

Site A - Bicester



Noise Impact Assessment

Home Office

July 2026

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Document:	Noise Impact Assessment
Project:	Site A - Bicester
Client:	Home Office

Revision:	N/A	Prepared by:	MM
Date:	03/07/2026	Checked by:	JA
Status:	First Issue	Approved by:	DA
Description of revision:			



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Appendix A – Acoustic Terminology

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Acronyms/Abbreviations

Acronyms/Abbreviations	Definition
CADNA	Computer Aided Noise Abatement
DMRB	Design Manual for Roads and Bridges
HGV	Heavy Goods Vehicle
PPG	Planning Practice Guidance
UDP	Unitary Development Plan
UKAS	United Kingdom Accreditation Service

1.0 Introduction

1.1 Purpose of this Report

This report presents the findings of a noise assessment to support a planning application for the provision of modular accommodation at Ministry of Defence (MOD) Site A in Bicester. Noise surveys have been undertaken and the results used to verify predictions of the short-term and long-term effects of noise.

A list of acoustic terminology used in this report is provided in Appendix A. Report Conditions are available upon request.

1.2 Legislative Context

This report is intended to provide information relevant to the local planning authority and their consultees in support of a planning application for the above proposed development. Policy guidance with respect to noise is found in the National Planning Policy Framework (NPPF), published in December 2024. With regard to noise and planning, the NPPF contains the following statement at Paragraph 198:

“198. 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 [...]

“200. 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.

“201. The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities.”

Planning Practice Guidance (PPG): Noise provides further guidance with regard to the assessment of noise within the context of Planning Policy. The overall aim of this guidance, tying in with the principles of the NPPF and the Explanatory Note of the Noise Policy Statement for England (NPSE), is to **“identify whether the overall effect of noise exposure is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.”**

A summary of the effects of noise exposure associated with both noise generating developments and noise sensitive developments is presented within the PPG and repeated below in Table 1.1.

Table 1.1: PPG Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No Specific Measures Required
No Observed Adverse Effect Level (NOAEL)			
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
Lowest Observed Adverse Effect Level (LOAEL)			
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
Significant Observed Adverse Effect Level (SOAEL)			
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

The NPPF, NPSE and PPG do not, however, present absolute noise level criteria which define SOAEL, LOAEL and NOEL which is applicable to all sources of noise in all situations. Therefore, within the context of the Proposed Development, national planning policy and appropriate guidance documents including 'BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings' (2014) have been used. Section 2.0 presents the noise level criteria used as a basis of this assessment.

The PPG also states that neither the NPSE nor the NPPF (which reflects the Noise Policy Statement) expects noise to be considered in isolation, separately from the economic, social and other environmental dimensions of the proposed development.

Furthermore, the PPG: Noise identifies at Paragraph: 011 Reference ID: 30-011-20190722 the requirement for developments proposals to incorporate measures to mitigating the impact of noise on residential developments. In particular:

“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 publicly 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).*

1.3 Acoustic Consultants’ Qualifications and Professional Memberships

The lead project Acoustic Consultant is MM. The report has been checked by JA and verified by DA. Relevant qualifications, membership and experience are summarised in Table 1.2 below.

Table 1.2: Acoustic Consultants' Qualifications & Experience

Name	Education	Experience in Undertaking Noise Assessments (Start date of working in noise & acoustics)	Attained Associate Membership of the Institute of Acoustics (date)	Attained Membership of the Institute of Acoustics (date)
MM	BSc 2015 PgDip 2016 MSc 2018	Nov 2015	Jan 2017	Dec 2022
JA	BSc (Hons) 2015 PgDip 2022	Jun 2016	Apr 2018	-
DA	BSc 2008 MSc 2010	Oct 2010	Jan 2011	Jan 2015

2.0 Assessment Criteria

In order to enable the assessment of the proposed development in terms of LOAEL and SOAEL, Table 2.1 presents equivalent noise levels and associated actions with the target noise level criteria identified. The noise level criteria detailed below have been derived from standards and design guidance:

- Association of Noise Consultants, Institute of Acoustics and Chartered Institute of Environmental Health Professional Practice Guidance (ProPG) on Planning and Noise - New Residential Development. May 2017BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings – Code of practice'
- World Health Organisations (1999) 'Guidelines for Community Noise'

A full bibliography of documents referenced within this report is provided within Appendix B.

Table 2.1: Noise Level Criteria and Actions

Noise Sources	Noise Level Criteria	Justification for Effect Level- Action Required
No Observed Adverse Effect Level (NOAEL)		
Absolute internal noise criteria for the following noise sources with windows closed: - Road traffic noise - Goods vehicle deliveries and unloading of vehicles. - Service yard noise including forklift truck movements. - Car Parks	Noise levels are below: Living Rooms: 35 dBL_{Aeq,16hours} Kitchens, Dining Rooms, and Studies: 40 dBL_{Aeq,16hours} Bedrooms: 35 dBL_{Aeq,16hours} 30dB L_{Aeq,8hr} - L_{AFmax,2min} noise levels do not exceed: 45dB L_{AFmax} based on 10th highest L_{AFmax,2min} sample)	Justification for Effect Level: Less than threshold values in Table 4 in BS8233:2014 and Table 1 in World Health Organisation (1999) Guidelines on Community Noise Action Required: None
Absolute external noise criteria for the following noise sources: - Road traffic noise - Goods vehicle deliveries and unloading of vehicles. - Service yard noise including forklift truck movements. - Car Parks	Noise levels are below 50dBL_{Aeq,16hours}	Justification for Effect Level: Less than 'desirable' values in BS8233:2014 Paragraph 7.7.3.2. Action Required: None
Lowest Observed Adverse Effect Level (LOAEL)		
Absolute internal noise criteria for the following noise sources with windows closed: - Road traffic noise - Goods vehicle deliveries and unloading of vehicles. - Service yard noise including forklift truck movements. - Car Parks	Noise levels are between: Living Rooms: 35-40 dBL_{Aeq,16hours} Kitchens, Dining Rooms, and Studies: 40-45 dBL_{Aeq,16hours} Bedrooms: 35-40 dBL_{Aeq,16hours} 30-35dB L_{Aeq,8hr} - L_{AFmax,2min} noise levels do not exceed 45dB L_{AFmax} based on 10th highest L_{AFmax,2min} sample)	Justification for Effect Level: Exceed threshold guidelines in Table 4 of BS8233:2014 and World Health Organisation (1999) Guidelines on Community Noise by no greater than 5dB to achieve <u>reasonable internal conditions</u> as defined by Note 7 to Table 1 in BS8233:2014 Action Required: Mitigate and reduce to a minimum the exceedance over the threshold
Absolute external noise criteria for the following noise sources: - Road traffic noise - Goods vehicle deliveries and unloading of vehicles. - Service yard noise including forklift truck movements. - Car Parks	Noise levels are between 50-55 dBL_{Aeq,16hours}	Justification for Effect Level: Exceed 'desirable' threshold guidelines but within upper threshold guidelines in Paragraph 7.7.3.2 of BS8233:2014
Significant Observed Adverse Effect Level (SOAEL)		
Absolute internal noise criteria for the following noise sources with windows closed: - Road traffic noise - Goods vehicle deliveries and unloading of vehicles.	Noise levels are between: Living Rooms: 40-45 dBL_{Aeq,16hours} Kitchens, Dining Rooms, and Studies: 45-50 dBL_{Aeq,16hours}	Justification for Effect Level: Exceeds BS8233:2014 L_{Aeq,T} reasonable criteria by 5dB or exceeds L_{AFmax,2min} (10th highest sample) Action Required:

Noise Sources	Noise Level Criteria	Justification for Effect Level-Action Required
- Service yard noise including forklift truck movements. - Car Parks	Bedrooms: 40-45 dBL_{Aeq,16hours} 35-40dB L_{Aeq,8hr} 45-55dB L_{AFmax,2min} based on 10th highest L_{AFmax,2min} sample)	Additional mitigation required to achieve effect of LOAEL or less.
Absolute external noise criteria for the following noise sources: - Road traffic noise - Goods vehicle deliveries and unloading of vehicles. - Service yard noise including forklift truck movements. - Car Parks	Noise levels exceed 55 dBL _{Aeq,16hours}	Justification for Effect Level: Exceeds BS8233:2014 L _{Aeq,16hours} upper criteria. Action Required: Additional mitigation required to achieve effect of LOAEL or less.
Unacceptable Observed Adverse Effect Level (UOAE)		
Absolute internal noise criteria for the following noise sources with windows closed: - Road traffic noise - Goods vehicle deliveries and unloading of vehicles. - Service yard noise including forklift truck movements. - Car Parks	Noise levels exceed: Living Rooms: 45 dBL_{Aeq,16hours} Kitchens, Dining Rooms, and Studies: 50 dBL_{Aeq,16hours} Bedrooms: 45 dBL_{Aeq,16hours} 40dB L_{Aeq,8hr} - L_{AFmax,2min} noise levels exceeds 55dB L_{AFmax} based on 10th highest L_{AFmax,2min} sample)	Justification for Effect Level: Exceeds BS8233:2014 L _{Aeq,T} reasonable criteria by 10dB or exceeds L _{AFmax,2min} (10 th highest sample) by 10dB or more. Action Required: Additional mitigation required to achieve effect of LOAEL or less.
Absolute external noise criteria for the following noise sources: - Road traffic noise - Goods vehicle deliveries and unloading of vehicles. - Service yard noise including forklift truck movements. - Car Parks	Noise levels exceed 60 dBL _{Aeq,16hours}	Justification for Effect Level: Exceeds BS8233:2014 L _{Aeq,16hours} upper criteria by 5dB or more. Action Required: Additional mitigation required to achieve effect of LOAEL or less.

ProPG Planning and Noise - New Residential Development

Professional Practice Guidance on Planning and Noise for new residential development (ProPG) was launched on 22nd June 2017 by the Chartered Institute of Environmental Health (CIEH), the Association of Noise Consultants (ANC) and the Institute of Acoustics (IOA). The guidance has been published to provide practitioners with guidance on the management of noise within the planning system in England.

The guidance is specifically for 'new residential development that would be exposed predominantly to noise from existing transport sources' and reflects the Government's overarching Noise Policy Statement for England (NPSE), the National Planning Policy

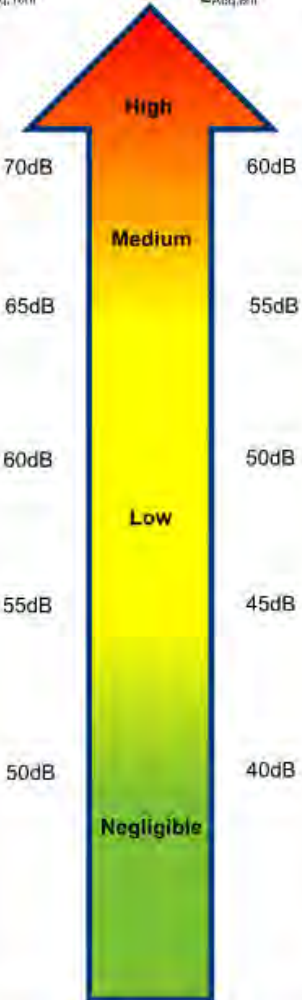
Framework (NPPF), and Planning Practice Guidance (including PPG-Noise), as well as other authoritative sources of guidance.

There are two stages of the overall approach outlined in the ProPG:

- Stage 1 – an initial noise risk assessment of the proposed development site; and
- Stage 2 – a systematic consideration of 4 key elements which is underpinned by an Acoustic Design Statement.

With regards to Stage 1, ProPG provides guidance to produce an initial site risk assessment, pre-mitigation, with regards to noise based on the prevailing daytime and night-time noise levels across the site, from which the site (or areas thereof) can be allocated a Noise Risk as shown in Figure 1.1 below, together with their corresponding sound levels as referred to in the ProPG.

Figure 1.1 ProPG Stage 1 Noise Risk Assessment

Noise Risk Assessment	Potential Effect Without Noise Mitigation	Pre-Planning Application Advice
Indicative Daytime Noise Levels $L_{Aeq,16hr}$ Indicative Night-time Noise Levels $L_{Aeq,8hr}$ 	 Increasing risk of adverse effect	High noise levels indicate that there is an increase risk that development may be refused on noise grounds. The risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS. Applicants are strongly advised to seek expert advice. As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is follow and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrates that a significant adverse noise impact will be avoided in the finished development. At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustics design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in he finished development.
	No adverse effect	These noise levels indicate that the development site is likely to be acceptable from a noise perspective and the application need not normally be delayed on noise grounds.

3.0 Assessment Methodology

3.1 Noise Modelling Methodology

Three-dimensional noise modelling has been undertaken based on the monitoring data to predict noise levels at a number of locations both horizontally and vertically. CADNA noise modelling software has been used. This model is based on ISO 9613-2 noise propagation methodology and allows for detailed prediction of noise levels to be undertaken for large numbers of receptor points and different noise emission scenarios both horizontally and vertically. The modelling software calculates noise levels based on the emission parameters and spatial settings that are entered. Input data and model settings as given in Table 3.1 below have been used.

Table 3.1: Modelling Parameters Sources and Input Data

Parameter	Source	Details
Horizontal distances – around site	Ordnance Survey	Ordnance Survey
Ground levels – around site	DEFRA	LIDAR 1m DTM
Building heights – around site	Consultant Observations	• 4.0m height for one-storey properties • 8.0 m height for two storey properties • 3.0m per additional storey
Receptor positions*	Consultant	• 1.5 m for ground floor properties • 4.0m height for first-floor properties
Modelling Parameters	Consultant	• Ground Absorption: 0.7 • Order of Reflections: 3 • Noise Contour Plot Grid Receiver Spacing: 1.1

It is acknowledged that a number of the values of parameters chosen will affect the overall noise levels presented in this report. However, it should be noted that the values used, as identified above, are worst-case.

4.0 ProPG Stage 1: Initial Noise Risk Assessment

4.1 Noise Survey Details

A monitoring survey was undertaken to characterise ambient and background noise levels currently experienced on the site. Equipment used during the survey included:

Table 4.1: Baseline Noise Survey Measurement Equipment

Equipment Type	Model	Serial Number
Sound Level Meter	Rion NL-52	710448
Sound Level Meter	Rion NL-52	732146
Calibrator	Rion NC-75	34145522

The measurement equipment was checked against the appropriate calibrator at the beginning and end of the measurements, in accordance with recommended practice. The accuracy of the calibrators can be traced to National Physical Laboratory Standards, calibration certificates for which are available on request.

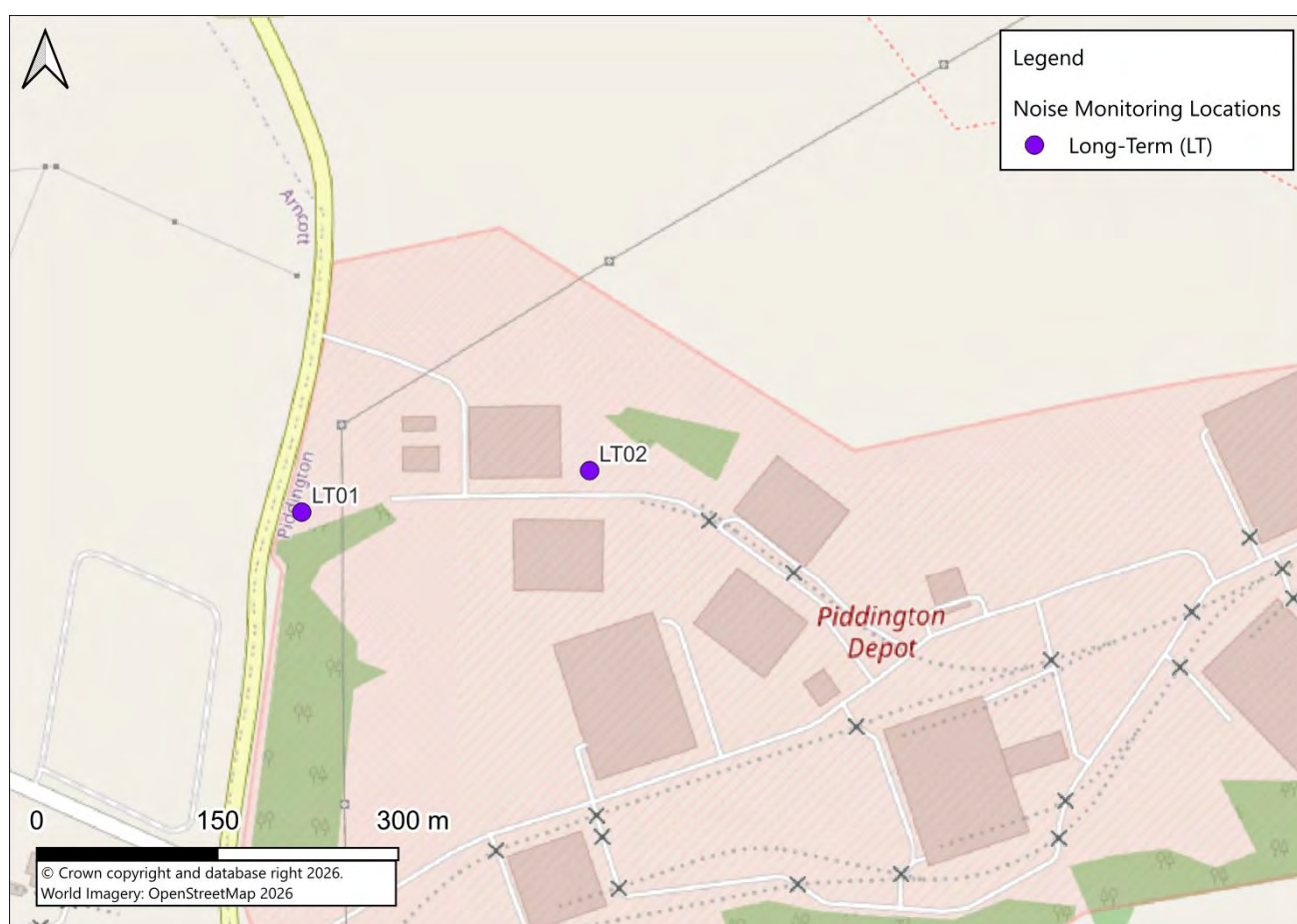
A baseline monitoring survey was undertaken at two locations (as specified in Table 4.2 and shown in **Figure 4.1** below) from Wednesday 17th June 2026 to Thursday 18th June 2026. Two Long-Term (LT) locations were measured unattended over a 24-hour period. The raw data collected from the long-term monitoring is available upon request.

Measurements were taken in general accordance with BS 7445-1:2003 The Description and Measurement of Environmental Noise: Guide to quantities and procedures. Weather conditions during the survey period were observed as being dry. Anemometer readings confirmed that wind speeds were less than 5 ms⁻¹ at all times during the survey, with a predominant south-western wind direction during the survey.

Table 4.2: Noise Monitoring Locations

Ref	Description
LT01	Located along the western boundary of A Site, adjacent to the B4011
LT02	Located in the middle of A Site

Figure 4.1: Noise Monitoring Locations



4.2 Noise Survey Results

The dominant noise sources found in the area was road traffic noise from the B4011. Other contributions to the ambient noise environment consist of birdsong and trees rustling in the wind.

Ambient and background noise levels are usually described using the L_{Aeq} index (a form of energy average) and the L_{A90} index (i.e. the level exceeded for 90% of the measurement period) respectively. Road traffic noise is generally described using the L_{A10} index (i.e. the level exceeded for 10% of the measurement period). For the long-term (LT) locations, the presented $L_{Aeq,T}$ and $L_{A10,T}$ are average noise levels whilst the L_{A90} is the modal noise level of each 5-minute measurement over the stated survey period.

The results of the statistical measurements and frequency measurements conducted during the survey are summarised in the following table. All values are sound pressure levels in dB (re: 2×10^{-5} Pa).

Table 4.3: Results of Baseline Noise Monitoring Survey (Average Levels)

Period	Duration (T)	Monitoring Date and Times	Location	L _{Aeq,T} (dB)	L _{Amax,T} (dB)	L _{Amin,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)
Weekday Daytime 07:00 - 23:00	19 Hours	17/06/2026 – 18/06/2026	LT01	60.0	84.9	26.9	63.4	48.0
Weekday Night-time 23:00 – 07:00	8 Hours	17/06/2026 – 18/06/2026		53.1	81.2	24.2	46.9	28.0
Weekday Daytime 07:00 - 23:00	18 Hours	17/06/2026 – 18/06/2026	LT02	45.4	79.4	26.4	46.0	38.0
Weekday Night-time 23:00 – 07:00	8 Hours	17/06/2026 – 18/06/2026		40.0	70.6	21.7	37.4	27.0

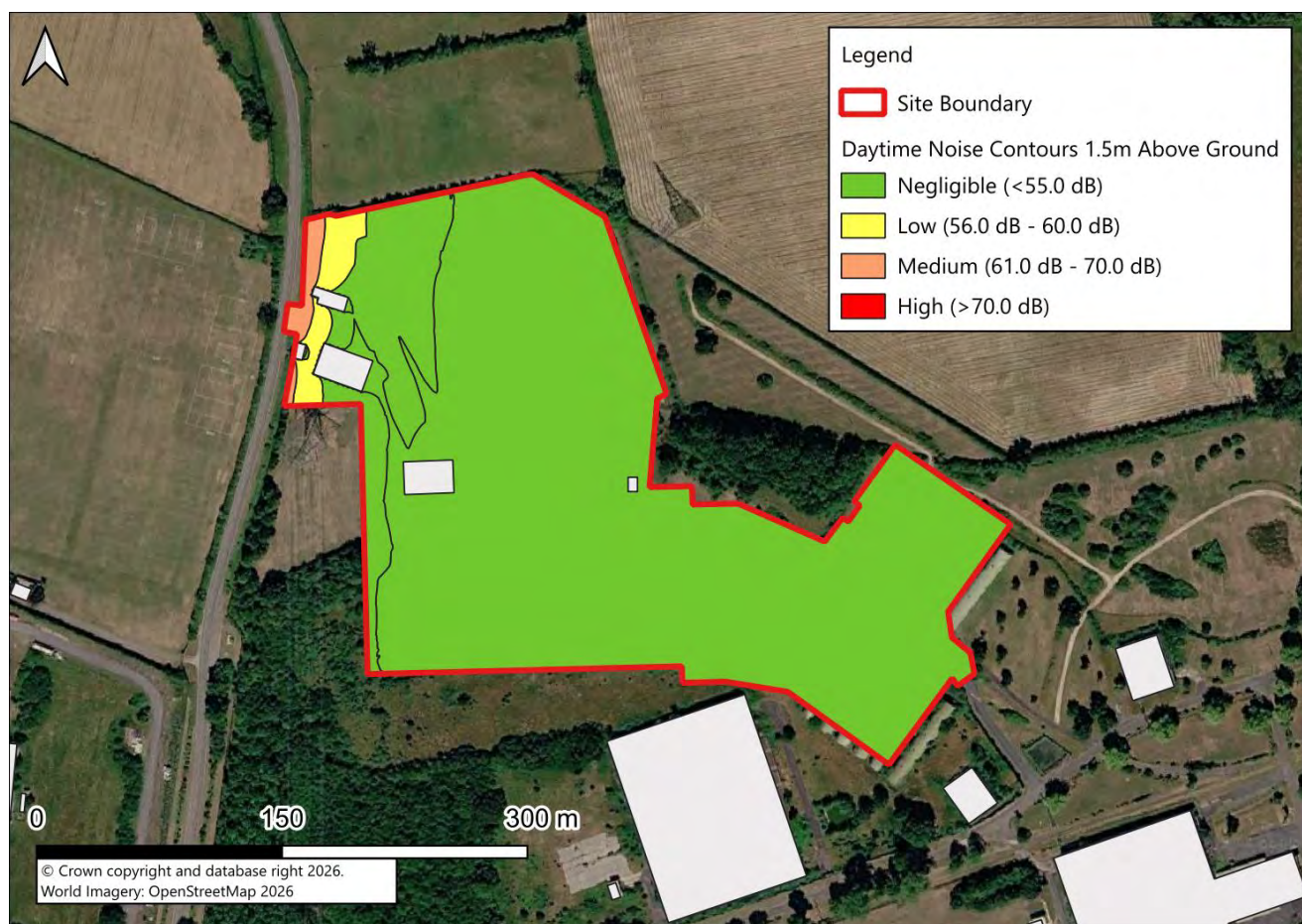
All values are sound pressure levels in dB re: 2x 10⁻⁵ Pa

4.3 Initial Site Noise Risk Assessment

4.1.1 Daytime Noise Risk

Internal Noise levels across the site range between 40 – 68 dB L_{Aeq,16hr} during the daytime period (07:00-23:00). A majority of the site falls within the Negligible Risk Category, whilst areas adjacent to the road to the west of the site fall within the Low to Medium Noise Risk Category, shown illustratively on Figure 4.2.

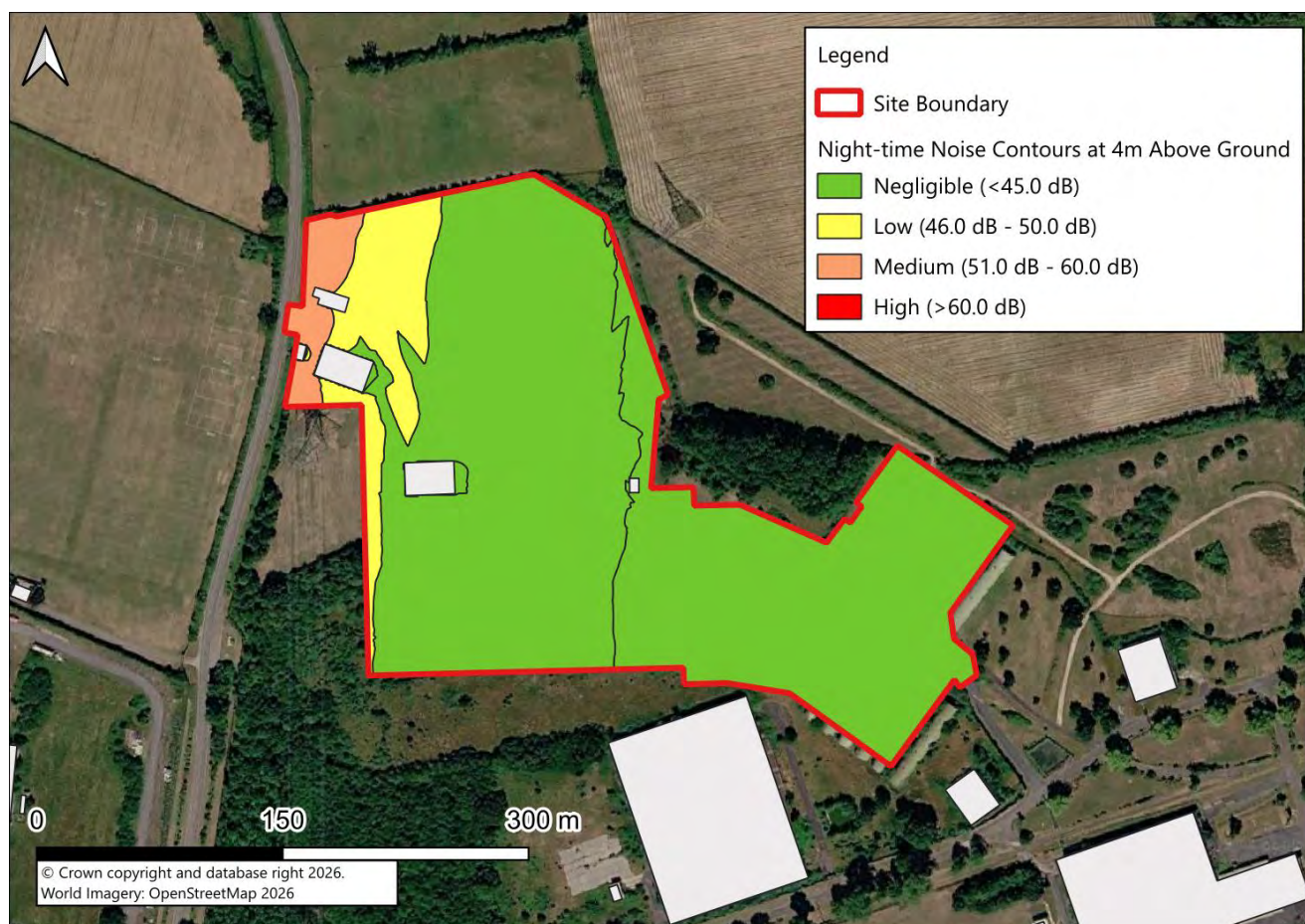
Figure 4-2: Daytime Noise Contours at 1.5m Above Ground, dB L_{Aeq}



4.1.2 Night-time Noise Risk

Noise levels across the site range between 35 – 61 dB L_{Aeq,8hr} during the night-time period (23:00-07:00). The majority of the site falls within the Negligible Noise Risk Category, whilst areas adjacent to the road fall to the west within the Low to Medium Noise Risk Category, shown illustratively on Figure 4.3.

Figure 4-3: Night-time Noise Contours at 4m Above Ground, dB L_{Aeq}



Based on the above, when assessed against the ProPG initial risk guidance, areas of the site falls into up to the 'Low' to 'Medium Risk' category. Therefore, a 'Stage 2' assessment is required. This entails the preparation of an Acoustic Design Statement (ADS) to demonstrate a good acoustic design process and show how sound impacts will be mitigated and minimised. The ProPG provides the following guidance for sites that fall into the low and medium categories

Low Risk

“At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.”

For these areas, careful consideration of Site layout may be required to minimise the requirements of mitigation. However, mitigation measures may be suitable in controlling noise where appropriate site design is not possible due to other factors.

Medium Risk

“As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.”

As this assessment is only indicative and includes an open site, it is likely that the areas identified above would reduce with the inclusion of proposed dwellings, which would provide effective shielding across the site. Furthermore, additional considerations can include the careful design of internal layouts, for example positioning less-sensitive facades (bathrooms, hallways, stairwells etc) along the boundary with the surrounding roads. Additionally, external amenity areas should be positioned on the shielded facades of buildings as far as possible, with solid 1.8m high garden fences to reduce noise as low as practicable.

5.0 ProPG Stage 2: Acoustic Design Statement

A ProPG Stage 2 assessment requires consideration of four key elements

- Element 1 – Good Acoustic Design Process
- Element 2 – Internal Noise Level Guidelines
- Element 3 – External Amenity Areas Noise Assessment
- Element 4 – Assessment of Other Relevant Issues

In order to address these elements, planning applications for new residential development requiring a Stage 2 assessment should include evidence that the following have been properly considered:

1. Check the feasibility of relocating, or reducing noise levels from relevant sources;
2. Consider options for planning the site or building layout;
3. Consider the orientation of proposed building(s);
4. Select construction types and methods for meeting building performance requirements;
5. Examine the effects of noise control measures on ventilation, fire regulation, health and safety, cost, CDM (construction, design and management) etc.;
6. Assess the viability of alternative solutions; and
7. Assess external amenity area noise.

The above points are considered in the following sections below.

5.1 Good Acoustic Design Process

At this outline stage, exact details regarding the orientation of proposed residential uses are not fixed. As such, despite the low noise risk on the majority of the site, it is recommended the proposed dwellings are located as far east from B4011 as practicable, without otherwise affecting the viability of the Site for development.

Furthermore it is recommended that any external amenity areas are located such that proposed buildings are located between amenity areas and B4011.

5.2 Internal Noise Level Guidelines

With regard to internal sound levels, the ProPG states that design should:

‘... principally aim, through the use of good acoustic design, to achieve the internal noise level guidelines in noise sensitive rooms with windows open. Where internal noise levels are assessed with windows closed the justification for this should be included in the ADS’

With reference to Table 2.1, the guidance in BS 8233:2014 proposes that the external building fabric for residential dwellings be designed such that a minimum steady-state internal daytime and night-time noise level of 35 and 30 dB $L_{Aeq,T}$ respectively can be achieved within habitable rooms.

Furthermore, with reference to the ProPG, it is recommended that individual internal noise events do not normally exceed 45 dB L_{AFmax} more than ten times a night.

To calculate the internal sound levels, detailed plans of the individual dwellings is required. However, in accordance with the ANC’s ‘Acoustic, Ventilation and Overheating’ (AVO) guidance, a standard, lowest-specification façade with a window open for ventilation provides up to 13 dB of attenuation of external sound levels. As such, this can be considered the lowest possible façade attenuation. Therefore, to meet the ProPG Internal Noise Guidelines (INGLs) without additional façade treatment, external sound levels incident on the façades of the proposed development need to not exceed 48 dB $L_{Aeq,16hr}$ during the day, 43 dB $L_{Aeq,8hr}$ at night and experience a 10th highest L_{AFmax} event not exceeding 58 dB.

As can be seen on Figure 4.2 and 4.3, a small section of the site would exceed these targets, and therefore consideration may need to be given to noise insulation to ensure that internal noise criteria targets can be met at these locations.

5.3 External Amenity Areas Noise Assessment

With regard to the assessment of external amenity areas, the ProPG refers to the design ranges in BS 8233:2014 with respect to the assessment of external amenity. The ProPG also refers to guidance in the PPG-N. Based on these two documents, the following guidance is provided with respect to the assessment of sound in external amenity areas:

3(ii) “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 $L_{Aeq,16hr}$.”

As shown on Figure 4.2 and Figure 4.3, the vast majority of the site will experience daytime sound levels below 55 dB $L_{Aeq,16hr}$. Therefore, the requirements for sound levels in external amenity areas of the ProPG is likely to be met.

5.4 Other Relevant Issues

ProPG primarily seeks to encourage a good acoustic design process for new residential development. It is recognised that it may not always be possible to achieve the internal noise level guidelines in all rooms within noise sensitive developments. Where it is not possible to achieve the recommended standards in every respect, regard should be had to the number of dwellings and number of habitable rooms in each of the dwellings where the recommended standard cannot be achieved. Similarly, regard should be had to the extent to which the guidance on the external amenity area noise assessment has been followed, including whether access to quiet or relatively quiet external amenity areas is considered necessary, and the extent of any adverse impacts on external amenity areas that are an intrinsic part of the overall design.

Design measures taken to reduce intrusion by noise may have unintended adverse consequences for the building or the nearby environment and may affect the attractiveness of the living environment for the occupants. Examples include roadside barriers that remove views or prevent crossing roads, sealed facades that affect personal control over the internal environment etc. Wherever possible, such unintended adverse consequences should be obviated by good acoustic design.

6.0 Conclusion

This report presents the findings of noise assessment produced in support of a planning application for the provision of modular accommodation at Ministry of Defence (MOD) Site A in Bicester.

An initial noise risk assessment has been undertaken for the proposed development site to provide an indication of the likely risk of adverse effects from noise with no subsequent mitigation included. The initial noise risk assessment has determined that the Site is subject to negligible to medium risk due to noise from B4011. Albeit the medium risk only corresponds to the extremities of the boundaries and the majority of the Site falls between negligible to low risk.

An assessment of potential sound impacts from transportation sound in line with guidance contained in the ProPG was undertaken and showed that internal daytime may exceed the guideline levels at some areas of the site, when considering a partial open window as the minimum design standard. As such, consideration of sound insulation may be required depending on the eventual design of the site. Sound levels in external amenity areas are likely to be below the upper and lower ProPG guideline levels across the majority of the site.

Appendices

Appendix A – Acoustic Terminology

Acoustic Terminology

- dB** Sound levels from any source can be measured in frequency bands in order to provide detailed information about the spectral content of the noise, i.e. whether it is high-pitched, low-pitched, or with no distinct tonal character. These measurements are usually undertaken in octave or third octave frequency bands. If these values are summed logarithmically, a single dB figure is obtained. This is usually not very helpful as it simply describes the total amount of acoustic energy measured and does not take any account of the ear's ability to hear certain frequencies more readily than others.
- dB(A)** Instead, the dBA figure is used, as this is found to relate better to the loudness of the sound heard. The dBA figure is obtained by subtracting an appropriate correction, which represents the variation in the ear's ability to hear different frequencies, from the individual octave or third octave band values, before summing them logarithmically. As a result the single dBA value provides a good representation of how loud a sound is.
- L_{Aeq}** Since almost all sounds vary or fluctuate with time it is helpful, instead of having an instantaneous value to describe the noise event, to have an average of the total acoustic energy experienced over its duration. The L_{Aeq, 07:00 – 23:00} for example, describes the equivalent continuous noise level over the 16-hour period between 7 am and 11 pm. During this time period the L_{pA} at any particular time is likely to have been either greater or lower than the L_{Aeq, 07:00 – 23:00}.
- L_{Amin}** The L_{Amin} is the quietest instantaneous noise level. This is usually the quietest 125 milliseconds measured during any given period of time.
- L_{Amax}** The L_{Amax} is the loudest instantaneous noise level. This is usually the loudest 125 milliseconds measured during any given period of time.
- L_n** Another method of describing, with a single value, a noise level which varies over a given time period is, instead of considering the average amount of acoustic energy, to consider the length of time for which a particular noise level is exceeded. If a level of x dBA is exceeded for say, 6 minutes within one hour, then that level can be described as being exceeded for 10% of the total measurement period. This is denoted as the L_{A10, 1 hr} = x dB.
- The L_{A10} index is often used in the description of road traffic noise, whilst the L_{A90}, the noise level exceeded for 90% of the measurement period, is the usual descriptor for underlying background noise. L_{A1} and L_{Amax} are common descriptors of construction noise.
- R_w** The *weighted sound reduction index* determined using the above *measurement* procedure, but weighted in accordance with the procedures set down in BS EN ISO 717-1. Partitioning and building board manufacturers commonly use this index to describe the inherent sound insulation performance of their products.



Appendix B – References

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