



Land South of Mortimers Lane, Fair Oak

Noise Assessment

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prepared for

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1.0 Introduction

1.1 An outline application is being submitted for up to 245 dwellings (Use Class C3), up to 350sqm multi-functional space and mobility infrastructure (Use Class Sui Generis), with associated open space, landscaping and infrastructure.

1.2 A pre application submission has been made to the local planning authority, Eastleigh Borough Council (EBC) and comments have been received from their Pollution and Environment team.

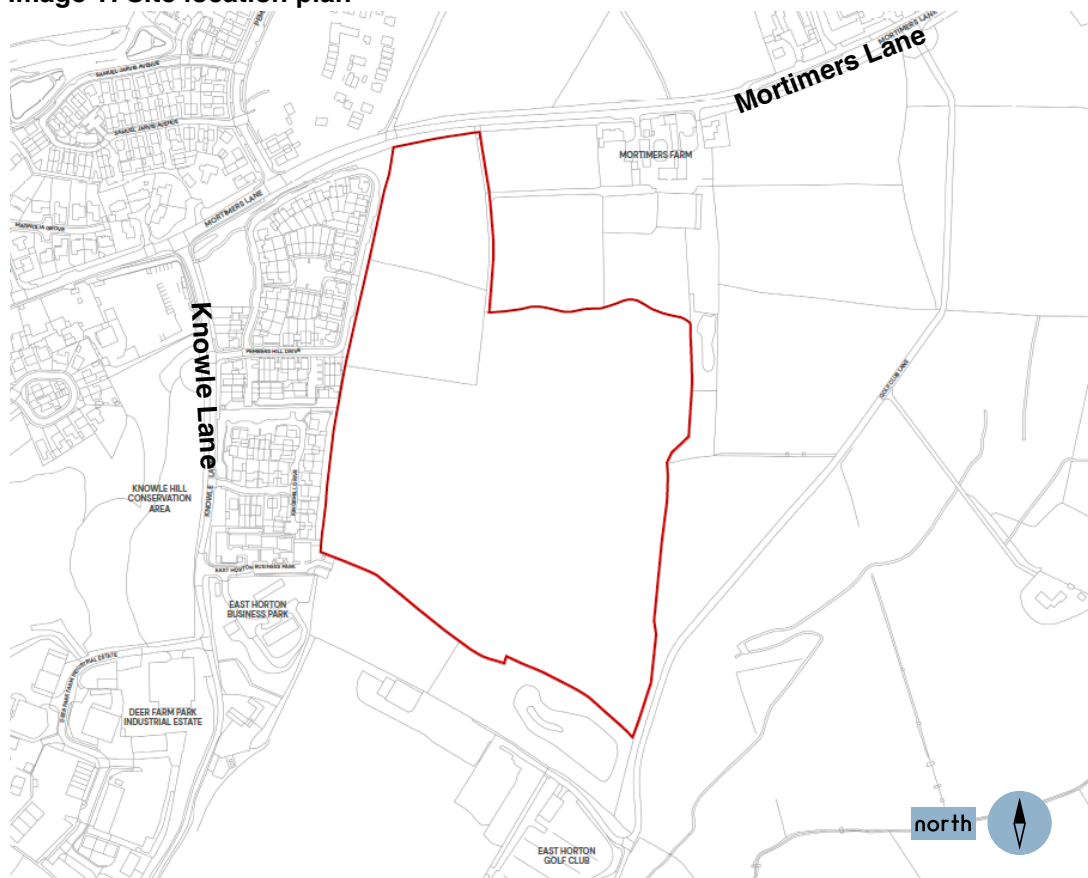
1.3 This report responds to the key points raised by the EBC and includes details of a noise survey, noise assessment and mitigation specifications that have been developed to support the application for the scheme.

2.0 Locality and Planning Context

Wider Site Location and Description

2.1 The proposed development is to be located to the south of the Mortimers Lane (B3037), on a parcel of land on Fair Oak's eastern extent (outline in red on the following **Image 1**).

Image 1: Site location plan



Aerial imagery courtesy of Google

2.2 Immediately to the south is a commercial development comprising 5 general industrial buildings (containing 15 individual units) which at time of writing had only recently completed construction (EBC application reference F/23/94668). This development forms part of the East Horton Business Park (EHBP).

2.3 A BskyB standby ground station is located to the southwest of the proposed development site. To south is an existing landfill gas engine which serves the now-closed Fair Oak Landfill site. To the southeast is East Horton Golf Club that is understood to hold events both internally and externally of the main golf club building. To the northwest is a new (at time of writing) residential development. Immediately to the north is farmland as is the case also to the east of the site.

Planning Context and Consultation

Local Plan

2.4 The Eastleigh Borough Local Plan (2016 to 2036) contains policy DM8 which relates to pollution and is set out in more detail in **Appendix B**. The approach set out within this assessment addresses the requirements of this policy.

Consultation

2.5 Consultee comments have been sought from EBC Planning and Environment Pollution team regarding noise (comment reference Q/23/96485). The full response is not replicated here for the sake of brevity however the key points for consideration can be summarised as follows:

- Commercial uses near to the site must be considered (some of which are expected to operate 24 hours a day). The agent of change principle should be given due consideration.
- Potential noise from the landfill gas engine servicing the former Fair Oak Landfill Site must be considered (which can operate at any point during the day or night).
- Potential noise from the golf course and clubhouse should be considered.
- The control of noise from the any community facilities that may be included as part of the multi-functional space (use class Sui Generis).
- The noise implications of the use of open windows as part of an overheating control strategy must be considered. Where windows are required to be closed to control noise impacts, alternative methods to provide overheating control must be outlined.

2.6 The following sections within this report take due account of the various points above, noting any limitations that may arise out of the fact that the application for the proposed development is outline in nature at this stage.

3.0 Noise Survey

3.1 A noise survey was conducted on-site between 11:15 on Tuesday 10th October until 14:45 on Monday 16th October 2023. Further details of the survey are set out within **Appendix A**.

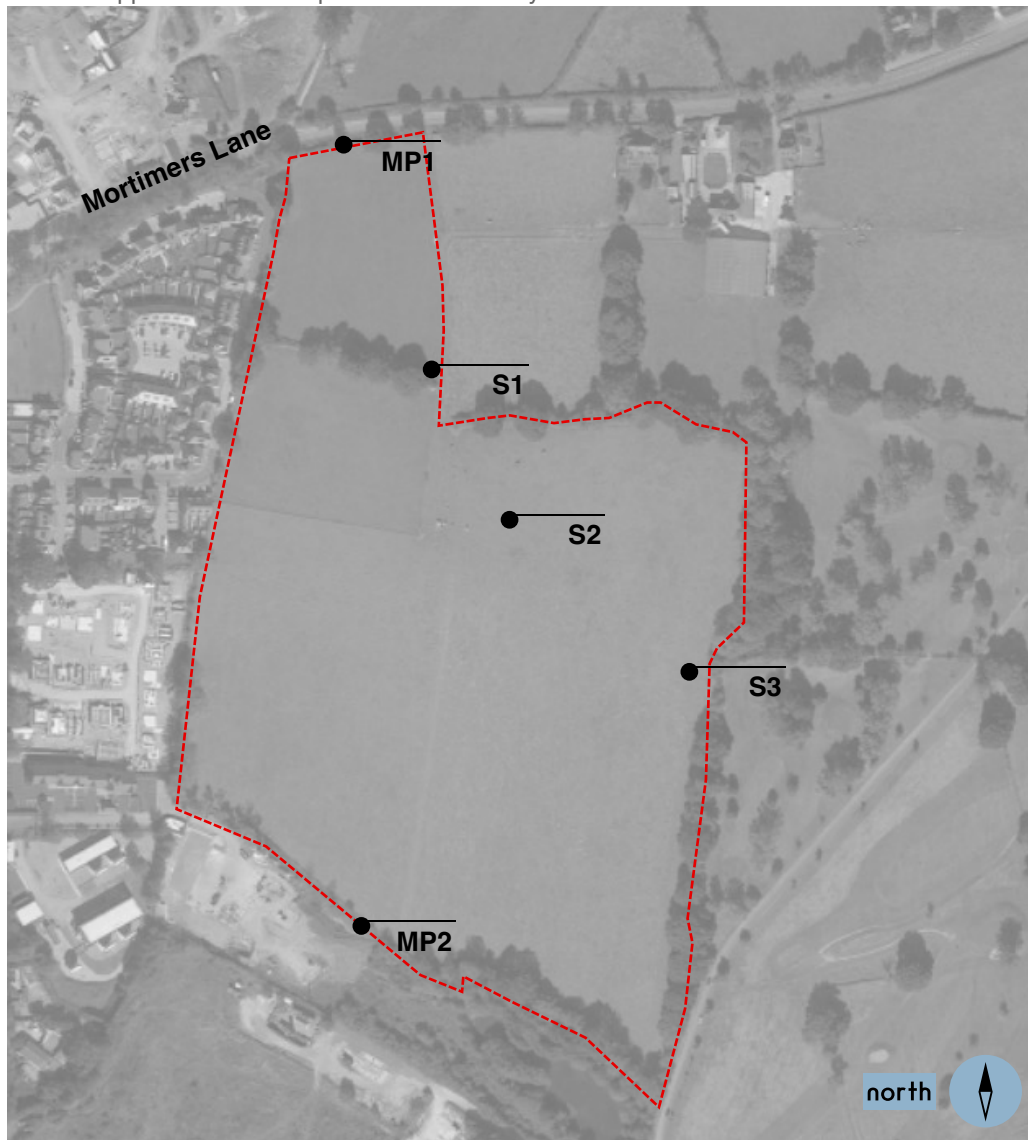
3.2 Long-term measurements were undertaken at two positions, one near Mortimers Lane and the other to the south of the site (all on current farmland). It is noted that construction activity immediately to the south of the site (linked to the East Horton Business Park development) affected

the survey between the hours of 0700-1700 during the week. Some of the data collected within these periods has therefore been omitted from the results used for the assessment.

3.3 Short-duration measurements were also undertaken at three positions across the middle of the site, moving back from Mortimers Lane. These were to quantify distance propagation to allow for the results of the noise model to be verified (discussed later). The locations of the long-term measurements MP1-2, and short-term measurements S1-3 are set out on the image below.

Image 2: Location of noise measurement positions across the site

--- Approximate development site boundary



Aerial imagery courtesy of Google

3.4 The results of the short-duration measurements are set out in **Appendix A**. The key observation at these measurement positions is that noise decreases with distance away from Mortimers Lane (as expected).

3.5 The tables below provide a summary of key noise level information from the two long-term positions described above. Historical weather data, collected from a local weather station¹, suggests

¹ [Southampton, United Kingdom Weather History | Weather Underground \(wunderground.com\)](https://www.wunderground.com/history/Southampton)

periods containing gusting winds during the 13th but otherwise remained suitably free from significant wind or precipitation for the duration of the survey. The measurement data presented for position MP2 had had the effects of construction activity omitted.

Table 1 Measured Noise Levels at MP1

Date (2023)	Day	Noise Level, dB		
		Daytime	Night-time	
		$L_{Aeq,16hr}$	$L_{Aeq,8hr}$	$L_{Amax,i}^5$
10 th October	Tuesday	62*	53	75
11 th October	Wednesday	63	53	75
12 th October	Thursday	64	54	74
13 th October	Friday	63	54	75
14 th October	Saturday	63	54	76
15 th October	Sunday	63	-	-

*Partial daytime and night time period due to survey start/end time

Table 2 Measured Noise Levels at MP2²

Date (2023)	Day	Noise Level, dB		
		Daytime	Night-time	
		$L_{Aeq,16hr}$	$L_{Aeq,8hr}$	$L_{Amax,i}^5$
10 th October	Tuesday	42*	38	54
11 th October	Wednesday	43	40	56
12 th October	Thursday	45	48	65
13 th October	Friday	47	39	65
14 th October	Saturday	44	42	57
15 th October	Sunday	44	-	-

*Partial daytime period due to survey start/end time

3.6 Ambient noise levels across a significant proportion of the site were subjectively perceived to be relatively low, an observation which is supported by the measured noise levels.

3.7 During the visits to site, noise emissions from the golf course, landfill gas engine and commercial uses were not perceptible (other than construction noise relating to the latter). These sources are discussed in more detail later in this report.

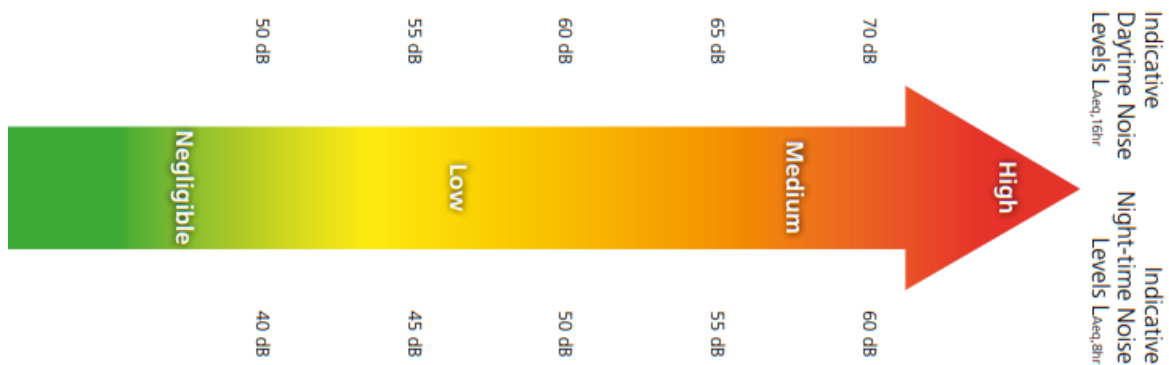
4.0 Noise Assessment

4.1 ProPG Initial Noise Risk Assessment

4.1.1 An initial ProPG site noise risk assessment has been undertaken based on the results of the noise survey and baseline noise contour plots set out above. The ProPG Stage 1 assessment thresholds are replicated below for ease of reference, with further guidance presented in **Appendix A**:

² Excluding construction affected periods between due to works to the south of the site.

Image 3: ProPG Initial Noise Risk Assessment



4.1.2 During the daytime, the following noise risk thresholds can be set in relation to the approximate distance from the kerb of Mortimers Lane:

- 0 to 25 meters: Medium to Low risk
- 25 to 95 metres Low to Negligible risk
- >95 meters: Negligible risk

4.1.3 During the nighttime, the following noise risk thresholds can be set in relation to the approximate distance from the kerb of Mortimers Lane:

- 0 to 28 meters: Medium to Low risk
- 25 to 105 metres Low to Negligible risk
- >105 meters: Negligible risk

4.1.4 **Image 4** below provides an indicative visualisation of the above distances (approximately representative of the average between day and night time thresholds):

Image 4 – ProPG Stage 1 risk assessment approximate thresholds distances



4.1.5 It is noteworthy that while the risk categorisations above are presented in relation to approximate threshold distances, this is to provide context only and the risk categorisation process works as a sliding scale.

4.1.6 Beyond circa 25 metres from the nearest kerb of Mortimers Lane therefore, the site can be categorised as having no more than a Low noise risk. In respect to noise in the low risk, the ProPG states:

“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 [Acoustic Design Statement] which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.”

4.1.7 Good acoustic design principles have been followed in respect to the consideration of noise affecting the proposed development as far as is practicable. This report should be taken to fulfil the purpose of an acoustic design statement as suggested by the ProPG. Further work will be required at the detailed application stage to further refine the layout, based on the commentary set out within this report.

Consideration of Layout

4.1.8 As assessment of noise conditions across a hypothetical proposed development has been undertaken. This exercise has fed into the development of the proposed Development Framework layout for the scheme (Pegasus Group drawing reference T23-2261_SE_007_01_C).

4.1.9 The layout will be further developed to mitigate road traffic noise initially through the provision of a ‘buffer zone’ between the northernmost development parcel and Mortimers Lane. This is based upon the findings of the ProPG stage 1 noise risk assessment and the early consideration of the control of overheating effects, as required by the Building Regulations Approved Document O.

4.1.10 The use of large, roadside noise barriers has been discounted, largely due to visual and other non-acoustic reasons. Such mitigation measures are not practicable for this scheme and therefore are not discussed further. Localised screening to garden areas is however considered, as discussed later in this report.

4.1.11 The multifunctional space (providing community facilities) is indicatively proposed near to the northern boundary of the site (although the exact location and scale is to be determined at the reserved matter stage). It is noted that this position would be both suitable for the proposed multifunctional space (as it is an area of the site exposed to marginally higher noise levels than southern areas and the multifunctional space is of a lower noise sensitivity than dwellings); or housing, with due consideration of noise control to such receptors, as discussed in **Section 4** of this report.

4.1.12 Taking into account the baseline noise conditions across the site, at distances of circa 100 metres from the nearest kerb of Mortimers Lane, the relevant internal noise criteria can be expected to be met with windows partially open (assuming a loss of circa 13 dBA through a partially open window). This distance does not include the screening effects of dwellings on the proposed development site, which would further reduce noise levels.

4.1.13 Accordingly, it can be expected that the internal noise criteria will likely be met with windows partially open within receptors much closer to Mortimers Lane than suggested above; the extent will be dependent on the final site layout. Where it is not practicable to achieve the relevant noise criteria with windows partially open, the means to achieve suitable internal noise conditions with windows closed are discussed later in this report.

4.1.14 Noise levels in the southern region of the site have been measured to be low, with a negligible ProPG stage 1 noise risk, and therefore only the most modest noise mitigation measures are expected to be required in this area. Good acoustic design principles shall however be considered where appropriate to the south in due course when developing the site layout.

4.2 Road Traffic Noise

Road Traffic / Anonymous Noise Sources

4.2.1 The guidance set out within BS 8233³ and the ProPG⁴ provides the relevant design/assessment criteria for the development and has been set out below for ease of reference. Further details can be found in **Appendix B**.

Table 3 Design criteria for road traffic noise sources to proposed dwellings

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 (inc. daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$ 45 dB $L_{Amax,f}$ not normally exceeded more than 10 times per night
External amenity	Gardens (or part thereof)	Aspirational target of 55 dB $L_{Aeq,16hour}$ ⁵	-

4.2.2 It is noteworthy that the above criteria are also referenced by the EBC Local Plan document as supporting text to policy DM8.

Computational Model

4.2.3 A computational acoustic noise mapping program, *Wölfel Meßsysteme* 'IMMI 24', has been used to model noise propagation from Mortimers Lane across the proposed development site. The development area (free of any development plans) and its local surroundings have been modelled to provide a 'Baseline' noise condition. CRTN⁶ and ISO 9613⁷ have been used as a basis to calculation noise propagation 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;

³ BS8233:2014 - Guidance on sound insulation and noise reduction for buildings

⁴ ProPG: Planning & Noise -Professional Practice Guidance on Planning & Noise, New Residential Development (May 2017)

⁵ Noting that it may not be practicable to achieve this in all areas.

⁶ Calculation of Road Traffic Noise (CRTN), Department of Transport, 1988

⁷ ISO 9613-1:1993 – Acoustics – Attenuation of sound during propagation outdoors – Part 1: Calculation of the absorption of sound by the atmosphere

- The surrounding built-up area.

4.2.4 The noise model has been used to predict day and night-time noise levels across the site in terms of $L_{Aeq,16hour}$, $L_{Aeq,8hour}$ and $L_{Amax,f}$ respectively. Noise sources within the model have been calibrated such that the model predicts the same levels of noise as measured at each long term survey measurement position.

4.2.5 The noise model does not include contributions from the commercial sources to the south or golf club; these sources are considered later in this report. The effects of distant roads are also not included within the model as they are not deemed to be significant.

Baseline Noise Conditions

4.2.6 The following **Image 5** and **Image 6** shows the predicted daytime (at ground floor) and night time (at first floor) baseline noise conditions (in terms of $L_{Aeq,T}$) across the proposed development site. **Image 7** shows noise levels in terms of night time $L_{Amax,f}$.

Image 5: Daytime baseline noise contour

Baseline daytime $L_{Aeq,16hour}$ noise levels at 1.5 metres above local ground level

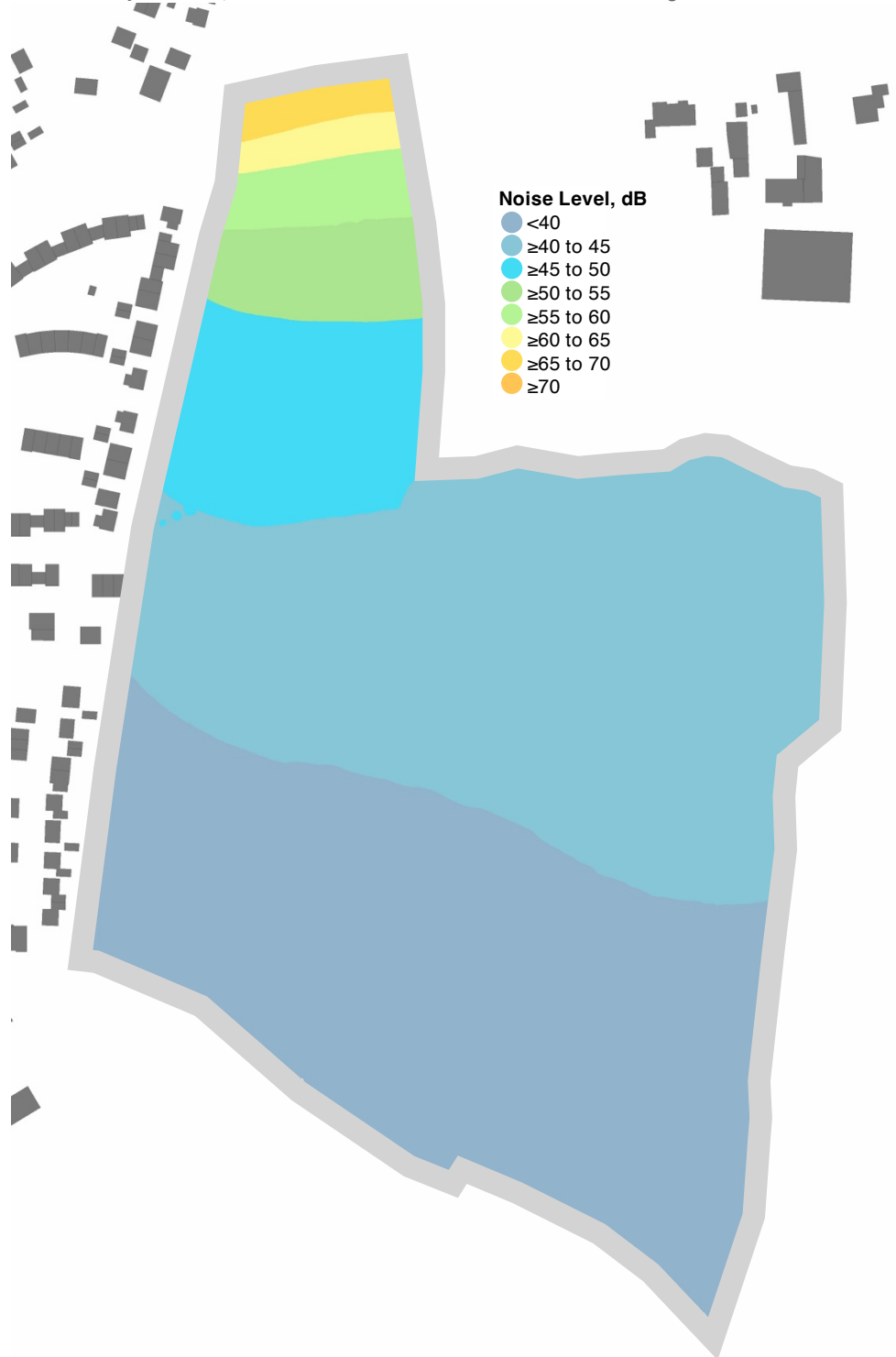


Image 6: Night time baseline noise contour

Baseline night time $L_{Aeq,8hour}$ noise levels at 4.5 metres above local ground level

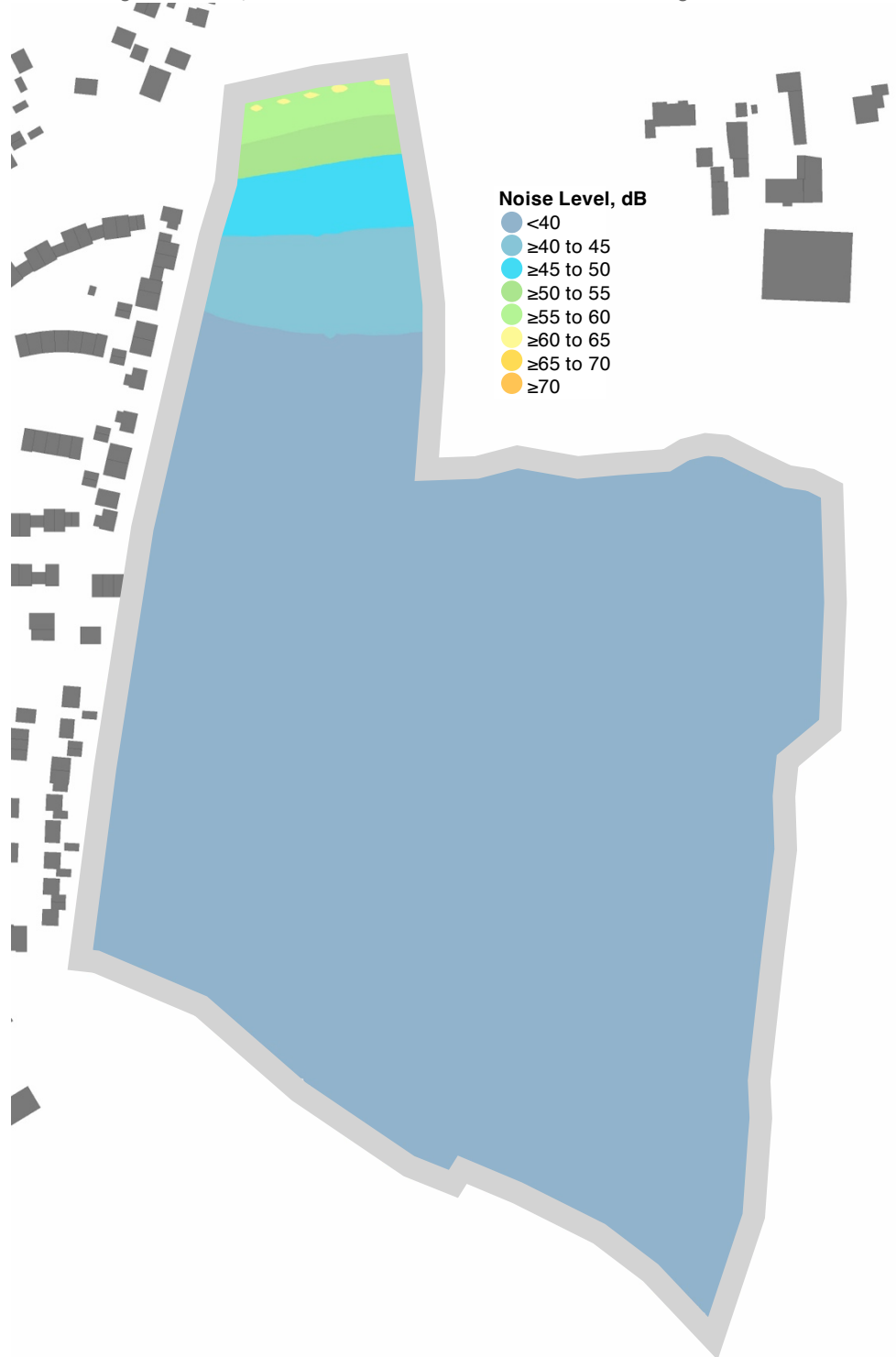
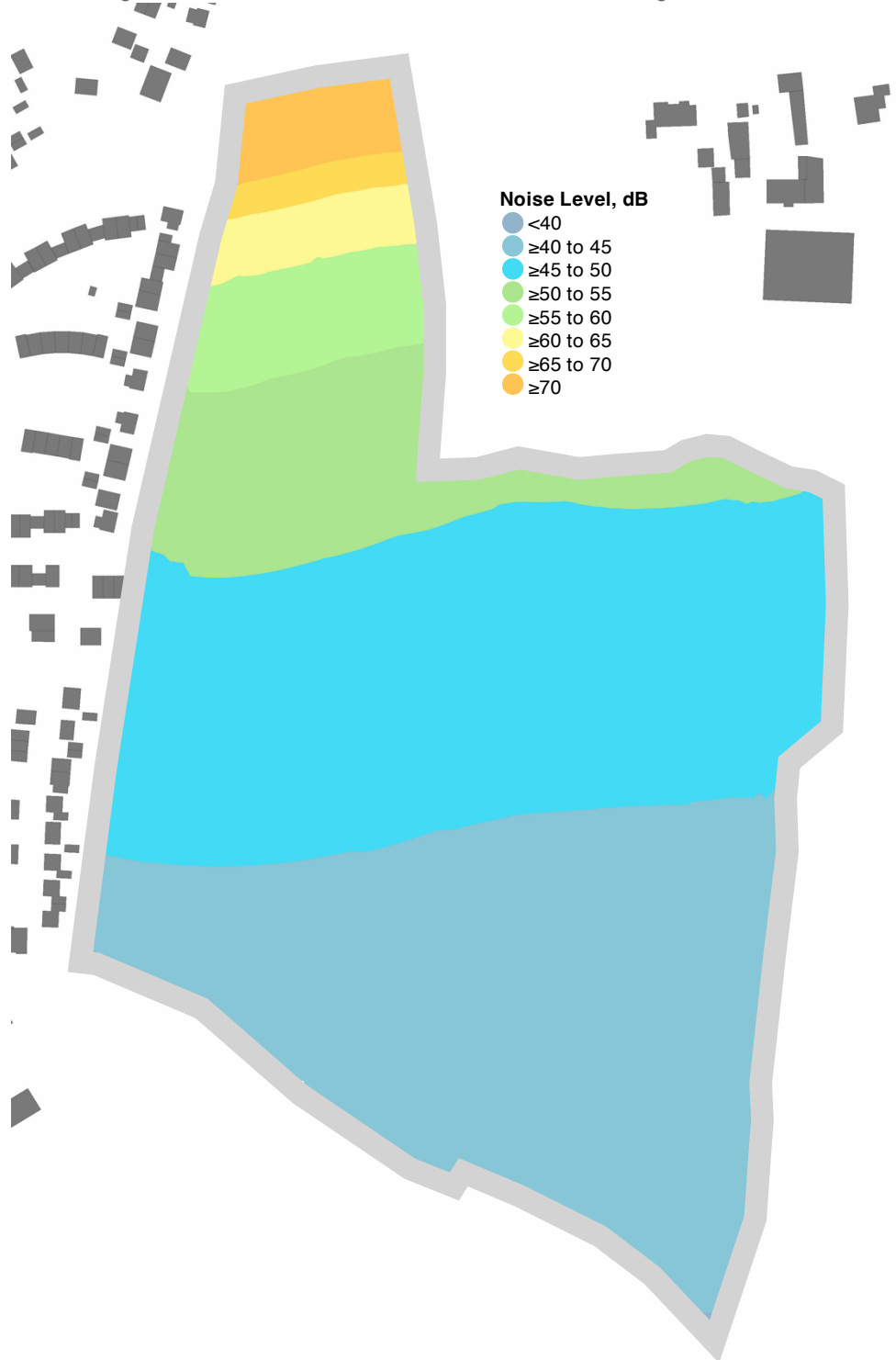


Image 7: Night time baseline noise contour (maximum)

Baseline night time $L_{Amax,f}$ noise levels at 4.5 metres above local ground level



Noise to External Amenity Areas

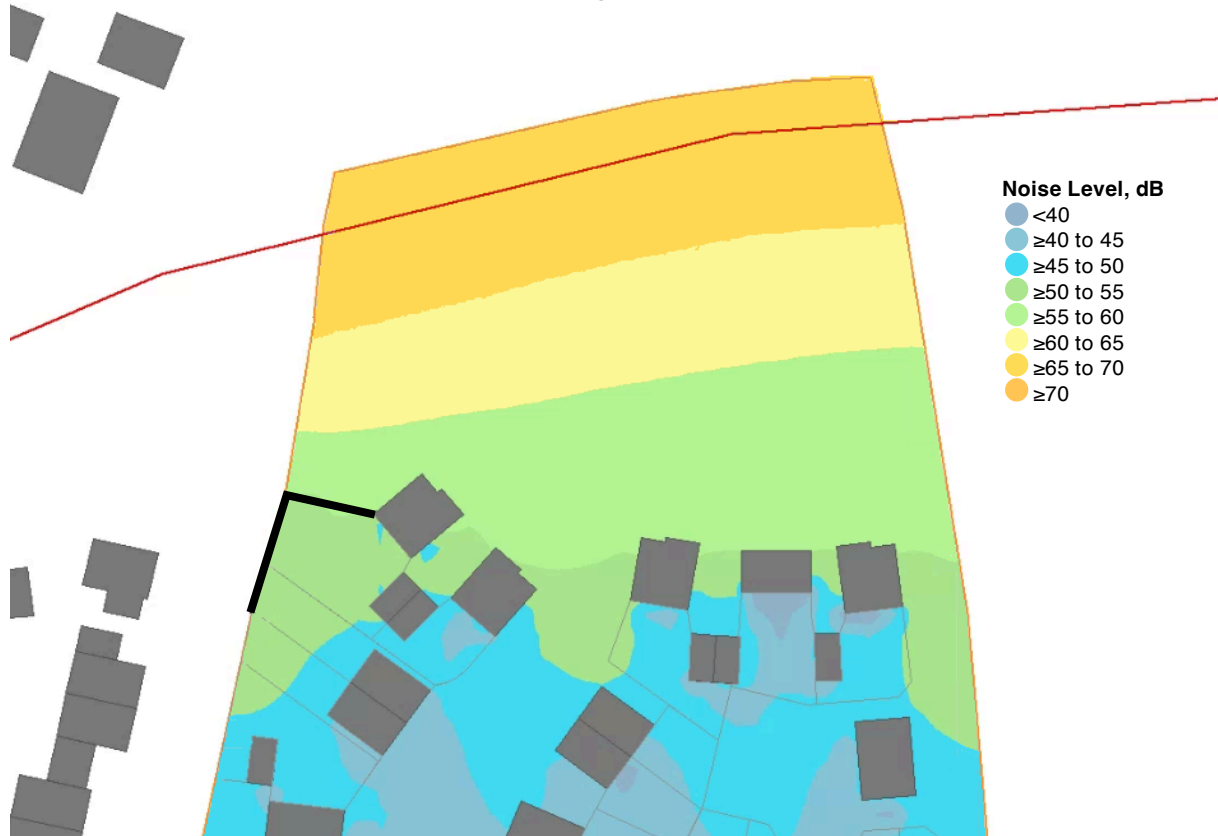
4.2.7 Noise to the closest gardens to Mortimers Lane can be suitably controlled by using one, or a combination of the following design principles:

- External amenity areas screened from Mortimers Lane by locating them behind their associated dwellings (relative to the road), thereby mitigating road traffic noise.
- Where the above is not possible due to other layout constraints, external amenity areas can be suitably protected against noise through the provision of localised acoustic screening (i.e. garden walls/fences or suitable height/mass, as discussed later in this report).
- External amenity areas positioned further than 55 metres from Mortimers Lane do not require any specific noise mitigation measures, assuming no additional screening that would occur as a result of any proposed intervening buildings.

4.2.8 Each of the above principles should not be taken as absolute requirements, rather parameters that can be included as part of the development of a detailed site layout. **Image 8** below shows a hypothetical layout for dwellings and external amenity areas in the northernmost extent of the site (the centreline of Mortimers Lane indicated as a red line for context).

Image 8 – Example external amenity area noise control

Day time noise contour plot at 1.5 metres above local ground level in terms of $L_{Aeq,16hour}$.



4.2.9 The layout shown above is not prescriptive and simply intended to show the principles of appropriate noise mitigation across the site.

4.2.10 The nearest indicative dwelling shown on the figure above is set back from Mortimers Lane by circa 30 metres from the nearest kerb. External amenity areas are indicated by the thin grey boundary lines.

4.2.11 On the right side of the figure, hypothetical external amenity areas are screened from Mortimers Lane by their associated dwelling. On the left side of the figure, the effects of a 1.8m acoustic screen (either timber fence or brick wall with no gaps or hole and a mass of greater than or equal to 10kg/m²) can be seen (the screen is shown as a solid **black** line). In both instances, it can be seen that noise from the road can be controlled to a level beneath the relevant aspirational criterion of 55 dB $L_{Aeq,16hour}$.

4.2.12 It has been demonstrated that it is entirely possible to suitably control noise from road traffic sources to external amenity spaces across the development.

Control of Noise Intrusion

4.2.13 The façades of the proposed dwellings are expected to be of a masonry construction. This does not preclude the use of alternative lightweight 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. It is understood that there are no plans for the client to use this construction.

4.2.14 Typical internal room dimensions have been taken as follows (understood to be suitably representative of the developer's typical dwelling sizes):

- Living Rooms: 5 m x 4 m x 2.7 m with 3 m² of glazing;
- Bedrooms: 4 m x 3 m x 2.7 m with 1.8 m² of glazing.

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

Glazing

4.2.16 As previously noted, it is expected that a significant proportion of dwellings across the proposed development will meet the internal noise level criteria with partially open windows (taken to offer a loss of approximately 13 dB from free field external level to reverberant internal level).

4.2.17 Once a layout has been developed to a suitable level of detail, it will be possible to quantify exactly which dwellings will meet the internal noise criteria with windows partially open. Where it is necessary to make use of the building façade elements to achieve the internal noise criteria.

4.2.18 Where it is not possible to achieve the internal noise criteria with windows partially open, standard thermal double glazing (expected to provide a single figure sound reduction performance of circa 30 dB R'_w) will be sufficient control noise intrusion to any dwelling beyond approximately 35 metres from the nearest kerb of Mortimers Lane.

4.2.19 This does not preclude the positioning of dwellings closer than 35 metres to Mortimers Lane, it is simply the case that glazing with a marginally higher sound reduction performance will be required, the specification of which would depend on the final positioning of the dwellings.

4.2.20 Where windows are required to be closed to achieve the internal noise criteria, it is important to ensure that suitable consideration is given to ventilation provision, as discussed in the following section.

Ventilation

4.2.21 Noise intrusion calculations have included the effects of up to three trickle ventilators to living rooms and two to bedrooms (noting that fewer would be acoustically acceptable).

4.2.22 It is understood that mechanical extract ventilation (MEV) will be the likely ventilation strategy for the proposed dwellings across the site. Such systems would be designed to meet the requirements of the Building Regulations Approved Document F, thereby ensuring suitable ventilation is provided to dwellings when windows are closed.

4.2.23 Similar to the glazing strategy for the scheme, non-acoustic direct airpath trickle ventilators (expected to provide a single figure sound reduction performance of circa 35 dB $D_{ne,w}$) will be sufficient to control noise intrusion to any dwelling beyond 35 metres from the nearest kerb of Mortimers Lane.

4.2.24 This again does not preclude the positioning of dwellings closer than approximately 35 metres to Mortimers Lane, it is simply the case that ventilators with a marginally higher sound reduction performance will be required, the specification of which would depend on the final positioning of the dwelling.

Summary

4.2.25 It has been demonstrated that noise from road traffic sources to dwelling proposed across the development can be controlled such that the relevant assessment criteria are met. It is noteworthy that where standard thermal double glazing and non-acoustic direct air path trickle ventilators are deemed to be acceptable to control road traffic, they would also be suitable to control noise from the other sources described in the following sections.

4.3 Dwelling Overheating and Noise

4.3.1 To satisfy the noise requirements of the Building Regulations Approved Document O (ADO), in locations where external free field noise levels exceed 49 dB $L_{Aeq,8hr}$ and / 64 dB $L_{Amax,f}$ during the night time period, it is necessary to provide a building overheating control strategy that does not rely on partially open windows to bedrooms at night. The above approach is based upon acoustics industry guidance⁸ on how to demonstrate compliance with the Building Regulations Approved Document O (as set out in **Appendix B**) and may be subject to change, should the guidance be revised (update expected in late 2024).

4.3.2 It has been determined that it will be possible to provide acceptable internal noise conditions during periods of overheating with partially open windows for all dwellings further than 50 metres from the nearest kerb of Mortimer's Lane (including those in the southern extent of the site).

4.3.3 For dwellings positioned closer to Mortimers Lane, the extent to which the use of open windows to control overheating will be dependent on the final site layout and the screening provided by the proposed dwellings. The above will be confirmed as part of detailed assessment works in due course. Open windows for overheating control may likely be permissible to dwellings significantly closer than 50 metres to Mortimers Lane, depending on the final site layout and screening provided by dwellings on the site.

4.3.4 Where it is ultimately determined that open windows cannot be relied on to provide relief from overheating, due to the noise-related constraints set out within ADO, alternative methods of ventilation will be required.

⁸ Guide to Demonstrating Compliance with the Noise Requirements of Approved Document O, July 2022 V1.0 (Consultation Draft)

4.3.5 The typical approach adopted by the developer 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.

4.3.6 The developer's energy compliance specialist has provided the following information concerning how the requirements of ADO would typically be addressed, taking into account a scheme's noise constraints:

- A full dynamic simulation will be carried out using the TM59⁹ methodology as stipulated within Approved Document O (if deemed necessary).
- The 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 for 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, so that the specific overheating mitigation requirements are met.

4.3.7 It is therefore expected that potential overheating effects can be controlled while also addressing the noise-related requirements of the ADO.

4.4 Golf Club Function Noise Emissions

4.4.1 Noise from general golfing activity and vehicular access to the East Horton Golf Club (EHGC) is not deemed to be a significant contributor to the noise climate across the proposed development.

4.4.2 Based on the club's publicly available literature, events with a capacity of up to 260 people can be held all year round, making use of three different function spaces (one including a dedicated outdoor patio space).

4.4.3 It is also stated in their literature that the venue is not subject to any noise restrictions. A review of information relating to the golf club on EBC's planning portal has been reviewed by Suono and no planning constraints relating to noise or events have been found.

4.4.4 For weddings (as an example of an event which is likely to have amplified music in the late evening), events are understood to typically commence at around 1200 and the bar closes and music ends at 0000 with carriages at 0030. There is the option for bar use to be extended until 0100 for an extra fee.

4.4.5 No golf club function activity was measured during the weekend section of the noise survey and at the time of writing there was no publicly published programme of events to allow for the scheduling of such a survey. Therefore, noise from the golf club has been considered contextually and largely qualitatively at this stage.

4.4.6 Based on the information available and outlined above, **Image 9** identifies the region on the Golf Club site that is typically expected to be used for functions (in **red**). It is expected that functions with amplified music would be held indoors, with typically only lower noise level activities occurring outdoors, potentially in the area identified in **orange** (noting this is not intended as a statement of

⁹ TM59 - Design methodology for the assessment of overheating risk in homes (2017)

exactly how the golf club operates functions, rather an expectation by Suono, based on the publicly available information).

Image 9 – Golf club building layout



Aerial imagery courtesy of Google

4.4.7 It is pertinent to consider other noise-sensitive receptors in the vicinity of the golf club. These are labelled (letterings are for reference only and in no particular order) on **Image 10**, with existing dwellings **ringed in orange**, the approximate edge of the proposed gross development area as a **dashed orange line** and the golf club function spaces **ringed in blue**.

Image 10 – Noise-sensitive receptors surrounding the Golf Club



Aerial imagery courtesy of Google

4.4.8 Firstly, it is noted that the proposed developable area is located approximately 270 metres from the golf club function areas. This distance can be expected to increase further as the site layout development progresses (and elements like gardens and other such buffers to dwellings are worked into the scheme).

4.4.9 The existing receptors surrounding the golf club are at distances of approximately between 330 metres and 690 metres, with the closest being receptors A and B at distances of approximately 330 and 405 metres respectively.

4.4.10 Based on the losses that can be expected through distance attenuation alone, it is expected that noise from any golf club function activity may be only circa 1.7 dB higher than that experienced at receptor A and 3.5 dB higher than experienced at receptor B. To provide context to these differences, a 3 dB change in noise level is commonly described as only being perceived as a very slight change¹⁰. There are a number of other factors (outlined later in this section) that may affect levels of noise transmitting from the Golf Club however the above allows for a straightforward comparison.

4.4.11 With the above in mind, it is suggested that if noise from functions at the golf club was routinely emitted at a level likely to adversely affect the proposed development, it is likely that adverse comments would also be received from existing receptors, as these would be exposed to subjectively highly comparable levels of noise. Significant levels of noise from functions at the golf club to the proposed development are therefore not expected.

¹⁰ i.e. two comparable noise sources of a level within circa 3 dB of each other would likely be perceived have having comparable loudness .

4.4.12 Noise mitigation effects relating to the significant distances from golf club function areas to the proposed development, the sound insulation provided by building envelopes (both at source and receptors, which would be designed in detail in due course), ground absorption/screening, and directivity effects etc. should also be borne in mind.

4.4.13 These noise mitigating effects will mean that the absolute levels of noise reaching the proposed receptors from golf club function activity are expected to be low (considering typical levels of noise that may be generated during a function with amplified music), even when considered in the context of the relatively low levels of noise that is prevalent during the nighttime to the south of the proposed development site.

4.4.14 It is therefore suggested that noise from functions at the EHGC is not expected to be significant to the proposed development. In addition, it is not expected that unreasonable restrictions would be placed on EHGC's operations as a result of the development, in line with the agent of change principle within the NPPF.

4.5 Commercial Uses to South

Assessment Criteria

4.5.1 The relevant assessment standard that should be adopted when considering noise from commercial activity is British Standard BS 4142:2014 (BS 4142)¹¹. Further commentary on this guidance is provided in **Appendix B**.

4.5.2 The following criteria are derived for the proposed receptors to take into account commercial activity to the south, again based on the guidance set out in **Appendix B**:

Table 4 Internal noise criteria for new dwellings when considering industrial noise sources

Activity	Location	Internal Ambient Noise Level	
		Daytime (0700-2300)	Night time (2300-0700)
Resting	Living Room	35 dB $L_{Ar,1hour}$	-
Dining	Dining room / area	40 dB $L_{Ar,1hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Ar,1hour}$	30 dB $L_{Ar,15minutes}$

4.5.3 The above criteria are considered after undertaking an initial estimation of impact, drawing from guidance in BS 4142.

Noise from Operation

4.5.4 The nearest industrial uses to the south (including the East Horton Business Park) have noise constraints enforced as part of their permission (application reference F/23/94668), relating to:

- Provision of suitable commercial unit building sound insulation
- the control of plant and operation noise to existing dwellings in the area.
- The requirement to submit noise management plan(s) for the commercial unit(s)

¹¹ British Standard BS 4142:2014+A1:2019 - Methods for rating and assessing industrial and commercial sound

4.5.5 Condition 14 relating to the above application requires that the buildings be constructed in line with the sound insulation requirement set out within the Noise Impact Assessment prepared by 24 Acoustics (12 December 2022, ref. R9791-1 Rev 2), unless alternative details are first submitted to and approved in writing by the Local Planning Authority. The above report sets out octave band sound insulation requirements for various building elements and predictions of noise levels at receptors around the commercial units.

4.5.6 The expected operating hours of the commercial units are from 0700-1800 Monday to Friday and 0800-1300 on Saturdays (i.e. during daytime hours only). It is noteworthy that the representative background noise level measured at MP2 during the above periods, derived based on guidance set out with BS 4142 was 40 dB $L_{A90,1\text{hour}}$.

4.5.7 The nearest existing residential receptors to the EHBP development to the south are those on Kingsmill Drive, at a distance of approximately 40 metres. In comparison, the proposed developable areas of the development site lie at a distance of approximately 15 to 20 metres to the north of the EHBP development. The exact location of dwellings on the proposed development is however not confirmed, and they may be at greater distances than suggest above.

4.5.8 At the Kingsmill Drive receptors, 24 Acoustics predict a rating level of 32 dB $L_{Ar,1\text{hour}}$. By correcting these noise levels for distance to 15 metres from the source, a level of 40 dB $L_{Ar,1\text{hour}}$ can be derived. This does not exceed the background noise level, which is an indication of a low impact when making an initial estimate of impact in line with the guidance set out within BS 4142.

4.5.9 It is necessary to then consider contextual factors when determining the expected noise impact on the proposed receptors and ensuring due consideration of the agent of change principle.

4.5.10 The layout of EHBP development largely provides screening between expected activity and the proposed development site, due to the position of the buildings (see area indicated by orange boundary on image 11 below).

Image 11 - East Horton Business Park development



Map imagery: Google

4.5.11 It is important to acknowledge that the commercial noise sources will be in place when residents move to the proposed development. They will therefore not be subject to an alteration in noise climate; noise from commercial unit operation essentially forms part of the underlying ambient noise climate.

4.5.12 When considering noise intrusion into the proposed dwellings and the relevant criteria based on guidance set out in BS 4142 and BS 8233, even when considering noise intrusion through a partially open window (offering a circa 13 dB loss from free field external level to reverberant internal level) said criteria can be expected to be met.

4.5.13 Following on from the above, when residents choose to close their windows and rely on the dwellings' alternative methods of ventilation (to be specified in accordance with the Building Regulations Approved Document F), such as mechanical extract ventilation (MEV), the relevant internal noise criteria would be comfortably achieved. It is noted that standard thermal double glazing and non-acoustic trickle ventilators are expected to be acceptable for all dwellings in the southern region of the site.

Noise from Plant

4.5.14 Condition 15 within the decision notice for the industrial scheme limits plant noise to 38 dB $L_{Ar,1hour}$ in the day and 36 dB $L_{Ar,15minutes}$ at night. It is not clear from the condition wording where these limits apply, but we would take them to apply at 1 metre from the nearest window of any residential receptor (that was existing at the time of the above application).

4.5.15 The above limits are reasonably stringent and therefore it is not expected that noise from associated plant would be significant at the proposed development. Further noise measurements could be undertaken at a later stage now that the EHBP development is now operational, to quantify

noise from any plant items that have been installed such that it can be ensured that noise would be suitably controlled.

Noise Management Plan

4.5.16 Condition 16 sets out the requirement for the submission of a noise management plan to the EBC prior to the commencement of any works on the site. It is noteworthy that such a plan was attached to the 24 Acoustics noise report referenced above (which was subsequently used to discharge the condition). It is expected that this would be followed by any incoming use of the units of the Business Park.

Summary

4.5.17 It is therefore concluded that noise from the East Horton Business Park is not expected to be a significant contributor of noise to the proposed development site. Noise can be further reduced by the envelopes of the dwellings that would be constructed, the details of which would be confirmed at a later stage. As noise from the commercial units is not expected to adversely affect receptors on the proposed development, it can also be concluded that the requirements of the agent of change principles within the NPPF can be met.

4.6 Landfill Gas Engine

Assessment Criteria

4.6.1 The assessment criteria and approach set out at the start of **Section 4.5** of this report have also been used in the consideration of noise from the Landfill Gas Engine.

Assessment and Commentary

4.6.2 It is understood that a landfill gas engine is situated approximately 70 metres from the southern boundary of the site. This has the capability to be operational at any point, 24-hours 7 days a week. While the source was not directly observed as being operational while Suono engineers were on site, the unattended noise logging equipment at MP2 is expected to have captured its activity.

4.6.3 Between 20:15 on the 14th October 2023 and 00:45 on the 15th of October, a near-consistent level of 40 dB $L_{Aeq,T}$ was measured, expected to be linked with the continuously operating gas engine plant equipment (see the time histories presented in **Appendix A**). Based on the octave band data captured, the noise source was broadband in nature. Similar patterns in noise can be seen when considering the L_{A90} noise index over other parts of the Saturday and Sunday of the survey period; a relatively consistent noise source can be seen to be controlling the background noise climate to a level of approximately 40 dB $L_{A90,T}$.

4.6.4 Representative background noise levels during the night time during periods not affected by gas engine activity were circa 37 dB $L_{A90,T}$. By logarithmically subtracting the background noise level from the measured gas engine noise emissions (affected by background noise conditions) yields a specific noise level for this source of approximately 37 dB $L_{Aeq,T}$.

4.6.5 The gas engine plant emitted broadband noise, ran continuously when operational and does not appear to be impulsive in nature. A +3 dB acoustic feature correction has however been applied to the specific noise level to account for any other non-specific acoustic character that may be present (in line with guidance in BS 4142); a rating level at MP2 of 40 dB $L_{Ar,Tr}$ for the gas engine can be derived.

4.6.6 Based on the guidance set out within BS 4142, when the above level is compared against night time background noise levels, it falls below a level that may provide an initial estimation of an adverse noise impact.

4.6.7 Despite the initial estimation that an adverse noise impact is not expected to occur, it is necessary to consider the context in which the noise is to be experienced by receptors. The contextual factors are broadly comparable to those which are pertinent for consideration in relation to EBHP activity.

4.6.8 It is important to acknowledge that the noise source is existing and will be in place when residents move to the proposed development. They will therefore not be subject to an alteration in noise climate; noise from the plant equipment essentially forms part of the underlying ambient noise climate.

4.6.9 When considering noise intrusion into the proposed dwellings and the relevant criteria based on guidance set out in BS 4142 and BS 8233, even when considering noise intrusion through a partially open window (offering a circa 13 dB loss from free field external level to reverberant internal level) said criteria can be expected to be met.

4.6.10 Following on from the above, when residents choose to close their windows and rely on the dwellings' alternative methods of ventilation (to be specified in accordance with the Building Regulations Approved Document F), such as mechanical extract ventilation, the relevant internal noise criteria would be comfortably achieved. It is noted that standard thermal double glazing and non-acoustic trickle ventilators are expected to be acceptable for all dwellings in the southern region of the site.

4.6.11 It is therefore concluded that noise from the landfill gas engines is not a significant contributor of noise to the proposed development site. Noise can be further reduced by the envelopes of the dwellings that would be constructed, the details of which would be confirmed at a later stage.

4.7 Multi-functional Space

4.7.1 The proposed multi-functional space is to be located to the north of the site, relatively close to Mortimers Lane where both ambient and background noise levels are higher, relative to southern regions of the site.

4.7.2 Further details of the multi-functional space are not known at this stage, however it is suggested that noise from this source could be controlled through the application of a suitably worded planning condition attached to the decision notice for the scheme. Suggested wording that could form the basis for such a condition is provided below and we welcome constructive dialogue with the local authority to agree on the final text:

"A noise assessment for any proposed multi-functional space must be submitted to the local authority prior to any construction works above the damp proof course of this element. The assessment must set out suitable design criteria for the expected use(s) (which may be agreed with the local authority prior to completion of the assessment works), set out an assessment of noise to nearby sensitive receptors and provide detailed specifications for any noise mitigation measures that may be required to meet the relevant criteria."

4.2 In practical terms, is it expected to be entirely possible to control noise emissions from the multi-functional space, potentially through appropriate building fabric design, control of plant noise emissions through the specification of suitable mitigation measures and the application of noise management plan, all only as required.

5.0 Conclusions

5.1 An outline application is being submitted for up to 245 dwellings (Use Class C3), up to 350sqm multi-functional space and mobility infrastructure (Use Class Sui Generis), with associated

open space, landscaping and infrastructure. This report sets out an outline noise assessment that has been undertaken for the scheme.

5.2 The proposed development is to be located to the south of the Mortimers Lane (B3037), on a parcel of land on Fair Oak's eastern extent. Immediately to the south is a commercial development comprising 5 general industrial buildings. Also to south is an existing landfill gas engine which serves the now-closed Fair Oak Landfill site. To the south east is East Horton Golf Club that is understood to hold events both internally and externally of the main golf club building.

5.3 A noise survey has been undertaken at the site to quantify the prevailing noise climate. From this data, an assessment of internal and external noise levels the development site has been undertaken in relation to road traffic noise. Good acoustic design principles have been recommended for consideration when developing the detailed site layout.

5.4 It has been found that standard thermal double glazing and non-acoustic trickle ventilators will be sufficient to suitably control noise to the proposed dwellings over the majority (and potentially all) of the site, depending on the final layout. For most of the site, it has been calculated that it will be possible to achieve the internal noise limits set out within BS 8233:2014 with partially open windows. The noise related requirements of the Building Regulations Approved Document O have been considered as appropriate.

5.5 Noise levels in external amenity areas are expected to meet the aspirational noise targets set out within the relevant national planning guidance and standards. This may potentially require the specification of localised mitigation measures such as fences/walls to gardens if they are in close proximity to Mortimers Lane.

5.6 Noise from the golf club, East Horton Business Park development and landfill gas engine plant has been considered. It has been determined that noise from these sources is not significant across the proposed development and can be further mitigated through the inherent noise mitigation measures that will be included as part of the development.

5.7 Noise from the proposed multi-functional space can be suitably controlled through the application of a suitably worded planning condition to a decision notice for the scheme.

5.8 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, taking due account of the agent of change principle and other relevant local and national planning policy.



Appendix A: Noise Survey

Details of the noise survey

Methodology and Equipment

A noise survey was conducted on site between 11:15 on Tuesday 10th October until 14:45 on Monday 16th October 2023. The survey works were undertaken in order to quantify road traffic noise along Mortimers Lane and noise from surrounding industrial adjacencies. Two unattended measurement positions were utilised, labelled MP1 and MP2. Three supplementary attended positions were utilised for short term measurements to understand noise propagation through the site, labelled S1-S3 on the image below and described in the following table:

Image A1: Location of noise measurement positions across the site



Aerial imagery courtesy of Google

Table 5 Measurement position

Location	Detail
MP1	Microphone at approximately 1.5 m above local ground level, at a horizontal distance of 6 metres from the northernmost edge of the site, in a free field position. Measurements were unattended. The noise climate was dominated by local road traffic.
MP2	Microphone at approximately 1.5 m above local ground level, at a horizontal distance of 6 metres from the southernmost edge of the site, in a free field position. Measurements were unattended. The noise climate was dominated by local road traffic.
S1	Microphone at approximately 1.5 m above local ground level, at a horizontal distance of 130 metres from the northernmost edge of the site, in a free field position. Measurements were short term and attended. The noise climate was dominated by local road traffic.
S2	Microphone at approximately 1.5 m above local ground level, at a horizontal distance of 226 metres from the northernmost edge of the site, in a free field position. Measurements were short term and attended. The noise climate was dominated by local road traffic.
S3	Microphone at approximately 1.5 m above local ground level, at a horizontal distance of 313 metres from the northernmost edge of the site, in a free field position. Measurements were short term and attended. The noise climate was dominated by local road traffic.

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

Table 6 Measurement equipment

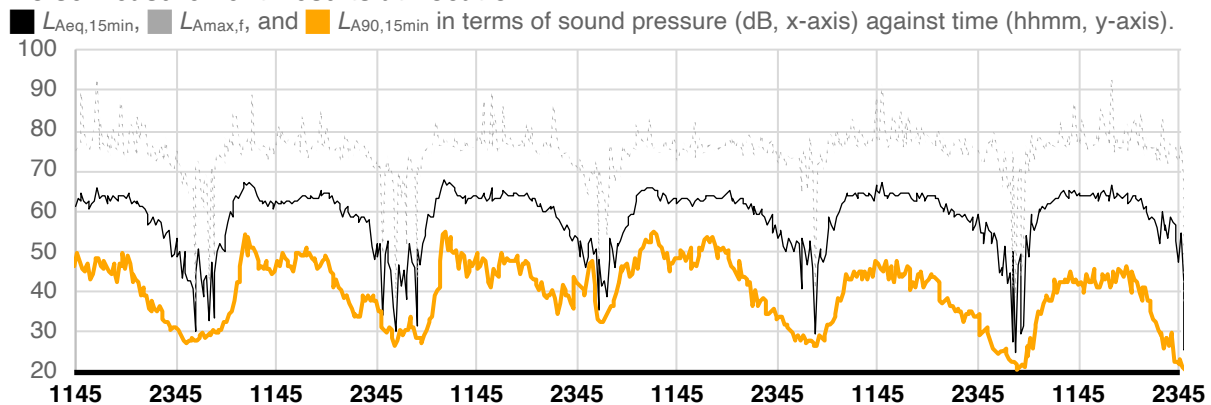
Location	Item	Detail
MP1 & MP2	Sound level analyser	Rion NL-52
	Outdoor microphone kit	Rion WS-15
	Acoustic calibrator	Rion NC-75
S1-3	Sound level analyser	Norsonic 140
	Outdoor microphone kit	Norsonic 1217
	Acoustic calibrator	Norsonic 1255

Measurements of the L_{Aeq} , L_{Amax} and L_{A90} indices were recorded over consecutive 15-minute periods for the duration of the unattended and attended survey elements. 1 minute noise profile information was also recorded.

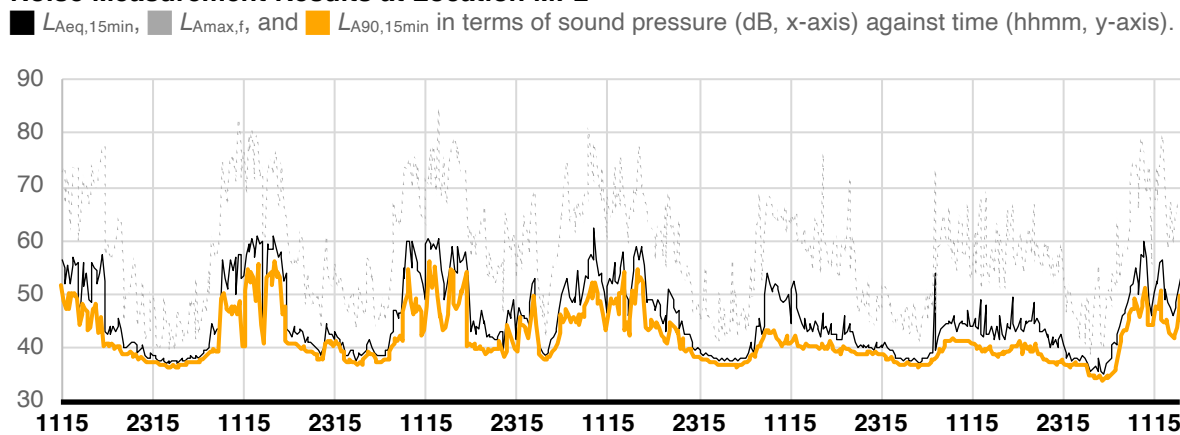
Historical weather data, collected from a local weather station¹², suggests periods containing gusting winds during the 13th (which have been omitted from analysis) but otherwise remained suitably free from significant wind or precipitation for the duration of the survey.

The following graphs present noise measurement results at measurement locations MP1 and MP2. At MP2, daytime weekday noise conditions were affected by construction activity on a site to the south of the noise logger (affected data has been presented here for completeness).

Noise Measurement Results at Location MP1



Noise Measurement Results at Location MP2



The tables below provide a summary of key noise level information from the two long term positions described above. The measurement data presented for position MP2 had had the effects of construction activity omitted.

¹² [Southampton, United Kingdom Weather History | Weather Underground \(wunderground.com\)](https://www.wunderground.com/history/Southampton)

Table 7 Measured Noise Levels at MP1 (A31)

Date (2023)	Day	Noise Level, dB		
		Daytime Average	Night-time Average	Night-time Max ⁵
		$L_{Aeq,16hr}$	$L_{Aeq,8hr}$	$L_{Amax,f}$
10 th October	Tuesday	62*	53	75
11 th October	Wednesday	63	53	75
12 th October	Thursday	64	54	74
13 th October	Friday	63	54	75
14 th October	Saturday	63	54	76
15 th October	Sunday	63	53*	-

*Partial daytime and night time period due to survey start/end time

Table 8 Measured Noise Levels at MP2¹³

Date (2023)	Day	Noise Level, dB		
		Daytime Average	Night-time Average	Night-time Max ⁵
		$L_{Aeq,16hr}$	$L_{Aeq,8hr}$	$L_{Amax,f}$
10 th October	Tuesday	42*	38	54
11 th October	Wednesday	43	40	56
12 th October	Thursday	45	48	65
13 th October	Friday	47	39	65
14 th October	Saturday	44	42	57
15 th October	Sunday	44	39	54

*Partial daytime period due to survey start/end time

Ambient noise levels across the site were subjectively perceived to be relatively low, an observation which is supported by the measured noise levels.

The table below provides a summary of the short term attended measurements that were undertaken. The primary function of these measurements was to help validate the output of the road traffic noise model, rather than as level that should be consider in isolation.

Table 9 Attended measurement position noise levels

Position	Noise Level, dB		
	$L_{Aeq,5minutes}$	$L_{A90,5minutes}$	$L_{Amax,f}$
S1	49	46	56
S2	46	41	56
S3	42	38	50



¹³ Excluding periods between 0700-1700 on weekdays due to construction works to the south of the site

Appendix B - Planning Policy and 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 2023.

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 180 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 191 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 191 makes reference the Noise Policy Statement for England which is discussed in the following section.

The 'agent of change' principle is discussed in paragraph 193 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 exposure¹⁴] 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.”

¹⁴ 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).

Local Policy

Eastleigh Borough Council Local Plan (2016 - 2036)

Policy DM8

The Eastleigh Borough Local Plan (2016 - 2036) contains policy DM8 which relates to pollution. This policy states the following (with key text emboldened for emphasis:

“Development will not be permitted if it is likely to cause loss of amenity or impact on public health or other unacceptable environmental impacts through:

- i. air pollution (including odours or particulate emissions);*
- ii. pollution of surface, underground, coastal waters or other watercourses;*
- iii. noise or vibration;***
- iv. light intrusion; or*
- v. land contamination.*

Development susceptible to particular forms of pollution will not be permitted:

a. where it will be affected by such pollution, unless measures can be taken that adequately mitigate the polluting effects;

or b. where it would inhibit existing economic or other activities giving rise to acceptable polluting effects.

Where a development site is known or suspected to be contaminated, before the site is developed the Borough Council will require the contamination to be remediated to a standard where as a minimum it cannot be defined as ‘contaminated land’ under Part IIA of the Environmental Protection Act 1990.”

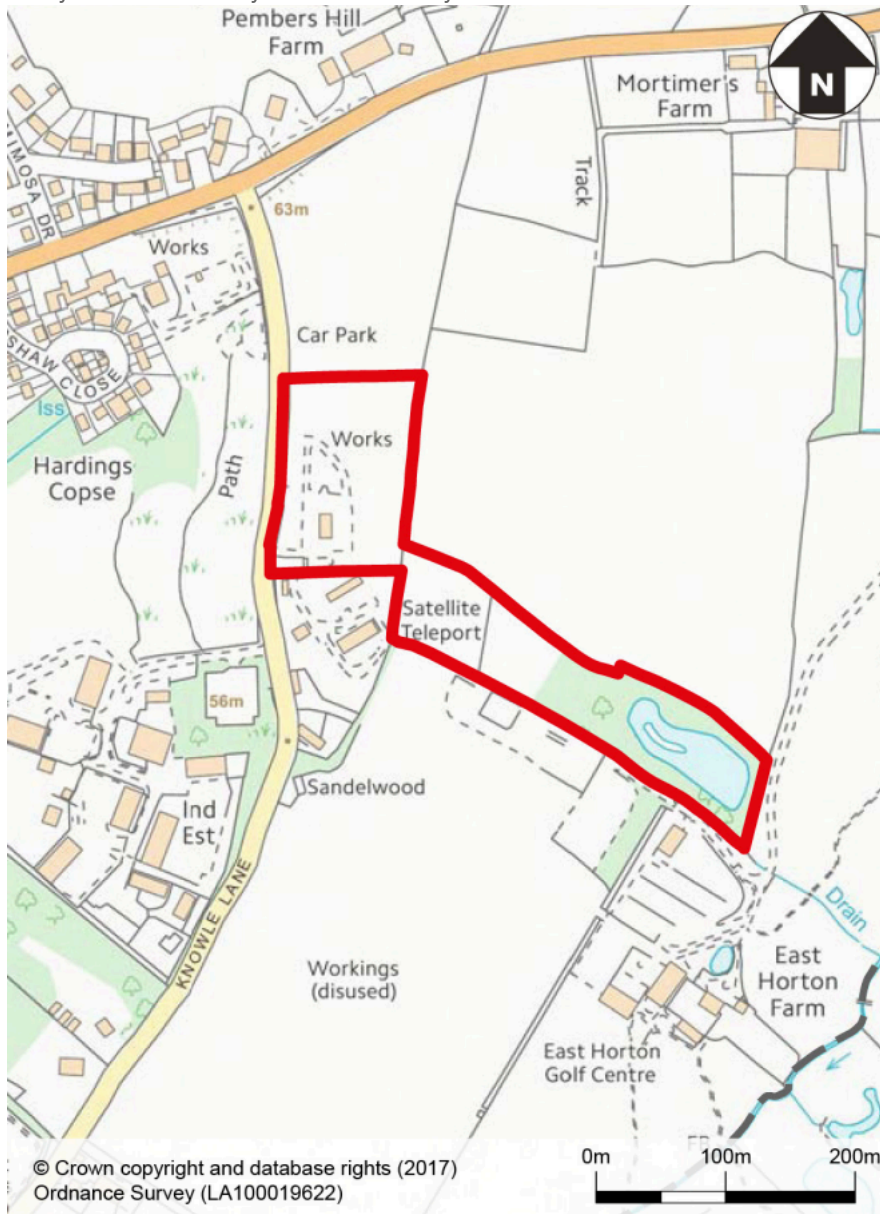
Designing a proposed residential development to meet the relevant design criteria set out in the following sections will ensure that suitable mitigation is specified to avoid unacceptable environmental impacts, in line with the requirements of Policy DM8.

Policy F05, Land East of Knowle Lane

5.9 Policy D05, Land East of Knowle Lane, supported the development of approximately 30 dwellings on the strip of land to the south of the proposed development site (identified below). This development was granted planning permission (with reference F/17/80640).

Image A1: Policy F05, Land East of Knowle Lane (Location)

Policy land identified by the red boundary.



5.10 The wording of Policy F05 is replicated below with key text emboldened for emphasis:

An area of 0.9 hectares on the east side of Knowle Lane is allocated for residential development of approximately 30 dwellings. Planning permission will be granted provided that detailed proposals accord with the development plan and meet the following specific development requirements:

i. a new vehicular and pedestrian access is provided from Knowle Lane;

ii. a buffer is provided to protect future residents from industrial noise sources to the south of the site;

iii. the development incorporates measures to safeguard the adjoining Site of Importance for Nature Conservation (SINC);

iv. evidence is provided that the site is not contaminated;

v. improvements for pedestrians in the vicinity of the site in Knowle Lane are carried out; and important trees on the site boundaries are protected or if necessary replaced.

5.11 It is of note that no mention is given to noise from sources other than industrial uses is set out within the policy. This suggests that it is of EBC's opinion that the site was suitable for residential development in respect to noise.

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

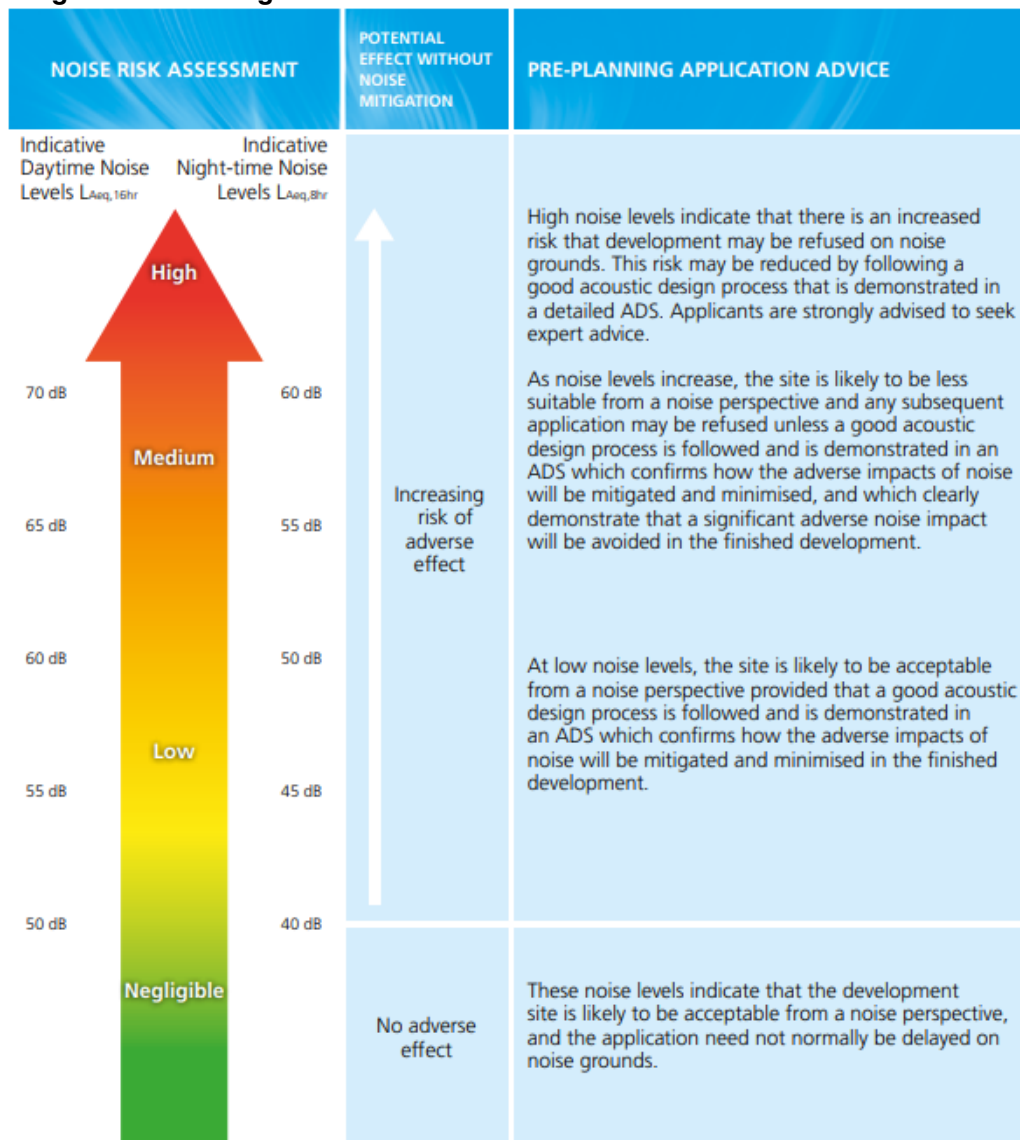


Figure 1 Notes:

- Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures.
- Indicative noise levels are the combined free-field noise level from all sources of transport noise and may also include industrial/commercial noise where this is present but is "not dominant".
- $L_{Aeq,15hr}$ is for daytime 0700 – 2300, $L_{Aeq,8hr}$ is for night-time 2300 – 0700.
- An indication that there may be more than 10 noise events at night (2300 – 0700) with $L_{Amax,F} > 60$ dB means the site should not be regarded as negligible risk.

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.

At time of writing draft acoustics industry guidance on the interpretation of the ADO is subject to consultation (discussed in the following section). It may therefore be necessary to revise the approach regarding how overheating is considered in the context of noise.

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.

Guide to Demonstrating Compliance with the Noise Requirements of Approved Document O, July 2022 (Draft for Consultation)

The above-titled guide provides guidance for practitioners when implementing the requirements of Approved Document O. It is stated as being designed to assist the industry in the understanding of what is published in the regulation and provides interpretation and clarification on the content of the published regulation. The guidance set out within the document must however be given an appropriate weight in relation to its draft status and may be subject to change.

The following external noise thresholds are set out in table 1 of the guidance, which relate to high and moderate overheating risk areas (as described within ADO):

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

Parameter	High Risk Location	Moderate Risk Location
$L_{Aeq,8hr}$ averaged over 8 hours (between 11pm and 7am)	44 dB	49 dB
L_{AFmax} more than 10 times a night (between 11pm and 7am)	59 dB	64 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 facade 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 achieved the 40 dB $L_{Aeq,8hour}$ level set out in ADO, but with a 4 dB reduction in noise offered by an open window in high overheating risk areas (based on an approximation of extended open areas) or a 9 dB reduction in moderate-risk locations.

As the Mortimers Lane site falls 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 level of 49 dB $L_{Aeq,8hour}$ and 64 dB L_{AFmax} can be taken as a pessimistic thresholds to identify where open windows could not be used to control overheating effects. This is on the basis that windows would be circa 30° open.

Appendix A of the guide provides a method for calculating the potential loss through a partially open window where further detailed assessment is required. The calculation method is replicated below:

To estimate the internal noise level from the predicted acoustic open area, Equation G.1 of BS 8233:2014 can be used, reduced for a single element as follows:

Equation 1

$$L_2 = L_{1,ff} - R + 10 \log \left(\frac{ST}{V} \right) + 11$$

Where:

L_2 is the internal level

$L_{1,ff}$ is the free-field external level (i.e. assumed to be 3 dB lower than a level 1m away from the façade according to BS 8233)

R is the sound reduction index, assumed to be zero for the open area, S (m²)

T is the reverberation time, 0.5 seconds for the standardised internal level

V is the room volume (m³). Consider as the floor area x room height.

S, open area as a fraction of floor area, e.g. 0.05 x floor area.

The floor areas cancel, and for 5 % of the floor area to be open and a room height of 2.4 m:

Equation 2

$$L_{1,ff} - L_2 = 0 - 10 \cdot \log \left(\frac{0.05 \times 0.5}{2.4} \right) - 11 = 9 \text{ dB}$$

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.

British Standard BS 4142

British Standard 4142:2014+A1:2019 (Methods for rating and assessing industrial and commercial sound) states in section 1.1:

“This British Standard describes methods for rating and assessing sound of an industrial and/or commercial nature, which includes:

- a) sound from industrial and manufacturing processes;*
- b) sound from fixed installations which comprise mechanical and electrical plant and equipment;*
- c) sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and*
- d) sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from fork-lift trucks, or that from train or ship movements on or around an industrial and/or commercial site.*

The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.”

The standard states its applications as,

“This standard is applicable to the determination of the following levels at outdoor locations:

- a) rating levels for sources of sound of an industrial and/or commercial nature; and
- b) ambient, background and residual sound levels,

for the purposes of:

- 1) investigating complaints;
- 2) assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and
- 3) assessing sound at proposed new dwellings or premises used for residential purposes.”

BS 4142 sets out a daytime assessment period of 1 hour and night time period of 15 minutes. The assessment methodology requires that a “specific level” from a given noise source is determined considering these time periods. Character corrections should be added if the noise has tonality, impulsivity, intermittency or other such characteristics; this gives the “rating level” of a given noise source. The level of the correction is based upon how the noise is perceived, as set out in the standard.

The rating level of noise, $L_{Ar, Tr}$, for the relevant assessment period is the calculated noise level at the nearest receiver location, adjusted to take into account the acoustic characteristic of the noise. Acoustic feature corrections can be made to account for tonality, impulsivity, intermittency and other characteristics present in the resultant sound at the receiver position. The magnitude or appropriateness of any correction will depend both on the type of noise source and the context in which it is perceived. Similarly, in accordance with BS 4142, the period of time for which an individual noise source is active during the relevant reference time period will also be considered in establishing the rating level.

It will also be necessary to consider the existing noise climate and what sound sources contribute to it. For example, where a noise generating activity is proposed adjacent to an existing similar noise generating site, the impact of the new noise source would be less than if it were to be planned in a location where its character and type is different to and more noticeable than any existing noise source nearby.

With regard to the background sound level against which the rating level is compared, the standard states the following:

“In using the background sound level in the method for rating and assessing industrial and commercial sound it is important to ensure that values are reliable and suitably represent both the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods.”

The periods of interest over a 24 hour day are usually related to day time activities (07:00-23:00h) and night time (23:00-07:00h). However the standard makes the following statement:

“Among other considerations, diurnal patterns can have a major influence on background sound levels and, for example, the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night-time period for sleep purposes. Furthermore, in this general context it can also be necessary to separately assess weekends and weekday periods.”

Therefore, the periods of time which can be considered as ‘waking up’ and ‘falling asleep’ stages, for example 06:00h to 07:00h and 23:00h to 24:00h, may need to be considered independently. Alternative periods may also be identified where breakdown beyond the standard day and night time analysis will be necessary, for example where background sound levels are shown to be regularly elevated.

Similarly, both weekend and weekday periods may need to be considered separately, with criteria set for both. The requirement to analyse specific time periods should be considered for each site individually.

Once the rating level at each receptor has been calculated, reference can be made to the following commentary in BS 4142 in relation to conducting an initial assessment of the impact, based on the difference between the rating level of the noise source and the pre-existing background sound level.

“Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level (see Clause 8) from the rating level (see Clause 9), and consider the following.

NOTE 1 More than one assessment might be appropriate.

a) Typically, the greater this difference [between industrial site noise rating level and baseline background level], the greater the magnitude of the impact.

b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

NOTE 2 Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.”

In situations where background sound levels are low, it is important to again consider context, rather than simply basing an assessment of impact on a difference in noise level, as suggested above. With regards to context in relation to absolute noise levels, the standard states the following:

“1) The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.

Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.

Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.”

British Standard BS 4142:2014 does not set out guidance for what constitutes low background noise levels. Instead, it can be inferred from the World Health Organisation Night Guidelines for Europe (2009) that a noise level of ≥ 30 dB $L_{\text{night, outside}}$ is not likely to give rise to any substantial observed noise effects.

Although the above criterion relates to an 8-hour period between 23:00 and 07:00 (i.e. the night time), the application of the criterion to any given 15 minute period during the night time (or one hour if applied to the daytime) effectively makes the criterion more stringent.

Taking into account the above therefore, it is suggested that noise limits for mechanical services plant equipment should be set with a lower threshold of 30 dB $L_{A_{r,Tr}}$. Noise levels equal to or below this threshold figure would not be expected to give rise to substantial observed effects (i.e. the impact would be low).

From the above, it can be concluded that ensuring noise emissions from a given site or activity do not exceed noise limits set at a level 5 dB above the representative background noise levels (or at the 30 dB $L_{A_{r,Tr}}$ threshold where background sound level are low) at a given receptors will provide an indication that noise adverse effect will **not** occur. Such a limit would therefore represent the LOAEL in relation to the thresholds set out within the PPG.

Consideration of Industrial Noise to New Sensitivities

When building near to an industrial/commercial source, section 8.5 of BS 4142 states that:

“Where a new noise-sensitive receptor is introduced and there is extant industrial and/or commercial sound, it ought to be recognized that the industrial and/or commercial sound forms a component of the acoustic environment. In such circumstances other guidance and criteria in addition to or alternative to this standard can also inform the appropriateness of both introducing a new noise-sensitive receptor and the extent of required noise mitigation.”

In section 11 of the BS 4142, it states that where the initial estimate of the impact needs to be modified due to the context, all relevant factors should be taken into consideration, including the following:

“1) The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.

Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night...

....The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:

i) Façade treatment;”

As detailed in clause 1 above, following the initial impact assessment, it is necessary to consider if the assessed impact should be changed due to the absolute level of the noise.

Where a given impact affects internal noise conditions it may be appropriate to install mitigation in the form of façade insulation treatment and alternative ventilation. In order to establish the required performance of this mitigation, it is necessary to consider the absolute internal noise contributions from the industrial source.

BS 8233 provides appropriate criteria for absolute noise levels from industrial noise within dwellings. This is based on the following guidance on internal noise within dwellings in BS 8233:

“This subclause applies to external noise as it affects the internal acoustic environment from sources without a specific character, previously termed “anonymous noise”. Occupants are usually more tolerant of noise without a specific character than, for example, that from neighbours which can trigger complex emotional reactions. For simplicity, only noise without character is considered in Table 4 [setting out internal ambient noise levels for dwelling]. For dwellings, the main considerations are:

- a) for bedrooms, the acoustic effect on sleep; and*
- b) for other rooms, the acoustic effect on resting, listening and communicating.*

NOTE Noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate.”

The guidance above, in particular the last paragraph, makes it clear that noise which has a specific character may require lower noise criteria than proposed for anonymous steady noise sources. Applying the acoustic character corrections set out in BS 4142 to industrial noise when considering its effects to habitable areas within dwellings and treating the criteria set out in BS 4142 as 1-hour and 15-minute rating levels for day and night time periods respectively effectively applies lower noise limits in line with BS 8233.

Paragraph 6.5.2 of BS 8233 states the following for residential developments in areas affected by industrial noise (this principle is also set out in section 2.43 of the ProPG):

“Where industrial noise affects residential or mixed residential areas, the methods for rating the noise in BS 4142 should be applied. BS 4142 describes methods for determining, at the outside of a building:

- a) noise levels from factories, industrial premises or fixed installations, or sources of an industrial nature in commercial premises; and*
- b) background noise level.”*

The quote above is explicit in stating that the methods for rating the noise in BS 4142 should be applied (i.e. deriving a rating level, L_{Ar}) and reinforces the approach set out above. It does not state that a full BS 4142 ‘assessment’ should be conducted. The reference to the background noise level relates only to a statement of the scope of BS 4142.

BS 4142 acknowledges the use of façade insulation treatment (and associated appropriate ventilation) as mitigation. In terms of ventilation, it notes that such mechanisms should be provided to reduce the need to have windows open, but it does not state that windows must be kept closed. This principle is in line with BS 8233 guidance where assessment should be considered with windows closed, but background ventilation provided.

BS 8233 directly states that BS 4142 can be used to establish the rating level from a commercial noise source. Through BS 4142, the character of the noise can be taken into account when considering noise from industrial sources to new noise sensitivity and it is not necessary to alter the numerical limits set out within BS 8233. The only change needed is to use a suitable assessment period, taken to be 1 hour during the day time and 15 minutes at night, as referenced in both BS 8233 and BS 4142.

Following on from the above and providing further commentary with regard to how noise from industrial source should be considered, the ProPG states:

“great care should be taken when considering using the noise level guidelines in Figure 2 in circumstances where industrial and/or commercial noise is present but “not dominant”. Issues that may arise include:

- Are there particular acoustic features (tones, impulses etc.) in the industrial and/or commercial noise that may increase its effect compared to sounds without such features? Are there any non-acoustic features that may also have an effect?*
- Will the time averaging over the 16 hour day or 8 hour night intervals used in Figure 2 lead to underestimation of the impacts of industrial and/or commercial noise that may occur for shorter but still substantial periods at a higher level?*

Professional judgement will have to be exercised in addressing these sorts of issues. One possible approach may be to apply BS4142:2014 character corrections to the noise level guideline values in order to derive suitable effect thresholds and/ or mitigation design targets and to use the same reference time periods recommended in the standard.

It should also be noted that the presence of industrial and/or commercial noise on the site, even if it is “not dominant”, may also raise wider issues that should be addressed under the other elements of Stage 2.”

Taking into account the above, the following assessment criteria apply when considering noise from industrial sources to habitable spaces within **new** noise sensitivities:

Table 1.4. Internal noise criteria for new dwellings when considering industrial noise sources

Activity	Location	Internal Ambient Noise Level	
		Daytime (0700-2300)	Night time (2300-0700)
Resting	Living Room	35 dB $L_{Ar,1hour}$	-
Dining	Dining room / area	40 dB $L_{Ar,1hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Ar,1hour}$	30 dB $L_{Ar,15minutes}$

