

13. NOISE

Introduction

- 13.1 This Environmental Statement (ES) Chapter for noise assesses the likely significant effects of the Proposed Development with respect to Noise, particularly the effects on the proposed and existing noise sensitive receptors. This Chapter also describes the legislative and policy framework; the methods used to assess the effects; the baseline conditions currently existing at the Application Site; the noise mitigation measures required to prevent, reduce or offset any significant negative effects; and the likely residual effects after these measures have been adopted.
- 13.2 This Chapter has been prepared by Professional Consult. In accordance with the Environmental Impact Assessment (EIA) Regulations (2017), this Chapter has been completed by Martyn Parker (BSc (Hons) & MIOA) who has over 10 years' experience in Noise and Vibration Assessments and is a Member of the Institute of Acoustics.
- 13.3 The methodology varies from Boyer approach with regards to sensitivity of receptor negligible has been included as this is in line with the Professional Practice Guidance (ProPG) on Planning and Noise and relevant British Standards.

Study Area

- 13.4 The extent of the study area has been defined to include the nearest noise sensitive receptors to the Site, which have been identified in **Table 13.4** of the Assessment. This will be included in the assessment of construction noise.
- 13.5 With regards to the change in road traffic noise levels due to the development, any increase greater than 25% of road traffic movements have been considered for the road network surrounding the development.
- 13.6 For the proposed residential development and noise sources that are audible at the redline boundary of the Site, these have been included in the assessment and includes for road, rail and commercial sound.

Legislative Planning Policy Framework

National Planning Policy Framework

- 13.7 Published in 2021, the revised National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these are expected to be applied. The Government updated the National Planning Policy Framework (NPPF) on 19th December 2023 and its associated National Planning Practice Guidance (NPPG) on 24th June 2023. Together, the NPPF and NPPG set out what the Government expects of local authorities. The overall aim is to ensure the planning system allows land to be used for new homes and jobs, while protecting valuable natural and historic environments.

- 13.8 Reference to noise is made in paragraphs 175, 185 and 186 of the NPPF which state that:

174. 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 ...noise pollution.

185. 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.*

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

- 13.9 Reference is made in the NPPF to the Department for Environment, Food and Rural Affairs (DEFRA) 2010 Noise Policy Statement for England (NPSfE).
- 13.10 The NPSfE is intended to apply to all forms of noise other than that which occurs in the workplace, and includes environmental noise and neighbourhood noise in all forms.
- 13.11 The NPSfE advises that the effect of noise should be assessed on the basis of negative and significant negative effect, but does not provide any specific guidance on assessment methods or limit sound levels.
- 13.12 This lack of numeric limit sound levels is a direct consequence of the advice also contained in the NPSfE which is that it is not possible to have 'a single objective noise-based measure that is applicable to all sources of noise in all situations.'
- 13.13 It further advises that the sound level at which a negative effect occurs is 'likely to be different for different noise sources, for different receptors and at different times.' In the absence of specific guidance within the NPPF and NPSfE for the assessment of

environmental noise, it is considered appropriate to base assessment on LPA requirements, current British Standards and national and international guidance (as described later in this Chapter). However, one noteworthy advisory point in the NPSfE is the need to place into context any general requirements that increases in ambient noise should be 'minimised'. In this regard the NPSfE states:

'Of course, taken in isolation and to a literal extreme, noise minimisation would mean no noise at all. In reality, although it has not always been stated, the aim has tended to be to minimise noise as far as is reasonably practical... the application of the NPSE should enable noise to be considered alongside other relevant issues and not to be considered in isolation. In the past, the wider benefits of a particular policy, development or other activity may not have been given adequate weight when assessing the noise implications.'

Planning Practice Guidance

- 13.14 Reference is made in the NPPF to the Department for Environment, Food and Rural Affairs (DEFRA) 2010 Noise Policy Statement for England (NPSfE).

'Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment.'

- 13.15 The NPPG provides advice regarding how to determine the impact of noise, including whether or not a significant adverse effect or adverse effect is occurring or likely to occur and whether or not a good standard of amenity can be achieved.

- 13.16 It provides more descriptive detail for the definitions of No Observed Effect Level (NOEL), Lowest Observed Adverse Effect Level (LOAEL) and Significant Observed Adverse Effect Level (SOAEL) than the NPSE, but does not specify numerical values.

- 13.17 The Observed Effect Levels are as follows:

SOAEL: This is the level of noise exposure above which adverse effects on health and quality of life occur.

LOAEL: This is the level of noise exposure above which adverse effects on health and quality of life can be detected.

NOEL: This is the level of noise exposure below which no effect at all on health or quality of life can be detected.

- 13.18 Relevant experience and professional judgment are fundamental to all stages of the assessment that leads to the determination of the significance of a noise effect. The non-numeric guidance contained within the NPPG, based upon the initial advice in the Noise Policy Statement, is summarised in **Table 13.1** below.

Table 13.1 – Noise Exposure Hierarchy

Perception	Example of Outcomes	Increasing Effect Level	Action
Noticeable and not intrusive	Noise can be heard but does not cause any changes in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No observed effect	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, 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 perceived change in the quality of life.	Observed adverse effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable adverse effect	Prevent

- 13.19 The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation. The PPG advises that these factors include:

‘The source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause greater adverse effect at night if they occurred during the day – this is because people tend to be more sensitive to noise at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night;

For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise; and

The spectral content of the noise and the general character of the noise. The local topology and topography should also be taken into account along with the existing and, where appropriate, the planned character of the area.'

13.20 And that more specific factors to consider when relevant are:

'Where applicable, the cumulative impacts of more than one source should be taken into account along with the extent to which the source of noise is intermittent and of limited duration;

Consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations; and

If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those.

Local Planning Policy

13.21 Wokingham Borough Council Development Plan currently includes the following documents:

Wokingham Borough Core Strategy DPD (January 2010);

Managing Development Delivery Local Plan (February 2014);

South East Plan Policy NRM6 (2010);

Emerging Draft Local Plan Update (2021); and

Adopted Supplementary Planning Documents, including:

South Wokingham SDL SPD (October 2011);

Infrastructure Delivery and Contributions SPD (October 2011);

Sustainable Design and Construction SPD (May 2010) and its Companion to Sustainable Design and Construction SPD document (May 2010);

Affordable Housing SPD (July 2013); and

Borough Design Guide SPD (May 2012).

Construction Noise

British Standard BS5228: Noise and Vibration Control on Construction and Open Sites Part 1: Noise 2009+A1 2014 (BS 5228-1)

13.22 BS 5228-1: 2009 sets out techniques required to predict and assess the likely noise effects from construction works, based on detailed information on the type and number of plant being used, their location, and the length of time they are in operation. The noise prediction

method is used to establish likely noise levels in terms of the $L_{Aeq,T}$ over the core working day.

- 13.23 BS 5228-1: 2009 also documents a database of information, comprising previously measured sound power levels for a variety of different construction plant undertaking various common activities. Example criteria are presented for the assessment of the significance of noise effects. Such criteria may be concerned with fixed noise limits and/or ambient noise level changes. With respect to fixed noise limits, BS 5228-1 presents the following noise limits which are taken as an average over a 10-hour working day:

Significant 70.0dB(A) in rural, suburban and urban areas away from main road traffic and industrial noise; and

75.0dB (A) in urban areas near main roads and heavy industrial areas.

Operational Noise

British Standard BS8233:2014 Guidance on sound insulation and noise reduction for buildings (BS8233)

- 13.24 The scope of this standard is the provision of recommendations for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new buildings or refurbished buildings undergoing a change of use, rather than to assess the effect of changes in the external noise climate. The standard suggests suitable internal noise levels within different types of buildings, including dwellings, as shown in **Table 13.2**:

Table 13.2 – BS8233 Recommended Internal Noise Level

Criterion	Typical Situation	Design $L_{Aeq,T}$ (dB)
Suitable resting/sleeping conditions	Living Room	35
	Bedroom	30
For a reasonable standard in bedrooms at night, individual noise events (measured with fast time weighting) should not exceed 45dB $L_{Amax,fast}$		

- 13.25 BS8233:2014 goes on to recommend noise levels for gardens:

“It is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$, with an upper guideline value of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited”.

Ventilation Requirements

- 13.26 Where a partially open window cannot be relied upon to provide an adequate level of facade sound insulation performance, it is necessary to consider alternative ventilation for habitable rooms. Section 8.4.5.4 within BS8233:2014 states:

'The Building Regulations' supporting documents on ventilation [48, 49, 50] recommend that habitable rooms in dwellings have background ventilation. Where openable windows cannot be relied upon for this ventilation, trickle ventilators can be used and sound attenuating types are available. However, windows may remain openable for rapid or purge ventilation, or at the occupant's choice.

Alternatively, acoustic ventilation units (see 7.7.2 below) are available for insertion in external walls. These can provide sound reduction comparable with double glazed windows. However, ducted systems with intakes on the quiet side of the building might be required in very noisy situations, or where appearance rules out through-the-wall fans.'

- 13.27 Section 7.7.2 states:

'NOTE 5 If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.'

Professional Practice Guidance on Planning & Noise 2017

- 13.28 Professional Practice Guidance (ProPG) on Planning and Noise has been produced to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England. The guidance encourages better acoustic design for new residential development and aims to protect people from the harmful effects of noise. It aims to complement Government planning and noise policy and guidance. In particular, it strives to:

Significant Advocate full consideration of the acoustic environment from the earliest possible stage of the development control process;

Encourage the process of good acoustic design in and around new residential developments;

Outline what should be taken into account in deciding planning applications for new noise-sensitive developments;

Improve understanding of how to determine the extent of potential noise impact and effect; and

Assist the delivery of sustainable development.

- 13.29 ProPG advocates a systematic, proportionate, risk based, 2-stage, approach. The approach encourages early consideration of noise issues, facilitates straightforward accelerated decision making for lower risk sites, and assists proper consideration of noise issues where the acoustic environment is challenging. The two sequential stages of the overall approach are:

- a. Stage 1 – an initial noise risk assessment of the Proposed Development Site.

It is important that the assessment of noise risk at a proposed residential development site is not the basis for the eventual recommendation to the decision maker. The recommended approach is intended to give an early indication of the likely initial suitability of the site for new residential development from a noise perspective and the extent of the acoustic issues that would be faced.

- b. Stage 2 – a systematic consideration of four key elements:

Element 1 – Demonstrating a “Good Acoustic Design Process”

It is imperative that acoustic design is considered at an early stage of the development control process. A good acoustic design process takes a multi-faceted and integrated approach to achieve optimal acoustic conditions, both internally and externally. Good acoustic design should avoid “unreasonable” acoustic conditions and prevent “unacceptable” acoustic conditions.

Element 2 – observing internal “Noise Level Guidelines”

Table 13.3 – ProPG Internal Noise Level Guidelines (additions to BS8233:2014 show in bold)

Activity	Location	07:00 – 23:00 Hours	23:00 – 07:00 Hours
Resting	Living room	35dB LAeq,16hr	No specific measures required
Dining	Dining room/area	40dB LAeq,16hr	Dining
Sleeping (daytime resting)	Bedroom	35dB LAeq,16hr	30dB LAeq 8hr 45dB L _{Amax} , Fast ⁴

NOTE 1 The Table provides recommended internal L_{Aeq} target levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Ground-borne noise is assessed separately and is not included as part of these targets, as human response to ground-borne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.

NOTE 2 The **internal L_{Aeq} target** levels shown in the Table are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a Road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the **internal L_{Aeq} target** levels recommended in the Table.

NOTE 3 These **internal L_{Aeq} target** levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year’s Eve.

NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax, F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. **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 Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. 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 6 Attention is drawn to the requirements of the Building Regulations.

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.**

Element 3 – Undertaking an “External Amenity Area Noise Assessment”

Advice in BS8233:2014 provides the following:

If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended. 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.'

Where, despite following a good acoustic design process, significant adverse noise impacts remain on any private external amenity space then that impact may be partially off-set if the residents are provided, through the design of the development or the planning process, with access to:

Stage 1 – an initial noise risk assessment of the Proposed Development site a relatively quiet façade or a relatively quiet externally ventilated as part of their dwelling; and/or

a relatively quiet alternative or additional external amenity space for sole use by a household; and/or

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, publicly accessible, external amenity space that is nearby.

Element 4 – Consideration of “Other Relevant Issues”

compliance with relevant national and local policy;

magnitude and extent of compliance with ProPG;

likely occupants of the development;

acoustic design v unintended adverse consequences; and

acoustic design v wider planning objectives.

- 13.30 Following the above stages, including the initial site risk assessment and full assessment, a recommendation to the decision maker is determined as follows:

Grant without noise conditions; or

Grant with noise conditions; or

Avoid (significant adverse effects); or

Prevent (unacceptable adverse effects).

World Health Organisation (WHO) Guidelines for Community Noise

- 13.31 Section 7.7.2 states: The WHO gives guidance on desirable levels of environmental noise. The levels presented in the WHO Community Guidelines are those at which adverse effects become measurable. The 1980 WHO document suggested that ‘general daytime outdoor noise levels of less than 55dB(A) $L_{Aeq,16hr}$ are desirable to prevent any significant community annoyance’ This level is an external free-field noise level. The 1980 document also stated in relation to internal levels ‘that night-time noise levels of 35dB(A) $L_{eq,8hr}$ or less will not interfere with the restorative process of sleep.’

13.32 A report was submitted to the WHO in 1995 for consideration as a revision to the 1980 document and revised community guidelines were issued in 2000. In the 2000 guidelines, it is considered that the sleep disturbance criteria should be taken as an internal noise level of 30dB $L_{Aeq,8hr}$ or an external level of 45dB $L_{Aeq,8hr}$. It also recommends that internal L_{Amax} levels of 45dB and external L_{Amax} levels of 60dB should be limited where possible.

13.33 The 2000 WHO document also states that 'To protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55dB $L_{Aeq,16hr}$ for a steady continuous noise.' i.e. the daytime levels effectively remain unchanged.

Design Manual for Roads & Bridges (DMRB)

13.34 The Highways Agency's DMRB (Volume 11, Section 3, Part 7 – Noise and Vibration) provides a method for evaluating both the immediate and long-term noise effects on receptors of changes in traffic flows on public highways, assessed using 18-hour traffic flow (06:00 – 24:00) data.

13.35 British Standard BS4142:2014+A1:2019: Methods for rating and assessing industrial and commercial Sound

13.36 BS4142:2014 describes methods for rating and assessing sound of an industrial or commercial nature which includes:

Significant Sound from industrial and manufacturing processes;

Sound from fixed installations which comprise mechanical and electrical plant and equipment;

Sound from the loading and unloading of goods and materials at industrial and / or commercial premises; and,

Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from processes or premises, such as that from forklift trucks, or that from train or ship movements on or around an industrial or commercial site.

13.37 The procedure detailed in the standard compares the measured or predicted noise level 'the specific noise level' from any of the above detailed noise sources with the background sound level at a residential dwelling. The measured background sound level at a receptor should be reliable and should not necessarily ascertain a lowest measured background sound level, but rather to quantify what is typical.'

13.38 The specific noise level also acknowledges the following reference time intervals depending upon whether the noise source operates during daytime or night-time periods:

Daytime (07:00 – 23:00): 1 hr; and

Night-time (23:00 – 07:00): 15 minutes.

- 13.39 There are a number of 'penalties' which can be attributed to the specific sound level depending upon the 'acoustic features' of the sound level under investigation. These penalties vary in their weighting depending upon the severity of the acoustic feature, as follows:

Tonality

- +2dB: where the tonality is just perceptible;
- +4dB: where the tonality is clearly perceptible; and,
- +6dB: where the tonality is highly perceptible.

Impulsivity

- +3dB: where the impulsivity is just perceptible;
- +6dB: where the impulsivity is clearly perceptible; and,
- +9dB: where the impulsivity is highly perceptible.

Intermittency

- +3dB: where the intermittency is just perceptible.

- 13.40 Where the assessment is carried out using the objective method, the tonality penalty is either 0dB or 6dB and the impulsivity penalty can range from 0dB up to 9dB in increments of 1dB, depending on the level of impulsivity identified.
- 13.41 In addition to the above acoustic features, there is a penalty for 'other sound characteristics' of +3dB where a sound exhibits characteristics that are neither tonal nor impulsive, though is readily distinctive against the acoustic environment.
- 13.42 BS4142 goes on to state that the rating level is equal to the specific sound level if there are no such features present or expected to be present.
- 13.43 Assessment of the rating level relative to the background noise level can yield the following commentary:

Typically, the greater this difference (between the rating level and the background sound level), the greater the magnitude of impact;

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

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

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. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

- 13.44 Whilst the amended 2019 Standard does make various references to it not being intended to assess noise impacts at indoor locations, section 1.1 does state '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'. Example 6 in the Standard states 'In addition to the rating/background sound level comparison shown in Table A.6, the primary concern is the potential for disturbance of residents who could be sleeping with open bedroom windows. Other guidance, such as BS 8233, might also be applicable in this instance'.
- 13.45 With the above in mind, and for a clear need to ensure that any potential commercial or industrial noise impacts at the building façade do not give rise to internal noise level which causes sleep disturbance in bedrooms, this Assessment will ensure that the predicted rating level (specific sound level including any character corrections) does not exceed 30dB in bedrooms.

Assessment Methodology

- 13.46 The key considerations in relation to the noise assessment are as follows:
- Identification of existing noise sensitive receptors adjacent to the Site and relevant highways;
 - The baseline noise conditions in the study area;
 - Identification of the significant sources of noise within the vicinity of the study area;
 - Acoustic modelling of terrestrial noise sources to predict likely noise levels across the Site;
 - Assessment of the predicted noise levels against relevant standards and guidance including British Standard (BS) 8233, BS 4142 and World Health Organisation (WHO) Community Noise amongst others;
 - The assessment under the above standards and guidance amongst others will determine the significance of any effect; and
 - Suitability of the Site for proposed noise sensitive uses.
- 13.47 The effects of noise during the construction phase will be assessed qualitatively in accordance with the British Standard 5228-1:2009+A1:2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise'. The focus will be on mitigation measures to be included in a Construction Environmental Management Plan (CEMP).
- 13.48 Due to the nature of the Development, there are not expected to be any significant sources of vibration, and therefore this topic has been scoped out of the ES. The Site is not subject to any existing sources of vibration that could have amenity implications. Nevertheless, good site practice during construction would also be undertaken in line with the CEMP.
- 13.49 The change in noise levels resulting from additional traffic flows associated with the Development will be evaluated. The magnitude of the impact will then be assessed in

accordance with guidance contained in Design Manual for Roads and Bridges LA111 Noise and Vibration.

- 13.50 Site suitability for residential development will be assessed in accordance with the NPPF, and the associated PPG and the Noise Policy Statement for England. British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' is the appropriate standard for the design of new dwellings.
- 13.51 British Standard 4142:2014+A1:2019 is the appropriate standard for assessing any commercial noise impacts associated with any mechanical associated with the commercial use upon the closest existing and proposed dwellings.

Potential Impacts

- 13.52 The potential noise impacts that have been considered in this assessment are summarised below:

Construction Phase

Direct construction noise at existing local and proposed sensitive receptors from construction activities; and

Increase in indirect construction noise at existing local and proposed noise-sensitive receptors from construction traffic.

Operational Phase

Changes in road traffic noise levels associated with the Development on existing local noise-sensitive receptors; and

The noise levels generated by the existing nearby road network and future road infrastructure delivered as part of the Development on future receptors within the Development.

Road and Rail Traffic Noise Impact Upon Proposed Receptors

- 13.53 During the baseline noise survey, it was noted that noise generated by road and rail traffic dominated the noise climate across the Site.
- 13.54 For the assessment of internal noise levels, the BS8233:2014 30dB $L_{Aeq,8hr}$ and 45dB L_{AFmax} applicable to bedrooms and 35dB $L_{Aeq,16hr}$ applicable to living rooms have been adopted for the night-time and daytime periods respectively. Where these criteria are exceeded, without mitigation in place, a moderate to major adverse impact will be observed depending on the level of exceedance.
- 13.55 For external amenity areas, such as gardens, the BS8233 lower upper value of 55dB $L_{Aeq,16hr}$ will be aimed for.

Impact of Proposed Commercial at proposed and existing receptors

- 13.56 Impact of any proposed commercial sound such as fixed plant associated with the commercial development will be assessed at the proposed and existing receptors against the criteria presented in BS4142.

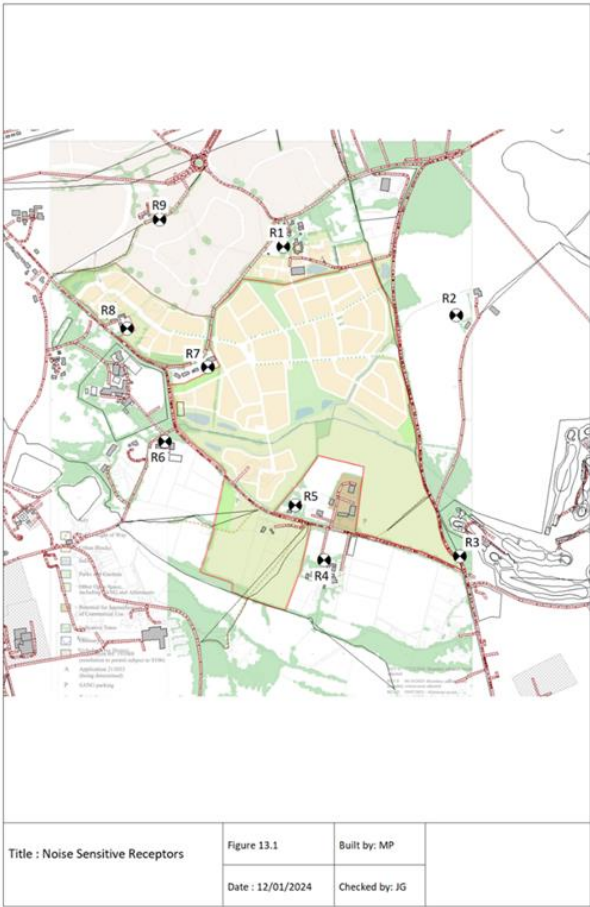
Impact of Existing Commercial at proposed receptors

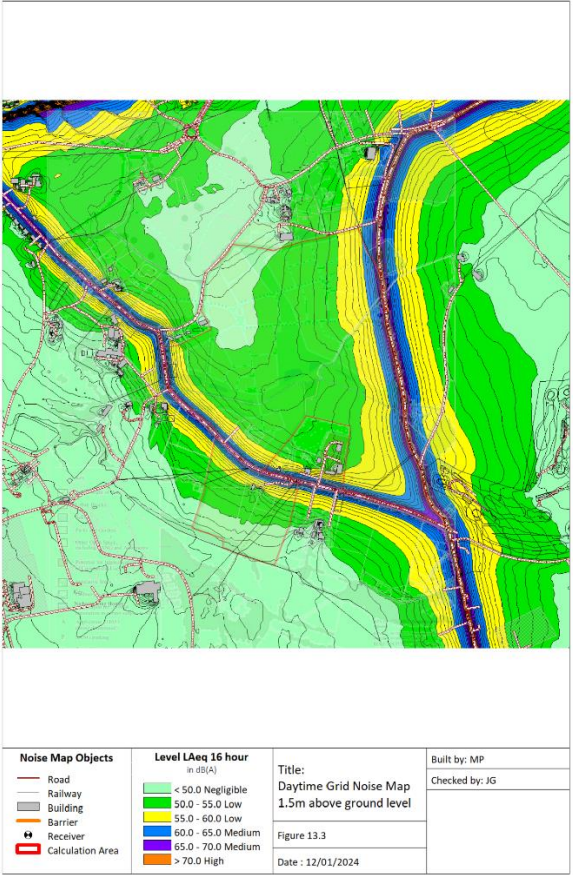
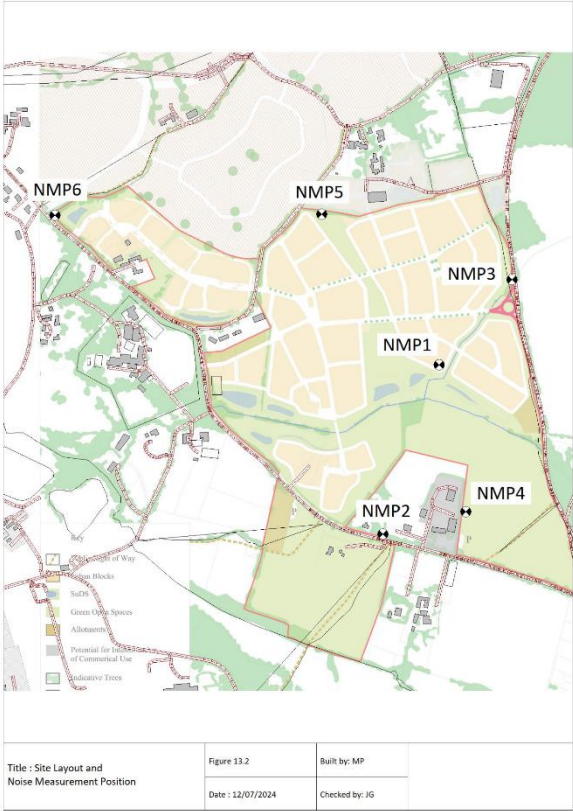
- 13.57 The Impact from any sound associated with the commercial unit to the south, which includes mobile and fixed plant, will be assessed at the nearest proposed receptors. For the Assessment, the guidance presented in BS4142:2014 will be used to assess any commercial-type noise sources.

Receptor

- 13.58 The existing noise sensitive receptors that have been considered in this assessment with regards to the construction and operational impacts of the Development, are listed in **Table 13.4. Figure 13.1 in Appendix 13.** shows the location of the receptors.

Figure 13.1 – Noise sensitive Receptors





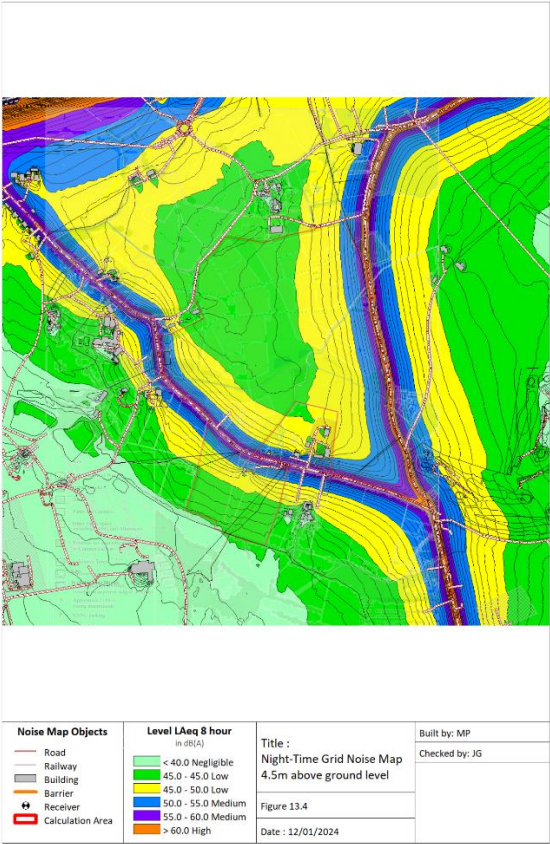


Table 13.4 – Noise Sensitive Receptors

Receptor	Location	X	Y
R1	The Barn House	483393.1	167595.95
R2	Park View Farm	483862.14	167437.59
R3	Robins Roast	483873.72	166661.79
R4	Suttin Court Farm	483436.6	166647.55
R5	Six Oaks and Priors Farm	483344.7	166824.93
R6	Meadows Farm	482924.84	167030.14
R7	Willow Bank and Sutton House	483063.87	167270.91
R8	Pearce's Farm	482803.95	167395.41
R9	Britton's Farm	482907.54	167745.69

- 13.59 The sensitivity of local receptors depends upon their nature. Where the sensitivity of a receptor is greater, identified impacts could be more significant, and vice versa. For instance, it is commonly considered that heavy industrial installations are not particularly sensitive to noise whilst residential dwellings are. Between these two receptor types are other locations and places of work such as offices.
- 13.60 In determining the significance criteria, it is necessary to consider the sensitivity of the receptor in conjunction with the predicted noise levels / level changes. **Table 13.5** presents the criteria used to define the sensitivity of receptors in relation to noise impacts.

Table 13.5 – Criteria Used to Describe Sensitivity of Receptors

Sensitivity	Description	Example Receptor
High	Receptors where people or operations are particularly sensitive to noise	Internal and external living areas associated with residential dwellings, quiet outdoor areas used for recreation, conference facilities, auditoria/studios, schools in the daytime, hospitals/residential care homes
Medium	Receptors moderately sensitive to noise where it may cause some distraction or disturbance	Offices, community facilities, scheduled Ancient Monuments/Listed Buildings
Low	Receptors with a low sensitivity to noise where it may in extreme cases cause some disturbance	Restaurants, commercial Installations

Sensitivity	Description	Example Receptor
Negligible	Receptors where distraction or disturbance from noise is minimal	Factories, storage centres, Industrial sites

Baseline Conditions

- 13.61 The primary noise sources with potential to impact upon the Site are the roads which are running to the east of the site and Easthampstead Road to the south. These would be quantified by the following surveys, some of which have been undertaken to date:

Noise Measurement Position 1 (NMP1): An Ambient and Background sound survey has been completed over a full weekday and weekend period. The measurement location was at the centre of the Site and the sound climate consisted of distant road traffic;

Noise Measurement Position 2 (NMP2): Omnia undertook a Road Traffic Measurement of Easthampton Road approximately 3.7m away from the nearest kerbside in accordance with CRTN. The microphone was located at a height of 1.5m.

Noise Measurement Position 3 (NMP3): Omnia undertook a Road Traffic Measurement of Old Wokingham Road approximately 3.5m away from the nearest kerbside in accordance with CRTN. The microphone was located at a height of 1.5m.;

Noise Measurement Position 4 (NMP4): Approximately 35m away from the yard area to the south at a height of 1.5m and at a distance of 3m from the commercial boundary. Noise sources at this location consisted of engine noise drilling and banging from the workshop;

Noise Measurement Position 5 (NMP5): Omnia undertook a Rail Traffic Measurement of the railway line to the north adjacent to the line, from the public walkway, in accordance with CRN. The Microphone was located at a height of 1.5m approximately 600m from the railway line; and

Noise Measurement Position 6 (NMP6): Omnia undertook a Road Traffic Measurement of Easthampton Road approximately 4m away from the nearest kerbside in accordance with CRTN. The microphone was located at a height of 1.5m.

- 13.62 **Figure 13.2 of Appendix 13** shows the location of the Noise Measurement Positions. The below tables summarise the baseline noise conditions at the development.

Table 13.6 – Background Sound Survey Data NMP1

Date	Mode Measured Sound Pressure Level Free-Field $L_{A90,15min}$ (dB) Daytime	Mode Measured Sound Pressure Level Free-Field $L_{A90,15min}$ (dB) Night-Time	Weather Summary
07/07/2022	41	30	Low wind speeds and dry weather conditions

Date	Mode Measured Sound Pressure Level Free-Field $L_{A90,15min}$ (dB) Daytime	Mode Measured Sound Pressure Level Free-Field $L_{A90,15min}$ (dB) Night-Time	Weather Summary
08/07/2022	42	40	Low wind speeds and dry weather conditions
09/07/2022	40	34	Low wind speeds and dry weather conditions
10/07/2022	35	34	Low wind speeds and dry weather conditions
Overall	42	34	

Table 13.7 – Road Traffic Sound Survey Data – Easthampton Road - NMP2

Period Start Time	Average Measured Sound Pressure Levels, Free-Field (dB) $L_{Aeq,T}$	Average Measured Sound Pressure Levels, Free-Field (dB) $L_{A10,T}$	10 th Highest $L_{Amax,fast}$
07/07/2022 10:00	64.4	69.9	72.6
07/07/2022 11:00	64.6	70	
07/07/2022 12:00	64.5	69.8	
$L_{Aeq,16hr}$ as calculated from CRTN		66.9	
$L_{Aeq,8hr}$ as calculated from CRTN and TRL Document		58.2	

Table 13.8 – Road Traffic Sound Survey Data – Old Wokingham Road – NMP3

Period Start Time	Average Measured Sound Pressure Levels, Free-Field (dB) $L_{Aeq,T}$	Average Measured Sound Pressure Levels, Free-Field (dB) $L_{A10,T}$	10 th Highest $L_{Amax,fast}$
07/07/2022 11:00	69.2	74	75.4

Period Start Time	Average Measured Sound Pressure Levels, Free-Field (dB) $L_{Aeq,T}$	Average Measured Sound Pressure Levels, Free-Field (dB) $L_{A10,T}$	10 th Highest $L_{Amax,fast}$
07/07/2022 12:00	69.3	73.9	
07/07/2022 13:00	69.2	73.9	
$L_{Aeq,16hr}$ as calculated from CRTN		70.9	
$L_{Aeq,8hr}$ as calculated from CRTN and TRL Document		61.8	

Table 13.9 – Existing Commercial Noise Data NMP4

Sources	Distance from NoiseSource (m)	Measured on Time (mm:ss) within the 1 hour daytime reference period	Measured Specific Sound Pressure Level L _{Aeq 1hr} (dB)
Engine noise	35	41 minutes	46.3
Drilling		1 minute 20 seconds	33.6
Banging		5 minutes 40 seconds	41.5
Total worst-case with all commercial noise added is 47.7dBA			

Table 13.10 – Rail Traffic Sound Survey Data – NMP5

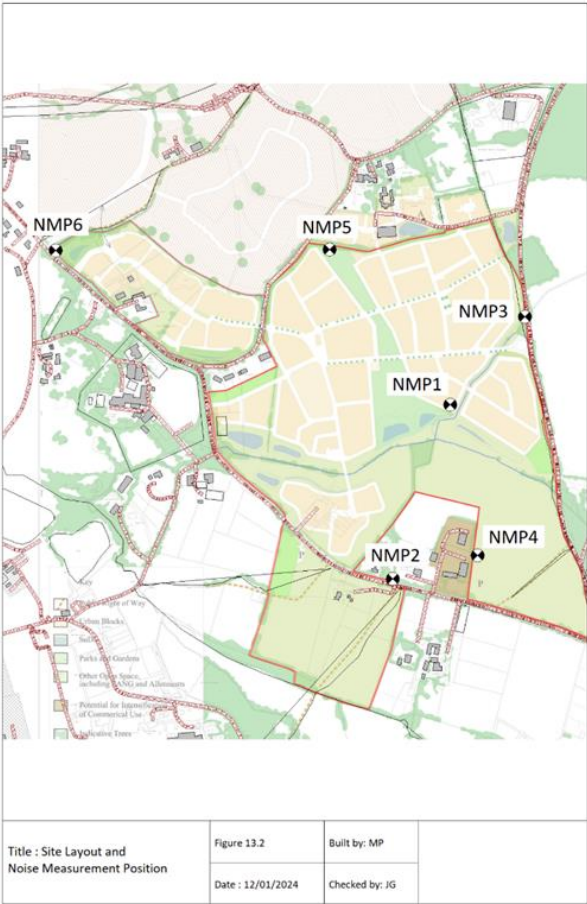
Parameter	Passenger Daytime (07:00 – 23:00)	Passenger Night-Time (23:00 – 07:00)
Timetabled Number of Trains	142	32
Number of Train Pass-Bys Measured	16	
Measured $L_{Amax,f}$ (dBA)	86.1	
Calculated SEL of One Train (dBA)	65.3	
Calculated SEL of all Trains per Period (dBA)	86.8	80

Parameter	Passenger Daytime (07:00 – 23:00)	Passenger Night-Time (23:00 – 07:00)
Resultant L_{Aeq} per Period (dBA)	39.2	35.7
Total Daytime L_{Aeq} 16hr (dBA):	39.2	
Total Night time L_{Aeq} 8hr (dBA):	35.7	

Table 13.11 – Road Traffic Sound Survey Data – Easthampton Road – NMP6

Period Start Time	Average Measured Sound Pressure Levels, Free-Field (dB) L _{Aeq,T}	Average Measured Sound Pressure Levels, Free-Field (dB) L _{A10,T}	10 th Highest L _{Amax,fast}
07/07/2022 10:00	69.4	73.8	87.4
07/07/2022 11:00	69.9	74.0	
07/07/2022 12:00	69.6	73.1	
L _{Aeq,16hr} as calculated from CRTN		70.6	
L _{Aeq,8hr} as calculated from CRTN and TRL Document		61.6	

Figure 13.2 – Site Layout and Noise Measurement Position



Summary of Baseline Conditions

13.63 The existing baseline conditions are currently dominated by road traffic sound from vehicles on the surrounding road network. **Figures 13.7 and 13.11** show the current noise levels at the development due to transportation sound.

Assessment of Effects

Significance Threshold

Construction Noise Significance Criteria

- 13.64 With respect to hours of work, BS5228 refers to the fact that noise levels generated during the evening (19:00 to 23:00 h) may need to be lower than the daytime (07:00 to 19:00 h) period (a figure of 10dB is quoted) and also that for any night-time operations (23:00 to 07:00 h) levels should be quieter still. The Standard does not, however, offer guidelines with respect to acceptable levels.
- 13.65 Following the fixed noise level limits presented in BS 5228-1 for urban areas and regions close to main road traffic, where it is calculated that construction noise levels will exceed 75dB LAeq,T (facade) applicable to the core working day, it is considered that a noise impact of between ‘moderate’ and ‘major’ magnitude could arise depending on the level of exceedance

(**Table 13.12**). Noise levels which are calculated to fall below this criterion are considered to give rise to a 'minor' magnitude of impact but of temporary nature. An exceedance of less than 3dB is considered minor, an exceedance of more than 3dB is considered moderate and more than 5dB is considered major.

Table 13.12 – Construction Noise Magnitude of Impact

Noise Level Change $L_{Aeq,T}$ (dB)	Magnitude of Impact
Below 75dB	Minor
+3dB above Criteria	Moderate
5.0+	Major

Completed Development Significance Criteria

Road Traffic Noise Impact Upon Existing Receptors

- 13.66 The assessment of noise impact due to changes in road traffic has been undertaken drawing upon the suggested classification of effect provided within the DMRB. The DMRB classification of effects has been adapted to produce a set of magnitude criteria ranging from no effect to major as presented within **Table 13.13** for the short term and **Table 13.14** for the long term.

Table 13.13 – Classification of Magnitude of Noise Impact for Comparison for Future Noise against Existing Noise – Short Term

Noise Level Change $L_{A10,18hr}$ (dB)	Magnitude of Impact
0	No Effect
0.1 – 0.9	Negligible
1.0 – 2.9	Minor
3.0 – 4.9	Moderate
+5	Major

Table 13.14 – Classification of Magnitude of Noise Impact for Comparison for Future Noise against Existing Noise – Long Term

Noise Level Change $L_{A10,18hr}$ (dB)	Magnitude of Impact
0	No Effect
0.1 – 2.9	Negligible
3.0 – 4.9	Minor
5.0 – 9.9	Moderate
+10	Major

- 13.67 Any impact of moderate adverse and over, in the short term, is considered significant and any change categorised as minor, or more is considered significant in the long term.

Commercial Noise Impact upon Proposed & Existing Development

- 13.68 There is potential for noise with the proposed operation of M&E plant associated with the proposed commercial to impact upon existing and future noise sensitive receptors. At this stage, however, the precise details of any M&E plant associated with the proposed commercial area are unknown. Accordingly, potential adverse effects due to mechanical plant will be controlled via condition, and plant noise emission limits based on the existing measured background noise levels in accordance with BS 4142:2014 'Methods for rating and assessing industrial and commercial sound'.
- 13.69 The assessment of future noise generated the proposed commercial use has been undertaken drawing upon the guidance contained within BS4142. The difference between the measured background sound level and the calculated rating level has been assessed in accordance with the following:

Typically, the greater this difference (between the rating and the background), the greater the magnitude of impact;

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

A difference of +5dB is likely to be an indication of an adverse impact, depending on the context; and

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. Where the rating level does not exceed the background sound level, this is an indication of specific sound source having a low impact.

Table 13.15 – Magnitude of Impact for Fixed Plant and Commercial

Rating Level Relative to the Background Sound Level $L_{A10,18hr}$ (dB)	Magnitude of Impact
More than 5dB Below	No Effect
Equal	Negligible
Up to 3dB above	Minor
5dB above	Moderate
10dB above	Major

- 13.70 The significance of noise impacts has been assessed against the magnitude of change and sensitivity of the receptor according to the impact matrix presented in **Table 13.16**. The significance of the impact is dependent on the context and nature of the noise and will be approached individually for each assessment/source. The effects can be beneficial as well as adverse on the receptors.

13.71 With Reference to the NPPF, NPSE and PPGN, significance is determined as follows:

Effects of Major significance are significant in EIA terms, commensurate with the UAEL and should be prevented and require mitigation;

Effects of Moderate significant are significant in EIA terms, commensurate with the SOAEL and should be avoided and require mitigation;

Effects of Minor significance are not significant in EIA terms, commensurate with the LOAEL and should be mitigated and reduced to a minimum as far as reasonably practicable; and

Effects of Negligible significance are not significant in EIA terms, commensurate with the NOEL with no specific requirements for mitigation.

Table 13.6 – Matrix for Determining Significance of Effects

		Sensitivity of Receptor / Receiving Environment to Change / Effect			
		High	Medium	Low	Negligible
Magnitude of change / effect	Major	Major	Major	Moderate	Minor
	Moderate	Major	Moderate	Minor	Negligible
	Minor	Moderate	Minor	Negligible	Negligible
	Negligible	Minor	Negligible	Negligible	Negligible

Construction Phase

Direct Construction Noise

- 13.72 It is inevitable with any major development that there will be some disturbance caused to those nearby during the clearance, earthworks and construction phases. However, disruption due to construction is only temporary, limited to the Site and is considered to be of medium-term duration.
- 13.73 The construction of the Development will take place on a phased basis and therefore the assessment of construction effects will be assessed on a phase by phase basis. It would be expected that noise would be intermittent and would decrease in intensity over the duration of the construction period.
- 13.74 The prediction has followed the methodology contained within BS 5228-1, in terms of the $L_{Aeq,T}$ over the core working day, which is 08:00 to 18:00 hours Monday to Friday and 08:00

to 13:00 Saturdays. The prediction assumes all plant is located at the approximate centre of the Site, to represent an average case scenario.

- 13.75 **Table 13.17** sets out the typical plant type, number and assumed utilisation (percentage on-time') used in the prediction of noise levels during the key construction activities. It is assumed that this would be the same across all three phases of construction.

Table 13.17 – Assumed Construction Plant Details

Plant Type	Sound Pressure Level at 10m	No of Plant	Assumed 'on time'
Tracked/Wheeled 360-degree excavators	79	2	70
Dumpers	77	2	70
Mobile Cranes	77	1	40
Hand Power tools including beakers	85	1	40
Power tools including drills, cutting disks, pipe threaders	85	1	40
Delivery Trucks	80	2	60
Skip Trucks	80	2	60
Forklift trucks	88	2	40
Ready-mix concrete wagons	67	1	40
Ready-mix concrete wagons and pumps	80	1	40
Diesel Generator	61	1	100

- 13.76 Predictions have been carried out to determine noise levels likely to be generated during the construction phase. For the purpose of these predictions, it was assumed that the intervening ground between the construction noise sources and the receivers will be acoustically hard such that there will be no additional attenuation of sound due to ground absorption, and that no acoustic barriers such as local buildings will be present, thus informing a worst-case assessment.
- 13.77 Noise predictions have been undertaken for the four off site noise sensitive receptors R1 to R9.
- 13.78 **Table 13.18** below sets out the average predicted unmitigated construction noise levels for the Proposed Development. A 75dB assessment criterion has been adopted in accordance

with guidance contained in BS5228 for urban areas. Any exceedances are highlighted in bold.

- 13.79 The average assessments are based on the average position to the centre of the closest proposed phase/development plot to that receptor. Any works that take place closer to the receptor will be for a short period and an average, central position is considered robust.
- 13.80 In addition, the worst-case level representing works being carried out along the site boundary.

Table 13.18 – Predicted Unmitigated Average and Worst-Case Construction Noise Levels, LAeq,10hr

Receptor	Average Construction Noise Levels LAeq,10hr (dB)	Worst Case Construction Noise Levels LAeq,10hr (dB)
R1	61.1	68.7
R2	59.5	64.1
R3	56	57.9
R4	60.8	63
R5	67.1	75.4
R6	61.4	69.4
R7	67.4	81.4
R8	57.9	63
R9	56.1	60.3

- 13.81 A review of **Table 13.18** identifies that the calculated unmitigated construction noise level is not exceeded at receptors R1-R9 based on the average construction noise levels.
- 13.82 However, the worst-case construction noise levels exceed the criterion for all receptors apart from R5 and R8. Nevertheless, for the majority of the time it is expected that a situation reflective of the average case will be applicable.
- 13.83 It should be noted that these predictions are worst case in that it is assumed that any mitigation measures, or screening afforded by site hoardings have not been implemented. Furthermore, it should be noted that it is unlikely that construction activities are to be conducted on the sections of the site closest to each of the identified receptors for significant periods of time. For the majority of the construction phase it is expected that activities will be conducted at greater distances from the receptors.
- 13.84 The sensitivity of receptors R1 – R9 are categorised as high and the magnitude of impact is categorised as moderate. Accordingly, there is predicted to be an adverse temporary short-term impact categorised as major to moderate significance prior to the implementation of mitigation measures. As the exceedance is considered significant appropriate mitigation measures have been recommended within the following sections.

Construction Generated Road Traffic

- 13.85 It is anticipated that in order to complete the construction phase of the Development, it will be necessary to move a significant amount of construction related material to and from the Site, thus resulting in a number of construction generated road traffic movements.
- 13.86 It should be noted that relatively large increases in road traffic movements would need to prevail in order for noticeable increases in road traffic noise levels to occur as a result of construction generated road traffic. Based on DMRB Guidance, although not accounting for changes in the percentage of HGV's, a 25% increase in traffic movements will only result in a 1dB increase in noise levels. Similarly, a 58% increase would be required for 2dB and 100% increase for a 3dB increase. It should be noted that a 3dB increase in noise levels is generally barely perceptible to the average human.
- 13.87 It is estimated that an average of 10 HGV deliveries per day and 20 cars/vans for operatives and visitors will take place per Development area. It is unlikely that more than two Development areas would be constructed at once, therefore an estimate of 20 HGVs and 40 cars/vans will enter and exit the Site. This would result in considerably less than a 25% increase in road traffic movements on the existing network. Furthermore, it should be noted that any increase in noise levels associated with construction generated road traffic is expected to be limited to the daytime hours only.
- 13.88 The sensitivity of the residential receptors is categorised as high and the magnitude of impact is categorised as **negligible**. Accordingly, there is predicted to be a **negligible** effect at all receptors.

Assessment of Operational Phase Effects

Change in Road Traffic Noise Levels on Existing Receptors

- 13.89 Upon completion of the Proposed Development, it is anticipated that local road traffic noise levels may change as a result of development generated vehicle movements. Therefore, it is appropriate to consider the magnitude of any impacts that might arise.
- 13.90 The results of the Transport Assessment (TA) undertaken by SCP Transport (refer to Appendix 6) have been used as the basis for the road traffic noise assessment. This focuses on roads immediately surrounding the site before the Proposed Development generated traffic is dispersed across the wider network. Traffic data supplied in the form of 18-hour AAWT flows were used in the calculations.
- 13.91 Where road traffic route alignments are to remain unchanged, road traffic noise calculations have been carried out in accordance with Calculation of Road Traffic Noise, being undertaken for a notional receptor location 10m from the edge of the carriageway of each road considered and 0.5m above ground level. A notional receptor has been used because the change in noise level adjacent to any given road will be the same at all locations where noise from this route is dominant. Only roads that have a 25% increase in road traffic movement due to the development have been included in the assessment, as a 25% increase would result in 1dB change in noise level and anything less than this is **negligible**.

- 13.92 In the first instance, it is required to compare the Do-Minimum scenario in the baseline year against the Do-Minimum scenario in the opening year in order to establish a baseline for the subsequent short and long-term assessments. **Table 13.19** details this assessment.

Table 13.19 – Predicted Change in Road Traffic Noise Levels between 2023 Do Minimum and 2029 Do Minimum

Road	Baseline Year (2026) without Proposed Development L _{A10,18hr} (dB)	Future Year (2038) without Proposed Development (Do-Min) L _{A10,18hr} (dB)	Change in Noise Level +/- (dB)
Easthampstead Road (West of Site Access B)	59.8	60.6	+0.8

- 13.93 It can be seen from **Table 13.19** that there is predicted to be a **negligible** increase in road traffic noise levels due to natural growth on the vast majority of roads. This will be used to inform the following assessments.
- 13.94 The predicted changes in short term road traffic noise are shown in **Table 13.20**. This table shows the difference between the assumed opening year with and without Proposed Development (2038 Do Minimum) and with the Proposed Development (2038 Do Something).

Table 13.20 – Predicted Change in Road Traffic Noise Levels between 2038 Do Minimum and 2038 Do Som

Road	Baseline Year (2038) without Proposed Development L _{A10,18hr} (dB)	Opening Year (2038) with Proposed Development (Do-Som) L _{A10,18hr} (dB)	Change in Noise Level +/- (dB)	Corresponding Magnitude of Impact
Easthampstead Road (West of Site Access B)	60.6	61.8	+1.2	Minor

- 13.95 It can be seen from **Table 13.20** that the greatest predicted short-term road traffic noise level change is 1.2dB.
- 13.96 Comparing this increase in road traffic noise levels as a result of the Proposed Development with the guidance contained in the DMRB, it can be determined that the magnitude of impact is categorised as **negligible** as there is an increase of 0.8dB due to natural growth not associated with the development.

- 13.97 The sensitivity of the existing noise sensitive receptors is categorised as moderate as the receptors are already located close to the roads and the magnitude of impact is categorised as **negligible**. The significance of effect is categorised as **negligible**.

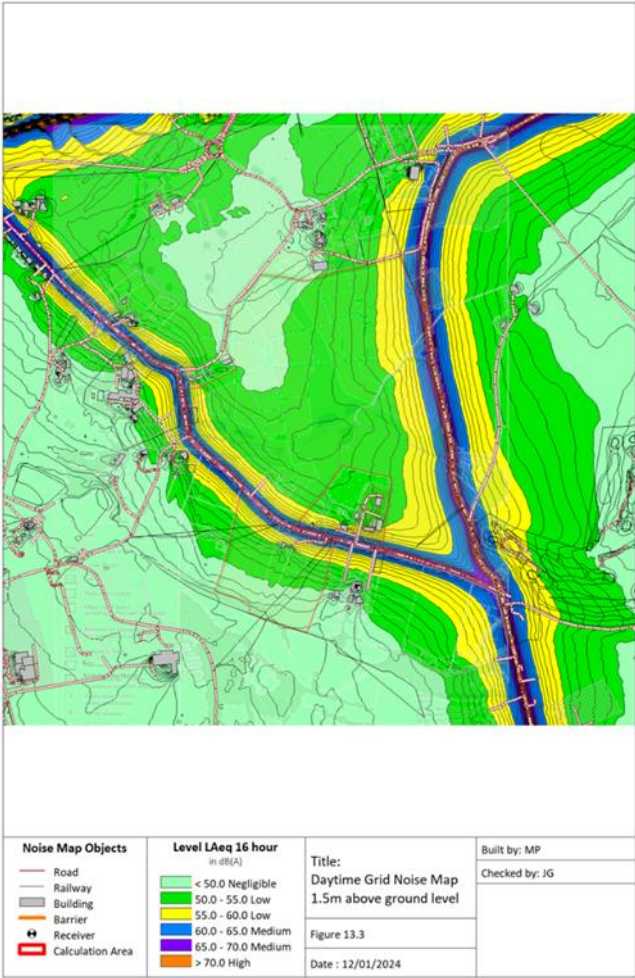
Road Traffic Noise Impact Upon Proposed Receptors

- 13.98 The Proposed Development will be located in an environment dominated by road traffic noise and it is important to consider the implications of these impacts upon any proposed noise sensitive receptors. For the purposes of this assessment, Professional Consult have used noise modelling software, CadnaA 2018, to determine the impact of noise from the roads and railway line across the Proposed Development.

External Amenity Areas

- 13.99 According to BS8233:2014, 'It is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$, with an upper guideline value of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors might be warranted'.
- 13.100 Therefore, the aim was to achieve 55dB $L_{Aeq,16hr}$ in external amenity areas, with an exceedance of this being acceptable close to the noise sources, as long as the lowest practicable noise levels are considered to be achieved following Site layout design and mitigation measures.
- 13.101 The grid noise map determined that predicted noise levels across the Site would range from below 50dB for the central region of the Site, to 65dB for the closest proposed developable areas to the Roads, without any suitable Site design and/or mitigation measures considered due to the impact of road traffic noise. **Figure 13.3 of Appendix 13** shows this grid noise map.

Figure 13.3 – Daytime Grid Noise Map (1.5m above ground level)



13.102 Although these levels are not excessively high when compared to the guidance in BS8233:2014 and given the locality of the Site, these are not considered the lowest practicable levels and as such, mitigation measures are required to ensure the lowest practicable levels in garden areas are achieved.

13.103 This is considered the 'Lowest Observed Adverse Effect Level' (LOAEL) for areas in excess of 55dB with the following advice:

'Noise can be heard and causes small changes in behaviour and/or attitude, 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 perceived change in the quality of life.'

With the action being: 'Mitigate and reduce to a minimum'.

13.104 For any areas subject to noise levels of less than 55dB the 'No Observed Adverse Effect Level' (NOAEL) is achieved and the following outcome is noted:

'Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.'

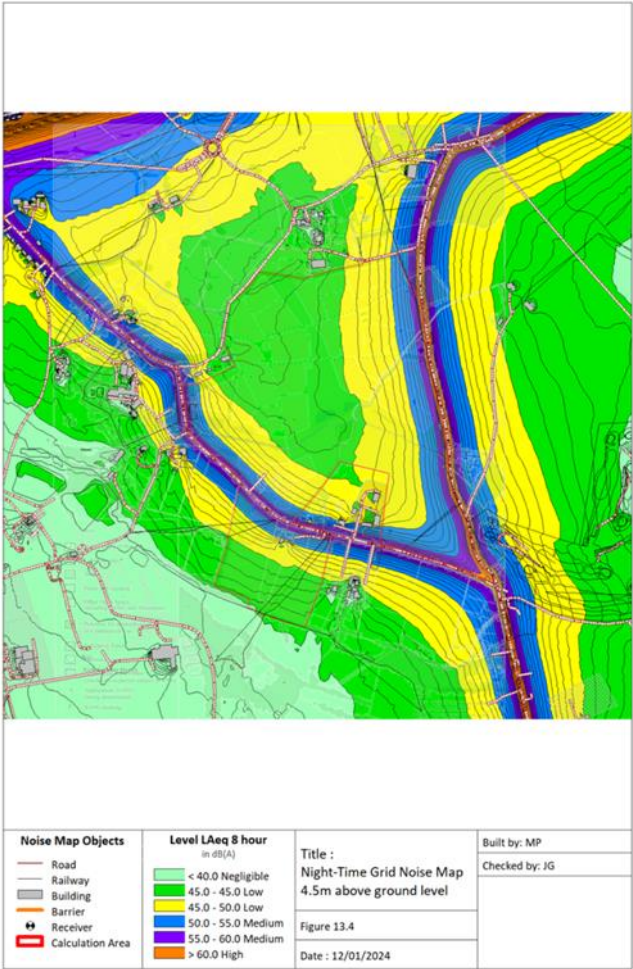
With the action being: 'No specific measures required'.

- 13.105 The sensitivity of the receptors is high and it is predicted that there would be a LOAEL at the closest garden areas to the roads without mitigation in place or considered. Accordingly, there is predicted to be a **moderate adverse effect** which is considered to be significant without the consideration of good acoustic design and/or mitigation measures in place.
- 13.106 The following section provides advice on Site layout design and provides suitable mitigation measures in order to ensure that external noise levels in garden areas are suitable and the amenity of future residents is protected.

Internal Habitable Rooms

- 13.107 At this stage internal noise levels cannot be accurately determined as no detailed layout has been developed. Accordingly, assumptions have been made regarding dwelling positions and are based on the proposed locations of the building envelopes as detailed in the Parameters Plan. **Figure 13.4** details the external noise levels during the night-time period.

Figure 13.4 – Night-Time Grid Noise Map (4.5m above ground level)



13.108 The highest predicted level at the boundary of the Site during the daytime is 65dB LAeq,16hr and for the night-time is 60dB LAeq,8hr. As such, it can be seen in the above grid noise maps that standard thermal double glazing the provides a sound reduction of at least 30dB Rw+Ctr will be sufficient for the of the Site.

13.109 Additionally, alternative ventilation will be required for any habitable rooms that have line of sight to the roads, as an alternative to opening a window.

13.110 Without alternative ventilation & higher specification glazing in place, noise levels in habitable rooms would be considered to be the LOAEL with windows open, and the following outcome is noted:

'Noise can be heard and causes small changes in behaviour and/or attitude, 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 perceived change in the quality of life.'

With the action being: 'Mitigate and reduce to a minimum'.

- 13.111 The above section has shown that internal habitable rooms can be suitably protected from adverse noise with the provision of alternative ventilation for dwellings located close to and/or with line of sight to the roads. Accordingly, internal noise levels should not be considered a constraining factor in the determination of the planning application and development of a masterplan.

Noise Impact Associated with Commercial on Proposed Receptors

- 13.112 A measurement has been undertaken on the southern boundary of the Site with the commercial unit. Sound from drilling, banging and engine movements was audible at the Site boundary.
- 13.113 In the first instance, it is necessary to calculate a sound power noise level for the noise level.

Table 13.21 – Calculation of Sound Power Level from Commercial

Source	Measured Sound Pressure Level LAeq,1hr (dB)	Measurement Distance (m)	Calculated Sound Power Level LwA (dB)	Height of Source above ground level (m)
Garage	42	38	65.8	2

- 13.114 In order to calculate an accurate overall specific sound pressure level at the closest proposed residential receptors, a noise model has been built using CadnaA.
- 13.115 **Figures 13.5** Show the predicted specific noise level from the commercial during the daytime period. The highest predicted specific noise level during the daytime is 5dB at the closest developable area plot.

Figure 13.5 - Daytime Grid Noise Map (1.5m above ground level commercial)

13.116 Given the dominance of road traffic at the proposed receptors, as can be seen in **Figures 13.3** and **13.4** it is unlikely that any acoustic feature corrections will be perceptible. However in order to represent a worst case a +3dB penalty has been applied for intermittency and a +3dB has also been applied for impulsivity.

13.117 **Table 13.22** completes the BS4142:2014 assessment at the closest receptors. A background sound level of 42dB L90 has been used for the daytime, these were the modal (typical) average level recorded at NMP1.

Table 13.22 – Calculation of Sound Power Level from Commercial

Period	Closest Receptor	Calculated Specific Noise Level at Receptor LAeq,1hr (dB)	Total Overall Character Correction (dB)	Calculated Rated Level Lar (dB)	Background Sound Level L90 (dB)	Difference +/- (dB)
Daytime	Southern parcel	5	6	11	42	-31

- 13.118 A review of **Table 13.22** indicates that the rated level of noise falls below the typical background sound level (the criteria noise level) and BS4142:2014+A1:2019 provides the following advice for this outcome:

“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.”

- 13.119 The sensitivity of the existing noise sensitive receptors is categorised as high and the magnitude of impact is categorised as **negligible**. Accordingly, there is predicted to be a **negligible impact** at the noise sensitive receptors and not significant under the EIA Regulations.

Fixed Plant Associated with the Proposed Commercial Use

- 13.120 At the outline stage, plant items for the proposed commercial use are unknown at this stage. Accordingly, it was necessary to set plant noise emission limits based on the measured background sound levels at the nearest sensitive receptors.
- 13.121 Background sound measurements have been taken during daytime and night-time periods over typical weekday and weekend periods. This allows plant noise emission limits to be set for all periods thus allowing a degree of flexibility when operational details of M&E plant associated with the Development, if any, become available.
- 13.122 The lowest measured average daytime and night-time background sound levels have been used in order to inform a worst-case assessment. **Table 13.23** derives the plant noise emission limits.

Table 13.23 – Derivation of Plant Noise Emission Limits

Receptor	Assessment Period	Typical (Mode) Background Sound Level $L_{A90,T}$ (dB)	BS4142 Criteria (dB)	Derived Rating Level L_{Ar} (dB)
Closest Proposed	Daytime (07:00 – 23:00)	42	$L_{Ar} = L_{90,T}$	42
	Night-Time (23:00 – 07:00)	34		34

- 13.123 For the avoidance of doubt, it is recommended that the plant noise emission limits set for the proposed dwellings are adhered to as these are marginally lower. **Table 13.23** indicates the plant noise emission limits which should be adhered to at the nearest habitable/sensitive façade for any fixed M&E plant which may form part of the Development.
- 13.124 As long as the derived rating levels are not exceeded at the receptors, a **negligible** impact should be observed due to fixed plant noise. The sensitivity of the existing noise sensitive receptors is categorised as high and the magnitude of impact is categorised as negligible. Accordingly, there is predicted to be a **negligible** effect at the noise sensitive receptors.

Proposed Mitigation

13.125 This section details the mitigation measures required in order to reduce the significance of impacts predicted in the previous section.

Construction Phase

Mitigation for Construction Noise Effects

13.126 Accepted safeguards exist to minimise the effects of construction noise, these include:

The various EC Directives and UK Statutory Instruments that limit noise emissions from a variety of construction plant;

Guidance set out in BS5228-1 which covers noise control on construction sites; and,

The powers that exist for local authorities under Sections 60 and 61 of the Control of Pollution Act 1974 to control noise from construction sites.

13.127 The adoption of Best Practicable Means, as defined in Section 72 of the Control of Pollution Act 1974 is usually the most effective means of controlling noise from construction sites. Such measures where appropriate may include the following:

Any compressors brought on to the site to be silenced or sound reduced models fitted with acoustic enclosures;

All pneumatic tools to be fitted with silencers or mufflers;

Care to be taken when erecting or striking scaffolds to avoid impact noise from banging steel.
All operatives undertaking such activities to be instructed on the importance of handling the scaffolds to reduce noise to a minimum;

The majority of deliveries to be programmed to arrive during normal working hours only. Care to be taken when unloading vehicles to minimise noise. Delivery vehicles to be routed so as to minimise disturbance to local residents. Delivery vehicles to be prohibited from waiting within or in the vicinity of the site with their engines running;

All plant items to be properly maintained and operated according to manufacturers' recommendations in such a manner as to avoid causing excessive noise;

All plant to be sited so that the noise impact at nearby noise sensitive properties is minimised;

Local hoarding, screens or barriers to be erected as necessary to shield particularly noisy activities;

Problems concerning noise from construction works can often be avoided by taking a considerate and neighbourly approach to relations with the local residents. Works should only take place during given periods, e.g. during normal construction hours and not at night;

Guidance set out in BS5228-1 which covers noise control on construction sites; and,

The powers that exist for local authorities under Sections 60 and 61 of the Control of Pollution Act 1974 to control noise from construction sites.

13.128 It is recommended that the above measures be included in the CEMP that will be issued to and agreed with the contractor(s) conducting the works. This should be secured via a planning condition.

13.129 By implementing the above measures, typical noise levels from construction works can be reduced by approximately 5dB to 10dB.

Construction Generated Road Traffic

13.130 As there is unlikely to be any significant increase in noise levels on the local road network as a result of construction generated traffic, the implementation of mitigation measures is not required.

Operational Phase

Proposed Receptors – Road Traffic Noise

External Amenity Area

13.131 The assessment section above determined that noise levels across the Site range between below 50dB and up to 65dB at the closest developable areas to the surrounding roads.

13.132 It is recommended that all exposed edges associated with the Development as a whole be shielded by buildings so that all garden areas are enclosed within the Development by the building envelopes of the dwellings. Gaps between dwellings should be kept to a minimum. And where access roads are perpendicular to the road, dwellings should form around corners, where possible. If this is not possible barrier can be used to mitigate any exposed garden areas.

13.133 The barriers could be wooden fence/brick wall construction. The barriers proposed should be of close boarded construction, be free from holes, sealed at the base and have a minimum mass of 15kg/m².

13.134 The context of any Site design and mitigation measures is important as the maximum mitigation may not be achievable due to other factors and such a compromise would be required. The performance of the detailed design in avoiding or mitigating noise impacts would be tested at the detailed design or reserved matters application stage.

Internal Habitable Rooms

13.135 The exact requirements for internal habitable rooms cannot be determined at this stage as the residential elements of the planning application are in outline only. The exact requirements would be determined at the detailed planning stage.

13.136 With a partially open window for background ventilation, the internal noise levels for habitable rooms would exceed the internal target criteria, particularly those that have line of sight to the noise roads. Accordingly, it will be necessary to consider an alternative ventilation scheme which does not require the opening of windows to provide fresh air flow

and background ventilation, windows are to remain openable for purge ventilation in these areas.

13.137 It is recommended that a through-frame window mounted trickle ventilator is incorporated into the glazing unit of the habitable rooms of the facades facing the roads so that fresh air can enter the room without having to open windows.

13.138 Alternatively, a through wall trickle ventilator could be used. It is recommended that the trickle ventilator be combined with a system that provides whole house background ventilation without the need for opening windows but windows should be openable in order to provide purge ventilation. Ideally, any inlet for fresh air should be located away from the noise source to ensure the freshest air available is brought into the habitable rooms.

13.139 The exact specification for alternative ventilation ultimately falls to the Applicant and, from an acoustics perspective, needs to ensure that fresh air flow can be achieved without the need for opening windows. It is necessary to meet the requirements given in BS8233:2014, Section 8.4.5.4, which states that:

'The Building Regulations' supporting documents on ventilation [48, 49, 50] recommend that habitable rooms in dwellings have background ventilation. Where openable windows cannot be relied upon for this ventilation, trickle ventilators can be used and sound attenuating types are available. However, windows may remain openable for rapid or purge ventilation, or at the occupant's choice.

Alternatively, acoustic ventilation units are available for insertion in external walls. These can provide sound reduction comparable with double glazed windows. However, ducted systems with intakes on the quiet side of the building might be required in very noisy situations, or where appearance rules out through-the-wall fans.'

13.140 Section 7.7.2 of the British Standard states:

'If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.'

13.141 Wherever possible habitable rooms should be located away from the noise source with less noise-sensitive rooms facing the noise source.

Existing Commercial on Proposed Receptors

13.142 This Chapter has shown that the rated level of noise from the existing commercial unit falls below the typical background sound level (the criteria noise level) and BS4142:2014+A1:2019 provides the following advice for this outcome:

"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."

Proposed Commercial – Fixed Plant Noise

- 13.143 This Chapter has set plant noise emission limits for any proposed fixed plant items associated with the proposed commercial use in order to protect the amenity of proposed and existing receptors.
- 13.144 As the application is outline only, mitigation measures may be required for certain areas due to certain activities associated with the proposed commercial area and will need to be assessed individually at the detailed planning stage.
- 13.145 It is worth considering appropriate Site design for the commercial area to lessen any potential impact at the receptors. Such as:
- Siting plant items away from receptors, i.e. on the shadow side of the building; and
- Any service areas should be suitably screened from the receptors.
- 13.146 Any necessary monitoring that is deemed appropriate to ensure that effective mitigation is maintained should be described.

Residual Effects

- 13.147 The residual effects assume that the mitigation and recommendations described above have been implemented in order to achieve the criteria or the lowest practicable levels and **no significant residual effects** under the EIA Regulations are predicted.

Construction Phase*Construction Noise*

- 13.148 If a CEMP is followed and adhered to and best practicable means are followed there should be a **short term minor adverse residual impact** at local level during the duration of the construction phase at existing and any proposed receptors.

Construction Generated Traffic Noise

- 13.149 There is predicted to be a **negligible residual effect** at all receptors at the local level. Furthermore, it should be noted that any increase in noise levels associated with construction generated road traffic is expected to be limited to the daytime hours only.
- 13.150 Given the predicted effect on local receptors it is not necessary to consider mitigation measures.

Operational Phase*Change in Road Traffic Level*

- 13.151 Comparing the changes in road traffic noise levels as a result of the Proposed Development with the guidance contained in the DMRB, it can be shown that the magnitude of impact is categorised as **Short term negligible and Long Term net Effect** at the local level, resulting in a **negligible effect**.

Existing Traffic Noise

- 13.152 Without appropriate design, it is considered that a **long-term minor to major adverse effect** at the local level would be experienced in the garden areas. However, if the lowest practicable levels can be achieved the impacts should range between **negligible and minor adverse**.
- 13.153 Within internal habitable rooms, a **negligible effect** at the local level can be achieved through the use of glazing and alternative ventilation, where required.

Proposed Commercial

- 13.154 With effective site management there is predicted to be a **negligible residual effect** at all receptors at the local level. Additionally, plant emission level following the guidance of BS4142:2014, which will result in a **negligible long-term impact** at any existing or proposed receptors at the local level.

Cumulative Effects Assessment**Construction Phase**

- 13.155 Should the construction programmes of any other proposed or committed developments (as set out in Chapter 2 of this ES) in the vicinity of the Development overlap, then there is the potential for significant cumulative construction noise effects at sensitive locations (as detailed in **Table 13.4**). However, implementation of suitable mitigation options as outlined within this Chapter (including the implementation of a CEMP), and employed at the other development sites, would ensure that effects would be **negligible**.

Operational Phase

- 13.156 Cumulative vehicle noise impacts may result from additional traffic growth on the local road network as a result of cumulative development in the vicinity of the Site.
- 13.157 Traffic data for 2026 & 2038, which includes anticipated future growth and vehicle trip generation from other committed developments, is imbedded in the traffic data provided. Therefore, operational phase cumulative effects are predicted to be **negligible**.

Limitations and Assumptions

- 13.158 The assessment has used the traffic data provided to predict the change in noise levels caused by the Development for the opening year 2026 & 2038. Details of the traffic assessment can be seen in the Transport Assessment and Travel Plan.

Summary of Effects

- 13.159 **Table 13.24** contains a summary of the likely significant effects of the Development.

Table 13.24 – Summary of Effect – Noise

Potential Effect	Nature of Effect (Permanent / Temporary)	Significance (Major/Moderate/Minor) (Beneficial/ Adverse/Negligible)	Mitigation / Enhancement Measures & Monitoring (and how these will be secured)	Residual Effects (Major/Moderate/Minor) (Beneficial/Adverse/ Negligible)
Construction				
Construction Noise	Temporary	Minor to Moderate Adverse	Incorporation of Best Practicable means and a Construction Environment Management Program (CEMP)	Negligible to Minor Adverse
Construction Generated Traffic	Temporary	Negligible	N/A	Negligible
Completed Development				
Change in Traffic Noise Level	Permanent	Negligible	N/A	Negligible
Existing Road Traffic on Proposed Residential	Permanent	Minor to Moderate Adverse	Good Acoustic Design, Acoustic Glazing & Alternative Ventilation.	Negligible to Minor Adverse
Existing Commercial on Proposed Residential	Permanent	Negligible	N/A	Negligible
Fixed Plant from Proposed Commercial	Permanent	Negligible	Plant noise emission Levels at closest Receptors	Negligible
Cumulative Effect				

Potential Effect	Nature of Effect (Permanent / Temporary)	Significance (Major/Moderate/Minor) (Beneficial/Adverse/Negligible)	Mitigation / Enhancement Measures & Monitoring (and how these will be secured)	Residual Effects (Major/Moderate/Minor) (Beneficial/Adverse/Negligible)
Construction	Temporary	Minor to Moderate Adverse	Incorporation of Best Practicable means and a Construction Environment Management Program (CEMP)	Negligible to Minor Adverse
Change in Traffic Noise Level	Permanent	Negligible	N/A	Negligible

Conclusion

- 13.160 This Chapter assesses the impact of the Development on Noise. In particular, it considers the potential effects of construction noise and changes in road traffic noise levels on existing receptors as well as existing and proposed sources of noise upon the proposed and existing receptors.
- 13.161 The Chapter describes the methods used to assess the impacts, the baseline conditions currently existing at the Site and surroundings, the potential direct and indirect impacts of the changes in road traffic levels, the mitigation measures required to prevent, reduce, or offset the impacts and the residual effects.
- 13.162 In order to determine baseline noise levels at existing and proposed receptors, a Baseline Noise Survey has been carried out around the Site. The Baseline Noise Survey consisted of road traffic noise surveys for the roads surrounding the Site, a rail survey and a commercial noise survey. In addition, a background survey has been undertaken at a location representative of the nearest proposed receptors.
- 13.163 If a CEMP is followed and adhered to and best practicable means are followed, there should be a short-term negligible to minor adverse effect at local level during the construction phase, at existing and any proposed receptors due to construction noise. The effects are not considered significant. Additionally, there is predicted to be a **negligible effect** at all receptors at the **local level** due to construction generated traffic.

- 13.164 Without appropriate Site design, it is considered that a long-term minor to moderate adverse impact at the local level would be experienced in the garden areas of the proposed dwellings. However, with lowest practicable levels achieved, the effects would range between **negligible and minor adverse** with a good acoustic design.
- 13.165 For garden areas close to the roads a **negligible long-term impact** at a local level can be achieved through suitable Site layout and if necessary acoustic barriers (fencing). Within internal habitable rooms, a **negligible effect at the local level** can be achieved through the use of glazing and alternative ventilation, where required.
- 13.166 This assessment has set M&E plant noise emission limits based on the existing measured background noise level and the adopted criteria given in BS4142:2014 for any proposed fixed plant items, associated with the proposed commercial area.
- 13.167 This Chapter has shown that the rated level of noise from the existing commercial unit falls below the typical background sound level (the criteria noise level).

References

National Planning Practice Guidance (NPPG) 2019;

BS4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound';

BS4142:2014+A1:2019+MID:2023 'Method Implementation Document'

BS8233: 2014 Guidance on Sound Insulation and Noise Reduction for buildings;

IEMA/IOA Guidelines for Noise Impact Assessment; and

World Health Organisation (1999 'Guidelines for Community Noise').

BS 5228-1: 2009+A1 2014: 'Code of practice for noise and vibration control on construction and open sites. Part 1: Noise';

BS 5228-2: 2009+A1 2014: 'Code of practice for noise and vibration control on construction and open sites. Part 2: Vibration';

Design Manual for Roads and Bridges (DMRB);

ProPG: Planning & Noise (2017) 'New Residential Development; and

BS6472-1:2008 'Guide to evaluation of human exposure to vibration in buildings. Part 1: Vibration sources other than blasting'.