effect Level (SOAEL): This is the level [of noise exposure¹¹] above which significant adverse effects on health and quality of life occur.

Lowest Observed Adverse Effect Level (LOAEL): This is the level [of noise exposure²] above which adverse effects on health and quality of life can be detected.

No Observed Effect Level (NOEL): This is the level [of noise exposure²] 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.

Given the overall thrust of the NPSE, the SOAEL is an important assessment threshold although the NPSE also comments in section 2.22 that:

“It is not possible to have a single objective noise based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times.”

Attention is drawn to the fact that the SOAEL is the level above which significant adverse effects can be observed. Importantly, it should be noted again in respect of the NPPF that the overall objective is to avoid or minimise significant adverse impacts; some degree of impact is acceptable, and it is not necessary or reasonable to seek to achieve no impact at all.

In addition to the principles set out above, the NPSE sets out three key aims:

The first aim of the Noise Policy Statement for England

“Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.”

The second aim of the Noise Policy Statement for England

“Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.”

The third aim of the Noise Policy Statement for England

“Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.”

¹¹ Additional text drawn from the Planning Practice Guidance Definition

Paragraph 2.24 of the NPSE states that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life. It also states that this does not mean that such adverse effects cannot occur.

Each development site must be judged on its ability to deliver on each of these aims, and while rating the prevailing noise against predefined thresholds is no longer necessary, defining the prevailing noise levels is an essential first step in assessing a given site under the current regime.

Planning Practice Guidance (PPG)

In March 2014 the Department for Communities and Local Government (DCLG) launched the national Planning Practice Guidance (PPG) web-based resource. The PPG on Noise (last updated in July 2019) expands upon the NPPF and NPSE and sets out more detailed guidance on noise assessment.

Like the NPPF and NPSE, the guidance does not include any specific noise levels but sets out further principles that should underpin an assessment. The PPG includes a section on noise, paragraph 003 of the which states:

“Plan-making and decision making need to take account of the acoustic environment and in doing so consider:

- 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; and*
- whether or not a good standard of amenity can be achieved.”*

It then refers to the NPSE and states that the aim is to identify where the overall effect of the noise exposure falls in relation to the relevant SOAEL, LOAEL and, by inference, the NOEL. Definitions for these thresholds are provided again with the PPG, which differ very slightly in wording to the NPSE, but are taken to be identical in their meaning.

In relation to the SOAEL, LOAEL and NOEL, the PPG makes the following important statement:

“Although the word ‘level’ is used here, this does not mean that the effects can only be defined in terms of a single value of noise exposure. In some circumstances adverse effects are defined in terms of a combination of more than one factor such as noise exposure, the number of occurrences of the noise in a given time period, the duration of the noise and the time of day the noise occurs.”

The guidance then presents a table, which is reproduced in the following table. The implication of the final line of the table is that only the 'present and very disruptive' outcomes are unacceptable and should be prevented. All other outcomes (i.e. all other lines in the table) can be acceptable, depending upon the specific circumstances and factors such as the practicalities of mitigation.

On that basis, noise levels deemed to be below the SOAEL can be considered acceptable providing noise has been mitigated and reduced to a minimum.

Table 1.1. Planning Practice Guidance summary of noise exposure hierarchy.

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not present	No Effect	No Observed Effect	No specific measures required
NOEL - No Observed Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
LOAEL - Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
SOAEL - Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, 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.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

It is noteworthy that the PPG states that:

“Noise impacts may be partially offset if residents have access to one or more of:

- a relatively quiet facade (containing windows to habitable rooms) as part of their dwelling;

- a relatively quiet external amenity space for their sole use, (e.g. a garden or balcony).
Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced if this area is exposed to noise levels that result in significant adverse effects;

- a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or

- a relatively quiet, protected, external publically accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minute walking distance).

Guidance Documents

The ProPG and BS 8233:2014

The Professional Practice Guidance on Planning & Noise – New Residential Development, 2017 (ProPG) was prepared by the Institute of Acoustics, the Chartered Institute of Environmental Health and the Association of Noise Consultants.

In relation to residential development, the ProPG builds on the principles and criteria set out BS 8233:2014 – Guidance on sound insulation and noise reduction for buildings (BS 8233).

While the ProPG it is helpful in many ways, it must be noted that the guidance and supplementary documents “does not constitute an official government code of practice and neither replaces nor provides an authoritative interpretation of the law or government policy on which users should take their own advice as appropriate”.

Section 2.27 of the ProPG states:

“It is considered that suitable guidance on internal noise levels can be found in “BS8233:2014: Guidance on sound insulation and noise reduction for buildings”. Table 4 in Section 7.7.2 of the standard suggests indoor ambient noise levels for dwellings (when unoccupied) and states that “in general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values”. The standard states (Section 7.7.1) that “occupants are usually more tolerant of noise without a specific character” and only noise without such character is considered in Table 4 of the standard.”

Indeed, ProPG expands on the advice and notes of BS 8233 Table 4, with relevant sections presented below:

Table 1.2. BS8233/ProPG internal noise criteria

Activity	Location	Internal Ambient Noise Level	
		Daytime (0700-2300)	Night time (2300-0700)
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 $L_{Aeq,8hour}$ 45 dB $L_{Amax,f}$ (Note 4)

Note 4

“... 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. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events"

Note 5

"... 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."

Note 7

"Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved. The more often internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5 dB, the more that most people are likely to regard them as "unreasonable". Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as "unacceptable" by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing "unacceptable" noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form."

With respect to external amenity spaces, ProPG again points to BS 8233 that states:

"the acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$..."

"...These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces but should not be prohibited."

The above thresholds (adjust as necessary taking into account the relevant notes) are taken to correspond to LOAELs, when considered in relation to the PPG and NPSE.

The ProPG sets out the principle of the "Acoustic Design Statement" (ADS) in which noise is quantified and assessed, and mitigation measures determined in line with the methodology set out therein. The preparation of an ADS is not relevant or appropriate for all sites, however many of the principles are those which would typically be adopted when preparing noise assessment for planning submissions etc.

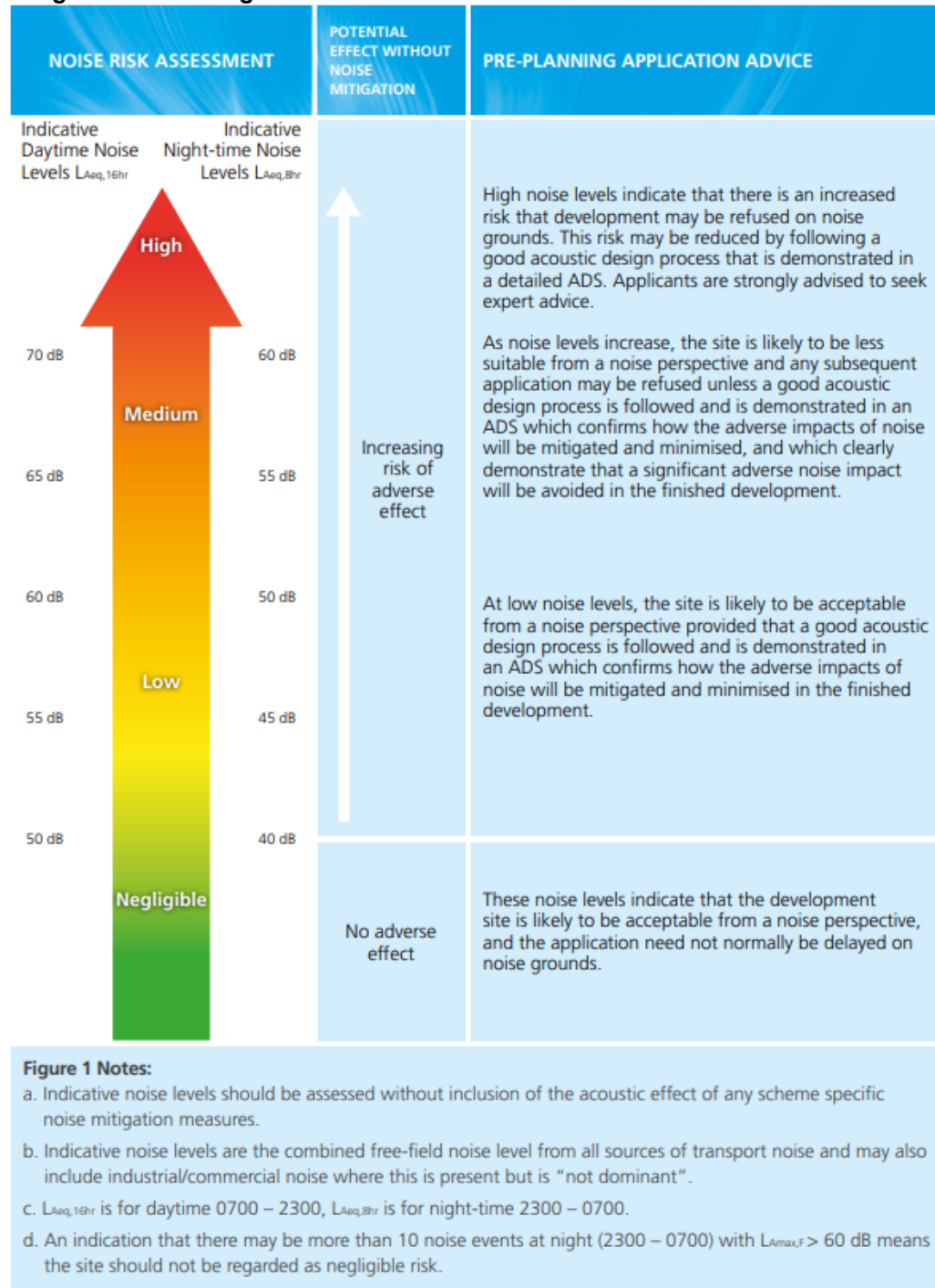
Features which may be included within an ADS comprise:

- An initial site noise risk assessment;
- A description of external site noise levels before and after mitigation measures;
- Demonstrations of good acoustic design principles;
- Details of how internal noise guidelines will be achieved;
- Assessment of the impact of $L_{Amax,F}$ noise levels where guidelines values are exceeded;

- An aim to achieve internal noise guidelines with windows open where practical, noting this approach will not necessarily be possible. Due consideration should be given to ventilation and thermal comfort with windows closed;
- Acoustic design to achieve good living conditions where internal noise guidelines can only be achieved with windows closed (noting the guidelines are not applicable when windows are open to provide purge ventilation);
- Information regarding the steps taken to minimise overheating where this is relevant to noise;
- A consideration of noise to external amenity areas;
- A presentation of the findings of the assessment, resulting noise impacts and any mitigation measures that may be required.

With regard to the initial site noise risk assessment, the ProPG sets out the following table. It is important to understand that a site with external noise levels categories as high risk does not mean that site is necessary unsuitable for development. Instead, it means that a good acoustic design process must be followed to ensure suitable conditions are provided to future occupants.

Image 1: ProPG Stage 1 Initial Site Risk Assessment



As neither the ProPG of BS 8233 form statutory guidance or regulations, it falls to the acoustics practitioner (or other similar party) to determine how the documents should be interpreted and how their contents are applied to any given scheme.

Building Regulations Approved Document O: Overheating

The Building Regulations Approved Document O (ADO) on overheating was published In December 2021. It sets out requirements to ensure that overheating (and related effects) within new residential buildings are suitably controlled.

ADO took effect on 15 June 2022 in England but does not apply to work subject to a building notice, full plans application or initial notice submitted before that date, provided the work for each building was started before 15 June 2023.

The statutory, legal requirements of ADO are replicated below, with particular attention drawn to part O1(2)(a):

Requirement O1(2)(a)

This section deals with requirement O1(2)(a) of Schedule 1 to the Building Regulations 2010.

Requirement	
<i>Requirement</i>	<i>Limits on application</i>
O1 Overheating mitigation	
(1) Reasonable provision must be made in respect of a dwelling, institution or any other building containing one or more rooms for residential purposes, other than a room in a hotel ("residences") to—	
(a) limit unwanted solar gains in summer;	
(b) provide an adequate means to remove heat from the indoor environment.	
(2) In meeting the obligations in paragraph (1)—	
(a) account must be taken of the safety of any occupant, and their reasonable enjoyment of the residence; and	
(b) mechanical cooling may only be used where insufficient heat is capable of being removed from the indoor environment without it.	

Intention

In the Secretary of State's view, requirement O1(2)(a) is met in a new residential building if the building's overheating mitigation strategy for use by occupants takes account of all of the following.

- Noise at night – paragraphs 3.2 to 3.4.
- Pollution – paragraph 3.5.
- Security – paragraphs 3.6 and 3.7.
- Protection from falling – paragraphs 3.8 to 3.10.
- Protection from entrapment – paragraph 3.11.

It can be seen that accounting for potential noise effects at night is an important consideration when addressing the requirements of part O1(2)(a), in relation to ensuring the "reasonable enjoyment of the residence".

Section 3.2-3.4 of ADO sets out the following guidance with respect to noise. This does not form part of the statutory requirement but serves as guidance for how, in the Secretary of State's view, noise should be addressed when considering overheating:

Noise

- 3.2** In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).
- 3.3** Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.
- 40dB $L_{Aeq,T}$ averaged over 8 hours (between 11pm and 7am).
 - 55dB L_{AFmax} more than 10 times a night (between 11pm and 7am).
- 3.4** Where in-situ noise measurements are used as evidence that these limits are not exceeded, measurements should be taken in accordance with the Association of Noise Consultants' *Measurement of Sound Levels in Buildings* with the overheating mitigation strategy in use.

NOTE: Guidance on reducing the passage of external noise into buildings can be found in the *National Model Design Code: Part 2 – Guidance Notes* (MHCLG, 2021) and the Association of Noise Consultants' *Acoustics, Ventilation and Overheating: Residential Design Guide* (2020).

The language of the text preceding the “limits” in section 3.3 suggest that these could be taken as guideline figures to assist the designer in identifying where noise issues may arise. The guidance does not state that noise levels must not exceed the “limits”, or that windows would always be shut where the above thresholds are exceeded, only that “windows are likely to be closed during sleeping hours” under such noise conditions.

It is important to note that in the context of ADO, the use of mechanical ventilation (e.g. MVHR) is considered a “passive means” of cooling a building. As per the requirements of ADO, “mechanical cooling” such as air conditioning may only be considered where all other passive methods of cooling are found to be insufficient.

Approved Document O Noise Guide, November 2024

The above-titled guide provides guidance for practitioners when implementing the requirements of Approved Document. It is designed to assist the acoustics industry in the understanding of what is published in the regulation and provides an agreed interpretation of the content.

The following external noise thresholds are set out in table 1 of the guidance. These thresholds apply when using the Simplified Method set out within ADO and relate to high and moderate overheating risk areas (again, as described within ADO):

Table 1 External Noise Levels Above Which the Simplified Method Cannot Be Used

Parameter	High Risk Location	Moderate Risk Location
$L_{Aeq,8h}$, averaged over 8 hours (between 11pm and 7am)	45 dB	50 dB
L_{AFmax} , more than 10 times a night (between 11pm and 7am)	60 dB	65 dB

Note: Several assumptions have been used to determine the outside-to-inside level difference. These are: 2.4m bedroom height, 0.5s bedroom RT, simple hole in the façade of area sufficient to provide the required Equivalent Area, no sound transmission other than via the opening. Calculation according to Equation G.1 of BS 8233:2014 [Ref. 7].

The table sets external noise thresholds based on achieving the 40 dB $L_{Aeq,8hour}$ and 55 dB $L_{Amax,f}$ thresholds set out in the ADO, but a 5 dB reduction in noise offered by a façade opening in high overheating risk areas or a 10 dB reduction in moderate overheating risk locations. These losses

are linked to the areas of opening that related to the ventilation provision requirements of the ADO Simplified Method.

As Maddoxford Lanefalls outside of London (and the other areas identified in Appendix C of the ADO), it is classed as a having a “moderate” overheating risk when considered in accordance with the simplified method set out within the ADO. Therefore, external levels of 50 dB $L_{Aeq,8hour}$ and 65 dB L_{AFmax} can be taken as a thresholds to identify where open windows could not be used to control overheating effects.

Where the Simplified Method cannot be used, or where the developer decides they want to use an alternative approach to the Simplified Method, dynamic thermal modelling is required. The ADO noise guide provides a means for acoustic consultant to provide guidance to the dynamic thermal modelling consultant (DTMC) to support this more detailed approach.

The ADO Noise Guide sets out a means to calculate the permitted Equivalent Area of facade opening that can be considered during dynamic thermal modelling, based on the noise constraints of a given site. This essentially limits the amount of window (or other ventilation) opening than can be considered by the DTMC, based on the noise level difference that is required through the façade to achieve the relevant ADO noise thresholds. When considering façade incident external noise levels, the following formula applies:

Equation 1⁸ $EA \text{ based on façade level difference} = V \times 10^{\left(\frac{-(D_{2m,nT} + 5)}{10}\right)}$

Where

$D_{2m,nT}$ is the is the façade level difference between the A-weighted level 2m in front of the façade ($L_{1,2m}$), and the standardised internal A-weighted level ($L_{eq,2,nT}$). In the absence of any better alternative method, the same principle can be applied to L_{AFmax} .

V is the room volume (m^3)

EA is the Equivalent Area of the open window (m^2)

When considering free field external noise levels, the following formula applies:

Equation 2⁸ $EA \text{ based on freefield level difference} = V \times 10^{\left(\frac{-(D_{nT} + 8)}{10}\right)}$

Further guidance is provided in the guide with respect to ventilation louvres. This is not replicated here for the same of brevity but shall be considered when necessary and appropriate.

Where it is necessary to either totally or partially restrict the use of open windows due to external noise constraints and provide additional ventilation or cooling through mechanical means, the following suggested internal noise thresholds are set out within the ADO noise guide:

Parameter	Bedrooms
Mechanical ventilation or mechanical cooling system noise	$L_{Aeq,T}$ 30 (±5) dB

Further to the above, the following is noted:

“Higher noise levels than those in Table 2, e.g. by up to 10 dBA, may be appropriate in some operating scenarios, where rapid changes to the cooling or ventilation rates quickly improve the thermal comfort of the occupant. Equally, lower noise levels may be appropriate for some types of residential development”

The guide also provides information regarding assessment uncertainty, post-completion noise measurements (not recommended to be undertaken), reporting and other factors. These elements are not set out here for the sake of brevity but are considered where necessary and appropriate.

AVO Residential Design Guide, 2020

The Acoustics, Ventilation and Overheating Residential Design (AVO) Guide, prepared by the Association of Noise Consultants was written to provide guidance on the control of noise in the context of overheating control. It is noteworthy that this guidance was published before both the ADO and ANC guidance set out in the previous section and therefore has to a large degree been superseded. It is still however useful reference and a helpful guide for context.

A key principle of the AVO is that internal noise in excess of the normal criteria set out within the ProPG and BS 8233:2014 are acceptable during the overheating condition, when open windows are used to provide a cooling effect. The amount by which internal noise conditions may be elevated is related to the duration over which overheating occurs and the guidance regencies the numerous methods to control overheating (beyond simple open windows).

Where external noise levels are equal to or fall below circa 53 dB $L_{Aeq,16hour}$ or 48 dB $L_{Aeq,8hour}$ the use of opening windows as primary means of mitigating overheating is not likely to result in adverse effect. Above these thresholds, it is for the acoustics practitioner to determine the potential for adverse effect.

Where external noise levels are high (above approximately 65 dB $L_{Aeq,16hour}$ or 55 dB $L_{Aeq,8hour}$) a “Level 2 assessment” is recommended, where the internal noise levels in the above BS 8223 table are effectively taken as the LOAEL.

Interpreted values of the AVO guide Table 3-3 (for Level 2 assessment) are repeated below with reference to the PPG thresholds for clarity.

Table 1.3. Summary of AVO Criteria

Bedroom Internal Ambient Noise Level (with windows open)			Action
Daytime $L_{Aeq,16hour}$	Night $L_{Aeq,8hour}$	Night $L_{Amax,F}$	
NOAEL – No Observed Adverse Effect Level			
≤ 35 dB	≤ 30 dB	Not normally exceeding 45 dB more than 10 times per night	No specific measures required
LOAEL - Lowest Observed Adverse Effect Level			
35 dB	30 dB	Exceeding 45 dB more than 10 times per night but not exceeding 65 dB	Mitigate and reduce to a minimum
SOAEL - Significant Observed Adverse Effect Level			
50 dB	42 dB	Normally exceeds 65 dB	Avoid / Prevent

The implication is that for circumstances where additional ventilation is necessary for cooling, but internal noise levels with windows open are between the LOAEL and a SOAEL, means to reduce noise should be introduced where possible but it is not necessary to achieve the BS 8233 levels.

