



Chapter 10

NOISE AND VIBRATION

10 Noise and Vibration

Preface

This ES chapter has been revised to reflect the following:

- Response to relevant consultation of the Submitted Scheme;
- Updated construction and operational phase noise modelling assessments reflecting changes to the Transport Assessment and additional embedded mitigation; and
- Updated cumulative noise assessment of cumulative schemes.

The remaining sections remain broadly unchanged from the 2021 ES. The only change in the significance of residual effects stated in the 2021 ES is identification of significant cumulative road traffic noise effects during the night-time period at three sensitive receptors.

10.1 Introduction

- 10.1.1 This chapter of the ES was prepared by Noise Consultants Limited ('NCL') and presents an assessment of the likely significant effects of the Development on land at Junction 10, M40, Baynards Green. Mitigation measures are identified, where appropriate, to avoid, reduce or offset any significant adverse effects identified and/or enhance likely beneficial effects. The nature and significance of the likely residual effects are reported.
- 10.1.2 The chapter considers the effects of:
- Construction activities and traffic movements (construction noise and vibration);
 - Noise associated with the operation of the Development (operational sound); and
 - Development related road traffic movements (operational road traffic noise).
- 10.1.3 The chapter is supported by the following technical appendices:
- Appendix 10.1 - Technical Glossary;
 - Appendix 10.2 - Legislation, Planning Policy and Guidance – Further Information;
 - Appendix 10.3 - Construction Noise and Vibration;
 - Appendix 10.4 - Operational Sound;
 - Appendix 10.5 - Operational Road Traffic Noise; and
 - Appendix 10.6 - Road Traffic Noise Contours.
- 10.1.4 The chapter should be read in conjunction with the following chapter:
- Chapter 12: Biodiversity. for consideration of likely noise effects on species and habitats.

Competence

- 10.1.5 The principal author of this work is Tom Everson BSc(hons) MIOA. He is a Senior Consultant with 6 years' experience in acoustics, noise and vibration prediction, measurement, and assessment. Tom is a Corporate Member of the Institute of Acoustics and Tom has key experience in noise modelling, assessment and EIA. He has been responsible for leading work part of multi-disciplinary projects and as stand-alone specialist assessments. His project experience includes: renewable energy, including wind power; rail and road infrastructure; residential and multi-use development; and construction noise management, including HS2 Euston station.
- 10.1.6 This work has been checked by George Gibbs BEng(hons) MSc CEng CEnv MIOA MIEnvSc. He is a Director of Environmental Acoustics with more than 15 years' experience in acoustics, noise and vibration prediction, measurement and assessment. George is a Chartered Engineer, a Chartered Environmentalist, and a Corporate Member of the Institute of Acoustics and of the Institute of Environmental Sciences. George has key experience in assessment and EIA and has been responsible for leading work part of multi-disciplinary projects and as stand-alone specialist assessment. His project experience includes: renewable energy, including wind power; nuclear new build; rail and road infrastructure; residential and multi-use development; airport expansion; mineral extraction; waste and recycling; and military activities.

10.2 Legislation, Planning Policy and Guidance

- 10.2.1 This section sets out a summary of the legislation, planning policy and guidance relevant to the noise assessment. Further information is included in Appendix 10.2.

Legislation Context

- 10.2.2 The following legislation is relevant to the Development:

- Planning Act (2008)¹;
- Land Compensation Act (LCA) (1973)²;
- Noise Insulation Regulations 1975³ and Noise Insulation (Amendment) Regulations 1988⁴. Regulations under the LCA 1973;
- Control of Pollution Act (1974)⁵;
- Environmental Protection Act (EPA) (1990)⁶;
- The Environmental Noise (England) Regulations (2006)⁷; and
- Noise and Statutory Nuisance Act (1993)⁸.

National

- 10.2.3 The following national planning policy is relevant to the Development:

- National Planning Policy Framework (2023)⁹; and
- Noise Policy Statement for England (NPSE) (2010)¹⁰.

Local

- 10.2.4 The following local planning policy is relevant to the Development:

- The Cherwell Local Plan 2011 - 2031 (incorporating re-adopted policy Bicester 13) (adopted July 2015); and
- Mid-Cherwell Neighbourhood Plan 2018-2031 (May 2019).

Guidance

10.2.5 The following guidance is relevant to the Development:

- The Guidelines for Environmental Noise Impact Assessment (2014)¹¹;
- WHO Community Noise Guidelines (1999)¹². These guidelines are partly superseded by the WHO Environmental Noise Guidelines for the European Region (2018)¹³;
- WHO Night Noise Guidelines (2009)¹⁴;
- BS 5228-1:2009+A1: 2014 Code of practice for noise and vibration control on construction and open sites: Part 1 – Noise (BS 5228-1) (2014)¹⁵;
- BS 5228-2:2009+A1:2014 Code of Practice for Noise and Vibration Control on Open Construction Sites – Part 2: Vibration (BS 5228-2) (2014)¹⁶;
- BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings: 1- Vibration sources other than blasting 2-Blast-induced vibration (2008)¹⁷;
- BS 7385-2:1993 Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from ground-borne vibration (1993)¹⁸;
- BS 4142: 2014+A1:2019 Methods for rating and assessing industrial and commercial sound (2019)¹⁹;
- BS 8233: 2014 Guidance on sound insulation and noise reduction for buildings (2014)²⁰;
- BS 7445-1:2003. Description and measurement of environmental noise. Guide to quantities and procedures (2003)²¹;
- Planning Practice Guidance Noise – PPG(N) (2019)²²;
- Calculation of Road Traffic Noise (CRTN) (1988)²³;
- Design Manual for Roads and Bridges: Sustainability & Environment Appraisal LA 111 Noise and vibration (LA 111) (2019)²⁴;
- Transport Research Laboratory (TRL) Report 53 ‘Ground vibration caused by civil engineering works’ (1986)²⁵; and
- Transport Research Laboratory (TRL) Report 429 (TRL 429 ‘Ground-borne vibration caused by mechanised construction works’, 2000²⁶.

10.3 Assessment Methodology

Consultation

10.3.1 Table 10.1 summarises key comments raised by consultees of relevance to this assessment and how the assessment has responded to them.

Table 10.1: Consultation Response Summary

Consultee and Comment	Response
<i>Fritwell Parish Council (29 July 2021) – EIA Scoping Opinion</i>	<p>What are the noise predictions at the site (in increased decibels) and range of noise attenuation to what localities?</p> <p>What will be the operational hours (is it 24/7)?</p> <p>Have residents in Ardley, Baynards Green, Fewcott, Fritwell and the new homes at Heyford Park been considered?</p> <p>An assessment of the change on road traffic noise levels has been undertaken across the Site at the surrounding receptors for both the day and the night-time periods. The Development is proposed for 24-hour operation and the assessment has considered the potential for adverse effects across these periods.</p> <p>The assessment has considered the likely noise related effects at receptors within the spatial scope, namely those at Baynards Green. The road traffic noise assessment has shown that receptors within other communities will experience a change in BNL of less than 1 dB(A) and have therefore not been considered in the assessment.</p>
<i>CDC (29 July 2021) – EIA Scoping Opinion</i>	<p>If required, reference should be made to BS4142:2014 (Methods for rating and assessing industrial and commercial sound) should noise sources be found that require this type of assessment.</p> <p>Sound from proposed industrial and commercial sources have been assessed in accordance with BS4142:2014+A1:2019.</p>
<i>CDC (23 June 2021) – Environmental Health and Planning</i>	<p>I have been asked to have a look at the methodology for the baseline survey at the above site. I can confirm that I happy with the approach that you have suggested.</p> <p>Proposed monitoring methodology adopted in the assessment.</p>
<i>CDC (05 November 2021) – Environmental Health</i>	<p>Having read the noise chapter of the ES I believe that as much as possible should be done to limit the noise impact of the nearby residential properties. I would therefore recommend that both the noise barrier in para 10.7.25 and the low noise road surfacing to achieve a further noise reduction of 3dB in para 10.7.29 be implemented should the scheme be granted permission by condition. In addition further mitigation developed as part of the final design should be supplied to and approved by the LPA prior to development commencing.</p> <p>A noise barrier and low noise road surfacing will be implemented along the B4100 to the north of the Western Development. A Construction Environment Management Plan (CEMP) will be submitted to the CDC prior to construction works taking place and will adopt best practical means (BPM) to mitigate noise as much as possible.</p>

Consultee and Comment	Response
<p>The travel plan designed to mitigate the impact on residential receptors should be supplied to and approved by the LPA prior to the commencement of the development.</p> <p>Prior to the commencement of the development, a Construction Environment Management Plan (CEMP), which shall include details of the measures to be taken to ensure construction works do not adversely affect residential properties on, adjacent to or surrounding the site together with details of the consultation and communication to be carried out with local residents shall be submitted to and approved in writing by the Local Planning Authority. Thereafter the development shall be carried out in accordance with approved CEMP.</p> <p>I would advise now that the council's recommend hours for construction work are set out below and differ from those proposed in para 6.5.2 of the ES:</p> <p>Monday to Friday - 7:30am to 6:00pm Saturday - 8:00am to 12:30pm Sunday - No noisy work Public / Bank Holidays - No noisy work</p>	

Study Area and Scope

- 10.3.2 The spatial extent of the study area has been considered with respect to the Eastern Development, Western Development, and Development.
- 10.3.3 The spatial extent of the study area for the construction noise and vibration assessment is consistent with those adopted in recent major infrastructure projects, including High Speed Two (HS2) Phases 1 and the 2a and Heathrow Expansion Project (HEP).
- 10.3.4 Details of the assessment year scenarios are summarised below:
- 2022 – Baseline (representative of pre-pandemic flows, as advocated in Chapter 8: Transport and Access);
 - 2026 – Future Baseline (without Development);
 - 2026 – Completed Development; and
 - 2026 – Completed Development + Tritax Scheme.

Construction Noise and Vibration

10.3.5 To assess the effects of construction noise and vibration, the spatial extents of the study area from the Site boundary are:

- 300m: noise from construction activities, such as material movements, earthworks, ground improvement and piling, crushing and breaking;
- 100m: ground-borne vibration effects from high energy construction activities, including piling works; and
- 1dB change: noise effects from construction vehicle movements on routes to and from the construction site (Eastern Development, Western Development, or Development) likely to result in a change of 1 decibel (dB) $L_{Aeq,T}$ or greater.

Operational Sound

10.3.6 To assess the effects of operational sound, the extents of the assessment include consideration of receptors where operational sound levels are likely to equal or exceed existing background sound levels, and therefore indicating the likelihood of an adverse impact. The receptor locations to be assessed were informed by the results of the baseline noise monitoring.

Operational Road Traffic Noise

10.3.7 For operational road traffic on new, altered or existing roads, the study area was defined based on the combined extent of:

- The area within 50m of road links with the potential to experience a short-term Basic Noise Level (BNL) change of more than 1 dB(A) as a result of the Development;
- Identified receptors with the potential to experience a short-term Basic Noise Level (BNL) change of more than 1 dB(A) as a result of the Development; and
- Where the noise level at identified receptors is forecast to exceed the relevant Lowest Adverse Effect Level (LOAEL).

Matters scoped out

10.3.8 Potential effects scoped out of this assessment include the potential effects of ground-borne vibration effects from construction and operational road traffic as these vehicle trips are not expected to form a significant source of vibration.

Establishing Baseline Conditions

10.3.9 Baseline data was collected over the study areas (set out in Section 10.3) and was obtained in three rounds of data gathering exercises:

- Round 1: A desk-based review of key data sources across the study area;
- Round 2: Noise modelling to inform baseline predictions; and
- Round 3: Noise surveys, where necessary.

Round 1: Desk-based review of key data sources

10.3.10 Round 1 baseline data collection has considered publicly available measurement and prediction data, including noise mapping published as required by the Environmental Noise (England) Regulations 2006, for major roads and major railways.

Round 2: Noise Modelling to Inform Predictions

10.3.11 Road traffic noise levels have been calculated within the study area for the 2022 Baseline scenario using the using LimA® computational sound modelling software (version 2020).

Round 3: Noise Surveys

10.3.12 A baseline noise survey was undertaken in July 2021 to inform an understanding of the baseline noise levels at locations representative of the closest residential and non-residential receptors.

10.3.13 The format of the survey was unattended continuous monitoring, supplemented by short-term measurements. Monitoring locations and durations are presented in Figure 10.1 are summarised in Table 10.2.

Figure 10.1: Monitoring Locations

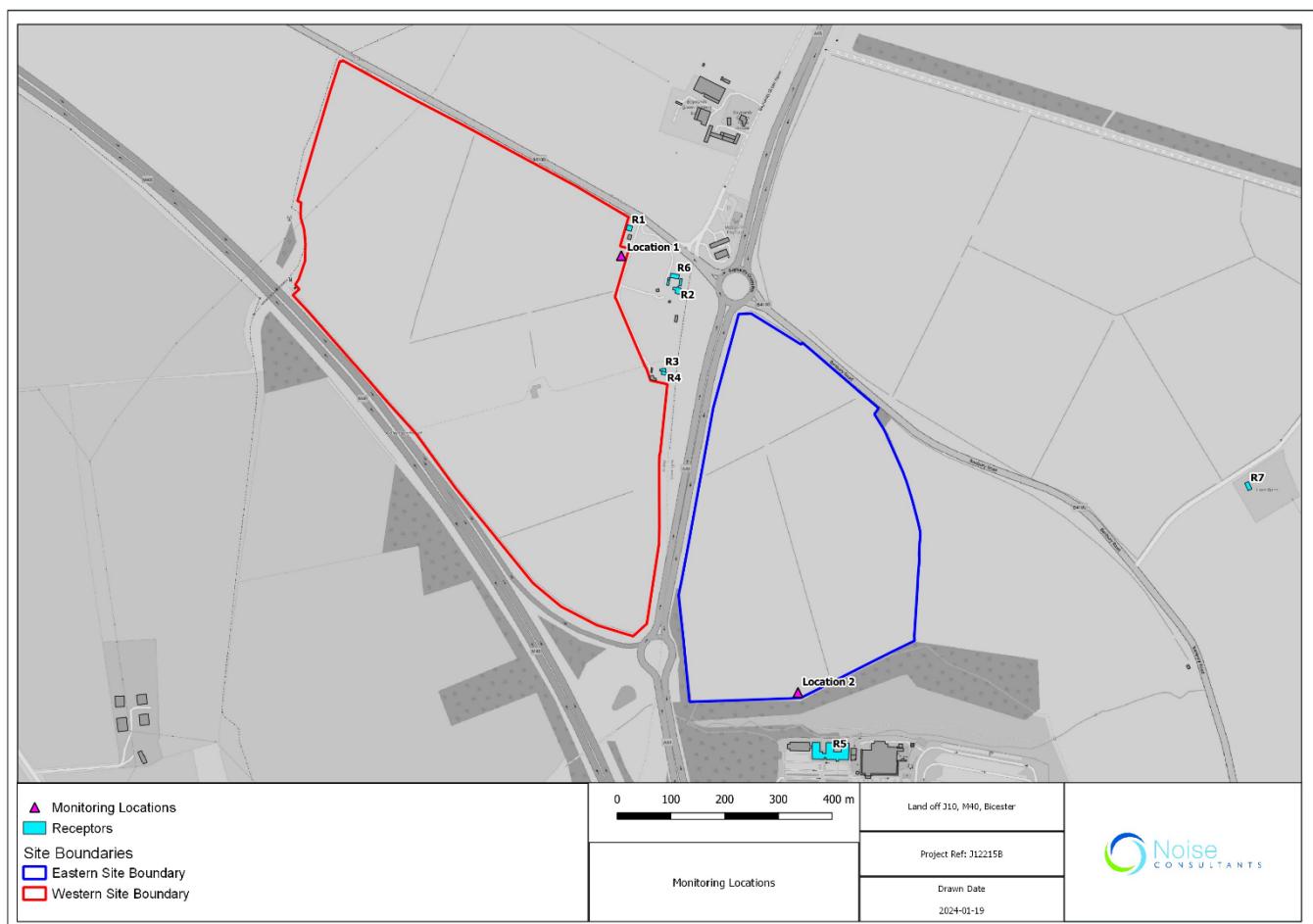


Table 10.2: Monitoring Locations

Monitoring Location	Location	Measurement Period (dd/mm/yyyy hh:mm)	Description
1	Western Development	06/07/2021 13:30hrs - 07/07/2021 13:00hrs	A measurement location at the northern section of the Western Development to quantify ambient noise levels representative of R1 – Medkre, R2 - Baynard House, R3 –

Monitoring Location	Location	Measurement Period (dd/mm/yyyy hh:mm)	Description
			1 The Cottages, R4 – 2 The Cottages, and R6 – Baynard Barn.
2	Eastern Development	06/07/2021 14:15hrs - 07/07/2021 13:30hrs	A measurement location at the southern boundary of the Eastern Development to quantify ambient noise levels representative of R5 - Travelodge Hotel.

Identifying Likely Significant Effects

10.3.14 The identification of likely significant effects requires consideration of the following:

- Significant adverse impacts on health and quality of life, as identified through Government noise policy as set out by the NPSE;
- Environmental likely significant effects (adverse and beneficial);
- In-combination noise effects (intra-project effectsⁱ); and
- Cumulative noise effects (inter-project effects).

Significant adverse impacts on health and quality of life

10.3.15 The NPSE (2010) requires noise and vibration assessments to identify effects from a development that would result in significant adverse impacts on health and quality of life. The NPSE (2010) Noise Policy vision is to:

"Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development".

10.3.16 This long-term vision is supported by three Noise Policy Aims that can be delivered through effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development. These aims are 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 improvement of health and quality of life.

10.3.17 The NPSE (2010) effect levels that relate to the likelihood of significant adverse effects on health and quality of life are as follows:

- NOEL - 'No Observed Effect Level': The level below which no effect can be detected;
- LOAEL - 'Lowest Observed Adverse Effect Level': The level above which adverse effects on health and quality of life can be detected; and
- SOAEL - 'Significant Observed Adverse Effect Level': The level above which significant adverse effects on health and quality of life occur.

10.3.18 PPG(N) provides further detail about how the effects of noise can be described in terms of perception and outcomes, adding a fourth term:

ⁱ See Chapter 3: EIA Methodology for further explanation of project effect definitions

- UAEI – ‘Unacceptable Adverse Effect Level’: The level above which adverse effects are unacceptable.

10.3.19 A noise exposure hierarchy is presented in PPG(N), linking the response of the receptor to the increasing effect levels and associated actions, as summarised in Table 10.3.

Table 10.3: PPG(N) Noise Exposure Hierarchy

Increasing Effect Level	Response	Observed Effect	Action
Below NOEL	Not present	No effect	No specific measures
Above NOEL	Present and not intrusive	No Observed Effect	No specific measures
Above LOAEL	Present and intrusive	Observed Adverse Effect	Mitigate and reduce to a minimum
Above SOAEL	Present and disruptive	Significant Observed Adverse Effect	Avoid
Above UAEI	Present and very disruptive	Unacceptable Adverse Effect	Prevent

10.3.20 The NPSE states that a ‘single objective’ noise (or vibration) based measure applicable to all sources and receptors that defines the onset of LOAEL and SOAEL is not possible. However, the thresholds for the onset of each of the effect levels can be defined based upon relevant policy, available Standards and technical guidance.

10.3.21 Where it is not possible to define the onset of LOAEL and SOAEL from policy, standards or guidance, the effect levels have been defined with reference to those used as part of nationally significant high-profile infrastructure projects in England.

10.3.22 Likely significant effects on health and quality of life is considered to have occurred should noise exposure from the Development result in a noise-sensitive receptor newly exceeding the SOAEL, taking into account any mitigation or compensation measures that are part of the Development.

Environmental likely significant effects (adverse and beneficial)

10.3.23 Likely significant effects in the context of the EIA Regulations are identified separately to government noise policy defined significant effects on health and quality of life, but do require that a development should include measures, where it is sustainable to do so, in order to “mitigate and minimise” adverse effects.

10.3.24 For the purposes of the assessment, noise exposure at assessed noise sensitive receptors that are below the LOAEL threshold are not considered to constitute a significant effect. Where the noise exposure at a residential receptor newly exceeds the SOAEL threshold, a likely significant adverse effect in terms of the EIA Regulations is deemed to occur, in addition to a significant observed adverse effect on health and quality of life in terms of government noise policy.

10.3.25 Determining whether a significant adverse effect occurs where noise exposure lies between the LOAEL and SOAEL thresholds requires consideration of additional quantitative and qualitative factors, namely:

- Noise level – the level of exposure between the LOAEL and SOAEL values;
- Change in noise level – the magnitude of noise level change; and
- Receptor type (community population) – the size of population exposed.

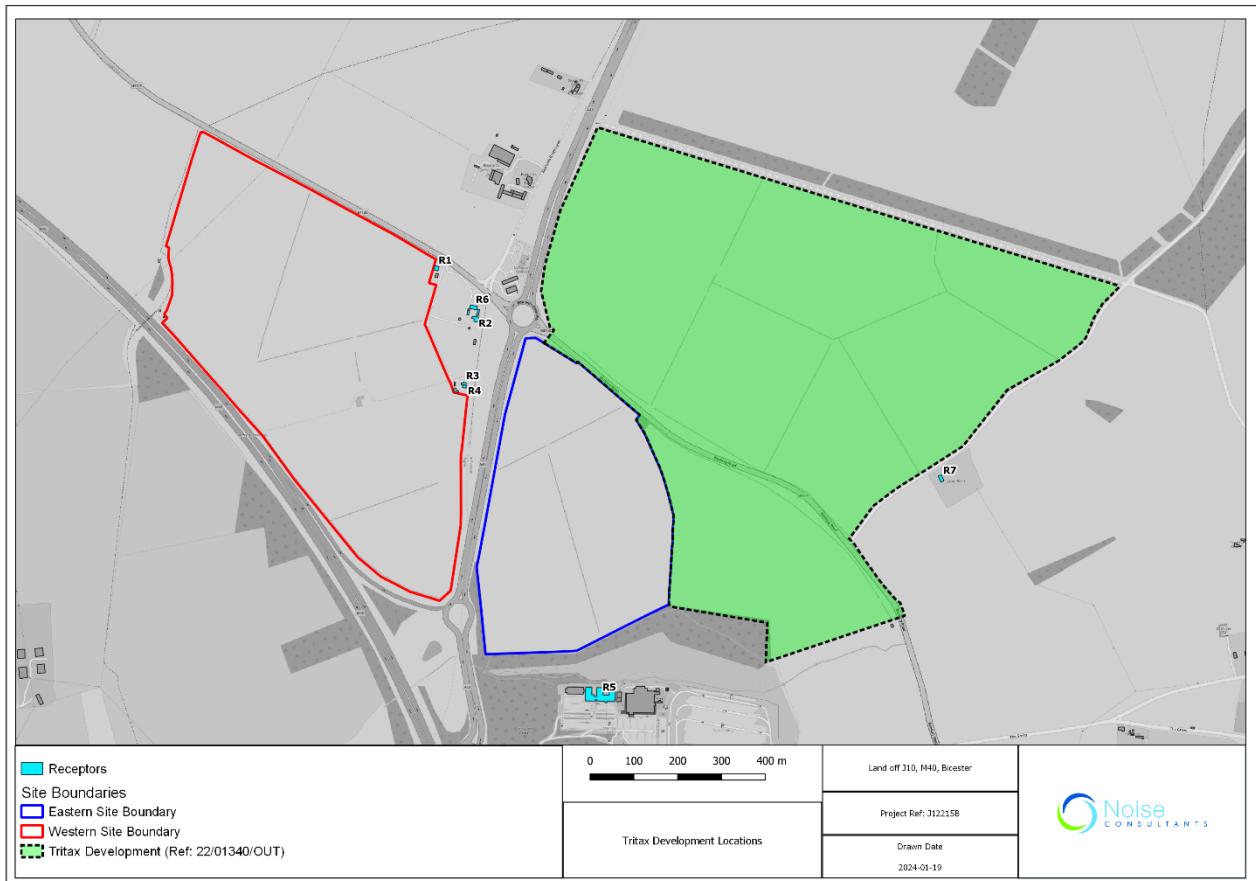
10.3.26 Additional factors to be considered include:

- type and magnitude of effect;
- the existing ambient acoustic environment;
- additional metrics (such as, L_{Amax});
- how effective the measures employed to mitigate effect are likely to be, based on professional judgement, including best practicable means (BPM);
- the duration of the effect; and
- the scale of population exposed.

Cumulative Effects

10.3.27 Potential significant cumulative noise effects can arise from inter-project effects (cumulative noise effects with other developments). There are no cumulative schemes in proximity that would create cumulative vibration impacts therefore this is not considered further. The proposed Tritax Scheme (Planning Ref: 22/01340/OUT) is located to the immediate north and east of the Eastern Development and could potentially create cumulative noise impacts. Cumulative noise impacts from the Development and the Tritax Scheme are therefore considered as part of the assessment of potential cumulative effects. The location of the Tritax Scheme with respect to the Site is presented in Figure 10.2.

Figure 10.2: Tritax Scheme (Planning Ref: 22/01340/OUT)



- 10.3.28 The assessment of inter-project effects requires an understanding of noise effects associated with other developments within the study area. The primary source is likely to be road traffic noise. Road traffic flows associated with other committed developments are included within the 2026 assessment years, and so are inherently considered as part of the road traffic noise assessment. However, the Tritax Scheme is currently not consented and road traffic flows associated with it are not included within the 2026 assessment years. Therefore, an assessment of cumulative road traffic noise from the Development and the Tritax Scheme is considered separately.
- 10.3.29 The study area for the construction assessment, as set out in paragraph 10.3.5, is limited to a maximum extent of 300m from the Site or where there is a 1dB change due to construction traffic movements. The Tritax Scheme is located within a 300m radius of the Site and both developments are expected to have a peak in construction activity in 2026. Therefore, the construction phase cumulative assessment accounts for potential construction noise impacts from both developments.
- 10.3.30 The study area for the operational noise assessment includes consideration of receptors where operational sound levels are likely to equal or exceed existing background sound levels, and therefore indicating the likelihood of an adverse impact. The receptor locations to be assessed were informed by the results of the baseline noise monitoring, and given the close proximity of the Tritax Scheme to the Site, cumulative operational noise impacts from both developments is considered as part of the assessment of the cumulative assessment.

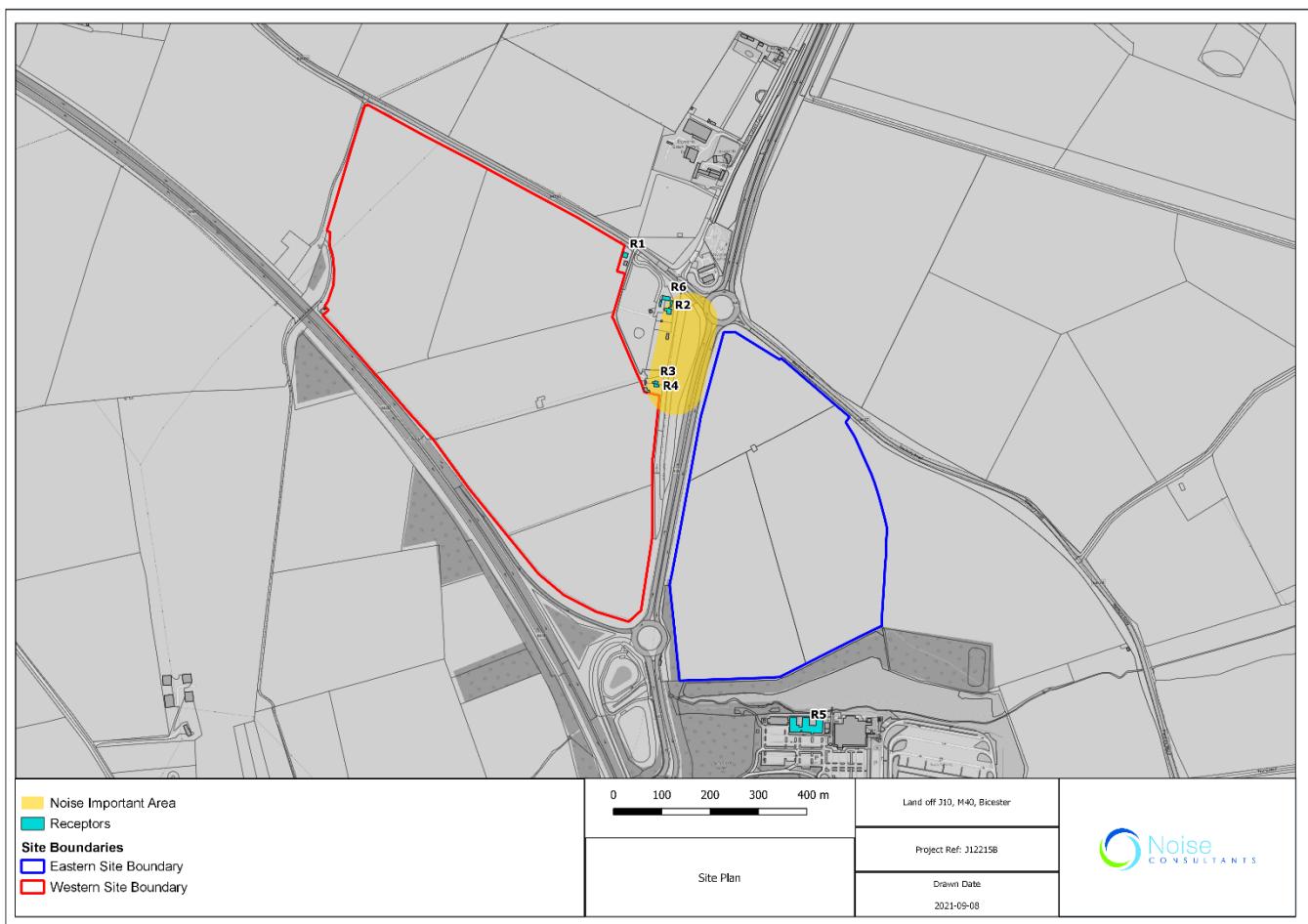
Determining Effect Significance

10.3.31 This section sets out the methodology for determining the significance of effect.

Receptor Groups

- 10.3.32 Where necessary, in addition to the likely effects of noise on individual residential receptors, consideration has been given to likely noise exposure within a community area, in particular where it was demonstrated that the noise exposure from the Development exceeds the LOAEL but is less than the SOAEL. In these instances, an environmental likely significant effect (adverse and beneficial) may occur with consideration of:
- The population within the community area; and
 - The sensitivity of the receptors within the community area, for instance the presence of buildings having specific noise and vibration sensitive resources, which are referred to as 'non-residential' receptors.
- 10.3.33 For community areas a similar assessment outcome may be demonstrated when there is a large effect at a small population, and a smaller effect at a large population. The evaluation of significance on a community basis is a combination of advice derived from Standards and policy, in addition to considerations of context and receptor sensitivity.
- 10.3.34 Where identified within the assessment spatial extents, non-residential receptors are also considered as they are likely to contain areas and activities that are potentially noise sensitive.
- 10.3.35 Noise Important Areas (NIAs) for roads and railways are areas identified by strategic noise maps as locations where the highest 1% of noise levels at residential locations can be found. There are approximately 10,000 NIAs in England, and their identification helps Highways England focus the planning and design of road traffic noise mitigation measures.
- 10.3.36 An NIA to the west of the A43, and incorporating part of the Development site, has been identified in the 2017 Defra strategic noise mapping. A consideration of the receptors existing sensitivity to noise is inherent in the assessment criteria, by way of consideration of the magnitude of change in noise level associated with the development, in addition to the absolute noise levels.
- 10.3.37 It is also not known whether Highways England have already developed road traffic noise mitigation measures with respect of the receptors in the NIA. On this basis, the receptors located within the NIA will be considered in the same context, and same assessment methodology, as those outside of the NIA.

Figure 10.3: Noise Important Area



10.3.38 In summary, the assessment considers the likely noise and vibration effects upon the receptors as detailed in Table 10.4. For residential receptors, consideration of noise related health effects included annoyance and sleep disturbance, with additional consideration of hypertension in the operational sound assessment.

10.3.39 For non-residential noise receptors, health outcomes considered were annoyance and disruption of use.

Table 10.4: Receptors Requiring Assessment for Noise and Vibration

Receptor group	Receptors included within group
Residential receptors	People, primarily where they live ('residential receptors') in terms of individual dwellings and on a wider community basis, including any shared community open areas (e.g. parks) as well as private open space (e.g. gardens) ⁱⁱ . Committed residential development identified following engagement with relevant local planning authorities, including Hayford Park, which is outside of the assessment scope.
Non-residential	Non-residential community facilities, namely educational, healthcare and places of worship, hotels, collectively described as 'non-residential receptors'.

ⁱⁱ 'Shared community open areas' are those that the national planning practice guidance identifies may partially offset a noise effect experienced by residents at their dwellings and are either a) relatively quiet nearby external amenity spaces for sole use by a limited group of residents as part of the amenity of their dwellings or b) a relatively quiet external publicly accessible amenity space (for example park to local green space) that is nearby.

Receptor group	Receptors included within group
receptors and quiet areas	Designated 'quiet areas' ⁱⁱⁱ . Committed noise sensitive non-residential development identified following engagement with relevant local planning authorities.

Receptors within study area

10.3.40 Residential and non-residential receptors within the study area have been identified using aerial photography and GIS datasets, and are shown in Figure 10.4 and Figure 10.5.

Assessing Significance

10.3.41 The section sets out the methodology for the identification of likely significant effects on residential receptors, and the assessment methodology and screening criteria adopted for non-residential receptors.

Residential Receptors

10.3.42 The PPG(N) noise exposure hierarchy was used to demonstrate the relationship between government noise policy observed effect, response and action, and EIA Regulations assessment considerations and effect, as summarised in Table 10.5 below.

Table 10.5: Government Noise Policy and EIA Regulations LOAEL and SOAEL Effect Interaction

Observed Effect	Response	Action	Assessment Consideration(s)	Effect
No effect	Not Present	No specific measures	None	Adverse effect unlikely
No observed effect	Present and not intrusive	No specific measures		
<i>Lowest Observed Adverse Effect Level (LOAEL)</i>				
Observed adverse effect	Present / Intrusive	Mitigate and reduce to a minimum	Noise Exposure Noise Change Population Additional Considerations	Possible EIA likely significant effect (adverse or beneficial)
<i>Significant Observed Adverse Effect Level (SOAEL)</i>				
Significant Adverse Effect	Present/ disruptive	Avoid	Noise Exposure Noise Change Additional Considerations	Significant adverse impact (health and quality of life) EIA likely significant effect (adverse or beneficial) where noise exposure currently exceeds SOAEL
Unacceptable Adverse Effect	Present/ very disruptive	Prevent		

ⁱⁱⁱ 'Quiet areas' comprise areas designated under Local Plans or Neighbourhood Development Plans as Local Green Spaces and areas identified as Quiet Areas through implementation of the Environmental Noise (England) Regulations 2006.

Construction Noise and Vibration

Construction Noise (fixed and mobile plant)

- 10.3.43 The LOAEL and SOAEL thresholds of potential effect were determined with regard to the ‘ABC Method’ Category A and Category C values, respectively, as set out in Annex E of BS 5228-1 (2014) and presented in Appendix 10.3.
- 10.3.44 The UAEL thresholds are based upon the BS 5228-1 (2014) requirements for temporary rehousing, associated with construction activities of 10 or more days of working in any 15 consecutive days, or for 40 or more days in any six consecutive months, and set at 10 dB above the SOAEL.

Construction Vibration

- 10.3.45 The assessment criteria for construction vibration have been determined with regards to BS 5228-2 (2014) and BS 7385:1993 and are presented in terms of Peak Particle Velocity (PPV mms^{-1}), as summarised in Appendix 10.3.
- 10.3.46 A significant effect from construction vibration is deemed to occur where there is a magnitude of impact exceedance of 1.00 mms^{-1} PPV during the daytime, or 0.30 mms^{-1} PPV during the night-time periods.

Construction Noise – Road Traffic

- 10.3.47 The assessment criteria used in the construction traffic assessment is consistent with the operational road traffic noise assessment, and is summarised in Appendix 10.3.

Operational Sound

- 10.3.48 BS 4142:2019 ‘Methods for rating and assessing industrial and commercial sound’ (BS 4142, 2019) is the principal assessment methodology used to carry out the assessment of sound of an industrial and/or commercial nature.
- 10.3.49 The assessment is performed by comparing the rating level of the sound source(s), $L_{Ar,Tr}$, against the background sound level, $L_{A90,T}$. The background sound level should be measured during a period in absence of the influence of sound from the industrial source. With regards to the assessment of impacts, BS 4142 (2019) states that:
- a) *“Typically, the greater the difference, the greater the magnitude of the impact”*
 - b) *“A difference of around + 10 dB or more is likely to be an indication of significant adverse impact, depending on the context”*
 - c) *“A difference of around + 5 dB is likely to be an indication of an adverse impact, depending on the context.”*
 - d) *“The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact. 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.”*

10.3.50 The BS 4142 (2019) guidance is an initial framework for the determination of likely effects, informed by additional considerations including: the magnitude of the effect; absolute level of noise; the existing ambient acoustic environment, and the sensitivity of the receptors.

10.3.51 The likely greatest operational sound sources from the Development include:

- Building services sound from the Development warehouses;
- Road traffic using roads within the Development; and
- Road traffic movements in car park areas.

Operational Road Traffic Noise

10.3.52 The LOAEL and SOAEL threshold of potential effect criterion for road traffic noise have been taken from LA 111 Noise and vibration (2019) guidance. For the daytime, the SOAEL noise exposure was deemed to be a façade level of 68 dB $L_{A10, 18hr}$ (equivalent of free-field level of 63 dB $L_{Aeq, 16hr}$)^{iv} and for the night-time period it was 55 dB $L_{night, outside}$.

10.3.53 The daytime and night-time LOAEL values were set at 55 dB $L_{A10, 18hr}$ (façade), and 40 dB $L_{night, outside}$, respectively.

10.3.54 UAEI levels are not set in UK policy for road traffic noise, therefore reference was made to ProPG (2017), and BS 8233 (2014). With respect to L_{Aeq} target levels within dwellings, ProPG (2017), states:

“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”

10.3.55 Taking the internal target noise levels advocated in BS 8233 (2014) and applying the ProPG (2017) 10 dB correction gives a daytime and night-time internal target noise criterion of 45 dB $L_{Aeq, 16hr}$ and 40 dB $L_{Aeq, 8hr}$, respectively. To convert the noise criterion to external free-field UAEI values a correction of 26 dB has been applied. A 26 dB indoor to outdoor noise level difference is based upon an assumed masonry construction dwelling, with standard thermal double-glazed windows (closed) with open trickle vent. This assumption is considered precautionary. Application of the 26 dB correction gives a daytime and night-time outdoor, free-field noise criterion of 71 dB $L_{Aeq, 16hr}$ and 66 dB $L_{Aeq, 8hr}$, respectively.

Significance Criteria – Summary

10.3.56 Values for the LOAEL, SOAEL and UAEI effect criteria, as referenced in the PPG(N) noise exposure hierarchy are summarised in Table 10.6, and are representative of outdoor, free-field values, unless otherwise stated.

Table 10.6: Thresholds of Potential Effect Criteria (outdoor, free-field noise levels unless otherwise stated)

Noise Source	Period	LOAEL	SOAEL	UAEI
Construction Noise	Daytime	65 dB $L_{Aeq, 12hr}$	75 dB $L_{Aeq, 12hr}$	85 dB $L_{Aeq, 12hr}$
	Evening	55 dB $L_{Aeq, 4hr}$	65 dB $L_{Aeq, 4hr}$	75 dB $L_{Aeq, 4hr}$

^{iv} BS 8233:2014 states that an $L_{A10, 18hr}$ can be converted to an $L_{Aeq, 16hr}$ with the following relationship: $L_{Aeq, 16hr} \approx L_{A10, 18hr} - 2 \text{ dB(A)}$

Additionally, a +3 dB correction is applied to a free-field level to obtain a façade level.

Noise Source	Period	LOAEL	SOAEL	UAEL
	Night	45 dB L _{Aeq,8hr}	55 dB L _{Aeq,8hr}	65 dB L _{Aeq,8hr}
Operational Sound	All	Effect criteria set in relation to BS 4142 (2019) requirements		
Construction and Operational Road Traffic Noise	Daytime	55 dB L _{A10,18hr} (façade)	68 dB L _{A10,18hr} (façade)	71 dB L _{Aeq,16hr}
	Night	40 dB L _{night, outside}	55 dB L _{night, outside}	66 dB L _{Aeq,8hr}

Significance Evaluation Criteria for Adverse Impacts on Health and Quality of Life

- 10.3.57 The evaluation of significance in relation to health and quality of life requires an understanding as to whether the calculated ‘end state’ noise exposure, inclusive of any reductions due to proposed mitigation, newly exceeds the potential effect criteria in Table 10.6.
- 10.3.58 Where the ‘end state’ i.e. with Development noise exposure newly exceeds the SOAEL value at a receptor, a significant effect in relation to health and quality of life has the potential to occur at an individual receptor. An unacceptable effect in relation to health and quality of life has the potential to occur where the noise emissions newly exceed UAEL.
- 10.3.59 Where the Development related noise exposure is demonstrated to be lower than the LOAEL values in Table 10.6, a significant effect in terms of the EIA Regulations is deemed not to occur.
- 10.3.60 Where the Development related noise exposure falls between LOAEL and SOAEL, this has the potential to constitute a significant effect, subject to the following considerations, namely:
- The level of noise exposure;
 - The change in the noise exposure as a result of the Development; and
 - The population experiencing such change and exposure to noise as a result of the Development.
- 10.3.61 The evaluation of potential significant effect on health and quality of life in relation to receptors newly exposed to development related noise exposures is considered on a case-by-case basis. However, in general, where a noise exposure is between the LOAEL and the SOAEL, and at least a medium change in exposure is calculated to occur, this is most likely to result in a significant effect.

Noise Exposure Classifications

- 10.3.62 Table 10.7 provides noise level exposure categories between the LOAEL and UAEL thresholds for application with the evaluation framework. Greater weight in terms of significance evaluation has been given to higher noise levels, even when occurring between the same thresholds, i.e. LOAEL and SOAEL.

Table 10.7: Noise Level Categories

Noise Level	Construction Noise			Construction and Operational Road Traffic Noise	
Very Low	<65dB L _{Aeq} , 12hr	<55dB L _{Aeq} , 4hr	<45dB L _{Aeq} , 8hr	<55dB L _{A10,18hr (f)}	<40dB L _{night} , outside
LOAEL					
Low	66-68dB L _{Aeq} , 12hr	56-58dB L _{Aeq} , 4hr	46-48dB L _{Aeq} , 8hr	56-59dB L _{A10,18hr (f)}	41-45dB L _{night} , outside
Medium	69-71dB L _{Aeq} , 12hr	59-61dB L _{Aeq} , 4hr	49-51dB L _{Aeq} , 8hr	60-63dB L _{A10,18hr (f)}	46-49dB L _{night} , outside
High	72-74dB L _{Aeq} , 12hr	62-64dB L _{Aeq} , 4hr	52-54dB L _{Aeq} , 8hr	64-67dB L _{A10,18hr (f)}	50-54dB L _{night} , outside
SOAEL					
Very High	>75dB L _{Aeq} , 12hr	>65dB L _{Aeq} , 4hr	>55dB L _{Aeq} , 8hr	>68dB L _{A10,18hr (f)}	>55dB L _{night} , outside
UAEL					
Unacceptable	>85dB L _{Aeq} , 12hr	>75dB L _{Aeq} , 4hr	>65dB L _{Aeq} , 8hr	>71dB L _{Aeq,16hr}	>66dB L _{Aeq} , 8hr

Magnitude of Change in Noise Exposure

10.3.63 A beneficial change is deemed to occur where it can be demonstrated that the Development would result in a reduction in noise exposure.

10.3.64 An adverse change is deemed to occur where the Development gives rise to an increase in noise exposure. The significance of the increase in noise exposure is dependent upon the magnitude of the change. For road traffic noise, the magnitude of change criteria presented in LA 111 for the 'short term' scenario was used to determine the: negligible; low; medium; and high categories. The Very High category correlates to the 'Major' long term magnitude, as summarised in Table 10.8.

Table 10.8: Change in Noise Level Categories

Change Category	Road traffic Noise
Negligible	<1 dB
Low	1 – 2.9 dB
Medium	3 – 4.9 dB
High	5 – 10 dB
Very High	>10 dB

Residential Populations

10.3.65 When the noise exposure is shown to exceed the LOAEL value, a likely significant effect in terms of the EIA Regulations may occur where:

- a larger population experiences a relatively smaller change in noise exposure; or
- a smaller population experiences a larger change in noise exposure.

- 10.3.66 A greater weight is given where there is a small noise exposure change over a larger population, which results in the noise exposure approaching the SOAEL value. Such considerations are given within the PPG(N) which states that:

"where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in the overall noise level may result in a significant adverse effect occurring even though little to no change in behaviour would be likely to occur."

Non-Residential Noise Sensitive Receptors

- 10.3.67 For the purposes of this assessment, non-residential receptors are defined as those which are not used as a permanent residence, however they do have a use sensitive to noise and vibration.
- 10.3.68 The assessment to determine whether or not such receptors would experience significant effects is based upon the quantitative and qualitative considerations outlined in the assessing significance section.
- 10.3.69 The assessment criterion used for the assessment of noise impacts at non-residential receptors identified within the spatial extents of the assessment are summarised in Table 10.9.

Table 10.9: Non-Residential Receptor External Noise Impact Criterion

Non-residential receptor group	Daytime 0700-2300hrs Impact Criterion dB L _{Aeq,16h}	Night-time 2300-0700hrs Impact Criterion dB L _{Aeq,8h}	Reference
Place of Worship	50*	Not Applicable	BS 8233:2014
Hotels	50*	45*	BS 8233:2014
Educational	50*	Not Applicable	BB93:2015
Healthcare	55*	50*	HTM08-01:2013

*and a change of >3 dB

- 10.3.70 Where noise exposure is shown to meet the associated noise criteria presented in Table 10.9, then no further assessment is required. Where the impact criterion is predicted to be exceeded, then consideration is given to the additional likely significant effects evaluation criterion, including change in noise level.

Evidence Assumptions and Limitations

- 10.3.71 Specific assumptions in relation to each of the assessments are set out within the respective appendices:
- Appendix 10.3 - Construction Noise and Vibration;
 - Appendix 10.4 - Operational Sound; and
 - Appendix 10.5 - Operational Road Traffic Noise.
- 10.3.72 The construction programme is not suitably developed to provide detailed phasing and equipment data. Assumptions required for the construction noise and vibration assessment

are therefore based on those adopted for other, similar, developments. Noise emission data is taken from BS 5228-1 (2014). Haulage routes within the construction site boundaries are not yet defined. The construction noise assessment is based on fixed plant operating at the closest position of the Development to the assessed receptors. This is considered to present a worst-case assessment as during periods when the works are at distances further from the receptors, the associated noise levels will be lower.

- 10.3.73 The operational sound assessment has included consideration of: building services sound from the Development warehouses; road traffic using roads within the Development site; and road traffic movements in car park areas. At this stage, the Development design is not suitably developed to undertake a detailed quantitative assessment of likely building services noise emissions. The assessment is therefore based on reasonable assumptions, based on experience of other, similar, developments.
- 10.3.74 Road traffic assumptions within the Development and movements associated with the internal car parks are based on traffic flows derived by the transport consultants and included in Chapter 8: Transport and Access.
- 10.3.75 The operational road traffic noise assessment is based upon 18-hour Annual Average Weekday Traffic (AAWT) and AAWT 1-hour night-time flows, for the Eastern, Western and Development Sites, including percentage heavy good vehicles (HGV) composition road traffic flow information, and consideration of cumulative sites. This information, including road traffic flows associated with cumulative schemes incorporated within these figures, is included within Chapter 8: Transport and Access.

10.4 Baseline Conditions

Baseline Noise Conditions

- 10.4.1 Baseline noise conditions have been determined through a combination of a desktop study, noise modelling and noise surveys.
- 10.4.2 The noise survey was undertaken by NCL between the 6th and 7th July 2021, and was designed to capture noise levels across the Site during the daytime (07:00-23:00), evening (19:00-23:00) and night-time (23:00-07:00) periods, and the noise levels captured are representative of the assessed receptors.
- 10.4.3 A meteorological monitoring station was deployed concurrently with the noise monitoring to identify periods of adverse weather. Due to periods of light rain occurring during the survey, data captured during the following periods were excluded from the calculations:
 - 06/07/2021 15:15hrs - 15:30hrs;
 - 07/07/2021 00:15hrs - 00:30hrs; and
 - 07/07/2021 01:00hrs - 02:15hrs.
- 10.4.4 The dominant contributors to the existing baseline acoustic environment at the measurement locations (as determined during equipment deployment and collection) were noted to include:
 - Road traffic noise sources - including the M40 to the south west and the A43 between the Eastern site and Western site.

- 10.4.5 A summary of the baseline noise conditions derived for the Eastern and Western Developments is presented in the following sections. Further information on the baseline noise conditions is presented in Appendix 10.4 – Operational Sound.

Eastern Development

- 10.4.6 As shown in Defra's 2017 Round 3 Strategic Noise Mapping, sections of the Eastern Development have existing road traffic noise contributions from the A43 and M40 >70 dB $L_{Aeq,16hr}$ and >65 dB $L_{Aeq,8hr}$, due to high levels of road traffic noise contributions during the daytime and night-time periods.
- 10.4.7 At R5, based on Defra's 2017 Round 3 Strategic Noise Mapping, existing road traffic noise contributions are >60 dB $L_{Aeq,16hr}$ and >55 dB $L_{Aeq,8hr}$. This exceeds the LOAEL threshold for the day and the SOAEL threshold for the night-time period.
- 10.4.8 A summary of the measured levels used to inform the noise baseline on the Eastern Development is presented in Table 10.10. The noise levels are rounded to the nearest whole decibel.

Table 10.10: Summary of Measured Baseline Noise Levels - Eastern Development

Monitoring Location	Location	Period	dB $L_{Aeq,T}$	dB $L_{A90,15min}$ (Mean)	dB $L_{A90,15min}$ (Mode)	dB L_{Amax} (Max)
Location 2	Eastern Site - Adjacent to the Travelodge Hotel	Daytime (07:00 - 23:00)	57	54	55	77
		Night (23:00 - 07:00)	52	49	47	69

- 10.4.9 Observations of the acoustic environment at the survey location are summarised in Table 10.11.

Table 10.11: Survey Observations - Eastern Development

Monitoring Location	Observations
Location 2	Road traffic noise from the M40 to the west and the A43 to the west of the monitoring location was noted to be the dominant contributor to the ambient noise climate whilst an NCL consultant was on-site. This included day and night periods.

Western Development

- 10.4.10 As shown in Defra's 2017 Round 3 Strategic Noise Mapping, sections of the Western Development have existing road traffic noise contributions from the A43 and M40 >70 dB $L_{Aeq,16hr}$ and >65 dB $L_{Aeq,8hr}$, due to high levels of road traffic noise contributions during the daytime and night-time periods.
- 10.4.11 At R1, R2 and R6, based on Defra's 2017 Round 3 Strategic Noise Mapping, existing road traffic noise contributions are >60 dB $L_{Aeq,16hr}$ and >55 dB $L_{Aeq,8hr}$. At R3 and R4, based on

Defra's Round 3 Strategic Noise Mapping, road traffic noise contributions are >65 dB L_{Aeq,16hr} and >60 dB L_{Aeq,8hr}.

- 10.4.12 A summary of the measured levels used to inform the noise baseline are presented in Table 10.12. The noise levels are rounded to the nearest whole decibel. Monitoring Location 1 was located on the side of the property away from the dominant existing noise sources, and therefore are representative of the sound environment at the quietest façade.

Table 10.12: Summary of Measured Baseline Noise Levels - Western Development

Monitoring Location	Location	Period	dB L _{Aeq,T}	dB L _{A90,15min} (Mean)	dB L _{A90,15min} (Mode)	dB L _{Amax} (Max)
Location 1	Western Site - Adjacent to Medkre and Baynard House	Daytime (07:00 - 23:00)	59	57	58	78
		Night (23:00 - 07:00)	55	50	47	76

- 10.4.13 Observations of the acoustic environment at the survey location are summarised in Table 10.13.

Table 10.13: Survey Observations - Western Development

Monitoring Location	Observations
Location 1	Road traffic noise from the M40 to the south west, B4100 to the north and the A43 to the east of the monitoring location was noted to be the dominant contributor to the ambient noise climate whilst an NCL consultant was on-site. This included day and night periods.

Baseline Vibration Conditions

Eastern Development

- 10.4.14 No significant contributors to the ground-borne vibration baseline environment have been identified within the Eastern Development study area.

Western Development

- 10.4.15 No significant contributors to the ground-borne vibration baseline environment have been identified within the Western Development study area.

Future Baseline Conditions

- 10.4.16 In the absence of the Development, existing sound levels in the Eastern Development and Western Development are likely to experience a gradual increase over time, primarily due to growth in road traffic. On low-speed roads, changes in car technology may potentially offset some of the expected sound level increases due to traffic growth.

10.4.17 Sound generated from tyre-road interaction dominates on higher speed roads therefore expected growth in road traffic is likely to increase ambient sound levels regardless of changes in technology.

Summary of Receptors and Sensitivity

10.4.18 A review of the Study Area using aerial photography and GIS datasets identified a non-residential receptor, a hotel, in addition to residential receptors. In addition, a Noise Important Area (NIA), as identified by Defra and in the vicinity of the Development, as shown in Figure 10.3.

10.4.19 Potential noise receptors identified and considered in the assessment include:

- Residential receptors;
- Residential receptors (in a Noise Important Area); and
- Non-residential receptors (Hotel).

10.4.20 No ‘quiet areas’ as designated through implementation of the Environmental Noise (England) Regulations 2006 have been identified within the assessment extents.

10.4.21 Representative residential and non-residential receptors for construction noise and vibration, operational sound and operational road traffic noise are shown in Figure 10.4 and Figure 10.5. The receptors are also summarised in Table 10.14.

Table 10.14: Sensitive Receptors

Receptor ID	Receptor Type	Easting	Northing	Construction Noise and Vibration	Operational Sound	Operational Road Traffic Noise
R1 – Medkre	Residential	454710	229233	✓	✓	✓
R2 – Baynard House	Residential	454800	229118	✓	✓	✓
R3 – 1 The Cottages	Residential	454773	228969	✓	✓	✓
R4 – 2 The Cottages	Residential	454774	228963	✓	✓	✓
R5 – The Travelodge Hotel	Non-Residential	455084	228257	✓	✓	✓
R6 – Baynard Barn	Residential	454800	229118	✓	✓	✓
R7 – Lone Barn	Residential	455862	228754	x	x	✓
R8 – Barleymow Farm	Residential	457594	233443	x	x	✓
R9 – Slade Farm	Residential	458035	233668	x	x	✓
R10 – Paynters Wood Farm	Residential	458185	233362	x	x	✓
R11 – Evenly Farm	Residential	458186	233334	x	x	✓

Figure 10.4: Sensitive Receptors (in the vicinity of the Development)

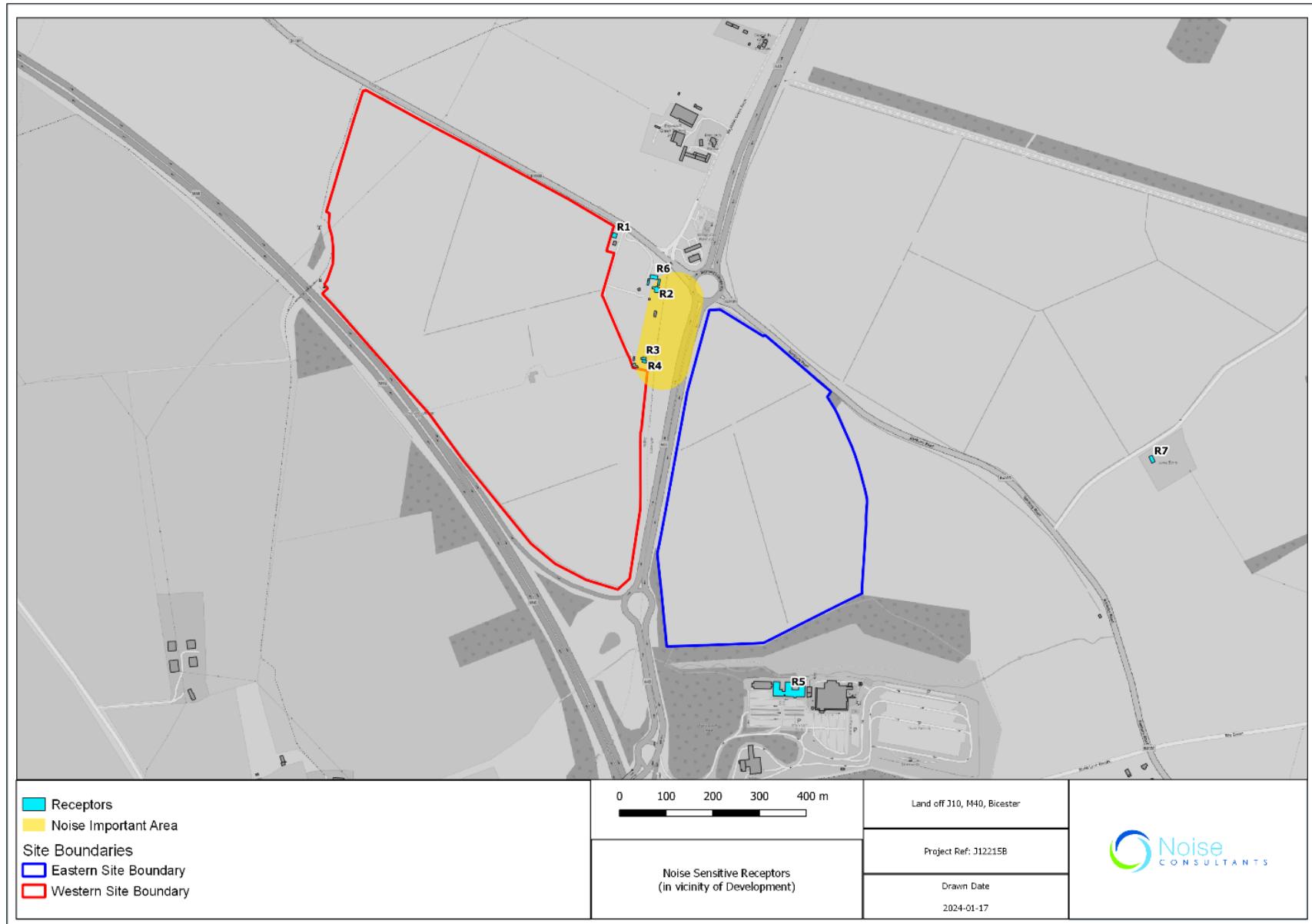
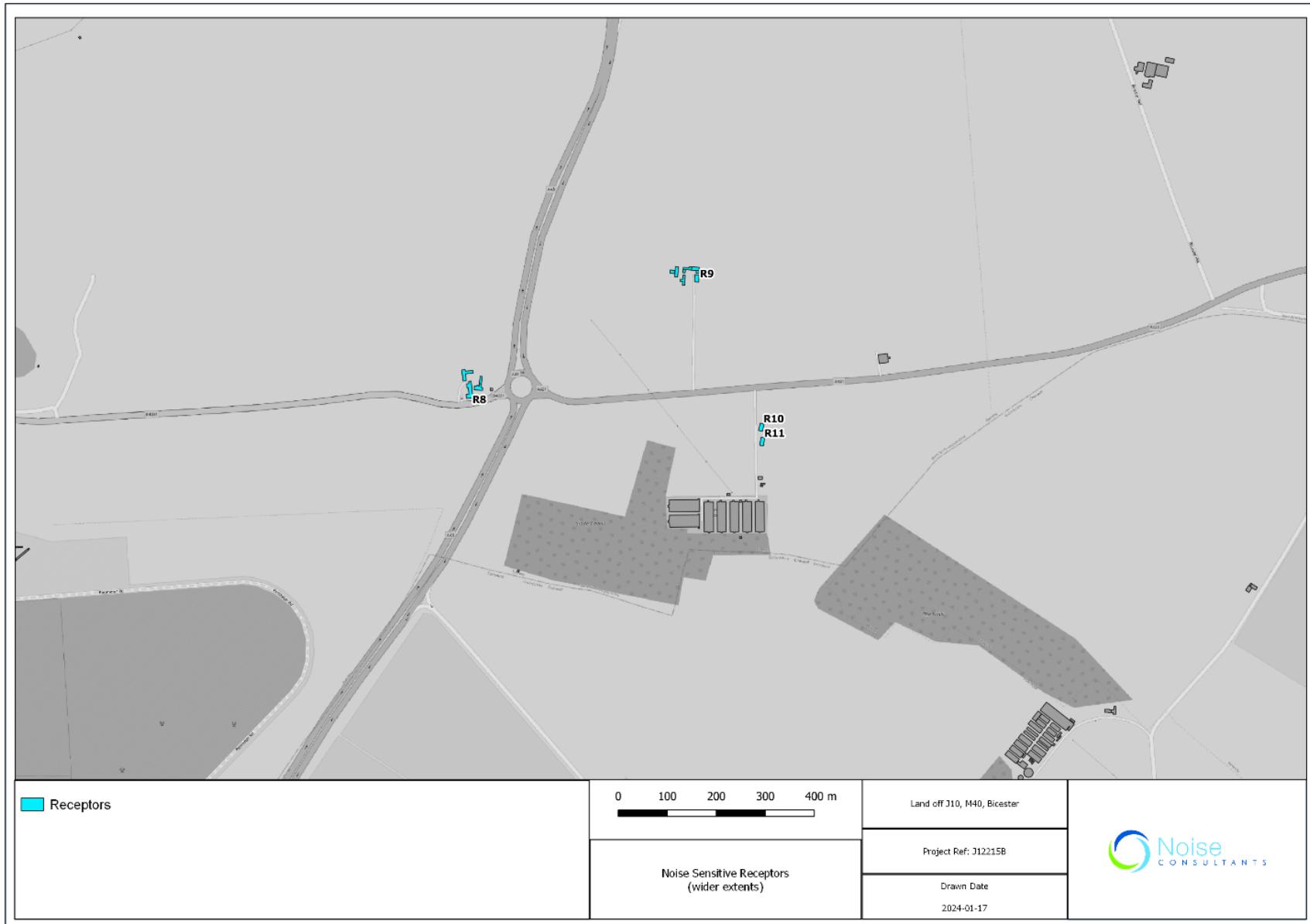


Figure 10.5: Sensitive Receptors (wider assessment extents)



- 10.4.22 The evaluation of significance takes account of receptor sensitivity to noise. No residential receptors within the study area have been identified as having a relatively high sensitivity to noise, therefore the assessment has assumed a ‘generic’ sensitivity to noise in accordance with the approach used to underpin noise policy and the setting of the LOAEL and SOAEL values.
- 10.4.23 The effect of noise or vibration on non-residential noise-sensitive receptors is dependent on the receptor’s specific sensitivity to noise. This is accounted for through the adoption of relevant assessment criteria as presented in Table 10.9.

10.5 Scheme Design and Management

- 10.5.1 IEMA Guidance uses the terms ‘primary’ (inherent design), ‘secondary’ (foreseeable) and ‘tertiary’ (ineluctable) mitigation. The purpose of this section is to clearly identify what measures are primary and tertiary mitigation and therefore can be relied upon in the assessment.

Construction Noise and Vibration

- 10.5.2 The Applicant has committed to implementing Construction Environmental Management Plans (CEMPs) during enabling, demolition and construction activities for the Development. The CEMPs will define the key construction activity principles that will be adhered to and developed during construction activities, including recommendations that represent good practice specific to the noise assessment, based on the assumed construction plant list and working methodologies. They will also include details on roles and responsibilities, working hours, control measures and activities to be undertaken to minimise environmental effects as well as monitoring and record-keeping requirements. It will also outline the methodology to be adopted should a complaint be received regarding excessive noise and/or vibration levels.
- 10.5.3 Framework CEMPs are included in Appendix 6.1 and 6.2; these will act as the basis for detailed CEMPs and agreed with CDC once contractors are appointed.

Completed Development

Operational Sound

- 10.5.4 At this stage the design of the Development is not suitably detailed to allow full consideration of the operational sound levels at receptors. Likely operational sound levels have therefore been determined based on assumptions adopted at other, similar developments and derived traffic flow information.
- 10.5.5 To control operational sound emissions from building services, cladding with a sound reduction performance commensurate of Kingspan KS1000 has been assumed.

Operational Road Traffic Noise

- 10.5.6 There is no road traffic noise-specific mitigation inherent in the design.

10.6 Construction

Assessment of Effects

- 10.6.1 A detailed assessment of construction noise and vibration is included within Appendix 10.3. This section sets out a summary of the assessment outcomes, and where necessary, associated mitigation recommendations.

Construction noise (fixed and mobile plant)

- 10.6.2 Construction noise levels have been calculated using spreadsheet-based noise models, adopting calculation methodologies advocated in BS 5228-2 (2014). Likely construction vibration levels have been informed by empirical formula presented within BS 5228-1:2009+A1:2014.

Enabling Works

- 10.6.3 Construction noise associated with the Enabling Works is considered as a phase as part of the Western Development and Development. As such, the conclusions reached below can be considered as representative of the worst-case effects associated with the Enabling Works in isolation.

Eastern Development

- 10.6.4 As shown in Table 10.16 in Appendix 10.3, when works are undertaken at the worst-case positions there are no predicted exceedances of SOAEL during any of the considered construction phases.
- 10.6.5 Accounting for the noise reductions associated with the good practice site measures to be detailed within the CEMP, a significance outcome of ‘Not Significant’ is determined at all receptors.

Western Development

- 10.6.6 As shown in Table 10.17 in Appendix 10.3, when works are undertaken at the worst-case positions there are no predicted exceedances of SOAEL during any of the considered construction phases.
- 10.6.7 Accounting for the noise reductions associated with the good practice site measures to be detailed within the CEMP, a significance outcome of ‘Not Significant’ is determined at all receptors.

Development

- 10.6.8 The assessment of construction noise from the Development is based on the worst-case noise level for the Eastern and Western Developments.
- 10.6.9 As shown in Table 10.18 in Appendix 10.3, when works are undertaken at the worst-case positions which is assumed to be the locations of the proposed building structures, there are no predicted exceedances of SOAEL during any of the considered construction phases.
- 10.6.10 In addition, all activities apart from ‘External Areas and Reinstatement’ have noise levels less than 72 dB $L_{Aeq,T}$, and therefore concurrent activities are less than 75 dB $L_{Aeq,T}$

(SOAEL). Based on the assumed construction plant lists, there is however the potential for concurrent ‘External Areas and Reinstatement’ activities at the Eastern and Western Developments to result in an exceedance of SOAEL at R3 and R4. The CEMPs will make provision for the Principal Contractors to be in liaison during the construction phases. Coordination of the construction programmes will seek to avoid activities with the greatest noise emissions associated with these phases occurring concurrently, and avoid noise levels exceeding the SOAEL.

- 10.6.11 Overall and taking into consideration the noise reductions associated with the good practice site measures to be detailed within the CEMP, a significance outcome of ‘Not Significant’ is determined at all receptors.

Construction Vibration (and Cosmetic Damage)

- 10.6.12 The spatial extents of the construction vibration assessment are set at 100m, as at greater distances the levels of vibration from construction activities are unlikely to exceed the assessment thresholds, and therefore not deemed a significant effect in terms of the EIA Regulations.

Eastern Development

- 10.6.13 As shown in Table 10.17 in Appendix 10.3 the closest receptor to the construction works at the Eastern Development is at a distance of 135m from the closest development position, and therefore outside the extents of the construction vibration assessment.
- 10.6.14 Construction related vibration immissions from the Eastern Development are likely to be below 1.00 mms^{-1} PPV during the daytime, and therefore a significant effect in terms of the EIA Regulations is not deemed to occur at residential receptors.

Western Development

- 10.6.15 As shown in Table 10.18 in Appendix 10.3 the closest receptor to the construction works at the Western Development is at a distance of 130m from the closest development position, and therefore outside the extents of the construction vibration assessment.
- 10.6.16 Construction related vibration immissions from the Western Development are likely to be below 1.00 mms^{-1} PPV during the daytime, and therefore a significant effect in terms of the EIA Regulations is not deemed to occur at residential receptors.

Development

- 10.6.17 As shown in Table 10.19 in Appendix 10.3 the closest receptor to the construction works is at a distance of 130m from the closest development position, and therefore outside the extents of the construction vibration assessment.
- 10.6.18 Construction related vibration immissions from the Development, including concurrent Eastern Development and Western Development activities, are likely to be below 1.00 mms^{-1} PPV during the daytime, and therefore a significant effect in terms of the EIA Regulations is not deemed to occur at residential receptors.

Construction Noise (Road Traffic)

- 10.6.19 The routing of construction traffic will be the subject of construction vehicle management considerations by the nominated construction contractor(s). However, it is anticipated that most construction vehicles will approach the Site via the A43 as opposed to the B4100. The routes taken by construction traffic will be agreed with the planning and highway authorities by way of a Construction Traffic Management Plan (CTMP) which would be secured by a planning condition.
- 10.6.20 Construction road traffic assumptions are derived by the transport consultants and included in Chapter 8: Transport and Access.
- 10.6.21 With reference to the construction road traffic noise change criteria, traffic flows would need to increase by at least 25% in order to result in a noise level change of approximately +/- 1 dB. Existing flows on the surrounding road network are relatively high, and therefore relatively high construction activity flows would be required in order to result in a noise level change greater than 'negligible'.

Enabling Works

- 10.6.22 As shown in Table 10.23 in Appendix 10.3, the associated change in construction traffic flows is <1%, therefore a negligible change in noise level is predicted, and a significance outcome of 'Not Significant'.

Eastern Development

- 10.6.23 As shown in Table 10.24 in Appendix 10.3, the associated change in construction traffic flows is <1%, therefore a negligible change in noise level is predicted, and a significance outcome of 'Not Significant'.

Western Development

- 10.6.24 As shown in Table 10.25 in Appendix 10.3, the associated change in construction traffic flows is <1%, therefore a negligible change in noise level is predicted, and a significance outcome of 'Not Significant'.

Development

- 10.6.25 As shown in Table 10.26 in Appendix 10.3, the associated change in construction traffic flows is <1%, therefore a negligible change in noise level is predicted, and a significance outcome of 'Not Significant'.

Mitigation, Monitoring and Residual Effects

- 10.6.26 No specific noise or vibration mitigation associated with the construction assessment is proposed beyond best practicable means to keep noise to a minimum which are in line with good practice site measures detailed within the CEMP. In addition to the CEMP, the Applicant has committed to ensuring that the contractor(s) implement CTMPs throughout construction of the Development which would include standard control measures for minimising, managing and monitoring construction effects. These will be provided at the Reserved Matters stage and secured via planning condition.

10.6.27 No significant residual effects for construction noise (fixed and mobile plant), vibration or road traffic have been identified for the Enabling Works, Eastern Development, Western Development or Development and no further mitigation is considered necessary.

10.7 Completed Development

Assessment of Effects

Operational Sound

- 10.7.1 A detailed assessment of operational sound is included within Appendix 10.4. This section sets out a summary of the assessment outcomes, and where necessary, associated mitigation recommendations.
- 10.7.2 The operational sound assessment is supported by a noise model developed using the LimA® computational sound modelling software (version 2020), using source sound emission data based upon a list of indicative plant items and assumptions on the likely % on-time during the relevant daytime and night-time assessment periods. The noise model has been used to determine the likely sound emissions at each receptor, and accounts for 24hr operational working.
- 10.7.3 Sound power levels for each source have been adopted based on those provided by a typical example in the absence of specific plant being finalised at this stage. Calculated sound levels have been used to determine the specific sound level at each receptor for use in the BS 4142 (2019) assessment.
- 10.7.4 The likely greatest operational sound sources from the Development include:
- Building services sound from the buildings within the Development;
 - Road traffic using roads within the Development (including HGVs), and in parking bays and service areas; and
 - Road traffic movements in car park areas.
- 10.7.5 The BS 4142 (2019) guidance is an initial framework for the determination of likely effects, informed by additional considerations including: the magnitude of the effect; absolute level of noise; the existing ambient acoustic environment, and the sensitivity of the receptors.

Eastern Development

- 10.7.6 The outcome of the assessment demonstrates that operational sound levels from the Eastern Development are likely to be below LOAEL at all assessed residential receptors and is likely to meet the non-residential receptor noise criterion during the daytime period.
- 10.7.7 During the night-time period, the predicted sound levels are above the LOAEL threshold at R3 and R4 and above the non-residential sound criterion at R5. Therefore, the related noise exposures have the potential to constitute a significant effect subject to further considerations, including the change in ambient noise levels at the receptors during the night-time period.
- 10.7.8 Consideration has therefore been given to the change in the existing ambient environment associated with the Eastern Development. The predicted change in noise level during the night-time period associated with the Eastern Development does not exceed 3 dB at any receptor, which is considered as the minimum perceptible under normal conditions.
- 10.7.9 A significance outcome of ‘Not Significant’ is therefore determined at all receptors.

Western Development

- 10.7.10 The outcome of the assessment demonstrates that operational sound levels from the Western Development are likely to be below LOAEL at all assessed residential receptors and are likely to meet the non-residential receptor noise criterion during the daytime period.
- 10.7.11 During the night-time period, the predicted sound levels are above the LOAEL threshold at R1, R2, R3, R4 and R6 but meet the non-residential noise criterion at R5. Therefore, the related noise exposures have the potential to constitute a significant effect subject to further considerations, including the change in ambient noise levels at the receptors during the night-time period.
- 10.7.12 Consideration has therefore been given to the change in the existing ambient environment associated with the Western Development. The predicted change in noise level during the night-time period associated with the Western Development does not exceed 3 dB at all receptors which is considered as the minimum perceptible under normal conditions.
- 10.7.13 A significance outcome of ‘Not Significant’ is therefore determined at all receptors.

Development

- 10.7.14 The outcome of the assessment demonstrates that operational sound levels from the Development are likely to be below LOAEL at all assessed residential receptors and are likely to meet the non-residential receptor noise criterion during the daytime period.
- 10.7.15 During the night-time period, the predicted sound levels are above the LOAEL threshold at R1, R2, R3, R4 and R6 and above the non-residential noise criterion at R5. Therefore, the related noise exposures have the potential to constitute a significant effect subject to further considerations, including the change in ambient noise levels at the receptors during the night-time period.
- 10.7.16 Consideration has therefore been given to the change in the existing ambient environment associated with the Development. The predicted change in noise level during the night-time period associated with the Development does not exceed 3 dB at any receptor, which is considered as the minimum perceptible under normal conditions.
- 10.7.17 A significance outcome of ‘Not Significant’ is therefore determined at all receptors.

Operational Road Traffic Noise

- 10.7.18 A detailed assessment of road traffic noise is included within Appendix 10.5 – Operational Road Traffic Noise. This section sets out a summary of the assessment outcomes, and where necessary, associated mitigation recommendations.
- 10.7.19 The operational road traffic noise assessment has considered the following assessment years:
- 2022 - Baseline;
 - 2026 - Future Baseline (without Development); and

- 2026 - Completed Development

10.7.20 The magnitude of change in noise exposure is considered for the 2026 Future Baseline (without Development) vs 2026 Completed Development scenario.

10.7.21 The magnitude of change in noise exposure is considered initially in terms of road links with the potential to experience a short-term BNL change of more than 1 dB(A) as a result of the Development.

10.7.22 Where there is a road link change in BNL of more than 1 dB(A) as a result of the Development, the magnitude of change and associated noise exposures have been determined at receptors in the vicinity of the Eastern Development, Western Development and Development respectively, to identify where road traffic noise levels are forecast to exceed the relevant LOAEL.

Eastern Development

10.7.23 A summary of the significance evaluation for those receptors in the vicinity of the Eastern Development and also in the vicinity of road traffic links with a change in daytime BNL of more than 1 dB(A) is presented in Table 10.15 and Table 10.16.

Table 10.15: Eastern Development - Daytime: 2026 Future Baseline vs 2026 With Development (Significance Evaluation)

Receptor ID	2026 With Development Noise Level $L_{A10,18h\,(f)}$	LOAEL/SOAE L/UAEL Category	Noise Exposure Category 'End State'	Noise Change Category	Significance Evaluation
R1	68.7	Above SOAEL	Very High	Negligible	Not Significant
R2	68.0	Above LOAEL	High	Negligible	Not Significant
R3	66.1	Above LOAEL	High	Negligible	Not Significant
R4	68.4	Above SOAEL	Very High	Negligible	Not Significant
R5	69.2	Above SOAEL	Very High	Negligible	Not Significant
R6	66.7	Above LOAEL	High	Negligible	Not Significant
R7	60.9	Above LOAEL	Medium	Negligible	Not Significant
R8	73.1	Above SOAEL	Very High	Negligible	Not Significant
R9	65.9	Above LOAEL	High	Negligible	Not Significant
R10	65.6	Above LOAEL	High	Negligible	Not Significant
R11	63.5	Above LOAEL	Medium	Negligible	Not Significant

Table 10.16: Eastern Development - Night-time: 2026 Future Baseline vs 2026 With Development (Significance Evaluation)

Recept or ID	2026 With Development Noise Level $L_{Aeq,8h}$	LOAEL/SOAE L/UAEL Category	Noise Exposure Category 'End State'	Noise Change Category	Significance Evaluation
R1	61.2	Above SOAEL	Very High	Negligible	Not Significant
R2	60.6	Above SOAEL	Very High	Negligible	Not Significant
R3	59.8	Above SOAEL	Very High	Negligible	Not Significant
R4	62.0	Above SOAEL	Very High	Negligible	Not Significant
R5	62.7	Above SOAEL	Very High	Negligible	Not Significant
R6	60.5	Above SOAEL	Very High	Negligible	Not Significant
R7	52.9	Above LOAEL	High	Negligible	Not Significant
R8	63.4	Above SOAEL	Very High	Negligible	Not Significant
R9	55.7	Above SOAEL	Very High	Negligible	Not Significant
R10	54.9	Above LOAEL	High	Negligible	Not Significant
R11	52.7	Above LOAEL	High	Negligible	Not Significant

10.7.24 These results illustrate that no significant effects are expected for receptors in the vicinity of the Eastern Development and in the wider assessment extent as shown in Figure 10.5.

Western Development

10.7.25 A summary of the significance evaluation for those receptors in the vicinity of the Western Development and also in the vicinity of road traffic links with a change in daytime BNL of more than 1 dB(A) is presented in Tables 10.17 and 10.18.

Table 10.17: Western Development - Daytime: 2026 Future Baseline vs 2026 With Development (Significance Evaluation)

Recept or ID	2026 With Development Noise Level $L_{A10,18h(f)}$	LOAEL/SOAE L/UAEL Category	Noise Exposure Category 'End State'	Noise Change Category	Significance Evaluation
R1	70.9	Above SOAEL	Very High	Low	Significant
R2	68.5	Above SOAEL	Very High	Negligible	Not Significant
R3	65.0	Above LOAEL	High	Negligible	Not Significant

Receptor ID	2026 With Development Noise Level L _{A10,18h (f)}	LOAEL/SOAE L/UAEL Category	Noise Exposure Category 'End State'	Noise Change Category	Significance Evaluation
R4	67.2	Above LOAEL	High	Negligible	Not Significant
R5	69.1	Above SOAEL	Very High	Negligible	Not Significant
R6	67.2	Above LOAEL	High	Negligible	Not Significant
R7	61.8	Above LOAEL	Medium	Negligible	Not Significant
R8	73.2	Above SOAEL	Very High	Negligible	Not Significant
R9	65.9	Above LOAEL	High	Negligible	Not Significant
R10	65.6	Above LOAEL	High	Negligible	Not Significant
R11	63.5	Above SOAEL	Medium	Negligible	Not Significant

Table 10.18: Western Development - Night-time: 2026 Future Baseline vs 2026 With Development (Significance Evaluation)

Receptor ID	2026 With Development Noise Level L _{Aeq,8h}	LOAEL/SOAE L/UAEL Category	Noise Exposure Category 'End State'	Noise Change Category	Significance Evaluation
R1	64.6	Above SOAEL	Very High	Medium	Significant
R2	61.3	Above SOAEL	Very High	Negligible	Not Significant
R3	58.0	Above SOAEL	Very High	Negligible	Not Significant
R4	60.3	Above SOAEL	Very High	Negligible	Not Significant
R5	62.2	Above SOAEL	Very High	Negligible	Not Significant
R6	62.0	Above SOAEL	Very High	Low	Significant
R7	54.1	Above LOAEL	High	Negligible	Not Significant
R8	63.5	Above SOAEL	Very High	Negligible	Not Significant
R9	55.8	Above SOAEL	Very High	Negligible	Not Significant
R10	55.2	Above SOAEL	Very High	Negligible	Not Significant
R11	53.0	Above LOAEL	High	Negligible	Not Significant

10.7.26 As shown, a significance outcome of 'Significant' is determined at receptors R1 and R6, located in the vicinity of the Western Development.

Development

10.7.27 A summary of the significance evaluation for those receptors in the vicinity of the Development and also in the vicinity of road traffic links with a change in daytime BNL of more than 1 dB(A) is presented in Tables Table 10.19 and Table 10.20.

Table 10.19: Development - Daytime: 2026 Future Baseline vs 2026 With Development (Significance Evaluation)

Receptor ID	2026 With Development Noise Level LA10,18h (f)	LOAEL/SOAE L/UAEI Category	Noise Exposure Category	Noise Change Category	Significance Evaluation
R1	71.0	Above SOAEL	Very High	Low	Significant
R2	68.6	Above SOAEL	Very High	Negligible	Not Significant
R3	65.0	Above LOAEL	High	Negligible	Not Significant
R4	67.3	Above LOAEL	High	Negligible	Not Significant
R5	68.8	Above SOAEL	Very High	Negligible	Not Significant
R6	67.3	Above LOAEL	High	Negligible	Not Significant
R7	60.8	Above LOAEL	Medium	Negligible	Not Significant
R8	73.2	Above SOAEL	Very High	Negligible	Not Significant
R9	66.0	Above LOAEL	High	Negligible	Not Significant
R10	65.9	Above LOAEL	High	Negligible	Not Significant
R11	63.7	Above LOAEL	Medium	Negligible	Not Significant

Table 10.20: Development - Night-time: 2026 Future Baseline vs 2026 With Development (Significance Evaluation)

Receptor ID	2026 With Development Noise Level L _{Aeq,8h}	LOAEL/SOAE L/UAEI Category	Noise Exposure Category	Noise Change Category	Significance Evaluation
R1	64.9	Above SOAEL	Very High	Medium	Significant
R2	61.7	Above SOAEL	Very High	Low	Significant
R3	58.4	Above SOAEL	Very High	Negligible	Not Significant
R4	60.6	Above SOAEL	Very High	Negligible	Not Significant
R5	62.0	Above SOAEL	Very High	Negligible	Not Significant
R6	62.4	Above SOAEL	Very High	Low	Significant
R7	53.0	Above LOAEL	High	Negligible	Not Significant
R8	63.9	Above SOAEL	Very High	Negligible	Not Significant
R9	56.1	Above SOAEL	Very High	Negligible	Not Significant
R10	55.6	Above SOAEL	Very High	Low	Significant
R11	53.4	Above LOAEL	High	Low	Not Significant

- 10.7.28 As shown, a significance outcome of 'Significant' is determined at receptors R1, R2 and R6, located in the vicinity of the Development. In addition, receptor R10 to the south of the A421 (Link 20 as shown in Figure 18.1, Chapter 8: Transport and Access) approximately 5 km northeast of the Development shows a significance outcome of 'Significant'.

Mitigation, Monitoring and Residual Effects

Operational Sound

10.7.29 Operational sound from building services has been calculated based on breakout noise from the proposed units and no significant effects have been identified. As details of the construction and makeup of the proposed units is unavailable at this stage, it is assumed that the cladding to be used will have similar sound reduction properties as used on similar projects, as detailed in Appendix 10.4. It is expected that the Applicant would be required to provide, and consider in the context of the assessment, the final design details when they become available. Additional noise related design considerations may include:

- The acoustic performance of the building cladding;
- The location of any building services; and
- The building orientation.

Operational Road Traffic Noise

10.7.30 Road traffic flow management and mitigation inherent in the development design includes measures set out in the Framework Travel Plan, as set out in Appendix 8.2. Notwithstanding, significant noise effects have been identified at a number of locations resultant from operational road traffic for the Western Development and therefore also the Development as a whole.

10.7.31 There are a number of mitigation strategies that can be implemented to reduce these noise levels at the receptors in the vicinity of the Development (i.e. R1, R2 and R6), with the most appropriate suite of measures subject to agreement with CDC. Noise mitigation options which would be considered, and delivered pre-occupation of the Development, include:

- A noise barrier – of sufficient density, to be located between the B4100 and the Western Development either on highways land (to be secured through a Section 278 (S.278) Agreement) or within the ownership boundary of the private dwellings. The specific design of any noise barrier will be the subject of further analysis, however for the purpose of significance evaluation a barrier with 2 metre height, located along the position illustrated in Figure 10.8 of Appendix 10.5 has been modelled;
- Low noise road surfacing – depending on the speeds of the road in question, and the existing road construction, the use of low noise road surfacing can achieve reductions in the region of 3 dB(A); or
- Financial contribution to the landowner of R1, R2 and R6, to contribute to upgrades in building sound insulation.

10.7.32 The mitigation strategy adopted would be subject to agreement with CDC.

Western Development

10.7.33 For the purpose of significance evaluation, the noise model has been updated to include a 2m noise barrier. The outcome of this potential mitigation measure is set out in Table 10.21 and Table 10.22.

Table 10.21: Western Development - Daytime: 2026 Future Baseline vs 2026 With Development with 2m Noise Barrier (Noise Change Category)

Receptor ID	Noise Exposure Category 'End State'	Noise Change Category	Significance Evaluation
R1	High	Negligible	Not Significant
R2	High	Negligible	Not Significant
R3	High	Negligible	Not Significant
R4	High	Negligible	Not Significant
R5	Very High	Negligible	Not Significant
R6	High	Negligible	Not Significant
R7	Medium	Negligible	Not Significant
R8	Very High	Negligible	Not Significant
R9	High	Negligible	Not Significant
R10	High	Negligible	Not Significant
R11	Medium	Negligible	Not Significant

Table 10.22: Western Development - Night-time: 2026 Future Baseline vs 2026 With Development with 2m Noise Barrier (Noise Change Category)

Receptor ID	Noise Exposure Category 'End State'	Noise Change Category	Significance Evaluation
R1	Very High	Negligible	Not Significant
R2	Very High	Negligible	Not Significant
R3	Very High	Negligible	Not Significant
R4	Very High	Negligible	Not Significant
R5	Very High	Negligible	Not Significant
R6	Very High	Negligible	Not Significant
R7	High	Negligible	Not Significant
R8	Very High	Negligible	Not Significant
R9	Very High	Negligible	Not Significant
R10	Very High	Negligible	Not Significant
R11	High	Negligible	Not Significant

10.7.34 As shown, the provision of a 2 m noise barrier would be sufficient to reduce potential noise effects at all receptors in the vicinity of the Western Development to a 'Not Significant' level.

Development

10.7.35 Table 10.23 and Table 10.24 illustrate the significance of noise effects of the Development with a 2m noise barrier in place.

Table 10.23: Development - Daytime: 2026 Future Baseline vs 2026 With Development with 2 m Noise Barrier (Noise Change Category)

Receptor ID	Noise Exposure Category	Noise Change Category	Significance Evaluation
R1	High	Negligible	Not Significant
R2	High	Negligible	Not Significant
R3	High	Negligible	Not Significant
R4	High	Negligible	Not Significant
R5	Very High	Negligible	Not Significant
R6	High	Negligible	Not Significant
R7	Medium	Negligible	Not Significant
R8	Very High	Negligible	Not Significant
R9	High	Negligible	Not Significant
R10	High	Negligible	Not Significant
R11	Medium	Negligible	Not Significant

Table 10.24: Development - Night-time: 2026 Future Baseline vs 2026 With Development with 2m Noise Barrier (Noise Change Category)

Receptor ID	Noise Exposure Category	Noise Change Category	Significance Evaluation
R1	Very High	Negligible	Not Significant
R2	Very High	Negligible	Not Significant
R3	Very High	Negligible	Not Significant
R4	Very High	Negligible	Not Significant
R5	Very High	Negligible	Not Significant
R6	Very High	Negligible	Not Significant
R7	High	Negligible	Not Significant
R8	Very High	Negligible	Not Significant
R9	Very High	Negligible	Not Significant
R10	Very High	Low	Significant
R11	High	Low	Not Significant

10.7.36 As shown, the provision of a 2 m noise barrier would be sufficient to reduce potential noise effects at all receptors in the vicinity of the Development to a 'Not Significant' level.

10.7.37 Further noise reductions, in the order of 3 dB, could be achieved with the provision of low noise road surfacing.

10.7.38 Should neither of these strategies be taken forward and depending on the age and nature of the properties, compensation could be provided to the occupiers of the identified properties to improve insulation should there be scope to do so.

10.7.39 The specific mitigation measures to be adopted will be determined as part of the development of the final design. Given that these mitigation options, alone or in combination, are considered to provide sufficient mitigation that would reduce noise to acceptable levels, no significant effects are expected on these receptors following implementation of this mitigation.

- 10.7.40 For receptor R10 located south of the A421 (Link 20, as shown in Figure 8.1, Chapter 8: Transport and Access), where a potential ‘Significant’ effect is determined for the night-time period with respect to the Development, the Travel Plan would set out measures to mitigate these impacts. The specific mitigation measures to be adopted in relation to this receptor will be determined as part of the development of the final design.
- 10.7.41 Where Development associated traffic can be concentrated during periods of the night-time when baseline traffic flows are greatest, such as the shoulder periods at the beginning and end of the night-time (2300-0000hrs and 0600-0700hrs), this would reduce the overall change in noise levels experienced by receptors on the A421, and the associated significance in EIA terms. However, on a precautionary basis in the absence of any further study, the effects at these receptors are considered ‘Significant’.

10.8 Cumulative Effects

Construction

- 10.8.1 Construction traffic from the Development + Tritax Scheme is expected to lead to a <1dB change in sound at all locations, i.e. negligible effect. The Development + Tritax Scheme associated construction traffic is approximately 80 two-way HGV on a daily basis, which is significantly lower flows than the baseline two-way HGV flows on the A43 (N) and A43 (S), 6800 and 5766, respectively.
- 10.8.2 When considered in the cumulative scenario, traffic flows are not expected to exceed this threshold and a negligible cumulative effect is predicted.

Construction Noise (fixed and mobile plant)

- 10.8.3 For the assessment of cumulative construction noise impacts, construction noise levels for the Development + Tritax Scheme scenario are considered.
- 10.8.4 As shown in Table 10.23 in Appendix 10.3, when construction works are undertaken concurrently with the Tritax Scheme, there are no predicted exceedances of SOAEL during any of the considered construction phases.
- 10.8.5 Accounting for the noise reductions associated with the good practice site measures to be detailed within the CEMP, a significance outcome of ‘Not Significant’ is determined at all receptors.

Completed Development

Operational Sound

- 10.8.6 For the assessment of cumulative operational sound impacts, operational sound levels for the Development + Tritax Scheme scenario are considered.
- 10.8.7 As shown in Table 10.50 in Appendix 10.4, the outcome of the assessment demonstrates that cumulative operational sound levels from the Development + Tritax Scheme are likely to be below LOAEL at all assessed residential receptors and are likely to meet the non-residential receptor noise criterion during the daytime period.

- 10.8.8 During the night-time period, the cumulative sound levels are above the LOAEL threshold at R1, R2, R3, R4 and R6 and above the non-residential noise criterion at R5. Therefore, the related noise exposures have the potential to constitute a significant effect subject to further considerations, including the change in ambient noise levels at the receptors during the night-time period.
- 10.8.9 Consideration has therefore been given to the change in the existing ambient environment associated with the Development + Tritax Scheme. The predicted change in noise level during the night-time period associated with the Development + Tritax Scheme does not exceed 3 dB at any receptor, which is considered as the minimum perceptible under normal conditions.
- 10.8.10 A significance outcome of 'Not Significant' is therefore determined at all receptors.

Operational Road Traffic Noise

- 10.8.11 The traffic data used in the 2026 Future Baseline and Future Development scenarios incorporates traffic flows associated with consented cumulative developments where road traffic flow information is available, and with the potential to affect flows on the roads included in this assessment. Consequently, the operational impacts reported inherently include those associated with the approved cumulative schemes.
- 10.8.12 In addition an assessment of cumulative road traffic noise from the Development and Tritax Scheme has been undertaken. With reference to Appendix 10.5, the cumulative operational road traffic noise assessment is based on the 'Development + Tritax Scheme' scenario.
- 10.8.13 The magnitude of change in noise exposure is considered for the following scenarios:
- 2026 Future Baseline (without Development) vs 2026 Future Baseline (with Completed Development + Tritax Scheme).
- 10.8.14 The magnitude of change in noise exposure is considered initially in terms of road links with the potential to experience a short-term BNL change of more than 1 dB(A) as a result of the Development + Tritax Scheme.
- 10.8.15 Where there is a road link change in BNL of more than 1 dB(A) as a result of the Development, the magnitude of change and associated noise exposures have been determined at receptors in the vicinity of the Development, to identify where cumulative road traffic noise levels are forecast to exceed the relevant LOAEL.
- 10.8.16 A summary of the significance evaluation for those receptors in the vicinity of the Development and also in the vicinity of road traffic links with a change in daytime BNL of more than 1 dB(A) is presented in Table 10.25 and Table 10.26.

Table 10.25: Development + Tritax Scheme - Daytime: 2026 Future Baseline vs 2026 With Development + Tritax Scheme (Significance Evaluation)

Receptor ID	2026 With Development Noise Level LA10,18h (f)	LOAEL/SOAE L/UAEL Category	Noise Exposure Category 'End State'	Noise Change Category	Significance Evaluation
R1	71.4	Above SOAEL	Very High	Medium	Significant
R2	68.9	Above SOAEL	Very High	Low	Significant
R3	65.5	Above LOAEL	High	Negligible	Not Significant
R4	67.5	Above LOAEL	High	Negligible	Not Significant
R5	68.9	Above SOAEL	Very High	Negligible	Not Significant
R6	67.6	Above LOAEL	High	Low	Not Significant
R7	61.9	Above LOAEL	Medium	Negligible	Not Significant
R8	73.4	Above SOAEL	Very High	Negligible	Not Significant
R9	66.2	Above LOAEL	High	Negligible	Not Significant
R10	66.3	Above LOAEL	High	Negligible	Not Significant
R11	64.0	Above LOAEL	High	Negligible	Not Significant

Table 10.26: Development + Tritax Scheme - Night-time: 2026 Future Baseline vs 2026 With Development + Tritax Scheme (Significance Evaluation)

Receptor ID	2026 With Development Noise Level LAeq,8h	LOAEL/SOAE L/UAEL Category	Noise Exposure Category 'End State'	Noise Change Category	Significance Evaluation
R1	65.4	Above SOAEL	Very High	Medium	Significant
R2	62.7	Above SOAEL	Very High	Low	Significant
R3	59.4	Above SOAEL	Very High	Negligible	Not Significant
R4	61.4	Above SOAEL	Very High	Negligible	Not Significant
R5	62.2	Above SOAEL	Very High	Negligible	Not Significant
R6	63.3	Above SOAEL	Very High	Medium	Significant
R7	55.1	Above SOAEL	Very High	Negligible	Not Significant
R8	64.5	Above SOAEL	Very High	Low	Significant
R9	56.8	Above SOAEL	Very High	Low	Significant

Recept or ID	2026 With Development Noise Level LAeq,8h	LOAEL/SOAE L/UAEL Category	Noise Exposure Category 'End State'	Noise Change Category	Significance Evaluation
R10	56.6	Above SOAEL	Very High	Low	Significant
R11	54.3	Above LOAEL	High	Low	Not Significant

10.8.17 As shown, in the vicinity of the Development, a significance outcome of 'Significant' is determined at receptors R1 and R2 during the daytime period and additionally at R6 during the night-time period. During the night-time period, receptors R8, R9 and R10 also show a significance outcome of 'Significant'. A qualitative consideration of mitigation options with respect to receptors R8, R9 and R10 is also presented.

Mitigation, Monitoring and Residual Effects

10.8.18 Road traffic flow management and mitigation inherent in the development design includes measures set out in the Framework Travel Plan, as set out in Appendix 8.2. Notwithstanding, significant noise effects have been identified at a number of locations resulting from operational road traffic for the Western Development and therefore also the Development as a whole.

10.8.19 There are a number of mitigation strategies that can be implemented to reduce these noise levels at the receptors in the vicinity of the Development (i.e. R1, R2 and R6), with the most appropriate suite of measures subject to agreement with CDC. Noise mitigation options which would be considered, and delivered pre-occupation of the Development, include:

- A noise barrier – of sufficient density, to be located between the B4100 and the Western Development either on highways land (to be secured through a Section 278 (S.278) Agreement) or within the ownership boundary of the private dwellings. The specific design of any noise barrier will be the subject of further analysis, however for the purpose of significance evaluation a barrier with 2 metre height, located along the position illustrated in Appendix 10.5: Figure 10.8 has been modelled;
- Low noise road surfacing – depending on the speeds of the road in question, and the existing road construction, the use of low noise road surfacing can achieve reductions in the region of 3 dB(A); or
- Financial contribution to the landowner of R1, R2 and R6, to contribute to upgrades in building insulation.

10.8.20 The mitigation strategy adopted would be subject to agreement with CDC.

10.8.21 Table 10.23 and Table 10.24 illustrate the significance of noise effects of the Development + Tritax Scheme with a 2 m noise barrier in place as shown in Figure 10.8 of Appendix 10.5.

Table 10.27: Development + Tritax Scheme- Daytime: 2026 Future Baseline vs 2026 With Development + Tritax Scheme with 2 m Noise Barrier (Significance Evaluation)

Receptor ID	Noise Exposure Category	Noise Change Category	Significance Evaluation
R1	High	Negligible	Not Significant
R2	High	Negligible	Not Significant
R3	High	Negligible	Not Significant
R4	High	Negligible	Not Significant
R5	Very High	Negligible	Not Significant
R6	High	Negligible	Not Significant
R7	Medium	Negligible	Not Significant
R8	Very High	Negligible	Not Significant
R9	High	Negligible	Not Significant
R10	High	Negligible	Not Significant
R11	High	Negligible	Not Significant

Table 10.28: Development + Tritax Scheme - Night-time: 2026 Future Baseline vs 2026 With Development + Tritax Scheme with 2 m Noise Barrier (Significance Evaluation)

Receptor ID	Noise Exposure Category	Noise Change Category	Significance Evaluation
R1	Very High	Negligible	Not Significant
R2	Very High	Negligible	Not Significant
R3	Very High	Negligible	Not Significant
R4	Very High	Negligible	Not Significant
R5	Very High	Negligible	Not Significant
R6	Very High	Negligible	Not Significant
R7	Very High	Negligible	Not Significant
R8	Very High	Low	Significant
R9	Very High	Low	Significant
R10	Very High	Low	Significant
R11	High	Low	Not Significant

10.8.22 As shown, a significance outcome of ‘Not Significant’ is determined for those receptors in the vicinity of the Development, with the provision of a 2m noise barrier.

10.8.23 Further noise reductions, in the order of 3 dB, could be achieved with the provision of low noise road surfacing.

10.8.24 The specific mitigation measures to be adopted will be determined as part of the development of the final design.

10.8.25 For receptors R8, R9 and R10, where a potential significant effect is determined for the night-time period with respect to the Development + Tritax Scheme, reductions in the overall change in noise levels experienced at the receptors could be achieved through further consideration of the night-time flow provisions set out in the Framework Travel Plan. This would reduce the change in noise levels, and likely associated significance in EIA terms. However, on a precautionary basis in the absence of any further study, the effect at these receptors is considered ‘Significant’.

Table 10.25: Summary of Residual Effects

Effect	Receptor (Sensitivity)	Geographic Scale	Development Site	Temporal Scale	Significance	Mitigation and Monitoring	Residual Effect
Enabling Works and Construction							
Construction noise	Residential and Non-residential Receptors	Local – Study Area	Enabling Works	Temporary	Not Significant	Adherence to the CEMP and CTMP	Not Significant
			Eastern Development		Potentially Significant		Not Significant
			Western Development				Not Significant
			Development				Not Significant
Construction vibration	Residential and Non-residential Receptors	Local – Study Area	Enabling Works	Temporary	Not Significant	Adherence to the CEMP and CTMP	Not Significant
			Eastern Development		Not Significant		Not Significant
			Western Development		Not Significant		Not Significant
			Development		Not Significant		Not Significant
Completed Development							
Operational sound	Residential Receptors	Local – Study Area	Eastern Development	Permanent	Not Significant	Additional mitigation developed as part of the final design, including consideration of: - the acoustic performance of the building cladding; - the location of any building services; and - the building orientation.	Not Significant
			Western Development	Permanent	Not Significant		Not Significant
			Development	Permanent	Not Significant		Not Significant
Operational Road Traffic Noise	Residential and Non-residential Receptors	Local – Study Area	Eastern Development	Permanent	Not Significant	Travel Plan measures	Not Significant
			Western Development	Permanent	Significant	Travel Plan measures, and further study of potential mitigation given by a noise barrier, low noise surfacing provision, and/or noise insulation measures.	Not Significant
			Development	Permanent	Significant		Significant for one receptor located south of the A421 for the night-time period; Not Significant at all other receptors
Cumulative Effects							
Construction noise	Residential and Non-residential Receptors	Local – Study Area	Development	Temporary	Not Significant	Adherence to the CEMP and CTMP	Not Significant
Operational sound	Residential Receptors	Local – Study Area	Development	Permanent	Not Significant	Additional mitigation developed as part of the final design, including consideration of: - the acoustic performance of the building cladding; - the location of any building services; and - the building orientation.	Not Significant
Operational Road Traffic Noise	Residential and Non-residential Receptors	Local – Study Area	Development	Permanent	Significant	Travel Plan measures, and further study of potential	Significant at three receptors for the

Effect	Receptor (Sensitivity)	Geographic Scale	Development Site	Temporal Scale	Significance	Mitigation and Monitoring	Residual Effect
						mitigation given by a noise barrier, low noise surfacing provision, and/or noise insulation measures.	night-time period; Not Significant for all other receptors

References

- ¹ Department for Communities and Local Government. (2009). Planning Act 2008.
- ² Land Compensation Act 1973. (1973)
- ³ The Noise Insulation Regulations 1975. (1975)
- ⁴ The Noise Insulation (Amendment) Regulations 1988. (1988)
- ⁵ Control of Pollution Act 1974. (1974)
- ⁶ Environmental Protection Act 1990. (1990)
- ⁷ The Environmental Noise (England) Regulation 2006. (2006)
- ⁸ Noise and Statutory Nuisance Act 1993. (1993)
- ⁹ Department for Communities and Local Government, (2023). National Planning Policy Framework.
- ¹⁰ Department for Environment, Food and Rural Affairs (Defra). (March 2010). Noise Policy Statement for England.
- ¹¹ Institute of Environmental Management and Assessment. (2014). The Guidelines for Environmental Noise Impact Assessment
- ¹² World Health Organisation. (1999). WHO Community Noise Guidelines.
- ¹³ World Health Organisation. (2018). WHO Environmental Noise Guidelines for the European Region.
- ¹⁴ World Health Organisation. (2009). WHO Night Noise Guidelines.
- ¹⁵ British Standards Institution. (2014). BS 5228-1:2009+A1: 2014 Code of practice for noise and vibration control on construction and open sites: Part 1 – Noise.
- ¹⁶ British Standards Institution. (2014). BS 5228-2:2009+A1:2014 Code of Practice for Noise and Vibration Control on Open Construction Sites – Part 2: Vibration
- ¹⁷ British Standards Institution. (2018). BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings: 1-Vibration sources other than blasting 2-Blast-induced vibration
- ¹⁸ British Standards Institution. (1993). BS 7385-2:1993 Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from ground-borne vibration
- ¹⁹ British Standards Institution. (2019). BS 4142: 2014+A1:2019 Methods for rating and assessing industrial and commercial sound.
- ²⁰ British Standards Institution. (2014). BS 8233: 2014 Guidance on sound insulation and noise reduction for buildings.

²¹ British Standards Institution. (2003). BS 7445-1:2003. Description and measurement of environmental noise. Guide to quantities and procedures

²² Planning Practice Guidance Noise – PPG(N). (2019).

²³ Department for Transport. (1988). Calculation of Road Traffic Noise.

²⁴ Highways England. (2019). Design Manual for Roads and Bridges: Sustainability & Environment Appraisal LA 111 Noise and vibration.

²⁵ Transport Research Laboratory (TRL) Report 53 ‘Ground vibration caused by civil engineering works’, 1986

²⁶ Transport Research Laboratory (TRL) Report 429 (TRL 429 ‘Ground-borne vibration caused by mechanised construction works’, 2000