8 Noise and Vibration

8.1 Scope of Assessment

8.1.1 This chapter of the ES assesses the likely significant effects of the Proposed Development in terms of noise and vibration and is supported by **ES Volume 3, Appendix D, Noise and Vibration.**

8.1.2 The chapter describes: the assessment methodology; the baseline conditions currently existing at the Site and in the surrounding area; the likely significant environmental effects; the mitigation measures required to prevent, reduce or offset any significant adverse effects; the likely residual effects after these measures have been employed; and the 'Type 2' (Inter-project) cumulative effects associated with the Proposed Development in combination with other developments within 5 km of the Site.

8.1.3 Type 1 cumulative effects 'intra-project effects' which are the combined effects of individual topic impacts on a particular sensitive receptor are considered in **ES Volume 2, Chapter 13: Effect Interactions**.

8.2 Key Legislation, Policy and Guidance Considerations

8.2.1 The noise and vibration assessment has been undertaken within the context of relevant planning policies, guidance documents and legislative instruments. These are summarised below.

Legislation and Regulation

Control of Pollution Act 1974

8.2.2 The Control of Pollution Act 1974[1] (CoPA) requires that 'Best Practicable Means' (BPM) (as defined in Section 72 or CoPA) are adopted to control construction noise on any given site.

8.2.3 The CoPA also states that in determining whether BPM has been employed, regard should be given to any relevant Code of Practice approved under Section 71 of CoPA: BS5228:2009+A1:2014[2,3] 'Code of practice for noise and vibration

[1] Control of Pollution Act. (1974).

[2] British Standard 5228-1: 2009 + A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise

[3] British Standard 5228-2: 2009 + A2:2014 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration

control on construction and open sites' (BS5228) has been approved as a Code of Practice by the Secretary of State.

8.2.4 Section 61 sets out the process for application to the local authority for prior consent to carry out works.

National Policy

The National Planning Policy Framework

8.2.5 The National Planning Policy Framework[4] (NPPF) sets out the Government's planning policies for England and how these should be applied:

"*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.*

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; and

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."

Noise Policy Statement for England

8.2.6 The Noise Policy Statement for England[5] (NPSE) seeks to clarify the underlying principles and aims in existing policy documents, legislation and guidance that relate to noise.

8.2.7 The statement applies to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise.

8.2.8 The statement sets out the long-term vision of the government's noise policy, which is to "*promote good health and a good quality of life through the effective management of noise within the context of policy on sustainable development*".

[4] Ministry of Housing, Communities & Local Government - National Planning Policy Framework, December 2024

[5] Department for Environment, Food & Rural Affairs – Noise Policy Statement for England, 15 March 2010

8.2.9 The guidance promotes the effective management and control of noise, within the context of Government policy on sustainable development and thereby aims to:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvements of health and quality of life.

8.2.10 The statement uses the concept of noise exposure categories as follows:

- No Observed Effect Level (NOEL) – the level below which no effect can be detected. Below this level no detectable effect on health and quality of life due to noise can be established;
- Lowest Observable Adverse Effect Level (LOAEL) – the level above which adverse effects on health and quality of life can be detected; and
- Significant Observed Adverse Effect Level (SOAEL) – the level above which significant adverse effects on health and quality of life occur.

8.2.11 It is recognised that SOAEL does not have a single objective noise-based level that is applicable to all sources of noise in all situations and therefore the SOAEL is likely to be different for different sources, receptors and at a different times of the day.

8.2.12 No guidance has been issued at the time of writing to identify the SOAEL and LOAEL for typical noise sources and receptors.

Planning Practice Guidance – Noise

8.2.13 The Planning Practice Guidance[6] (PPG) expands on the use of SOAEL:

"if the exposure is above this level the planning process should be used to avoid this effect occurring, by use of appropriate mitigation such as by altering the design and layout. Such decisions must be made taking account of the economic and social benefit of the activity causing the noise, but it is undesirable for such exposure to be caused."

8.2.14 The PPG also goes on to identify unacceptable noise exposure:

"*at the highest extreme, noise exposure would cause extension and sustained changes in behaviour without an ability to mitigate the effect of noise. The impacts on health and quality of life are such that regardless of the benefits of the activity causing the noise, this situation should be prevented from occurring*."

[6] Department for Communities and Local Government. (2014). Planning Practice Guidance – Noise.

8.2.15 In addition, PPG refers to further considerations to mitigating noise on residential developments. PPG states that the noise impact may be partially off-set if the residents of those dwellings have access to:

- 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 with increasing noise exposure and could be such that significant adverse effects occur;
- 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
- a relatively quiet, protected, external publicly accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minutes walking distance).

Regional & Local Policy

Tandridge District Core Strategy

8.2.16 The Tandridge District Core Strategy Document 2008[7], was adopted on 15th October 2008 and is a key document used in determining planning applications within Tandridge District Council.

8.2.17 Policy CSP 18 Character and Design states:

"*Development must not significantly harm the amenities of the occupiers of neighbouring properties by reason of overlooking, overshadowing, visual intrusion, noise, traffic and any other adverse effect.*"

Tandridge District Council Plan 2033

8.2.18 The replacement Local Plan was submitted for examination in January 2019 and hearings took place in Autumn 2019.

8.2.19 The Inspector's report, received by the council in early 2024, stated that the plan was not capable of being found sound. The council subsequently resolved on 18 April 2024 to withdraw the submission version of its draft Local Plan under s.22(1) of the Planning and Compulsory Purchase Act 2004.

8.2.20 Work on the new local plan is underway but is at a very early stage so will not have any bearing on the determination of this application. The most recent

[7] Tandridge District Core Strategy 2008, Adopted 15th October 2008

Local Development Scheme refers to submission of the new local plan in 2026 and adoption in 2027.

Technical Standards and Guidance

ProPG: Planning & Noise Professional Practice Guidance on Planning & Noise New Residential Development

8.2.21 Current Government guidance on planning and noise for new residential developments is found in the NPPF. One of the strengths of the NPPF is that it sets clear objectives. However, the Institute of Acoustics (IOA), Association of Noise Consultants (ANC) and Chartered Institute of Environmental Health (CIEH) feel there is insufficient technical guidance for practitioners and developers on how to deliver the Government's objectives. Therefore, these professional bodies have jointly produced the ProPG[8] which aims to complement existing Government advice and provides a recommended approach that can be applied proportionately to each development site to encourage good acoustic design.

8.2.22 The ProPG seeks to promote the use of good acoustic design to:

- enable new homes to be built in areas previously considered unsuitable because of noise by appropriate evaluation and careful use of suitable mitigation;
- allow rapid identification of sites where noise is unlikely to be a constraint for new residential developments;
- permit swift recognition of noisy sites that are very unlikely to be suitable for new residential developments; and
- help to reduce the harmful impact of noise on those moving into the properties and the surrounding communities.

8.2.23 ProPG recommends the following:

"*Where there is a justification that the internal target noise levels can only be practically achieved with windows closed, which may be the case in urban areas and at sites adjacent to transportation noise sources, special care must be taken to design the accommodation so that it provides good standards of acoustics, ventilation and thermal comfort without unduly compromising other aspects of the living environment. In such circumstances, internal noise levels can be assessed with windows closed but with any facade openings used to provide "whole dwelling*

[8] CIEH, IOA and ANC - ProPG: Planning & Noise Professional Practice Guidance on Planning & Noise New Residential Development, May 2017

ventilation" in accordance with Building Regulations Approved Document F (e.g. trickle ventilators) in the open position.

It should also be noted that the internal noise level guidelines are generally not applicable under "purge ventilation" conditions as defined by Building Regulations Approved Document F, as this should only occur occasionally (e.g. to remove odour from painting and decorating or from burnt food).

In addition to providing purge ventilation, open windows can also be used to mitigate overheating. Therefore, should the … scheme … be assessed with windows closed, but this scheme is reliant on open windows to mitigate overheating, it is also necessary to consider the potential noise impact during the overheating condition".

British Standard 7445

8.2.24 British Standard (BS) 7445-2: 1991 'Description and measurement of Environmental Noise'[9] defines parameters, procedures and instrumentation required for noise measurement and analysis.

British Standard 8233

8.2.25 British Standard 8233: 2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'[10] provides criteria for the assessment of internal noise levels for various uses including dwellings and commercial properties. This supersedes BS8233:1999 which is withdrawn but referred to in a number of the planning policy documents referenced above.

British Standard 6472

8.2.26 British Standard 6472-1: 2008 'Guide to Evaluation of Human Exposure to Vibration in Buildings Part 1: Vibration Sources other than Blasting'[11] presents recommended frequency weighted vibration spectra (for continuous vibration) and vibration dose values (VDV) (for intermittent vibration) above which comment is likely to occur in residential properties.

[9] British Standard 7445-2: 1991 Description and measurement of environmental noise, Part 2: Guide to the acquisition of data pertinent to land use, BSI, London.

[10] British Standard 8233: 2014 'Guidance on Sound Insulation and Noise Reduction for Buildings', BSI, London.

[11] British Standard 6472-1: 2008 Guide to evaluation of human exposure to vibration in buildings, Part 1: Vibration sources other than blasting, BSI, London.

British Standard 5228

8.2.27 British Standard 5228: 2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites'[12] , provides a 'best practice' guide for noise and vibration control, and includes sound power level (SWL) data for individual plant as well as a calculation method for noise from construction activities. Part 1 relates to noise and part 2 relates to vibration.

British Standard 7385

8.2.28 British Standard 7385: 1993 'Evaluation and Measurement for Vibration in Buildings'[13] presents guide values or limits for transient vibration, above which there is a likelihood of cosmetic damage.

British Standard 4142

8.2.29 British Standard 4142: 2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'[14] describes methods to use outdoor sound levels to assess the likely effects of sound of an industrial and/or commercial nature on people who might be inside or outside a dwelling or premises used for residential purposes exposed to this sound.

ISO 9613-2:2024

8.2.30 ISO 9613 'Attenuation of sound during propagation outdoors – Part 2: A general method of calculation'[15] gives general methods of calculating sound propagation outdoors including attenuation due to geometrical divergence (distance); air and ground absorption; screening; reflections and other effects.

Calculation of Road Traffic Noise

8.2.31 Department of Transport/Welsh Office Memorandum 'Calculation of Road Traffic Noise'[16] (CRTN) describes procedures for traffic noise calculation and is suitable for environmental assessments of schemes where road traffic noise may have an impact.

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[12] British Standard 5228: 2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites', BSI, London.

[13] British Standard 7385-2: 1993 Evaluation and measurement for vibration in buildings — Part 2: Guide to damage levels from groundborne vibration

[14] British Standard 4142: 2014+A1:2019 Methods for rating and assessing industrial and commercial sound'.

[15] ISO 9613-2:2024 Attenuation of sound during propagation outdoors – Part 2: A general method of calculation

[16] Calculation of Road Traffic Noise, Department of Transport Welsh Office, HMSO, 1988

A Guide to Measurement and the Prediction of the Equivalent Continuous Sound Level L_{eq}

8.2.32 The Noise Advisory Council's 'A Guide to Measurement and Prediction of the Equivalent Sound Level L_{eq}'[17] describes procedures for prediction of various sources of transportation and industrial noise. The traffic noise predictions are based on a sound exposure level for the passing of a single vehicle, and therefore is suitable for predicting traffic noise levels on roads with lower flows (i.e. <1000 vehicles per day).

Design Manual for Road and Bridges

8.2.33 Highways England 'Design Manual for Road and Bridges Sustainability and Environment Appraisal LA111 – Noise and Vibration'[18] (DMRB) provides guidance on the appropriate level of assessment to be used when assessing the noise and vibration impacts arising from all road projects, including new construction, improvements and maintenance.

Guidelines for Community Noise 1999

8.2.34 The World Health Organisation (WHO) Guidelines for Community Noise (1999)[19] sets out guidance on suitable internal and external noise levels in and around residential properties. This document states that, in dwellings, the critical effects of noise are on sleep, annoyance and speech interference.

IEMA and IOA Guidelines for Noise Impact Assessment 2014

8.2.35 The Institute of Environmental Management and Assessment (IEMA) and IOA Guidelines for Noise Impact Assessment[20] sets good practice standards for scope content and methodology of noise impact assessment. The guidelines present categories of significance relating to the change of basic noise levels.

Building Regulations Part O (Approved Document O)

8.2.36 Approved Document O[21] took effect from 15 June 2022 for use in England and provides practical guidance in common building situations in residential

[17] Guide to Measurement and Prediction of the Equivalent Sound Level Leq. The Noise Advisory Council (1978)

[18] Design Manual for Roads and Bridges, Volume 11, Environmental Assessment, Section 3, Environmental Assessment Techniques, LA 111, Noise and Vibration, (formerly HD 213/11, IAN 185/15), Highways England, May 2020

[19] World Health Organisation (1999), WHO Guidelines for Community Noise.

[20] Institute of Environmental Management and Assessment. (2014) Guidelines for Environmental Noise Impact Assessment

[21] HM Government. The Building Regulations 2010 - Approved Document O, Overheating (2021)

buildings on how to meet the requirements of the Building Regulations with regards to overheating.

8.3 Assessment Methodology

Determination of Baseline

8.3.1 In order to assess the potential noise impact of the Proposed Development, it is necessary to determine the baseline conditions. The baseline conditions are typically the current (at the time of writing the ES) environmental and socio-economic conditions of the Proposed Development and surroundings.

8.3.2 The Proposed Development lies on the land between Barrow Green Road, the Oxted Rail Line and residences on Court Farm Lane and Wheeler Avenue.

8.3.3 Based on observations during the daytime survey, the surrounding noise climate of the Site consists of contributions from the following sources:

- The mainline Oxted Railway Line;
- Road traffic from Barrow Green Road;
- Aircraft Noise;
- Pedestrian use of the public footpaths through the site; and
- Trees Rustling and Birdsong.

8.3.4 An unattended environmental noise survey was carried out at the Site of the Proposed Development between 4th October 2024 and 11th October 2024 to obtain full daytime and night-time ambient noise levels during weekdays and at a weekend. The environmental noise survey was undertaken in accordance with BS 7445: Part 2.

8.3.5 The unattended sound level meters' microphones were positioned at a height of 1.2 metres (m) above the ground level, and more than 4 m away from any reflective surface and therefore are considered to be free-field measurements. The measurement microphones were fitted with a windshield and appropriate corrections applied.

8.3.6 The sound level meters were set to log continuously over 15-minute periods measuring octave band and A -weighted L_{eq}, L_{Fmax}, L_{10} and L_{90} parameters.

8.3.7 **Figure 8.1** shows the unattended measurement locations from the 2024 survey.

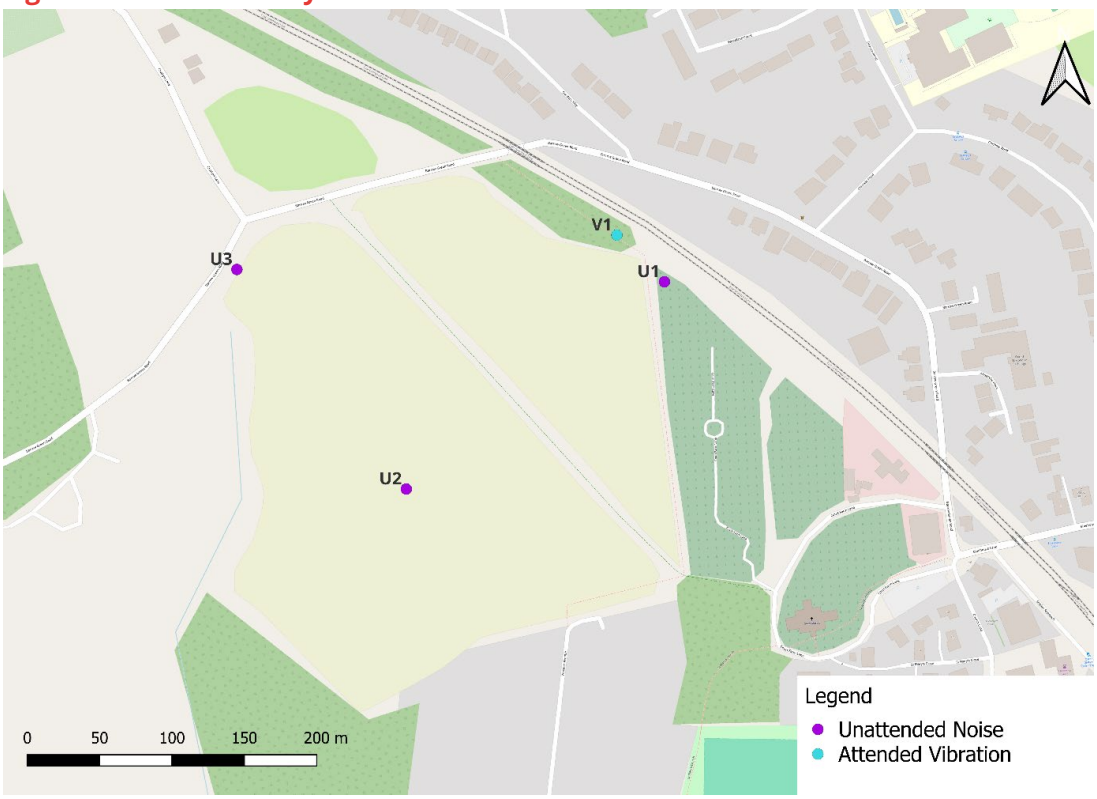
8.3.8 U1 was located on the northeastern boundary of the Site, parallel to the railway line that runs between Oxted and Woldingham Stations. The purpose of this location was to collect noise data from trains passing the Site.

8.3.9 U2 was located towards the centre of the Site. The purpose of this location was to collect background noise data for the quieter locations within the Proposed Development

8.3.10 U3 was located towards the northwestern boundary of the Site, near Barrow Green Road. The purpose of this location was to collect noise data from traffic on Barrow Green Road.

8.3.11 Further details and results of the baseline noise and vibration surveys are provided in **ES Volume 3, Appendix D, Noise and Vibration**.

Figure 8.1: Noise Survey Measurement Locations



Prediction Methodology

8.3.12 A noise impact is a change in the acoustic environment. This may be through the introduction of a new noise source, a change to an existing source causing change to the noise climate at existing receptors or the introduction of a new noise sensitive development.

8.3.13 The magnitude of the noise impact can depend on the absolute noise level, change in noise level, duration of the exposure and the time of day at which it occurs.

8.3.14 Noise impacts can lead to effects on receptors, such as annoyance or sleep disturbance for residential receptors or disturbance to non-residential receptors.

8.3.15 The significance of a noise effect can vary depending on the type of receptor and its sensitivity to noise, such as residential, commercial, or educational land uses.

8.3.16 The extent of the potential effects of the Proposed Development have been assessed using a scale from 'major adverse' to 'major beneficial', a duration scale of short, medium and long term, and a geographic scale of local, district, regional, national and international. A 'major' or 'moderate' effect constitutes a 'significant effect'.

8.3.17 **Table 8.1** below details how this relates to the national noise policy effect levels and therefore the action to be taken.

Table 8.1 Significance of Adverse Effect Related to National Noise Policy

Significance of Effect	Increasing Effect Level	Action to be taken
Negligible	Noise impact exceeding NOEL	No specific measures
Minor Adverse	Noise impact exceeding LOAEL, below SOAEL	Mitigate and reduce to a minimum
Moderate Adverse	Noise impact exceeding SOAEL	Avoid
Major Adverse	Unacceptable Adverse Effect	Prevent

Construction Noise

Prediction Methodology

8.3.18 To quantify potential construction noise impact, typical worst-case construction activity noise levels, $L_{Aeq,10hr}$, from the assumed construction activities have been predicted in accordance with BS 5228: Part 1 at a point 1 m from the facade of the relevant receptor. Calculations have been based on anticipated construction methods and mechanical plant likely to be used.

Impact Threshold

8.3.19 Construction noise impacts have been assessed using the predicted noise levels in accordance with the evaluation criteria set out in **Table 8.2**. These criteria are the 'ABC' construction evaluation criteria set out in BS 5228: Part 1.

Table 8.2 Construction Evaluation Criteria – residential receptors

Assessment category and threshold value period	Threshold value, in decibels (dB) ($L_{Aeq,\ T}$)		
	Category A [A)]	Category B [B)]	Category C [C)]
Night-time (23:00 – 07:00)	45	50	55
Evening and weekends [D)]	55	60	65
Daytime (07:00 -19:00) and Saturdays (07:00 – 13:00)	65	70	75
Note 1: A potential significant effect is indicated if the $L_{Aeq,\ T}$ noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level. *Note 2: If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total $L_{Aeq,\ T}$ noise level for the period increases by more than 3 dB due to site noise.* *Note 3: Applied to residential receptors only.*			
[A)] Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values. *[B)] Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.* *[C)] Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.* *[D)] 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.*			

8.3.20 The noise levels presented in **Table 8.2** are not intended to be used as a limit for noise emission from construction activities but rather as a guide to determine the significance or otherwise of the noise effects during the construction.

8.3.21 The magnitude of impact from noise can be summarised as shown in **Table 8.3.**

Table 8.3 Magnitude of Impact from Construction Noise

Magnitude of Impact	Total Construction Noise Level
Negligible	Less than or equal to the ambient noise level
Minor Adverse	Greater than ambient noise level

Magnitude of Impact	Total Construction Noise Level
Moderate Adverse	Greater than the impact threshold value defined in **Table 8.2**
Major Adverse	5 dB above the impact threshold value defined in **Table 8.2**

8.3.22 The SOAEL is considered to be the level at which the predicted construction noise level exceeds the construction noise evaluation 'Moderate Adverse' criteria. Construction noise levels which fall into the 'Minor Adverse' criteria are considered to fall in between the SOAEL and the LOAEL.

8.3.23 If the 'Moderate Adverse' impact criteria is exceeded, other project-specific factors such as the duration and character of the impact as well as the use of the receptor may also need to be considered to determine if there is a significant effect.

8.3.24 Construction noise impacts at non-residential receptors have been assessed using the predicted noise levels in accordance with the evaluation criteria set out in BS 5228: Part 1 example method 2 – '5 dBA change'. Noise impacts are deemed to be potentially significant if the total noise level (pre-construction ambient plus site noise level) exceeds the pre-construction ambient noise level by 5 dB or more, subject to lower cut-off values of 65 dB, 55 dB and 45 dB $L_{Aeq,T}$ from site noise alone, for the daytime, evening and night-time periods respectively, and a duration of one month or more, unless works of a shorter duration are likely to result in significant effect.

8.3.25 Acoustic modelling has been carried out in accordance with BS 5228: Part 1 to calculate the likely noise levels at the closest receptors to the Site during the worst-case construction periods. The 3D model accounts for any reflections, screening provided by the hoarding, ground absorption and likely percentage on times for the construction plant. Further information regarding the calculations is given in **ES Volume 3, Appendix D, Noise and Vibration.**

Construction Vibration

8.3.26 The Proposed Development will potentially introduce vibration from temporary construction plant. It is considered that the main source of vibration during construction works relate to surface compaction works.

8.3.27 The vibration predictions have been undertaken in accordance with the methodologies described in BS 5228: Part 2 for the closest residential and non - residential receptors.

8.3.28 Predicted vibration levels have been assessed utilising the example vibration criteria contained within BS 5228: Part 2 to assess the effect of perceptible

vibration on people and BS 7385: Part 2 to assess the effect of vibration on buildings.

8.3.29 **Table 8.4** below is reproduced from BS 5228: Part 2. The vibration levels are in terms of Peak Particle Velocity (PPV) at the receptor. The 0.3 mm/s level is considered to be the LOAEL and 1 mm/s level to be the SOAEL.

Table 8.4 from BS 5228 Part 2 'Guidance on Effects of Vibration Levels'

Vibration Level	Effect
0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3 mm/s	Vibration might just be perceptible in residential environments.
1.0 mm/s	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if early warning and explanation has been given to residents.
10 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments.

8.3.30 **Table 8.5** below is reproduced from BS 7385: Part 2. The levels given represent guide values for the onset of cosmetic damage in buildings.

Table 8.5 from BS 7385 Part 2: 'Transient Vibration Guide Values'

Vibration Level	Peak Component particle velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz	15 Hz and above
Reinforced or framed structures industrial and heavy commercial buildings.	50mm/s at 4 Hz and above.	
Unreinforced or light framed structures Residential or light commercial type buildings.	15mm/s at 4 Hz increasing to 20mm/s at 15 Hz.	20mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above.
Note 1 Values referred to are at the base of the building. Note 2 for unreinforced, at frequencies below 4Hz, a maximum displacement of 0.6 mm (zero to peak) should not be exceeded.		

Off Site Construction Traffic Noise

8.3.31 The change in noise associated with increased construction traffic on the surrounding road network has been calculated in accordance with CRTN.

8.3.32 The potential impacts as a result of off-site road traffic have been evaluated in accordance with the DMRB short term traffic noise effect criteria given in **Table 8.6**. The change has been calculated as the difference between the baseline scenario and baseline with peak construction traffic.

Table 8.6 DMRB Short Term Traffic Noise Effect Criteria

Noise Change, $L_{A10,18hr}$ dB	Magnitude of Effect
0	No change
0.1 – 0.9	Negligible
1 – 2.9	Minor
3 – 4.9	Moderate
5+	Major

8.3.33 The SOAEL is considered to be equivalent to be a 3 dB change; the LOAEL is a 1 dB change. The change in noise level is calculated on individual road links, however the effect criteria apply to the total road traffic noise change at receptors, so in some cases additional calculations have been completed. The LOAEL the SOAEL are subject to lower cut off values of 55dB $L_{A10,18hr}$ and 68dB $L_{A10,18hr}$ respectively at the façade of the receptor.

Operational Noise

Mechanical Plant Noise

8.3.34 The operation of noise sources from the Proposed Development, including building services mechanical plant, has been assessed against BS 4142. The assessment is based on the difference between the rating noise level of the specific operational noise source and the measured background noise levels during periods of potential operation. The rating level includes corrections for acoustic character should these be present in the specific operational noise (such as tones or impulsiveness).

8.3.35 BS 4142 states that typically the greater the difference between the rating level and the background noise level, the greater the magnitude of the impact:

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

- 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 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.

8.3.36 **Table 8.7** gives an indication of how the BS 4142 assessment may align with the national noise policy effect levels; however, the actual impact will depend on the context the new noise source is introduced into.

Table 8.7 Operational Noise Assessment Criteria Effect Level

Difference between Rating Level and Background Level	BS 4142 Rating	NPSE effect level
-10 dB*	N/A*	NOEL
0 dB	Indication of the specific sound source having a low impact depending on the context.	LOAEL
+10 dB	Likely to be an indication of a significant adverse impact depending on the context.	SOAEL

** The difference between rating level and background level of -10 dB was removed from BS 4142: 2014 revision; however, this rating level can still be used as an indication of NOEL.*

Off-Site Operational Traffic Noise

8.3.37 The change in noise associated with increased operational traffic on the surrounding road network has been calculated in accordance with CRTN. For roads with less than 1000 vehicles per 18 hours the change in noise level has been calculated in accordance with 'A Guide to Measurement and the Prediction of the Equivalent Continuous Sound Level L_{eq}'.

8.3.38 The potential impacts as a result of off-site road traffic have been evaluated in accordance with DMRB long term traffic noise effect criteria in **Table 8.8**. The change has been calculated as the difference between the future year 'do minimum' scenario and a future year 'do something' scenario, representative of the opening year 2030.

Table 8.8 DMRB Long Term Traffic Noise Effect Criteria

Noise Change, $L_{A10,18hr}$ dB	Magnitude of Effect
0	No change
0.1 – 2.9	Negligible

Noise Change, $L_{A10,18hr}$ dB	Magnitude of Effect
3 – 4.9	Minor
5 – 9.9	Moderate
10+	Major

8.3.39 The SOAEL is considered to be equivalent to be a 3 dB change for short to medium term effects and a 5 dB change for long term effects; the LOAEL is a 1 dB and 3 dB change respectively. The change in noise level is calculated on individual road links, however the effect criteria apply to the total road traffic noise change at receptors, so in some cases additional calculations have been completed. The LOAEL the SOAEL are subject to lower cut off values of 55dB $L_{A10,18hr}$ and 68dB $L_{A10,18hr}$ respectively at the façade of the receptor.

Proposed Development Site Suitability

8.3.40 The introduction of a noise sensitive development into areas exposed to noise requires that a site suitability assessment is completed. The uses within the Proposed Development consist of residential units which have noise sensitive internal rooms and external spaces.

8.3.41 With the Proposed Development operational, the Site will be exposed to noise from the existing noise sources. The Site will also be exposed to new noise sources which will be implemented as part of the Proposed Development, such as mechanical plant servicing commercial units.

8.3.42 Assessment of the Proposed Development has been based on survey data from the unattended baseline measurements.

8.3.43 The site suitability assessment involves comparison of measured noise levels to various internal and external guidelines which the Proposed Development should be designed to meet. Where the Proposed Development meets these guidelines, it is expected that the noise levels experienced by future users will be below the LOAEL and adverse effects will be unlikely to occur.

Residential Uses – Internal Rooms

8.3.44 The following guideline internal ambient noise levels for habitable rooms, shown in **Table 8.9** are given in BS 8233. The feasibility of the Proposed Development achieving these guideline levels has been assessed to determine the suitability of the Site for the proposed noise sensitive uses.

Table 8.9 BS 8233 Residential Internal Ambient Noise Level Criteria

Activity	Typical Situation	Average Ambient Daytime Noise Level $L_{Aeq,16hr}$ dB	Average Ambient Night-time Noise Level $L_{Aeq,8hr}$ dB
Resting	Living rooms	35	N/A
Dining	Dining rooms	40	N/A
Sleeping (Daytime resting)	Bedrooms	35	30

8.3.45 In locations where regular individual noise events occur (such as scheduled aircraft or passing trains) which can cause sleep disturbance, BS 8233 recommends that a guideline value be set in terms of sound exposure level (SEL) or L_{AFmax}, the maximum sound level, during a measurement period or a noise event, depending on the character and number of events per night. Where development is considered necessary or desirable, the criteria in **Table 8.9** may be relaxed (increased) by up to 5 dB.

8.3.46 The WHO Guidelines of Community Noise 1999 recommends that a 'Typical night-time L_{AFmax} dB' value of 45 dB should not be exceeded more than 10 to 15 times inside bedrooms during the night-time period to avoid potential sleep disturbance.

Residential Uses - External Spaces

8.3.47 The suitability of the use of outdoor amenity spaces within the Proposed Development has been assessed in line with guidance from BS 8233 which states the following:

"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$ with an upper guideline value of 55 dB $L_{Aeq,T}$ 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, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, 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."

8.3.48 Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations,

specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas but should be achievable in some areas of the space."

Site Vibration Exposure

8.3.49 The nearest potential vibration sources are from local road traffic. Heavy road traffic would only be expected to lead to significant vibration levels if it is within a 5 to 10 m distance from the sensitive receptor and the roads are in poor condition. The roads surrounding the Site are in good condition and further than 10m from sensitive receptors. Therefore, road traffic is not expected to give rise to significant vibration effects due to the propagation distances and road surface conditions required to maintain significant levels of vibration at the receptor. Subsequently, no further assessment of vibration exposure from road traffic has been completed.

8.3.50 The Oxted Railway Line runs parallel to the northwest portion of the Proposed Development. Potential vibration impact due to nearby railway movements on nearby lines has been assessed in line with guidance from BS 6472 and criteria given in **Table 8.10**. Vibration levels that result in possible or probable adverse comment would be considered to be a 'significant' effect.

Table 8.10 BS 6472 Vibration Dose Value Ranges within Residential Buildings

Place and Time	Adverse comment not expected ($ms^{-1.75}$)	Low probability of adverse comment ($ms^{-1.75}$)	Adverse comment possible ($ms^{-1.75}$)	Adverse comment probable ($ms^{-1.75}$)
Residential buildings 16hr day (07:00-23:00)	<0.2	0.2 to 0.4	0.4 to 0.8	>0.8
Residential buildings 8hr night (23:00-07:00)	<0.1	0.1 to 0.2	0.2 to 0.4	>0.4

Limitations and Assumptions

Demolition and Construction Phase

Demolition and Construction Noise

8.3.51 Detailed methodology for the demolition and construction of the Proposed Development is not available at this stage and would be determined by the appointed contractor at each phase of the development. However, indicative construction information has been provided by the Applicant based upon size and scale of the scheme, its location, and their professional judgement.

8.3.52 Assuming continuous working, the Proposed Development will be delivered in approximately 4 years with four phases of construction as outlined in **Table 5.4** and **Figure 5.11** in **ES Volume 2, Chapter 5: The Proposed Development and Construction Overview**.

8.3.53 Based on the current available works description, activities are expected to begin at the north of the Site and progress toward the south, durations and start and end dates for activities are as follows:

- Enabling works and site infrastructure: Q3 2026 – Q1 2027
- Main works: Q2 2027 – Q4 2029
- Care home: Q3 2028 – Q2 2029
- Fit out, internal works and landscaping: Q4 2027 – Q2 2030

8.3.54 It is considered that the noise impact would be greatest during enabling and site infrastructure works.

8.3.55 An indicative construction programme and plant list is detailed in **ES Volume 2, Chapter 5: The Proposed Development and Construction Overview**.

8.3.56 Noise impacts from main works are likely to be lower than the enabling and site infrastructure works and would be lower still during facade and fit-out works.

8.3.57 The core working hours for site preparation and construction would be:

- 07:30 – 18:30 hours weekdays;
- 08:00 – 13:00 hours Saturday; and
- No working Sunday & Bank Holiday.

8.3.58 Any works outside of these hours would be subject to regulatory approval.

Construction Vibration

8.3.59 Of the works described above, it is assumed that surface compaction will have the potential to lead to significant levels of vibration at receptors.

8.3.60 Rollers used during surface compaction works are included in the proposed construction plant and equipment to be used during the demolition and substructure works.

Construction Road Traffic Noise

8.3.61 Construction year 2028 presents the highest number of peak daily construction movements for HGVs and light vehicles. Peak construction traffic levels have been assessed against 2030 baseline traffic flows.

8.3.62 The assessment is based on traffic data provided by the Applicant's Transport Consultants.

Operational Noise

Operational Mechanical Plant

8.3.63 TDC will require the Proposed Development to comply with their noise limits. It is assumed that sufficient embedded mitigation will be employed so that the limits are complied with.

Operational Road Traffic

8.3.64 Future traffic flows include all predicted flows to be generated by the proposed and committed developments in the agreed list of cumulative schemes in order to represent the worst-case noise change on the surrounding roads when the Site is fully operational, and all homes are occupied.

8.4 Scoping and Consultation

8.4.1 An EIA Scoping Report (presented in **ES Volume 3, Appendix A1)** was submitted to TDC on 22nd August 2024 with a formal request for an EIA Scoping Opinion on the proposed scope of the EIA and the assessment methodologies. in accordance with Regulation 15 of the EIA Regulations. TDC subsequently issued their Scoping Opinion on the proposed scope and methodology of the topics for assessment within the EIA. A copy of TDC's Scoping Opinion is provided in **ES Volume 3 Appendix A2**.

8.4.2 No specific points were raised regarding the noise and vibration assessment.

8.5 Baseline Assessment and Identification of Key Receptors

Noise Sensitive Receptors

8.5.1 The following existing and proposed noise sensitive receptors in proximity to the Proposed Development have been taken into consideration when assessing

the impacts associated with noise and vibration from both the construction and operational phases. All identified receptors are of high sensitivity.

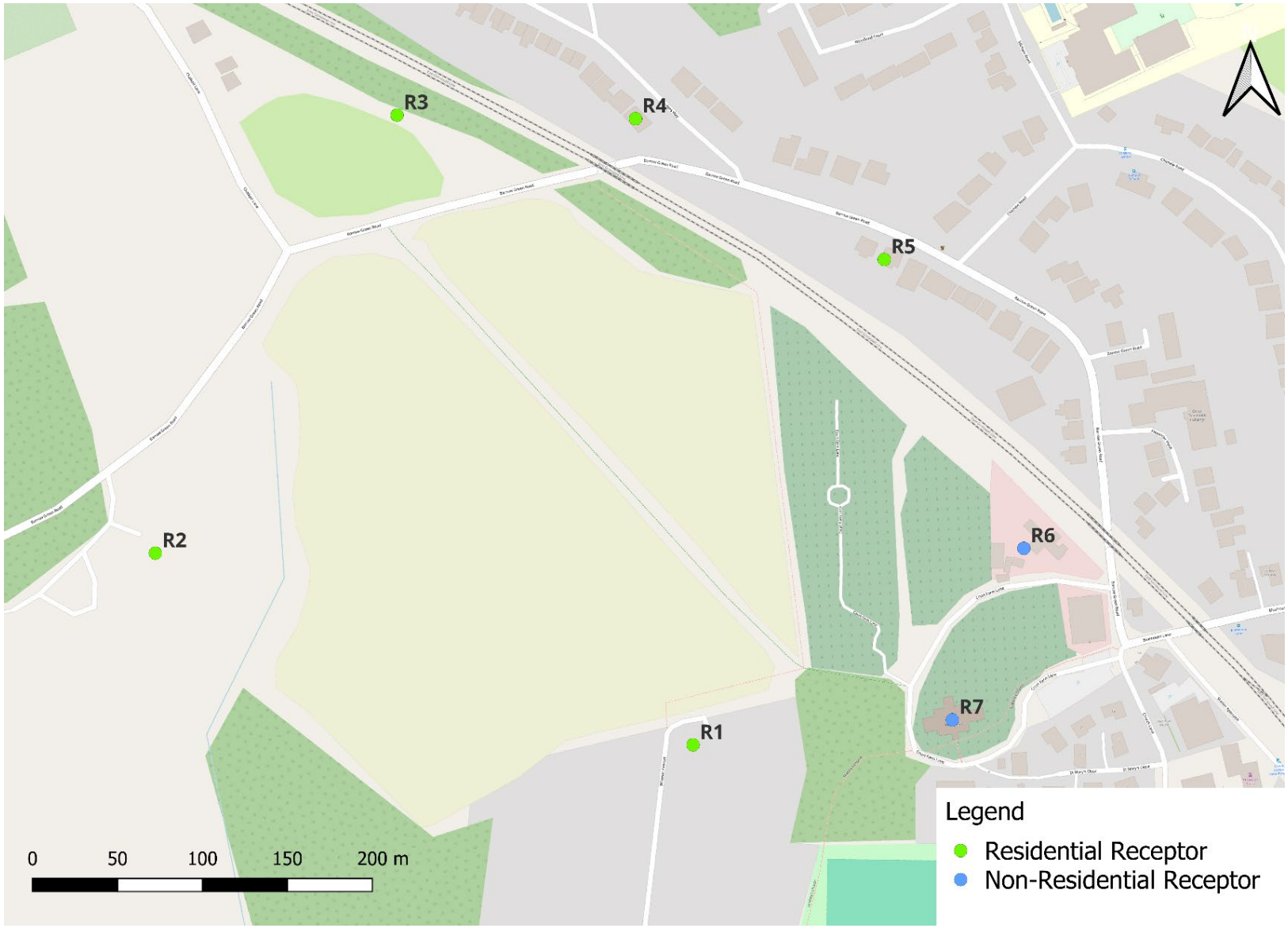
8.5.2 The existing receptors and type of receptor are presented in **Table 8.11** as follows:

Table 8.11 Existing Receptors

Receptor ID	Receptor	Type	Approximate worst case distance from Site
R1	Residences on Wheeler Avenue	Residential	35m
R2	Residences on Barrow Green Road	Residential	100m
R3	Residences on Barrow Green Road	Residential	85m
R4	Residences on Gordons Way	Residential	70m
R5	Residences on Barrow Green Road	Residential	50m
R6	Medivet Oxted	Non-Residential	150m
R7	St Mary's Church	Non-Residential	100m

8.5.3 **Figure 8.2** shows the locations of the existing noise sensitive receptors.

Figure 8.2 Existing Receptor Locations



temple

Baseline Survey and Results

8.5.4 During the unattended and attended survey measurements, it was noted that the noise environment across the majority of the Site is dominated by road traffic noise from Barrow Green Road; areas to the north-west are also exposed to rail noise from the Oxted Rail Line. A description of dominant and perceptible noise sources at each measurement location is included in **ES Volume 3, Appendix D, Noise and Vibration**.

8.5.5 **Table 8.12** presents a summary of the noise levels derived for each receptor from the 2024 unattended survey results measured at ground level.

8.5.6 Measurements at all locations were considered to be under free field conditions. 3D modelling was used in conjunction with survey measurements to determine the baseline noise levels at receptors. Full results of the baseline noise surveys and information concerning how level have been derived are presented in **ES Volume 3, Appendix D, Noise and Vibration.**

Table 8.12 Summary of Noise Levels Derived for Each Receptor from Unattended Survey Results

Receptor IDs Represented	Ambient Noise Level $L_{Aeq,T}$ dB		Typical Maximum Noise Level L_{Amax} dB		Typical Minimum Background Noise Level L_{A90} dB	
	Day	Night	Day	Night	Day	Night
	07:00-23:00	23:00-07:00	07:00-23:00	23:00-07:00	07:00-23:00	23:00-07:00
R1	50	40	55	50	42	39
R2	52	43	68	63	44	40
R3	55	46	68	63	44	40
R4	61	52	68	63	44	40
R5	64	54	68	63	44	40
R6	47	40	55	50	42	39
R7	47	40	55	50	42	39

Future Baseline

8.5.7 Without the Proposed Development, road traffic noise levels in the area may increase marginally over time primarily due to road traffic growth or specific committed developments. Other factors such as changes in car and road surface technology may offset that increase to an extent. It is expected that these changes will have a negligible effect on the assessment and therefore, no adjustments have been made to the existing baseline data collected to account for changes in the future baseline.

8.6 Identification and Description of Changes Likely to Generate Effect

Demolition and Construction

8.6.1 Demolition and construction activities close to sensitive receptors could potentially generate noise impacts, particularly when noisy activities coincide. These impacts can lead to temporary direct, reversible effects in the form of annoyance, speech interference and disturbance and are confined to the local scale (i.e. surrounding buildings).

8.6.2 Where compaction activities are to take place near existing sensitive receptors, vibration impacts may arise. This impact can lead to temporary direct, reversible effects in the form of annoyance from perceptible vibration of short to medium duration and are confined to the local scale (i.e. surrounding buildings). In more extreme cases, it can also lead to direct and permanent effects in the form of building damage (cosmetic and structural) on the local scale.

8.6.3 Construction road traffic could potentially generate additional noise impacts at noise sensitive receptors surrounding the Proposed Development. These impacts can lead to temporary effects in the form of annoyance and disturbance of short to medium duration and are generally confined to the local scale (i.e. surrounding roads) but has the potential to lead to effects on the district scale (i.e. roads further afield).

Operation

8.6.4 During operational phase, noise from static sources within the Proposed Development (mechanical plant and equipment associated with residential and commercial building services) could potentially generate noise impacts. This can lead to direct, reversible effects in the form of annoyance and disturbance of long-term duration and are confined to the local scale (i.e. surrounding receptors).

8.6.5 During operation of the Proposed Development, a change in road traffic could potentially generate noise impact. This can lead to indirect, reversible effects in the form of annoyance and disturbance of short to medium duration, then potentially lead to effects of long-term duration and are generally confined to the local scale (i.e. surrounding roads) but has the potential to effect on the district scale (i.e. roads further afield).

8.7 Assessment of Likely Significant Effect

Demolition and Construction Phase

Embedded Mitigation Measures

Construction Noise and Vibration

8.7.1 Impacts during the noisiest periods should be considered and addressed in terms of "Best Practicable Means" (BPM) and controlled and managed through the Section 61 process of the Control of Pollution Act 1974.

8.7.2 BS 5228 does not state criteria for acceptable levels of construction noise; therefore, the preferred approach is to reduce noise levels where possible, but with due regard to practicability. Sometimes a greater noise level may be acceptable if the overall construction time, and therefore length of disruption, is reduced.

8.7.3 Within the Construction Environmental Management Plan (CEMP) (to be secured by planning condition), there will be a noise and vibration management strategy. This will identify the probability of vibration from ground compaction activities to determine the need for periodic or continuous vibration monitoring and to highlight opportunities for engagement and giving prior warning to local receptors.

8.7.4 In addition to BPM measures, the calculations of construction noise are worst case and assume that all plant are operating at the closest location to the receptor simultaneously. In practice this is unlikely to occur, and so levels of noise and vibration will be reduced.

Construction Off-Site Traffic Noise

8.7.5 As per the CEMP, a Construction Logistics Plan will be implemented to manage vehicle routing, access to Site, on site management and vehicle movements and working hours.

8.7.6 Provision should be made, wherever possible, to ensure that unloading of vehicles will be carried out on-site rather than on the adjacent roads. All construction traffic entering and leaving the Site should be closely controlled.

Vehicles making deliveries or removing spoil from the Site should travel via designated traffic routes previously agreed with local authorities and interested parties. Construction traffic should be controlled by means of a vehicle arrival and departure management plan to achieve an even spread of vehicle movements during the working day. Access and egress for construction vehicles may vary according to the particular stage or phase of the works.

8.7.7 As a matter of good practice, measures designed to reduce the number of vehicle trips attributable to workforce commutes will be implemented, as part of the Construction Logistics Plan, by facilitating modal shift, discouraging the use of private vehicles for trips to and from the Site, particularly as a single occupant and encouraging waking, cycling, public transport and/or car sharing. Appropriate measures include: the provision of up-to-date public transport information (i.e. timetables, bus maps and routes, etc.) to site workers during toolbox talks, inductions or similar and keeping information updated on a site noticeboard in a prominent location.

Anticipated Effects

Demolition and Construction Noise

8.7.8 The nearest existing noise sensitive receptors around the Proposed Development are existing residential receptors (R1, R2, R3, R4 & R5) and the additional two identified noise sensitive non-residential receptors (R6 & R7). These noise sensitive properties in some locations are within 35 m of the Proposed Development.

8.7.9 Predictions of noise levels associated with Enabling works and Site infrastructure, Main works, Care home and Fit out works listed in the indicative construction programme have been undertaken at 1 m from the facade of the noise sensitive receptors identified in **Table 8.11** for all elevations.

8.7.10 Calculations have been carried out in accordance with BS 5228: Part 1. The assessment includes activity plant items based on BS 5228 and likely percentage operational times for the construction plant.

8.7.11 **Table 8.13** presents the predicted $L_{Aeq,10hr}$ facade levels for a working day ($L_{Aeq,5hr}$ for Saturdays) at each of the closest residential receptors.

Table 8.13 Predicted Worst Case and Typical $L_{Aeq,\ 10hr}$ ($L_{Aeq,5hr}$ for Saturdays) at the closest residential receptors.

Receptor	BS 5228 ABC Category/ Impact Threshold	Representative daytime ambient noise level ($L_{Aeq\ 16hr}$), dB at façade	Predicted worst case construction noise level $L_{Aeq,10hr}$ ($L_{Aeq,5hr}$ for Saturdays), dB at façade	Worst Case Impact Magnitude
R1	A/65	50	65	Minor Adverse
R2	A/65	55	56	Minor Adverse
R3	A/65	58	57	Minor Adverse
R4	A/65	64	59	Minor Adverse
R5	B/70	67	62	Minor Adverse

8.7.12 Based on **Table 8.13** the assessment indicates that the effects of construction activities could have a minor adverse effect during construction at residential receptors R1, R2, R3, R4 & R5 at a worst-case distance. Details of the calculations are presented in **ES Volume 3, Appendix D, Noise and Vibration.**

8.7.13 **Table 8.14** presents the predicted $L_{Aeq,10hr}$ facade levels for a working day ($L_{Aeq,5hr}$ for Saturdays) at the closest non-residential receptor.

Table 8.14 Predicted Worst Case $L_{Aeq,\ 10hr}$ ($L_{Aeq,5hr}$ for Saturdays)

Receptor	Representative daytime ambient noise level ($L_{Aeq\ 16hr}$), dB at façade	Predicted worst case construction noise level $L_{Aeq,10hr}$ ($L_{Aeq,5hr}$ for Saturdays), dB at façade	Total noise level (pre-construction ambient plus site noise) $L_{Aeq,T}$ dB at façade	Impact Magnitude
R6	50	52	54	Minor
R7	50	56	57	Minor

8.7.14 At Medivet Oxted (R6) and St Mary's Church (R7) the predicted combined noise level does exceeds the ambient level but is below the lower cut off value so the effect of construction works on these receptors is likely to be minor.

8.7.15 It should be noted that the calculation methodology used assumes that no screening or other forms of attenuation are provided (except site hoarding), and a worst-case distance has been used for all work activities. Predicted noise levels are therefore conservative and in practice the actual noise levels may be lower than those predicted.

8.7.16 The nature of the construction works mean that the conservative situation predicted may only exist for a matter of days, or even hours. There would be regular periods, even during a single day, when the assumed plant would not be in operation, for example during breaks or changes of working routine. All works will be undertaken in accordance with BPM, and appropriate mitigation adopted where applicable.

Construction Vibration

8.7.17 Of the works described above, it is assumed that the most significant vibration generating activities associated with the works will be ground compaction during enabling works.

8.7.18 Based on assumptions of a typical vibratory roller, a double drum Bomag BW 135 AD vibratory roller, free-field resultant PPVs have been calculated using calculations in TRL Report 429 'Groundborne vibration caused by mechanised construction works'.

8.7.19 The calculated resultant peak particle velocities for steady state operation are shown in **Table 8.15**. Details of the calculations are presented in **ES Volume 3, Appendix D, Noise and Vibration**.

Table 8.15 Estimated Free-Field Vibratory Roller PPVs

Receptor	Worst case distance between receptor and vibratory roller, m	Resultant Peak Particle Velocity (mm/s)	Resultant Peak Particle Velocity (mm/s)
R1	35	0.2	Negligible
R2	100	0.1	Negligible
R3	85	0.1	Negligible
R4	70	0.1	Negligible
R5	50	0.1	Negligible
R6	150	0.0	Negligible

Receptor	Worst case distance between receptor and vibratory roller, m	Resultant Peak Particle Velocity (mm/s)	Resultant Peak Particle Velocity (mm/s)
R7	100	0.1	Negligible

8.7.20 **Table 8.15** indicates there is a negligible risk of an adverse effect from construction vibration at the nearest receptors at the Site.

8.7.21 It should be noted that the assessment is based on worst case distances from the parameter plan (i.e. between the receptor and Site boundary) and, therefore, activities at this distance will be limited in their durations and will occur over a larger area. Given the likely short duration of the exposure to these levels, the effect is likely to be negligible at all receptors.

8.7.22 This potential vibration impact will be managed via planning for compacting activities to take place, where possible, during periods when occupants of the surrounding buildings are least likely to be sensitive to the construction vibration. It has been assumed that the start-up and run down of vibratory plant will take place at greater distances.

8.7.23 This potential vibration impact will be managed via planning for vibration activities to take place, where possible, during periods when occupants of the surrounding buildings are least likely to be sensitive to the construction vibration.

8.7.24 Vibration levels generated during all construction works would be significantly below the levels that may cause even cosmetic damage to properties.

Construction Off Site Traffic Noise

8.7.25 Noise impacts that may arise due to construction traffic flows have been assessed based on information provided by the project traffic consultants and are detailed in **ES Volume 2, Chapter 5: The Proposed Development and Construction Overview**. The access to the Site designated for construction purposes will be limited to the entrance off Barrow Green Lane, with construction traffic moving from the M25 to the A25. Proposed routes for construction vehicles have been included **ES Volume 2, Chapter 5: The Proposed Development and Construction Overview**.

8.7.26 The change in noise associated with increased construction traffic on the surrounding road network has been calculated in accordance with CRTN, the results of the assessment are presented in **Table 8.16**.

Table 8.16 Construction Road Traffic Noise Assessment

Road	Predicted Change in Traffic Noise Level, $L_{A10,18hr}$, dB	Short Term Impact Level
Barrow Green Lane (to the west of proposed site access)	0.5	Negligible
A25 Godstone Road (West of Church Ln)	0.1	Negligible

8.7.27 The assessment shows that changes in road traffic noise due to the Proposed Development during the 2028 peak construction year are predicted to be negligible in the short term for all road links listed. No changes are expected on all other road links.

Operational Phase

Embedded Mitigation Measures

Mechanical Plant Noise

8.7.28 Currently there is limited detailed information on the proposed noise generating plant to be used on Site once operational.

8.7.29 It is assumed that sufficient embedded mitigation will be employed so that the limits are complied with, if any mechanical plant is to be installed. Plant limit criteria for plant to be installed as part of the Proposed Development will be addressed at reserved matters stage. No likely significant effects are to occur if these limits are complied with.

Operational Traffic Noise

8.7.30 A framework travel plan, provided by the traffic and transport consultant, is presented in **ES Volume 3 Appendix E.** The plan provides a long-term management strategy to support sustainable and active travel at new developments.

Anticipated Effects

Mechanical Plant Noise

8.7.31 **Table 8.17** identifies recommended operational noise limits based on the noise survey results.

8.7.32 The operational noise limit is the rating level measured at the relevant receptor as defined in BS 4142. The limit applies to the measured or calculated total

combined specific noise levels from the plant or equipment, at 1 m from the closest window of the relevant sensitive property during that stated time period. Should the noise from the plant contain any impulsive or tonal characteristics, the rating level should include the appropriate acoustic character correction as specified in BS 4142.

Table 8.17 Recommended Operational Noise Limits Rating Levels

Receptor	Day (07:00-23:00)		Night (23:00-07:00)	
	Typical Lowest Background Noise Level, L_{A90} dB	Operation Limit Rating Level dBA	Typical Lowest Background Sound Level, L_{A90} dB	Operation Limit Rating Level dBA
New and existing Residential Receptors	44	44	40	40

8.7.33 All plant to be installed on, or as part of, the Proposed Development will be subject to the above criteria which can be secured by way of condition. The collective sum of all plant operating under worst case conditions will achieve the above limits with careful selection of plant items and appropriate attenuation (enclosures, attenuation packages, induct silencers, etc.) of air source heat pumps and the atmosphere terminations of ventilation plant. Plant items should be located as far as practicable or not overlooking any residential premises.

8.7.34 Based on the above, no significant adverse effects as a result of mechanical plant noise are anticipated.

8.7.35 Detailed calculations of mechanical plant noise should be completed at detailed design stage to ensure that plant noise limits can be achieved.

Operational Road Traffic Noise

8.7.36 **Table 8.18** presents the predicted change in noise level associated with increased development traffic on the surrounding road network during operational phase year 2030 when all phases are complete and operational. Details of the calculations are presented in **ES Volume 3, Appendix D, Noise and Vibration.**

Table 8.18 Operational Road Traffic Noise Assessment

Road	Predicted Change in Traffic Noise Level, $L_{A10,18hr}$ dB	Short Term Impact Level	Long Term Impact Level
Barrow Green Lane (to the east of proposed site access)	1.4	Minor	Negligible
Barrow Green Lane (to the west of proposed site access)	1.9	Minor	Negligible
Wheeler Avenue	2.2	Minor	Negligible
Church Lane (East of Wheeler Avenue)	0.3	Negligible	Negligible
Church Lane (N/S Alignment, north of Station Rd W)	0.3	Negligible	Negligible
Church Lane (West of Wheeler Avenue)	0.2	Negligible	Negligible
A25 Godstone Road (West of Church Ln)	0.1	Negligible	Negligible
A25 West Hill (East of Church Ln)	0.0	Negligible	Negligible
East Hill Road (N/S Alignment)	0.3	Negligible	Negligible
A25 East Hill Road (E/W Alignment)	0.1	Negligible	Negligible

8.7.37 The assessment shows that changes in road traffic noise due to the Proposed Development during the operation year 2030 are predicted to be minor in the short term on Barrow Green Road and Wheeler Avenue. For all other links, the assessment indicates that changes in road traffic noise due to the Proposed Development during operational phase year 2030 will be negligible in the short term and the long term.

Site Suitability

Internal Levels

Road Traffic Noise

8.7.38 Noise exposure from existing sources to which the Proposed Development is exposed can lead to noise impacts due to elevated internal noise levels in habitable rooms (such as livings rooms and bedrooms). This can lead to effects such as annoyance, speech interference, disturbance and, during the night-time, sleep disturbance.

8.7.39 Noise survey results have been used to calculate the noise contribution from surrounding roads and rail line on the worst-affected receptors within the Proposed Development. CadnaA noise modelling software has been used to carry out the prediction and calculation of road traffic and rail noise from surrounding existing roads and rail sources.

8.7.40 **Table 8.19** presents a summary of the worst-case noise exposure levels identified for the proposed dwellings nearer the site boundary and surrounding noise sources. Dwellings further into the centre of the Site will be exposed to lower noise levels. The $L_{Aeq,16hr}$ and $L_{Aeq,8hr}$ noise exposure levels have been derived from the noise model. The $L_{AFmax,T}$ has been derived from the L_{Amax} baseline survey data from the closest representative survey location, with point source distance attenuation applied. A map of the proposed blocks is presented in **ES Volume 2, Chapter 5: The Proposed Development and Construction Overview**.

Table 8.19 Summary of Typical Noise Exposure at Proposed External Facades

Elevation	Typical Day $L_{Aeq,16hr}$, dB 0700-2300	Typical Night $L_{Aeq,8hr}$, dB 2300-0700	Typical Night $L_{Amax,8hr}$, dB 2300-0700
Facades to the North and East within approx. 50m of the railway line	58	53	63
Facades to the North and East further than approx. 50m of the railway line	57	49	63
South	47	40	50
West	47	40	50

8.7.41 Daytime internal noise levels should be controlled to allow reasonable resting conditions in living rooms and bedrooms. Night-time internal noise levels should be controlled to allow reasonable sleeping conditions in bedrooms.

8.7.42 The criteria for indoor noise levels are 35 dB $L_{Aeq,16hr}$ during the day in living rooms, and 30 dB $L_{Aeq,8hour}$ and 45 dB L_{AFmax} during the night in bedrooms. Where a development is considered necessary or desirable, these may be relaxed (increased) by up to 5 dB.

8.7.43 **Table 8.20** shows the recommended design approach to achieve the targets set out in BS 8233 and the WHO guidance on internal noise levels for worst affected facades facing roads. No ventilation openings such as trickle vents are proposed on the facades facing Bow Common Lane or the railway line for background ventilation.

8.7.44 On the internal facing facades, lower levels of sound insulation facade elements will likely be acceptable.

Table 8.20 Required Sound Insulation and Design Approach for the Proposed Development

Facade	Room Type	Outline guidance on the required glazing sound insulation to achieve BS 8223:2014 & WHO guidelines for Community Noise, R_w + C_{tr}, dB
All facades	Living Room	Standard performance glazing (25dB R_w+C_{tr} for example 4/12/4)
	Bedroom	

8.7.45 External noise ingress calculations indicate that it is feasible to meet the BS 8233 and WHO guideline internal noise levels using the following practical design approach for the building facade:

- specific calculated assessment required of sound insulation for all elements of the building envelope;
- moderate sound insulation for non-vision areas and roof;
- standard acoustic performance windows of minimum sound insulation as set out in **Table 8.20**; and
- acoustic rated ventilation where required to meet minimum sound insulation.

8.7.46 As the internal ambient noise exposure can be controlled to suitable targets, the Proposed Development is suitable for residential purposes. A detailed calculation of the internal noise levels should be undertaken during detailed design stage to assist with the design of the building facade and ensure suitable internal noise levels are achieved.

Rail Vibration Assessment

8.7.47 Vibration measurements were obtained from the passing by of several passenger trains. During the survey, there was no perceptible vibration felt by the surveyor on-site.

8.7.48 Using data sourced from Southern Rail, the approximate number of trains passing the Site is 100 during each day and 12 during the night. The 16hr day and 8hr night VDV have been calculated along each axis based on the above number of events and the average measured VDV for the trains passing and are presented in **Table 8.21.**

Table 8.21 Day and night-time predicted VDV for the London Underground

Vibration Criteria	X-axis	Y-axis	Z-axis
VDV_{16hr} $m/s^{1.75}$	0.02	0.02	0.04
VDV_{8hr} $m/s^{1.75}$	0.01	0.01	0.02

8.7.49 Based on the predicted vibration levels presented in **Table 8.22**, there is a low probability of adverse comment a result of the Oxted Rail Line trains, according to the BS 6472 criteria. The effect on the Proposed Development is considered to be not significant.

Plant Noise

8.7.50 Mechanical heating, ventilating and air conditioning (HVAC) systems can contribute to noise disturbance; therefore, where possible fixed plant should be positioned away from any noise sensitive receptors.

8.7.51 Without mitigation measures, HVAC Systems could cause a significant impact on local noise sensitive receptors. At this stage in the design process, the exact location, make, model and number of HVAC units associated with the Proposed Development has not yet been determined.

8.7.52 When detailed information and locations are available, a comprehensive assessment will be undertaken to demonstrate compliance with TDC criteria.

8.7.53 A condition added to any future planning permission to require that prior to the installation of any fixed plant associated with the Proposed Development, full details of the equipment to be installed will be submitted to TDC for approval.

Overheating

8.7.54 During overheating conditions, there are greater ventilation requirements to cool the rooms within residential dwellings. In most cases, this additional ventilation would be provided by the use of open windows. There is a risk of greater noise impact during overheating conditions as noise will be let in through the open windows.

8.7.55 Approved Document O indicates that windows are likely to be closed if noise levels within bedrooms exceed 40 dB $L_{Aeq,8hrs}$ and 55 dB L_{AFMax} more than 10 times a night. In these cases alternative forms of overheating mitigation to open windows may be required.

8.7.56 Following the ANC Guide to Demonstrating Compliance with the Noise Requirements of Approved Document O July 2022 v1.0, the Proposed Development would be considered a medium risk location, so the outside-to-inside level difference for window openings necessary to satisfy the simplified method of Approved Document O are expected to be 9dB.

8.7.57 Taking the 9dB outside-to-inside level difference, facades of dwellings to the North and East within approximately 50m of the railway line are likely to exceed the Approved Document O noise levels where alternative forms of overheating mitigation to open windows may be required. Therefore, during the design of these dwellings more detailed assessment of the noise impact during the overheating condition is required so that suitable mitigation can be included. There should be consideration of the layout so that noise sensitive uses (bedrooms) are located away from the noise sources wherever possible.

8.7.58 All other facades are forecast to be below the Approved document O requirement, so open windows would be allowable as a means of controlling overheating.

External Noise Levels – Residential

8.7.59 It is desirable that the external noise level in amenity spaces such as private gardens does not exceed 50 dB $L_{Aeq,16hr}$, with an upper guideline value of 55 dB $L_{Aeq,16hr}$, which would be acceptable in noisier environments.

8.7.60 The assessment of external noise levels to BS 8233 and WHO guideline levels indicates that the guideline level of 50 dB $L_{Aeq,16hr}$ would be achieved for the majority of the amenity areas within the centre of the Proposed Development facing away from surrounding roads and railway line. External facing facades overlooking surrounding roads and railway line are unlikely to achieve guideline noise levels for external amenity areas.

8.7.61 **Figure 8.3** shows the external noise levels at the ground floor level. Light green is below the recommended limit of 50 dB $L_{Aeq,T}$, dark green indicates the level is

below the upper guideline limit of 55 dB $L_{Aeq,T}$, red indicates that the noise level exceeds the upper guideline level.

8.7.62 The effect of noise on residents wishing to use the external amenity areas exposed to more than 55 dB $L_{Aeq,T}$ can be assessed as a moderate adverse effect. It is acknowledged that the current indicative placement of the Local Equipped Area for Play (LEAP) is partially within this area (as shown in **Figure 8.3** below). However, as the scheme is outline in nature, further design refinement will take place at reserved matters stage to ensure that the potential for adverse effects will be minimised.

8.7.63 Additionally, BS 8233 recognises that although there are ideal target levels, it is not always achievable in noisier areas where development is desirable. Higher noise levels need to be balanced against other considerations such as the benefit of living in these central areas.

8.7.64 Furthermore, the Planning Practice Guidance advises that noise impacts may be partially off-set if the residents of those dwellings affected by high noise levels have access to:

- a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings, and/or;
- a relatively quiet, protected, external publicly accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minutes walking distance).

8.7.65 There are relatively quieter areas within the amenity spaces which are screened from the road and rail noise as well as the nearby (within 5 minutes' walk) green space of Master Park which is available to all residents.

Figure 8.3 External Noise levels $L_{Aeq,16hr}$ in external amenity areas at 1.5m above ground level, dB.

8.8 Scope for Additional Mitigation Measures

Potential Additional Mitigation Measures

Demolition and Construction Phase

Noise and Vibration

8.8.1 A Construction Environmental Management Plan (CEMP) will be secured by condition and implemented by the contractor during construction which will act as the means for delivering the mitigation described below. General construction noise and vibration mitigation measures may include the following:

- unnecessary revving of engines should be avoided, and equipment switched off when not in use;
- internal haul routes should be kept well maintained;
- drop heights of materials should be minimised;
- plant and vehicles should be sequentially started up rather than all together;

- as far as reasonably practicable, sources of significant noise should be enclosed;
- plant should always be used in accordance with manufacturers' instructions;
- care should be taken to place site equipment away from noise-sensitive areas;
- where possible, loading and unloading should also be carried out away from such areas;
- regular and effective maintenance by trained personnel should be undertaken to keep plant and equipment working to manufacturers specifications; and
- breaking out of concrete structures should be undertaken using concrete 'munching' equipment where possible. If percussive breaking is undertaken, then it will be done so during agreed hours.

8.8.2 As specified in **ES Volume 2, Chapter 5: The Proposed Development and Construction Overview**, the Site hoarding will be applied to all Site perimeters in accordance with the requirements of the CEMP.

Off-Site Traffic Noise

8.8.3 No additional mitigation measures are proposed for off-site traffic noise.

Operational Phase

Mechanical Plant Noise

8.8.4 Plant items should be located as far as possible away from and not overlooking any residential premises. Noise due to mechanical services equipment may need to be controlled by selecting low-noise items of plant, fitting acoustic louvred screens or enclosures, or erecting acoustic screens.

8.8.5 This will be applied to ASHPs and other noise generating equipment at the top of any houses where appropriate. An assessment of the proposed mechanical services plant should be undertaken, during the detailed design stage, to demonstrate that the limits proposed in **Table 8.17** will be achieved.

Application Site Noise Exposure

Internal Noise Levels

8.8.6 Where possible, plant will be located away from noise sensitive residential dwellings or amenity areas and regular maintenance will be undertaken on all proposed plant to ensure the units are operating efficiently and not generating undue noise.

8.8.7 Mitigation in the form of restricting deliveries to the daytime only and controlling delivery hours would be suitable ways of minimising disturbance to residents.

External Noise Levels

8.8.8 No additional mitigation measures are proposed for reducing external noise levels.

Likely Effectiveness of Additional Mitigation Measures

Demolition and Construction Phase

Noise

8.8.9 With the additional mitigation measures listed above, short term minor adverse effects are still expected at the closest residential properties surrounding the Proposed Development (R1, R2, R3, R4 & R5); however, they will be minimised as far as is practicable using BPM and, in some cases, reduced to negligible effects.

8.8.10 With the additional mitigation measures listed above, minor adverse effects are still expected at the closest non-residential receptor to the Proposed Development (R7).

Vibration

8.8.11 With the additional mitigation measures listed above, the assessment indicates that construction vibration is likely to lead to negligible effects.

Off-Site Traffic Noise

8.8.12 With the additional mitigation measure listed above, construction off site traffic is likely to lead to negligible effects due to road traffic noise.

Operational Phase

Mechanical Plant Noise

8.8.13 With the additional mitigation measures listed above, effects from operational mechanical plant noise are likely to be negligible.

Off-Site Traffic Noise

8.8.14 No additional mitigation measures are proposed for operational road traffic noise so impacts are predicted to be minor on Barrow Green Lane in the short term and negligible in the long term on Barrow Green Lane and on all other local road links in the short and long term.

External Noise Levels

8.8.15 With the additional mitigation measures listed above, effects on residents using outdoor amenity areas are likely to be negligible.

8.9 Residual Effects

8.9.1 Following the effective implementation of the additional mitigation measures proposed above, the activities that could have a minor adverse effect at R1, R2, R3, R4 & R5 during the construction phase. It should be noted that the calculation methodology used assumes that no screening or other forms of attenuation are provided (except site hoarding), and a worst-case distance has been used for all work activities.

8.9.2 Predicted noise levels are therefore conservative and in practice the actual noise levels may be lower than those predicted. The nature of the construction works mean that the conservative situation predicted may only exist for a matter of days, or even hours. There would be regular periods, even during a single day, when the assumed plant would not be in operation, for example during breaks or changes of working routine.

8.9.3 All works will be undertaken in accordance with BPM and appropriate mitigation adopted where applicable, which would reduce the impact of the activity as much as possible.

8.9.4 No other significant residual effects are predicted to arise from the Proposed Development during construction or operational phases.

8.10 Cumulative Effects

8.10.1 Cumulative effects are the combined effects of several development schemes (in conjunction with the Proposed Development) which may, on an individual basis be insignificant but, cumulatively, have a significant effect.

8.10.2 The ES has given consideration to 'Cumulative 'Effects' for schemes located within 5 km radius from the boundary of the Site as listed in **ES Volume 2, Chapter 3: EIA Methodology, Table 3.7.**

Demolition and Construction Phase

Noise and Vibration

8.10.3 Schemes that are located within approximately 5 km of the identified sensitive receptors can give rise to potential cumulative noise and vibration impacts should construction works take place simultaneously on all sites.

8.10.4 The following nearby committed development schemes are identified as potentially affecting some of the same receptors as the Proposed Development during construction:

- Land at Chichele Road, Oxted (APP/M3645/W/24/3345915);
- Land off Oxted Road (A25), Oxted (APP/M3645/W/21/3272384); and
- Oxted Quarry, Chalkpit Lane, Oxted (TA/2023/1135)

8.10.5 It is assumed that contractors for other sites will comply with BPM and any other TDC requirements in order to reduce the impacts of cumulative construction works noise. Hence, it is considered that an increase in the effects described at identified receptors in the chapter from cumulative construction noise is unlikely.

Off-Site Traffic Noise

8.10.6 Cumulative noise effects from construction traffic from planned committed developments have been considered. Off-site construction traffic figures used in this assessment include the cumulative developments, therefore, cumulative noise from construction traffic from planned schemes is unlikely to give rise to any additional adverse effects.

Operational Phase

Noise

8.10.7 It is expected that building services noise from the committed developments will be designed to achieve appropriate operational noise limits.

8.10.8 Due to the distances between the committed developments and the nearest receptors, it is considered that compliance with operational noise limits at each development would not result in limits being exceeded with all developments in operation.

8.10.9 Overall, it is considered that the effect of cumulative building services noise would be of negligible significance.

Off-Site Traffic Noise

8.10.10 The traffic flow data provided by the Applicant's Transport Consultant and used in the noise assessment takes into consideration the cumulative effects of increased traffic from committed developments under the 'future do something' scenario.

8.10.11 Therefore, cumulative effect of noise from operational traffic is unlikely to give rise to any additional adverse effects.

8.11 Summary and Conclusions

8.11.1 The assessment has been based on environmental surveys, prediction and calculations undertaken for the Site.

8.11.2 The main sources of noise incident on the Site and surrounding receptors are road traffic noise, rail noise, pedestrian noise, and occasional overhead aircraft noise.

8.11.3 The impact of noise and vibration during construction of the Proposed Development has been predicted and assessed in accordance with BS 5228. Impacts from construction activities are predicted at the closest noise sensitive receptors to the works with temporary minor adverse effects likely. Best practicable means measures will be secured by condition and implemented to minimise noise and vibration from the construction Site.

8.11.4 It is predicted that off-site traffic, as a result of construction activities, will not affect the noise environment despite an increase in construction traffic on the surrounding road network. The overall road traffic noise changes are negligible.

8.11.5 Proposed plant are likely to be the primary noise generating plant in the Proposed Development. It is assumed that sufficient embedded mitigation is employed so that the noise limits set out in this chapter are complied with. No likely significant effects are likely to occur if these limits are complied with.

8.11.6 Operational road traffic has been assessed in terms of a change in noise associated with the operation of the Proposed Development. Short term minor impacts have been predicted on Barrow Green Lane. Short and long-term negligible effects during full operation of the Proposed Development have been predicted along all other local road links.

8.11.7 A Site Suitability assessment has been completed. A noise model has been used to predict rail and road traffic noise levels at the proposed facades and external spaces of sensitive receptors within the Proposed Development when operational. It is feasible to meet the BS 8233 and WHO guidelines on internal noise levels using the following practical design approach for the building facade and avoid adverse effects for future residents and educational uses:

- specific calculated assessment required of sound insulation for all elements of the building envelope;
- moderate sound insulation for non-vision areas and roof;
- standard acoustic performance windows of minimum sound insulation as set out in **Table 8.20** for all facades;
- acoustic rated ventilation where required to meet minimum sound insulation;

- guideline external noise levels are likely to be met for the majority of residential amenity areas within the Proposed Development such as gardens. Gardens within 30m of the road and rail line will be exposed to noise levels above the upper guideline of 55 dB $L_{Aeq,T}$. Where the noise level requirements are not met suitable alternative quieter areas are available.

8.11.8 The potential for cumulative noise and vibration impacts from other schemes that are located within approximately 5 km of the identified sensitive receptors have been assessed. It is considered unlikely that cumulative effects will occur during construction or operation.

8.11.9 **Table 8.22** summarises the topic effects resulting from the Proposed Development. Significant effects are not predicted at any of the nearest identified receptors.

Table 8.22 Summary of Residual Effects

Receptor/ Affected Group	Value or Sensitivity (Significance) of Receptor	Activity or Impact	Embedded Design Mitigation	Magnitude/ Spatial Extent/ Duration/ Likelihood of Occurrence	Significance of effect	Additional Mitigation	Residual Magnitude of Impact	Significance of Residual effect
Construction								
Existing residential receptors R1, R2, R3, R4 & R5.	High	Construction Noise during Demolition & Enabling and Substructure Activities	Best Practicable Means. Engagement and prior warning to local receptors. Construction Environmental Management Plan (CEMP)	Minor Direct Local Temporary Likely	Minor Adverse	Screening S61	Minor	Minor Adverse
Existing Non-Residential receptor R6 and R7.	High	Construction Noise during Demolition & Enabling and	Best Practicable Means. Engagement and prior warning to	Minor Direct Local	Minor Adverse	Screening S61	Minor	Minor Adverse

Receptor/ Affected Group	Value or Sensitivity (Significance) of Receptor	Activity or Impact	Embedded Design Mitigation	Magnitude/ Spatial Extent/ Duration/ Likelihood of Occurrence	Significance of effect	Additional Mitigation	Residual Magnitude of Impact	Significance of Residual effect
		Substructure Activities	local receptors. Construction Environmental Management Plan (CEMP)	Temporary Likely				
Existing receptors within 150m of the site boundary (R1, R2, R3, R4, R5, R6 & R7)	High	Construction Vibration during Demolition & Enabling and Substructure Activities	Best Practicable Means. Engagement and prior warning to local receptors. Construction Environmental Management Plan (CEMP)	Negligible Direct Local Temporary Likely	Negligible	None	Negligible	Negligible
	High			Negligible	Negligible	None	Negligible	Negligible

Receptor/ Affected Group	Value or Sensitivity (Significance) of Receptor	Activity or Impact	Embedded Design Mitigation	Magnitude/ Spatial Extent/ Duration/ Likelihood of Occurrence	Significance of effect	Additional Mitigation	Residual Magnitude of Impact	Significance of Residual effect
All existing noise sensitive receptors.		Construction Traffic	Construction Traffic Management Plan	Direct Local Temporary Likely				
Operation								
All existing noise sensitive receptors	High	Operational Mechanical Plant	Plant Noise Limits	Negligible Direct Local Temporary Likely	Negligible	None	Negligible	Negligible
Residential receptors R1, R2, R3 & R5	High	Operational Traffic	None	Minor Direct Local Temporary Likely	Short Term Minor Adverse / Negligible Long term	None	Short Term Minor Adverse / Negligible Long term	Minor Adverse
	High		None	Negligible	Negligible	None	Negligible	Negligible

Receptor/ Affected Group	Value or Sensitivity (Significance) of Receptor	Activity or Impact	Embedded Design Mitigation	Magnitude/ Spatial Extent/ Duration/ Likelihood of Occurrence	Significance of effect	Additional Mitigation	Residual Magnitude of Impact	Significance of Residual effect
Residential and non-residential receptors R4, R6 & R7		Operational Traffic		Direct				
				Local				
				Temporary				
				Likely				
Cumulative Effects – Construction								
No cumulative effects likely								
Cumulative Effects – Operation								
No cumulative effects likely								