

Chapter H

Noise and Vibration



Milton Keynes East Environmental Statement

Chapter H: Noise

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H1.0 Introduction

H1.1 This Chapter forms part of the Milton Keynes East Environmental Statement ('ES') which sets out the findings of an Environmental Impact Assessment ('EIA') of the proposed development of a sustainable urban extension ('SUE') to Milton Keynes. It relates to land to the east of the M1 motorway and to the south of Newport Pagnell. A description of the background to the proposal; the relationship of this chapter to the wider ES; and a description of the site and the development is provided at Chapters A to C of this ES.

H1.2 This chapter reports the outcome of the assessment of likely significant effects on the surrounding noise and vibration climate arising from the Proposed Development. The suitability of the Development Site for the proposed uses and the need to provide a suitable noise environment for future occupants has also been considered.

H1.3 This chapter should be read in conjunction with the following technical appendices (Volume 2 to this ES):-

- Appendix H1 Site Suitability Assessment
- Appendix H2 Glossary of Acoustic Terminology
- Appendix H2 Noise and Vibration Guidance
- Appendix H3 Noise Monitoring Equipment
- Appendix H4 Baseline Noise Survey – Key Noise Sources
- Appendix H5 Meteorological Conditions
- Appendix H6 Attended Noise Survey Results
- Appendix H7 Unattended Noise Survey Results
- Appendix H8 Construction Plant List and Information

About the Author

H1.4 This chapter has been prepared by Luke Smith who is a Senior Acoustic Engineer at WSP and a Member of the Institute of Acoustics (MIOA).

H1.5 Luke has over 7 years' experience across a range of noise and vibration projects, helping to successfully deliver a number of residential developments such as Wolsey Grange in Ipswich, Barton Park in Oxford and High Leigh Garden Village in Hoddesdon. Luke has been the lead consultant for the assessment and long-term monitoring of noise and air quality impacts from Dublin Airport and has worked on high-profile schemes such as Heathrow Third Runway. Luke has key experience in noise and vibration assessments for Development Consent Order (DCO) projects including the A1(M) Junction 6 to 8, which was part of the Smart Motorway Programme.

H2.0 **Policy Context**

Legislation

The Control of Pollution Act, 1974 ^{Ref 1}

- H2.1 The principal legislation covering demolition and construction noise is the Control of Pollution Act (CoPA) 1974, Part III. Sections 60 and 61 of the Act give the local authority special powers for controlling noise arising from construction and demolition works, regardless of whether a statutory nuisance has been caused or is likely to be caused. Works within the scope of these provisions include repair and maintenance work and road works. These powers may be exercised either before works start or after they have started.
- H2.2 Section 60 enables a local authority in whose area work is going to be carried out, or is being carried out, to serve a notice of its requirements for the control of site noise and vibration on the person who appears to the local authority to be carrying out the works. Such a notice may also be served on others appearing to the local authority to be responsible for, or to have control over, the carrying out of the works.
- H2.3 This notice can:
- 1 Specify the plant or machinery that is or is not to be used
 - 2 Specify the hours during which the construction work can be carried out
 - 3 Specify the level of noise that can be emitted
 - 4 Provide for any changes of circumstances
- H2.4 Section 61 of the Act provides a mechanism for the main contractor or developer to take the initiative and approach the local authority to ascertain its noise requirements before construction work starts. If a formal application for "prior consent" is received by the local authority it is obliged to give a decision within 28 days; failure to do so or the attachment of unnecessary or unreasonable conditions are grounds for appeal by the applicant.
- H2.5 Parts of the Act have been superseded by the Environmental Protection Act 1990, which amongst other things empowers local authorities to issue a noise abatement notice where nuisance can be proven.

National Policy and Guidance

Noise Policy Statement for England (NPSE), 2010 ^{Ref 2}

- H2.6 The NPSE seeks to ensure that noise issues are considered at the right time during the development of policy and decision making, and not in isolation. It highlights the underlying principles on noise management already found in existing legislation and guidance.
- H2.7 The NPSE sets out the long-term vision of Government noise policy as follows:
“Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development”.
- H2.8 This long-term vision is supported by the following aims:
*“Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:
- Avoid significant adverse impacts on health and quality of life*

- Mitigate and minimise adverse impacts on health and quality of life
- Where possible, contribute to the improvement of health and quality of life”

H2.9 The NPSE employs the following categories of noise exposure which assist in determining the onset of adverse effects:

- **NOEL - No Observed Effect Level** - This is the level below which no effect can be detected and below which there is no detectable effect on health and quality of life due to noise.
- **LOAEL - Lowest Observed Adverse Effect Level** - This is the level above which adverse effects on health and quality of life can be detected.
- **SOAEL - Significant Observed Adverse Effect Level** - This is the level above which significant adverse effects on health and quality of life occur.

H2.10 However, the NPSE goes on to state that:

“It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available”

National Planning Policy Framework (NPPF, 2019) ^{Ref 3}

H2.11 First published in 2012 and most recently updated in February 2019, the NPPF sets out the Government’s planning policies for England and how these are expected to be applied. Noise is referenced within the document as follows:

"170. Planning policies and decisions should contribute to and enhance the natural and local environments by: ...[a number of points including]...

preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans”;

and

“180. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development - and avoid noise giving rise to significant adverse impacts on health and the quality of life⁶⁰; and

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason....”

and

“182. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.”

H2.12 Reference number 60 within NPPF paragraph 180(a) points to the Explanatory Note to the Noise Policy Statement for England (NPSE).

Planning Practice Guidance (PPG), 2019 ^{Ref 4}

H2.13 This web-based resource was issued for use by the Department for Communities and Local Government (DCLG). The purpose of the guidance is to complement the NPPF and provide advice on how to deliver its policies.

H2.14 The section on noise was first published on 6 March 2014 and most recently updated in July 2019. It includes a table that summarises *“the noise exposure hierarchy based on the likely average response of those affected”* and offers *“examples of outcomes”* relevant to the NOEL, LOAEL and SOAEL effect levels described in the NPSE. The term Unacceptable Adverse Effect (UAE) level is introduced which equates to noise perceived as *“present and very disruptive”*. It is stated that UAEs should be prevented.

H2.15 These outcomes are in descriptive form and there is no numerical definition of the NOEL, LOAEL and SOAEL (or UAE). The noise exposure hierarchy table is reproduced as Table H2.1.

Table H2.1 Noise Exposure Hierarchy Based on the Likely Average Response

Perception	Examples of outcomes	Increasing effect levels	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum

Perception	Examples of outcomes	Increasing effect levels	Action
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

Local Policy

Plan:MK 2016 – 2031, adopted March 2019 ^{Ref 5}

H2.16

The primary guidance on noise and vibration is provided in Policy NE6 – Environmental Pollution, the relevant text of which (paragraphs G and H) are reproduced below. The terminology regarding adverse effects mirrors that used in the PPG.

“G. A Noise and Vibration Impact Assessment will be required for proposals with the potential to cause disturbance to people or the natural environment due to noise and/or vibration and for proposals that are considered to be sensitive to noise and/or vibration. Proposals that would result in or be subject to noise pollution and/or vibration that is:

- 1. Very disruptive and would have an unacceptable adverse effect on human health or the natural environment or the tranquillity and enjoyment of the countryside will not be permitted.*
- 2. Disruptive and would have a significant adverse effect on human health or the natural environment or the tranquillity and enjoyment of the countryside will be refused unless the need for, and benefits of, the development significantly outweigh the harm and all feasible solutions to avoid and mitigate that harm have been fully implemented.*
- 3. Intrusive and would have an adverse effect on human health or the natural environment or the tranquillity enjoyment of the countryside will be resisted unless the need for, and benefits of, the development outweigh the harm and all feasible solutions to avoid and mitigate that harm have been fully implemented.*

H. Proposals adjacent or within 100m of existing or proposed major roads, heavily trafficked roads, and railways will be required to adopt setbacks and landscaping measures to provide screening and acoustic buffers to protect the amenity of proposed buildings and areas of outdoor amenity space.”

H2.17

There are other relevant references to noise and vibration within Plan:MK 2016 – 2031.

Policy CT8 – Grid Road Network

“D. New grid roads will be designed with the following characteristics:

2. Grid roads will also accommodate main services, and landscaping of appropriate road surfaces to protect adjacent development from the noise and visual intrusion of traffic and give a green character to the road. Where possible, grid roads will incorporate a bund providing additional protection.”

Policy EH7 – Promoting Healthy Communities

“A. Milton Keynes Council is committed to reducing health inequalities, increasing life expectancy and improving quality of life of the Borough. Proposals should be designed to achieve the aspirations below:

5. Seeking to improve air quality and reduce noise by locating and designing pollution generating land uses and roads to avoid adverse impacts on sensitive land uses, and securing necessary mitigation measures to make development acceptable.”

Policy D5 – Amenity and Street Scene

“A. All proposals will be required to create and protect a good standard of amenity for buildings and surrounding areas, and in particular should ensure:

2. Dwellings are dual aspect to enable passive ventilation, subject to any noise and air pollution mitigation measures that are required to make the proposal acceptable.”

Milton Keynes East Strategic Urban Extension - Development Framework - Supplementary Planning Document, March 2020 ^{Ref 6}

H2.18 There are a number of references to noise throughout this document which identifies the A422/A509 and particularly the M1 motorway as significant sources of noise and pollution, drawing (in paragraph 2.12.1) the following conclusions.

“Less noise sensitive development, such as employment, should be located adjacent to the M1, and A422/A509 corridor.

Noise and air pollution sensitive uses should be set back and buffered from the M1 and A422/A509.”

H2.19 Similar comments are included in Section 4.6 entitled Sustainability.

“The principal source of noise within the development is from vehicles travelling on the M1 and A422/A509. Consequently, noise mitigation measures will need to be carried out.

The precise nature of those noise mitigation measures should be established by developers through the undertaking of a Noise Impact Assessment.

There are a number of measures that can be employed, including:

- locating less vulnerable (i.e. non-residential) uses adjacent to the M1 and/or A422/A509;*
- setting dwellings back an appropriate distance;*
- sound insulation in dwellings;*
- noise bunds.*

H3.0 **Assessment Methodology & Significance Criteria**

Assessment Methodology

H3.1 In accordance with the noise and vibration section of the EIA Scoping Report submitted to MKC, this section considers the methodology for assessing noise and vibration effects during the construction and operation (i.e. once completed and occupied) of the Proposed Development.

Aspects Scoped-out of the Noise and Vibration Assessment

H3.2 The following aspects have been scoped-out of this assessment in line with the EIA Scoping Report:

- 1 Construction phase traffic noise; and
- 2 Operational fixed building services plant noise.

H3.3 A summary of these aspects is included below with a description of why it is considered appropriate that they are scoped-out of this assessment.

- 1 Construction phase traffic noise - Heavy vehicles arising from the construction of the Proposed Development would be temporary. These additional traffic movements are considered unlikely to affect the road traffic noise levels significantly given that vehicles are anticipated to access the site directly from the M1 or the adjacent major road network, rather than the more lightly trafficked local roads where any adverse effects would be more pronounced. Measures will be identified in the ES chapter for inclusion in a Construction Environmental Management Plan (CEMP), to minimise any adverse effects. Consequently, construction road traffic noise is scoped out of the noise and vibration assessment.
- 2 Operational fixed building services plant noise - Any fixed external plant items and operational noise associated with commercial elements of the Proposed Development will be subject to noise emission limits, determined in line with the background sound levels and the guidance contained within BS 4142:2014+A1:2019 *Methods for Rating and Assessing Industrial and Commercial Sound* ^{Ref 7}. Based on the guidance in BS 4142, noise emission limits will be set to equal the typical background sound level¹ or at an alternative criterion agreed with MKC. Consequently, no significant effects are anticipated providing plant is appropriately specified, procured, configured and, if necessary, mitigated. It is anticipated that a condition would be appended to any planning permission, stating that relevant noise emission limits should be met².

Aspects Scoped-in to the Noise and Vibration Assessment

H3.4 The following aspects have been scoped-in to this assessment:

- 1 Noise and vibration impacts during the construction phase, and
- 2 Operational development generated road traffic noise impacts.

H3.5 These aspects are summarised in Table H3.1. Note that existing sensitive receptors, which are included in Table H3.1 are identified in Section H4.0.

¹ In line with the guidance in BS 4142, plant noise emission limits will be set to equal the background sound level. BS 4142 states that "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".

² A condition is anticipated that would require plant noise emission limits to be met. The condition may also require a baseline noise survey to be undertaken post-planning to ensure that noise emission limits are compared against background sound levels that are typical and representative at the time the plant is being specified.

Table H3.1: Aspects Scoped-in to the Noise and Vibration Assessment

Impact	Stage	Receptor	Comments
[i] Construction noise and vibration	Construction	Existing sensitive receptors	As the construction plant working to prepare the ground and construct the Proposed Development (including the works associated with the realigned Tongwell Street, the new strategic north-south link road over the M1 and all other new highways within the Proposed Development) would be in the vicinity of existing sensitive receptors, there is the potential for adverse effects to occur.
[ii] Development-generated road traffic noise	Operational		There is the potential for a change in road traffic noise at existing sensitive receptors as a result of development-generated traffic using the local road network (including the realigned Tongwell Street, the new strategic north-south link road over the M1 and all other new highways within the Proposed Development).

H3.6 An assessment of the suitability of the site for the proposed sensitive receptors has been undertaken and is presented in Appendix H1.

H3.7 The aspects considered within the site suitability assessment are summarised in Table H3.2.

Table H3.2: Aspects considered within the Site Suitability Assessment

Impact	Stage	Receptor	Comments
Noise from traffic on the surrounding road network	Operational	Proposed sensitive receptors ¹	There is the potential for noise from traffic using the road network which surrounds and passes through the site (particularly the M1, A422 and A509) to exceed target criteria at the proposed residential uses during daytime and night-time periods and proposed educational uses during the daytime period.
Noise from operational activity at Interchange Park	Operational		There is the potential for noise from operational activity within the Interchange Business Park, located to the north of the site, to exceed target criteria at proposed noise sensitive uses. Depending on the nature of operations, impacts may be anticipated during daytime and night-time periods.
Noise from plant and operational activity associated with the Holiday Inn	Operational		Should sensitive receptors be located in proximity to the Holiday Inn, there exists the potential for noise from the operation of fixed plant associated with the hotel, to exceed target criteria, particularly during the night-time period at the proposed residential uses.

Note: ¹ Private dwellings, extra care homes, schools within the Proposed Development

H3.8 In addition to aspects above, there is potential for sources within the Proposed Development to affect proposed sensitive receptors also within the Proposed Development. These aspects are summarised in Table H3.3.

Table H3.3: Elements within the Proposed Development - Summary of Potential Impacts

Impact	Stage	Receptor	Comments
Construction noise and vibration	Construction	Proposed sensitive receptors ¹	Depending on the phasing of the works and the proximity of construction plant to sensitive receptors within the Proposed Development, there is the potential for noise and vibration generated by temporary construction works to result in adverse effects. As information on the programme of works and occupation dates is not known at this time, this has been assessed qualitatively.
Noise from operational activity within the employment sector	Operational		Depending on the final location of elements within the Proposed Development and the use class of the employment land, there is the potential for noise generated by operational activity to exceed target criteria at proposed noise sensitive uses. This has been assessed qualitatively, setting out good design principles to avoid potential issues at interfaces between different zones within the Proposed Development.

Note: ¹ Private dwellings, extra care homes, schools within the Proposed Development

Noise and Vibration Guidance

- H3.9 The following guidance documents have been used during the preparation of this chapter, with further details presented in Appendix H3: Noise and Vibration Guidance.
- H3.10 The following documents are appropriate to the prediction and assessment of construction noise and vibration:
- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise ^{Ref 8}; and
 - BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration ^{Ref 9}.
- H3.11 The following documents are appropriate to the prediction and assessment of road traffic noise affecting existing and proposed receptors:
- Department of Transport/Welsh Office (1988), Calculation of Road Traffic Noise (CRTN) ^{Ref 10}, and
 - Transport Research Laboratory (TRL) (2002), Project Report PR/SE/451/02 ^{Ref 11}; and
 - Highways England, (May 2020) The Design Manual for Roads and Bridges (DMRB) LA 111 Noise and vibration, Revision 2 ^{Ref 12}.
- H3.12 The following documents are appropriate when assessing noise affecting the proposed receptors (residential and education), as presented in Appendix H1:
- Professional Practice Guidance (ProPG) on ‘Planning and Noise: New Residential Development’ (2017) ^{Ref 13};
 - BS 8233:2014 Guidance on sound insulation and noise reduction for buildings ^{Ref 14};
 - World Health Organisation ‘Guidelines for Community Noise’ (1999) ^{Ref 15};
 - Building Bulletin 93: 2015 ‘Acoustic design of schools: performance standards’ ^{Ref 16}; and
 - Association of Noise Consultants (2015) ‘Acoustics of schools: a design guide’ ^{Ref 17}.

Study Areas

H3.13 The study areas for the assessment of noise and vibration arising from the construction of the Proposed Development (aspect (i) in Table H3.1 above) are as follows:

- construction noise – 300m
- construction vibration – 100m

H3.14 The Study Area for the assessment of development generated road traffic noise (aspect (ii) in Table H3.1 above) includes the following areas:

- the area within 600m of new road links or road links physically changed or bypassed by the project;
- the area within 50m of other road links with potential to experience a short term BNL³ change of more than 1.0 dB(A) as a result of the project.

H3.15 These study areas are consistent with the guidance contained in DMRB LA 111.

Methodology for Gathering Data on Existing Conditions

H3.16 The method adopted to measure the baseline conditions is described below. In the absence of any known existing issues with vibration, no baseline vibration measurements were undertaken.

H3.17 Satellite imagery was used to determine the noise survey locations which were selected based on proximity of the noise sensitive receptors to the Proposed Development, existing dominant noise sources and site access and security issues.

H3.18 The baseline noise conditions have been derived through a combination of short-term attended measurements and continuous unattended measurements for periods of up to one week. In this way it has been possible to cover a large number of positions and relevant periods of the day and night.

H3.19 All the equipment used during the survey is listed in Appendix H4: Noise Monitoring Equipment. The meters were calibrated before and after each set of measurements using the acoustic calibrator, which had been calibrated within the preceding twelve months by a United Kingdom Accreditation Service (UKAS) accredited calibration laboratory. Each meter was found to be equal to or less than ± 0.1 dB adrift from the pre-measurement calibration.

H3.20 All microphones were protected by a windshield and positioned at a height of 1.2-1.5m in the free-field.

Attended Noise Measurements

H3.21 Attended noise measurements were undertaken at four locations shown on Figure H3.1 over the periods described in Table H3.4.

³ The Basic Noise Level (BNL) is described in the CRTN. It does not relate to any specific receptor, but rather is a measure of source noise, at a reference distance of 10 m from the nearside carriageway edge of a specific length of highway. It is determined by obtaining the estimated noise level from the 18-hour traffic flow and then applying corrections for vehicle speed, percentage of heavy vehicles, gradient and road surface as described in CRTN

Figure H3.1: Measurement Location Plan



Table H3.4: Attended Baseline Noise Survey Measurement Schedule

Location	Period	Date	Time (hh:ss)	Duration (minutes)
STMP1 (5m from Newport Road)	Night	03/11/2020	00:15 - 00:30	15
			01:22 - 01:37	15
	Day	04/11/2020	11:43 - 12:43	60
			13:55 - 14:55	60
STMP2 (28m from the A509, near the Holiday Inn)	Night	03/11/2020	00:12 - 00:27	15
			01:28 - 01:43	15
	Day	04/11/2020	10:37 - 11:37	60
			12:50 - 13:50	60
STMP3 (15m from Tongwell Street)	Night	03/11/2020	00:38 - 00:53	15
			01:00 - 01:15	15
STMP4 (4m from Willen Road)	Night	03/11/2020	00:37 - 00:52	15
			01:02 - 01:17	15

Unattended Noise Measurements

H3.22 Unattended noise measurements were undertaken at five locations shown on Figure H3.1, over the periods described in Table H3.5.

Table H3.5: Unattended Baseline Noise Survey Measurement Schedule

Location	Time from		Time to	Duration (hours)
LTMP1	02/11/2020 13:21	to	10/11/2020 11:07	189 (> 7 days)
LTMP2	02/11/2020 12:35	to	10/11/2020 10:40	189 (> 7 days)
LTMP3	02/11/2020 11:48	to	09/11/2020 19:58	175 (> 7 days)
LTMP4	02/11/2020 11:27	to	03/11/2020 02:49	14 (< 1 day)
LTMP6	02/11/2020 16:50	to	03/11/2020 14:01	21 (< 1 day)

Notes:

LTMP1 – 11m from the M1 on its NE side, 80m south of the Willan footbridge over the M1
 LTMP2 – 10m from the A509 on its south side, opposite Interchange Business Park
 LTMP3 – south of Caldecote Lane, 135m south of the A422 and 195m west of the A509
 LTMP4 – 8m from the A509 on its east side, 365m north of the Holiday Inn
 LTMP5 – not used
 LTMP6 – remote on field edge, ENE from the Holiday Inn and nearly 500m east of the A509

H3.23 Key noise sources that were noted at each monitoring location during the survey are presented in Appendix H5: Baseline Noise Survey - Key Noise Sources (Volume 2 to this ES).

Weather Conditions

H3.24 Weather conditions during the baseline noise survey were relatively benign, being dry most of the time with generally light winds. Appendix H6: Meteorological Conditions presents a summary of the weather conditions recorded at Cranfield Airfield (approximately 5km to the north-east) based on a three-hour breakdown over the full duration of the survey. In summary:

- Monday 2 November 2020 was breezy with wind speeds over 5ms⁻¹. Tuesday 3 November 2020 was less breezy with wind speeds mostly below 5ms⁻¹. For the remainder of the survey winds were light (no more than 5ms⁻¹).

- 2 There was notable rain recorded on the morning of Tuesday 3 November 2020, otherwise there was little or no rain.
- 3 On Monday and Tuesday 2 and 3 November 2020 winds were predominantly from the southwest whilst on Wednesday and Thursday 4 and 5 November 2020 winds were predominantly from the northwest. Thereafter winds were from the southeast except for a short period between late on Sunday 8 November 2020 and early on Monday 9 November 2020 and again on the last day of the survey, when winds were from the southwest.
- 4 Except for Monday 2 November 2020, when the air temperature was relatively high (between 8 and 17°C, average daytime temperatures ranged between 5 and 14°C and average night-time temperatures ranged between 3 and 12°C).

H3.25 With the exception of the period of rainfall during the morning of Tuesday 3rd November, conditions are considered typical for the time of year and suitable for the measurement of environmental noise. The noise survey data gathered during the period of rainfall have been excluded from analysis and, therefore, not considered further in the assessment.

Acoustic Model

H3.26 A 3D digital acoustic model of the site and the surrounding area has been generated using acoustic modelling software CadnaA[®]. The model has been informed by the following:

- 1 Traffic data supplied by Transport Consultant, WSP, for the baseline year (2019); the year of opening for the development (2031) and the year in the future when the development is established (2048).
- 2 Topographical data for the existing ground levels across the Proposed Development and surrounding area, obtained from LIDAR data of 1m resolution, publicly available from the Department for Environment Food and Rural Affairs (DEFRA).
- 3 Topographical data for the proposed ground levels across the Proposed Development, supplied by Infrastructure Engineers, WSP.
- 4 Alignments for the proposed highways, supplied by Infrastructure Engineers, WSP.
- 5 Ordnance Survey (OS) basemapping data, MasterMap[®] and AddressBase Plus[®]

H3.27 The heights of residential buildings within the model have been set at 8m. The heights of non-sensitive buildings have been determined using online mapping sources. All buildings have been set to be acoustically reflective.

H3.28 The model assumes a ground absorption coefficient of 1 (i.e. acoustically absorptive conditions), to reflect the largely rural ground cover across the site and surrounding area.

H3.29 Noise levels from road traffic within the model have been calculated using the CRTN methodology. As the CRTN methodology predicts noise levels in terms of the dB $L_{A10,18h}$, corrections are required in order to derive the daytime and night-time average equivalent noise levels in line with the BS 8233 criteria. In order to calculate the daytime (07:00 – 23:00 hours) $L_{Aeq,16h}$ 2 dB has been subtracted from the predicted dB $L_{A10,18h}$. TRL method 3^{Ref 18} was used to convert the predicted dB $L_{A10,18h}$ value into the night-time (23:00 – 07:00) dB $L_{Aeq,8h}$ value.

Model Calibration

H3.30 The digital acoustic model has been calibrated by comparing the acoustic model outputs based on the traffic data for the baseline year (2019) and the measurements obtained from the baseline noise survey, as summarised above.

- H3.31 The measurement positions used in the calibration of the model are provided below. Further details of these measurement positions are provided on Figure H3.1.
- 1 LTMP1 – approximately 11m from the southbound carriageway of the M1
 - 2 LTMP2 – approximately 10m from the westbound carriageway of the A509
 - 3 LTMP3 – South of Caldecote Lane and approximately 135m South of A422 / 195m west of A509

H3.32 Table H3.6 presents the measured daytime ambient noise levels ($L_{Aeq,16hr}$) and night-time ambient noise levels ($L_{Aeq,8hr}$) at the three long-term measurement positions, along with the predicted noise levels at the corresponding locations in the model.

Table H3.6: Acoustic Model Calibration

Measurement Location		Daytime ambient noise level (dB)	Night-time ambient noise level (dB)
		($L_{Aeq,16h}$)	($L_{Aeq,8h}$)
LTMP1 In proximity to the M1	Measured (A)	78.8	76.8
	Predicted (B)	78.6	74.4
	Difference (A-B)	-0.2	-2.4
LTMP2 In proximity to the A509	Measured (C)	68.3	63.6
	Predicted (D)	68.1	59.5
	Difference (C-D)	-0.2	-4.1
LTMP3 In proximity to the A422 / A509	Measured (E)	57.3	53.9
	Predicted (F)	56.9	52.3
	Difference (E-F)	-0.4	-1.5

- H3.33 It can be seen that the measured⁴ and predicted noise levels are between 0.2 and 0.4 dB of each other during the daytime across the three positions, with the measured levels being marginally higher at all three positions. Differences of this magnitude are considered to be negligible and therefore acceptable.
- H3.34 During the night-time, the difference between the measured and predicted noise levels are more pronounced with the lowest difference at 1.5 dB (LTMP3) and the highest at 4.1 dB. As is the case during the daytime, the measured levels are the higher of the two.
- H3.35 The greater difference between the measured and predicted levels during the night-time is anticipated to be due to the use of TRL method 3 in the model calculation procedure, which is empirically derived from varied sources of road traffic measurement data.
- H3.36 Consequently, a +2.9 dB correction has been applied to the TRL method 3 calculation within the model. This results in an overprediction of 0.1 dB at LTMP1 and 1.0 dB at LTMP3 when compared with the measured noise levels and presents a robust assessment case. At LTMP2, the predicted noise levels are 1.0 dB lower than the measured noise levels, which is considered to fall within acceptable tolerances.

⁴ The measured noise levels reported are the arithmetic average of the complete daytime and night-time periods throughout the survey duration. The adjusted night-time noise levels (i.e. those to which the correction have been added) fall within the range of measured 8 hour night-time noise levels.

Significance Criteria

Construction Noise

- H3.37 Construction noise levels have been predicted at nearby existing sensitive receptors based on a typical construction plant list for a development of this size and nature, and following the methodology set out in Annex F of BS 5228-1.
- H3.38 The effects of construction noise from the development of the site and supporting road infrastructure, on existing sensitive receptors, have been assessed based on guidance contained within BS 5228-1.
- H3.39 The following scale has been used to assess the magnitude of impact and significance of effect for construction noise.

Table H3.7: Scale of Impacts and Effects - Construction Noise

Façade daytime noise level (LAeq,T) solely from construction works 1	Façade night-time noise level (LAeq,T) solely from construction works 2	Magnitude of impact	Significance of effect
≤65 dB	≤55 dB	Negligible	Not significant
66 dB to 70 dB	56 dB to 60 dB	Minor adverse	
71 dB to 75 dB	61 dB to 65 dB	Moderate adverse	Significant 3
≥76 dB	≥66 dB	Substantial adverse	

Note:

1 T = the time period over the core working day

2 T = the time period over the core working night

3 A façade noise level of 71 dB LAeq,T and 61 dB LAeq,T effectively denotes the SOAEL for the daytime and night-time periods respectively. However, a noise impact of moderate or substantial magnitude would usually only be considered a significant effect if the impact occurs for a duration exceeding:

- > 10 or more days or nights in any 15 consecutive days or nights, or
- > a total number of days exceeding 40 in any 6 consecutive months

- H3.40 At this stage, the exact programme of construction works is not yet known. However, given the scale of the Proposed Development, impacts could be for longer than 10 days in any 15 consecutive days, or a total number of days exceeding 40 in any 6 consecutive months, as per Table H3.6. Consequently, Moderate and Substantial Adverse effects are considered to be significant.

Construction Vibration

- H3.41 Construction vibration levels have been predicted at nearby existing sensitive receptors based on a typical construction plant list for a development of this size and nature, and following the methodology set out in Annex E of BS 5228-2.
- H3.42 The effects of construction vibration from the development of the site and supporting road infrastructure, on existing sensitive receptors, have been assessed based on guidance contained within BS 5228-2.
- H3.43 The following scale has been used to assess the magnitude of impact and significance of effect for construction vibration.

Table H3.8: Scale of Impacts and Effects - Construction Vibration

Peak particle velocity (PPV) from construction works	Magnitude of impact	Significance of effect
$\leq 0.3 \text{ mms}^{-1}$	Negligible	Not significant
0.4 to 0.9 mms^{-1}	Minor adverse	
1.0 to 4.9 mms^{-1}	Moderate adverse	Significant ¹
$\geq 5.0 \text{ mms}^{-1}$	Substantial adverse	

Note:

¹ A peak particle velocity of 1.0 mms^{-1} effectively denotes the SOAEL. However, a noise impact of moderate or substantial magnitude would usually only be considered a significant effect if the impact occurs for a duration exceeding:

- > 10 or more days or nights in any 15 consecutive days or nights, or
- > a total number of days exceeding 40 in any 6 consecutive months

H3.44 The focus of the construction noise and vibration assessment will be on the identification of any significant effects, and consequently any mitigation measures that will need to be included in a CEMP.

Operational Road Traffic Noise

H3.45 Road traffic noise levels in terms of $L_{A10,18h}$ over the daytime period (06:00-24:00 hours) have been predicted based on traffic data provided by the project's transport consultant, and in line with guidance contained within the CRTN. TRL Project Report PR/SE/451/02 has been used to convert the predicted $L_{A10,18h}$ to the L_{night} for the night-time period (23:00-07:00 hours).

H3.46 The magnitude of change has then been assessed in general accordance with the guidance contained in the Design Manual for Roads and Bridges (DMRB) Volume 11 Section 3 LA 111 Noise and Vibration (May 2020), using, in particular, the scales contained in that document.

H3.47 A number of assessment year scenarios and comparisons have been considered, in accordance with the DMRB LA 111, to assess the potential effects of operational road traffic noise in the short-term and long-term. These are detailed below:

- 1 Comparison 1: opening year without the Proposed Development vs. opening year with the Proposed Development (short-term change); and
- 2 Comparison 2: opening year without the Proposed Development vs. future year (opening year plus 15 years) with the Proposed Development (long-term change).

H3.48 The first comparison above identifies the short-term change in traffic related noise as a result of the Proposed Development, and the second comparison identified the long-term change in traffic related noise as a result of the Proposed Development. The DMRB LA 111 methodology also requires a third comparison, the long-term non-project noise change:

H3.49 Comparison 3: opening year without the Proposed Development vs. future year (opening year plus 15 years) without the Proposed Development (long-term change).

H3.50 DMRB LA 111 describes two different magnitude of change scales for the assessment of operational road traffic depending on whether the noise change is short-term or long-term as summarised in Table H3.8.

Table H3.9: Magnitude of Change Scale - Operational Road Traffic Noise

Magnitude of change ¹	Short-term change in noise level, dB(A) ²	Long-term change in noise level, dB(A) ²
No change	0	0
Negligible	0.1 to 0.9	0.1 to 2.9
Minor	1.0 to 2.9	3.0 to 4.9
Moderate	3.0 to 4.9	5.0 to 9.9
Substantial ³	≥ 5.0	≥ 10.0

Notes:

1 impact could be adverse or beneficial to align with positive or negative noise level changes (see note 2 below)

2 noise level change (LA10,18h or Lnight) could be positive or negative

3 the DMRB LA 111 describes this category as 'Major', but 'Substantial' has been used here and in the remainder of this ES chapter, for consistency purposes

- H3.51 The process for determining whether significant effects are likely to arise due to operational road traffic noise begins with determining the magnitude of noise change in the short-term. This magnitude of change is compared against the scale in Table H3.8 (second column) to provide an initial assessment of likely significant effects.
- H3.52 The starting point is that changes of moderate magnitude or above are considered to be Significant, whilst changes of minor magnitude or below are considered to be Not Significant. Where the magnitude of change in the short-term is negligible at noise sensitive buildings, it is concluded that the noise will not cause changes to behaviour or response to noise and so will not give rise to a likely significant effect. For noise sensitive receptors where the magnitude of change in the short-term is minor, moderate or substantial, the initial assessment of significance can then be modified, if necessary, through consideration of a combination of other contextual factors or local circumstances to determine final significance. These other indicators include:
- 1 whether the short-term change is towards the bottom or top of the short-term noise band change;
 - 2 the long-term change, with and without the Proposed Development;
 - 3 the absolute noise level – (in this regard the daytime and night-time SOAEL are 68 dB LA10,18h (façade) and 55 dB LAeq,8h (free-field) respectively);
 - 4 receptor specific circumstances such as:
 - i whether the highest noise change affects a blank façade or a façade without a habitable room window;
 - ii the length of façade affected, relative to the whole building; and
 - iii whether benefits affect some façades to off-set adverse effects elsewhere (and vice versa);
 - 5 whether the Proposed Development is likely to alter the acoustic character of the area; and
 - 6 the likely perception of residents.
- H3.53 The emphasis when considering these other indicators is whether the changes in noise would likely lead to changes in behaviour and response.

Consultation

- H3.54 A request for a scoping opinion and the EIA Scoping Report (see Appendix B1) was sent to Milton Keynes Council ('MKC') on 02 October 2020. Amongst other things the scoping report

identified aspects that would be scoped-in and those that would be scoped-out of the assessment. The approach to the assessment of those aspects to be scoped-in was also provided.

H3.55 During the preparation of the scoping report a tele-conference call was held on 22 September 2020 with the Council, Applicant and WSP, where the proposed approach to the noise and vibration assessment was discussed with opportunity provided to clarify points and respond to any queries. No particular issues were raised with respect to noise and vibration.

H3.56 MKC's EIA Scoping Opinion (see Appendix B2) was received on 30 November 2020, with the following comment on noise and vibration.

"The approach to air quality, odour and noise assessments are supported, both for operational and construction phases of the development."

Assumptions and Limitations

General

H3.57 The Proposed Development is submitted as a hybrid planning application with noise sensitive land uses included within the outline element. Therefore, all assessments included in this chapter, including that relating to site suitability (see Appendix H1), are based on parameter plans rather than a fixed and detailed masterplan.

H3.58 It is assumed that the employment buildings will be designed appropriately for their intended future users/occupiers. Therefore, these receptors are considered not to be particularly sensitive to noise and/or vibration and therefore have not been considered further in this Chapter.

H3.59 The assessments included within this Chapter are based upon the results generated by a 3D acoustic model. Assumptions specific to the model are provided in Section H4.0 along with the calibration procedure and results.

Construction

H3.60 At this stage the precise details of the construction work, including associated plant, working hours, programme and methodology are not known. The construction noise and vibration assessment is therefore under-pinned by a number of stated assumptions, which have been informed by advice provided by the Design Team. Assumptions include the number and type of plant, source noise levels and operating duration and location. No piling is assumed to be required for the construction of the new buildings on site.

H3.61 It is assumed that additional traffic movements associated with construction are considered unlikely to affect the road traffic noise levels significantly given that vehicles are anticipated to access the site directly from the M1 or the adjacent major road network, rather than the more lightly trafficked local roads where any adverse effects would be more pronounced.

Operational Road Traffic

H3.62 Traffic data which have been supplied for the baseline year (2019), have been taken from a strategic model developed in 2016. It is understood that the data from the 2016 strategic model have been validated using surveys undertaken in 2019 and the transport consultant has drawn the conclusion that the data from the 2016 strategic model are sufficiently representative of the traffic data in 2019. Details of this validation procedure are provided in Chapter D: Transport. The traffic data supplied for the year 2048 represent the year of completion for the Proposed Development and are considered sufficiently representative of the traffic 15 years after the opening year (i.e. 2046, assuming an opening year of 2031).

H3.63 Where traffic links have not been supplied specifically at the approach to and exit from roundabouts (i.e. where traffic speeds are likely to reduce), speeds have been limited to 48kph. Where speeds below 20 kph have been provided, these have been increased to 20 kph.

H4.0 **Baseline Conditions**

Existing Conditions

Sensitive Receptors

H4.1 Existing residential and other (non-residential) sensitive receptors considered within the assessment are identified below and presented in Figure H4.1.

Residential Receptors

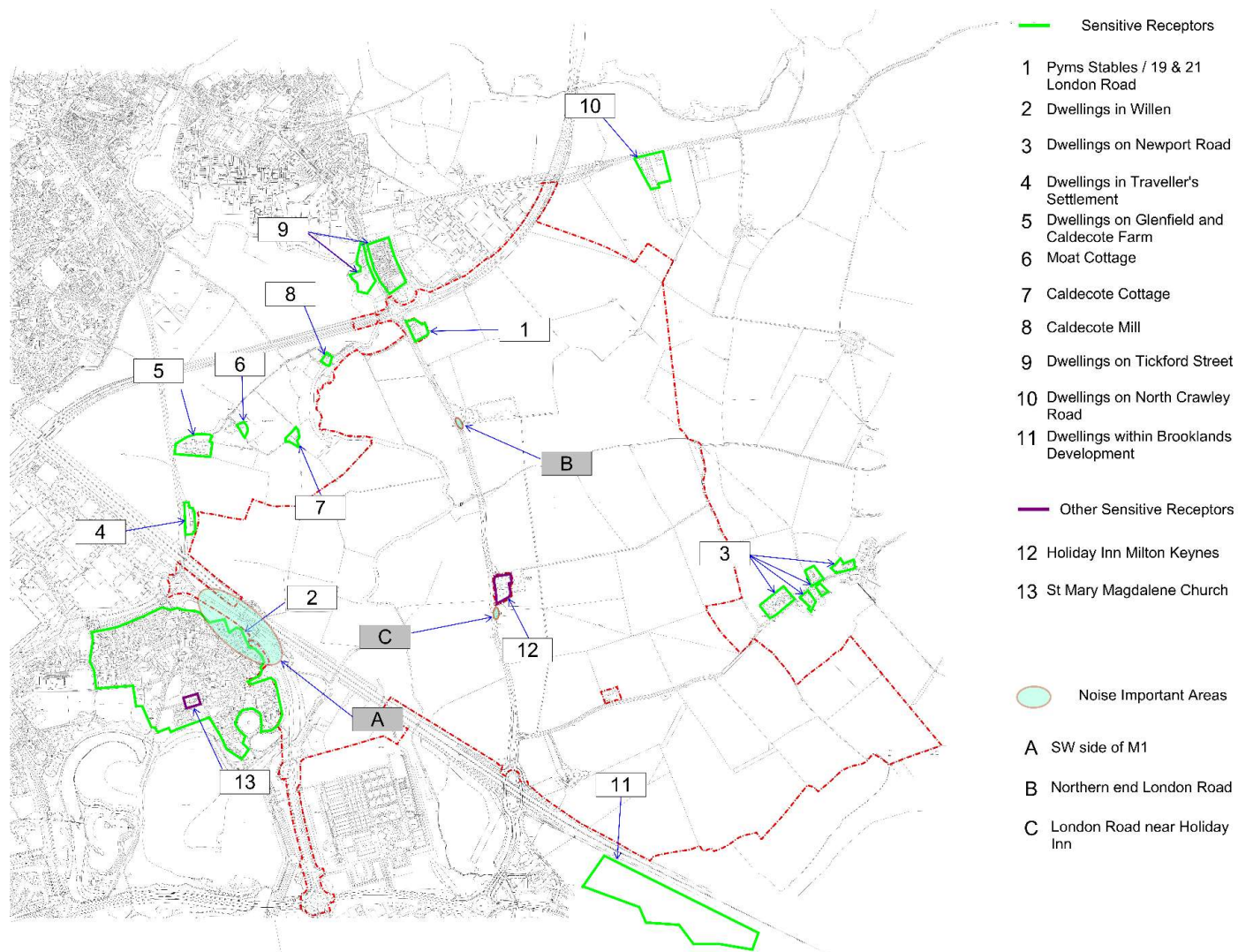
- 1 Pym's Stables and dwellings at the northern end of A509, in proximity to Tickford roundabout, adjacent to the northern Development Site boundary;
- 2 dwellings at the north and north-eastern extremity of Willen, particularly those on Dolben Court, Ketton Close, Chillery Leys and Carteret Close. The nearest of these dwellings is located approximately 30m south of Tongwell Street;
- 3 dwellings located on Newport Road at the westernmost extremity of Moulsoe Village, the nearest of which is approximately 110m north-east of the site boundary;
- 4 dwellings within the traveller's settlement located east of Willen Road and adjacent to the western site boundary;
- 5 dwellings located on Glenfield, along with Caldecote Farm, adjacent to the south, all of which are approximately 270m north-west of the site boundary;
- 6 Moat Cottage approximately 270m north-west of the site boundary;
- 7 Caldecote Cottage, located adjacent to the quarry and approximately 220m north-west of the site boundary;
- 8 Caldecote Mill, located approximately 70m south of A422 and approximately 140m west of the site boundary;
- 9 dwellings located toward the southern end of Tickford Street (B526), the nearest of which is located approximately 130m north of the site;
- 10 dwellings located on North Crawley Road, to the east of Interchange Park, the nearest of which is approximately 300m north east of the site;
- 11 dwellings in the recent Brooklands development, north of Brooklands Meadows Park, particularly those nearest to the site on Ivernia Avenue, Buccaneer and Maritime Way, located approximately 110m south of the site across the M1 highway; and

Other Sensitive Receptors

- 1 Holiday Inn Milton Keynes M1 East, which is located along the A509;
- 2 St Mary Magdalene Church, located on Milton Road and approximately 340m south-east of the site boundary.

H4.2 The proposed sensitive receptors within the Proposed Development itself have also been considered in this chapter.

Figure H4.1 Sensitive Receptors and Noise Important Areas



Noise Important Areas

H4.3 The Government, through consultation with Defra and local authorities, has prioritised areas where people are most exposed to noise and are at greatest risk of experiencing significant adverse impact to health and quality of life as a result of their exposure to noise. These identified areas are termed 'Noise Important Areas' (NIAs).

H4.4 The NIAs falling within the operational road traffic noise study area (also shown on Figure H4.1) are tabulated below

Table H4.1: Noise Important Areas

Figure H1 reference	NIA	Length	Location	Owner
A	5406	440m	On the SW side of the M1 at Willen	Highways England
B	11980	50m	On A509 London Road, 540m south of Tickford Roundabout	MKC
C	5214	50m	On A509 London Road, immediately south of the Holiday Inn	MKC

Noise Survey Results – Attended Short-term Measurement Locations

H4.5 The following noise levels have been captured to enable assessments to be undertaken in accordance with relevant guidance:

- 1 ambient noise ($L_{Aeq,T}$) and background noise ($L_{A90,T}$) over 15 minutes at night between 00:00 and 02:00 hours; and
- 2 ambient noise ($L_{Aeq,T}$) and background noise ($L_{A90,T}$) over at least 60 minutes during the day between 10:00 and 15:00 hours.

H4.6 The tables below present a summary of the measured noise levels at each of the four attended short-term measurement locations. A more detailed breakdown of the survey results is presented in Appendix H7: Attended Noise Survey Results (Volume 2 of this ES).

Table H4.2: Summary of Measured Noise Levels (dB) at STMP1 (Newport Road)

Day and date	Period	Start time (hh:ss)	Duration (mins)	Noise level (dB)	
				$L_{Aeq,T}$	$L_{A90,T}$
Tuesday 03-Nov-20	Night	00:15	15	53	49
		01:22	15	53	51
Wednesday 04-Nov-20	Day	11:43	60	59	45
		13:55	60	59	46

Table H4.3: Summary of Measured Noise Levels (dB) at STMP2 (A509)

Day and date	Period	Start time (hh:ss)	Duration (mins)	Noise level (dB)	
				$L_{Aeq,T}$	$L_{A90,T}$
Tuesday 03-Nov-20	Night	00:12	15	57	51
		01:28	15	57	51
Wednesday 04-Nov-20	Day	10:37	60	56	51
		12:50	60	56	52

Table H4.4: Summary of Measured Noise Levels (dB) at STMP3 (Tongwell Street)

Day and date	Period	Start time (hh:ss)	Duration (mins)	Noise level (dB)		
				L _{Aeq,T}	L _{A90,T}	L _{A10,T}
Tuesday 03-Nov-20	Night	00:38	15	63	46	-
		01:00	15	62	47	-

Table H4.5: Summary of Measured Noise Levels (dB) at STMP4 (Willen Road)

Day and date	Period	Start time (hh:ss)	Duration (mins)	Noise level (dB)		
				L _{Aeq,T}	L _{A90,T}	L _{A10,T}
Tuesday 03-Nov-20	Night	00:37	15	59	53	-
		01:02	15	59	54	-

Noise Survey Results – Unattended Long-term Measurement Locations

- H4.7 In accordance with relevant guidance, the following noise levels have been captured:
- 1 ambient noise (L_{Aeq,T}) during the day (between 07:00 and 23:00 hours) and night (between 23:00 and 07:00 hours);
 - 2 typical background noise (L_{A90,15min}) during the day (between 07:00 and 23:00 hours) and night (between 23:00 and 07:00 hours);
 - 3 the UK traffic noise index (L_{A10,18h}) during the day (between 06:00 and 24:00 hours); and
 - 4 the typical L_{A90,15min} during the night (between 23:00 and 07:00 hours).
 - 5 the typical maximum noise (L_{Amax,5min}) during the night (between 23:00 and 07:00 hours).
- H4.8 Typical background noise levels (L_{A90,15min}) have been derived from the modal values of the 15 minute measurements during the daytime or night-time periods. Where the daytime or night-time periods are multi-modal, the lowest mode has been taken.
- H4.9 Typical maximum noise levels have taken as the 10th highest of the 5 minute measurements during the night-time, in accordance with World Health Organisation 'Guidelines for Community Noise' (1999) ^{Ref 15}.
- H4.10 The tables below present a summary of the measured noise levels at each of the five unattended long-term measurement locations. A more detailed breakdown of the survey results is presented in Appendix H8: Unattended Noise Survey Results (Volume 2 to this ES).

Table H4.6: Summary of Measured Noise Levels (dB) at LTMP1

Day	Date	Daytime noise levels (dB)			Night-time noise levels (dB)		
		07:00-23:00		06:00-24:00	07:00-23:00		
		L _{Aeq,16h}	L _{A90,15min} *	L _{A10,18h}	L _{Aeq,8h}	L _{A90,15min} *	L _{AFmax,5min} *
Mon	02-Nov-20	78	70	81	78	61	88
Tue	03-Nov-20	79	70	82	77	59	86
Wed	04-Nov-20	79	73	81	77	59	86
Thu	05-Nov-20	78	68	81	77	57	86
Fri	06-Nov-20	78	70	81	75	56	85
Sat	07-Nov-20	75	63	79	71	50	84
Sun	08-Nov-20	76	67	80	78	62	87
Mon	09-Nov-20	79	69	82	74	63	84
Tue	10-Nov-20	75	72	77	-	-	-

Notes:

The coloured cells denote a partial measurement. Data from period of rainfall on Tuesday 3rd November excluded, therefore partial measurement on this day.

* typical values

Table H4.7 : Summary of Measured Noise Levels (dB) at LTMP2

Day	Date	Daytime noise levels (dB)			Night-time noise levels (dB)		
		07:00-23:00		06:00-24:00	07:00-23:00		
		L _{Aeq,16h}	L _{A90,15min} *	L _{A10,18h}	L _{Aeq,8h}	L _{A90,15min} *	L _{AFmax,5min} *
Mon	02-Nov-20	67	50	69	65	46	82
Tue	03-Nov-20	70	59	72	63	44	80
Wed	04-Nov-20	69	53	72	63	44	80
Thu	05-Nov-20	67	48	70	62	46	80
Fri	06-Nov-20	67	48	70	59	45	80
Sat	07-Nov-20	65	50	68	57	38	78
Sun	08-Nov-20	64	49	67	64	40	81
Mon	09-Nov-20	69	44	72	64	42	82
Tue	10-Nov-20	72	58	76	-	-	-

Notes:

The coloured cells denote a partial measurement. Data from period of rainfall on Tuesday 3rd November excluded, therefore partial measurement on this day.

* typical values

Table H4.8: Summary of Measured Noise Levels (dB) at LTMP3

Day	Date	Daytime noise levels (dB)			Night-time noise levels (dB)		
		07:00-23:00		06:00-24:00	07:00-23:00		
		L _{Aeq,16h}	L _{A90,15min} *	L _{A10,18h}	L _{Aeq,8h}	L _{A90,15min} *	L _{AFmax,5min} *
Mon	02-Nov-20	59	52	59	53	48	62
Tue	03-Nov-20	58	54	59	55	48	64
Wed	04-Nov-20	58	52	59	54	48	64
Thu	05-Nov-20	55	48	56	54	46	63
Fri	06-Nov-20	58	51	59	53	46	63
Sat	07-Nov-20	55	52	56	48	38	61
Sun	08-Nov-20	52	46	53	53	44	62
Mon	09-Nov-20	57	52	58	-	-	-

Notes:

The coloured cells denote a partial measurement. Data from period of rainfall on Tuesday 3rd November excluded, therefore partial measurement on this day.

* typical values

Table H4.9 Summary of Measured Noise Levels (dB) at LTMP4

Day	Date	Daytime noise levels (dB)			Night-time noise levels (dB)		
		07:00-23:00		06:00-24:00	07:00-23:00		
		LAeq,16h	LA90,15min *	LA10,18h	LAeq,8h	LA90,15min *	LAFmax,5min
Mon	02-Nov-20	74	55	77	65	49	-

Notes:

The coloured cells denote a partial measurement

* typical values

Table H4.10 Summary of Measured Noise Levels (dB) at LTMP5

Day	Date	Daytime noise levels (dB)			Night-time noise levels (dB)		
		07:00-23:00		06:00-24:00	07:00-23:00		
		LAeq,16h	LA90,15min *	LA10,18h	LAeq,8h	LA90,15min *	LAFmax,5min *
Mon	02-Nov-20	58	53	-	51	49	57

Notes:

The coloured cells denote a partial measurement

* typical values

- H4.11 The results of the noise survey have been used to determine the relevant threshold categories for the construction noise assessment and to aid the calibration of the operational road traffic noise model (see paragraph H3.30 to H3.36).

Future Baseline

- H4.12 In the absence of the Proposed Development it is likely that other applications would come forward as the area has been allocated within Plan:MK 2016-2031. This notwithstanding, it is expected that the noise environment would be subject to change as a result of general growth in road traffic between the existing baseline year (2019) and the future baseline year (i.e. the year of opening of the Proposed Development in 2031).
- H4.13 A comparison between the road traffic data for the existing baseline and the future baseline indicates that noise levels in the area surrounding the Proposed Development are predicted to change by up to +2 dB. This is equivalent to a long-term change of negligible magnitude, in accordance with DMRB ^{Ref 12}.

H5.0 **Potential Effects**

Embedded Mitigation

H5.1 In preparing this assessment, the following mitigation has been assumed to be in place.

During Construction

H5.2 The adoption of Best Practicable Means (BPM), as defined in the Control of Pollution Act 1974, will be a fundamental mitigation measure. The manifestation of BPM will be a series of noise and vibration control measures, which will be incorporated within a CEMP. A condition should be imposed on any permission granted, which will require the developer and subsequently the Contractor to accord with the CEMP. Compliance with the CEMP, which will be prepared in association with the local authority, will minimise noise and vibration effects.

H5.3 The most relevant measures with respect to noise and vibration are set out below:

- 1 Mobile and static plant will be located as far as possible away from dwellings.
- 2 If the noise is directional the source will be pointed away from noise dwellings whenever practical.
- 3 The location and orientation of site offices and buildings will be considered in order to maximise the separation distance and screening provided from site operations to noise sensitive receptors.
- 4 A policy will be adopted where plant on site is reviewed to ensure it is the quietest available for the required task.
- 5 Engines will be switched off when vehicles are stationary – there should be no idling vehicles.
- 6 When reversing, mobile plant and vehicles will travel in a direction away from noise sensitive receptors whenever possible.
- 7 The use of white noise and directional reversing warning alarms will be employed on all mobile plant in order to reduce impacts, whenever possible.
- 8 In-cab communication systems will be employed removing the impact of short duration horn use, whenever possible.
- 9 All plant, equipment and vehicles will be fitted with appropriate noise suppression equipment to reduce noise levels as far as is practicable.
- 10 Generators and compressors will be located within suitable acoustic enclosures that do not affect the ventilation requirements or restrict access for maintenance.
- 11 Restrictions on the hours of construction to 08:00 – 18:00 hours on weekdays, and 08:00 – 13:00 hours on Saturdays, with the exception of some night-time works for bridge construction over the M1.

H5.4 It is often the case that problems concerning noise from construction works can be avoided by taking a considerate and neighbourly approach to relations with the local neighbours. Consequently, the appointed contractor will:

- 1 Develop and implement a stakeholder plan that includes community engagement before work commences on site.
- 2 A contact number and responsible person to whom complaints should be directed (and who has the authority to influence how works are undertaken on site) should be provided.

- 3 Residents and others likely to be affected by the works should be kept informed of forthcoming works, for example through the use of regular newsletters.

H5.5 Based on the above, a cautious -5 dB correction has been applied to all on-site construction activities to take into account the embedded mitigation measures to be employed on site to reduce noise levels.

During Operation

H5.6 With regards to the primary street corridors through the Development Site, due consideration has been given to measures that when incorporated into the engineering design would minimise potential impacts. Each of these is considered below:

- 1 Horizontal alignment (moving a route away from sensitive receptors). As the Development Site is predominantly greenfield in nature, the alignment of the primary streets inherently maximises the separation distance between the new road network and the existing sensitive dwellings nearby.
- 2 Vertical alignment (keeping a route low within the natural topography to exploit any natural screening). The primary street network runs broadly at grade along most of its length; engineering constraints relating to drainage, flood risk and the need to tie-in to existing connections means that the road cannot not adopt a lower profile.
- 3 Low noise surface (effective at reducing noise in the mid to high frequencies where tyre noise dominates, which typically is where speeds are in excess of 75 kph, or around 47 mph). It is understood that a 30 mph speed limit will be imposed on the primary street network through the Development Site, which means that tyre noise is unlikely to be a significant contributor to the overall level of traffic noise emanating from the new roads. This in turn means that a low noise road surface is unlikely to provide any meaningful benefit and consequently this form of mitigation has not been embedded into the development and is not considered further.
- 4 Speed restrictions (all else remaining the same, lowering traffic speeds will serve to reduce road noise at source). The new primary streets are understood to have a proposed speed limit of 30 mph rather than, say, 40 mph, and this should to help to minimise road traffic noise.

During Construction

Construction Noise

H5.7 This assessment considers the noise effects likely to arise during the temporary works associated with the construction phase of the Proposed Development and associated infrastructure. It is expected that there will be some disruption during the construction works in terms of noise at existing nearby sensitive receptors and at nearby completed and occupied residential phases of the Proposed Development during the construction works. However, disturbance will be localised and works will be temporary.

H5.8 The noise levels will be attenuated by distance from the source; the greater the distance between the source and receptor, the lower the noise level at that receptor, all else remaining equal. Features between the source and receptor can also help to obstruct the passage of noise. When works are being undertaken where a line of sight to the plant is obscured or the works are contained within a building or structure, a significant reduction in noise levels will be experienced.

- H5.9 As detailed in Chapter C of this ES, the Proposed Development will be built out in three key phases. For the purposes of the noise assessment, the overall construction works have been split into three key activities:
- i. highway and bridge construction (Phase 1 only);
 - ii. site clearance (all Phases); and
 - iii. building construction (all Phases).
- H5.10 The calculation methodology contained in BS 5228-1 has been used to predict the levels of noise that are likely to be generated by the works at the nearby sensitive receptors. The construction plant noise emission data have been taken from Annex C of BS 5228-1 for the anticipated plant for each construction activity. Details of these plant and their noise emission levels, as well as their assumed on-time, are shown in Appendix H9: Construction Plant List and Information.
- H5.11 Worst-case and average-case scenarios have been considered. For the worst-case scenario, noise levels have been predicted based on a single item of each of the plant operating at the closest point within the Development Site to each receptor. For the average-case scenario, noise levels have been predicted based on the full complement of plant working in a more central location of the Development Site.
- H5.12 Appendix H9 presents the worst-case distances (i.e. the shortest distance between the receptor and construction activity at the Development Site boundary) and average case distances for each receptor at which noise levels have been predicted.
- H5.13 The predicted façade noise levels for the worst and average case scenarios at the receptors within the 300m study area of the construction works are presented in Table H5.1. The receptors are shown within the Sensitive Receptors and Noise Important Areas plan, as presented in Figure H4.1.
- H5.14 Where potentially significant daytime effects have been identified based on the scale of effects table as presented in Table H3.6, cells have been highlighted in orange. For potentially significant night-time effects as a result of bridge construction over the M1, cells have been highlighted in blue. Where predicted noise levels fall within the negligible or minor adverse category, as presented in Table H3.6, and therefore not considered significant, the cells have been left uncoloured.

Table H5.1: Predicted Construction Noise Levels at Sensitive Receptors, Façade dB $L_{Aeq,T}$

Reference in Figure H1	Receptor location	Phase 1						Phase 2				Phase 3			
		Highway and bridge construction		Site set-up and earthworks		Building construction		Site set-up and earthworks		Building construction		Site set-up and earthworks		Building construction	
		Worst case	Ave case	Worst case	Ave case	Worst case	Ave case	Worst case	Ave case	Worst case	Ave case	Worst case	Ave case	Worst case	Ave case
1	Pyms Stables/northern end of A509 London Road	75	62	54		53	-	74	56	73	55	-	-	-	-
2	Carteret Close	65	63	-	-	-	-	-	-	-	-	54	-	54	-
	Tuffnell Close	65	62	-	-	-	-	-	-	-	-	54	-	54	-
	Chillery Leys	67	62	-	-	-	-	-	-	-	-	-	-	-	-
	Ivernia Avenue, Buccaneer and Maritime Way	-	-	53	-	53	-	-	-	-	-	-	-	-	-
3	Newport Road	-	-	-	-	-	-	-	-	-	-	55	-	55	-
4	Willen Road traveller's settlement	-	-	-	-	-	-	-	-	-	-	74	56	73	55
6,7 and 8	Caldecote Lane (including Moat Cottage, Caldecote Cottage and Caldecote Mill)	-	-	-	-	-	-	52		52		-	-	-	-
-	Phase 1 of Proposed Development	-	-	-	-	-	-	74	56	73	55	74	56	73	55
-	Phase 2 of Proposed Development	-	-	-	-	-	-	-	-	-	-	74	56	73	55
-	Bloor Homes development	-	-	-	-	-	-	-	-	-	-	74	56	73	55

- H5.16 As can be seen from Table H5.1, during the worst-case scenario the predicted noise levels at the following receptors are likely to be of moderate adverse magnitude (significant) during certain construction phases:
- 1 Dwellings on Pym's Stables and at the northern-most end of the A509 London Road
 - 2 The Holiday Inn Milton Keynes M1 East
 - 3 Dwellings on Carteret Close
 - 4 Willen Road traveller's settlement
 - 5 Dwellings associated with Phase 1 and 2 of the Proposed Development
 - 6 Dwellings associated with Bloor Homes development
- H5.17 For all other receptors during the worst-case scenario, the predicted noise levels are of negligible to minor adverse magnitude and therefore considered not significant.
- H5.18 During the average-case scenario, with the exception of night-time bridge construction works, the predicted noise levels at all receptors are of negligible to minor adverse magnitude and therefore considered not significant. The predicted noise levels during the average case scenario for dwellings on Carteret Close during night-time bridge construction works are likely to be of moderate adverse magnitude (significant).
- H5.19 It should be noted that significant effects will be short in duration during the worst-case scenario, when the plant listed in Appendix H9, are in use at the closest point to the nearby sensitive receptors outlined above. The significant night-time effect identified in the average-case scenario for dwellings on Carteret Close are also anticipated to be short in duration as the bridge works will be undertaken during a few limited night-time motorway closures.
- H5.20 The exact construction plant type, location and periods of operation will need to be reviewed following appointment of the Principal Contractor and this assessment updated, where needed.
- Construction Vibration**
- H5.21 As with construction noise, it is expected that there will be some disruption in terms of vibration caused to nearby sensitive receptors during the construction works associated with the Proposed Development. However, disturbance will be localised and works will be temporary.
- H5.22 In accordance with the methodologies and criteria in BS 5228-2, as detailed in Appendix H3, vibration levels likely during vibratory rolling (i.e. compaction) of material on the Development Site have been predicted. This activity is likely to generate the highest level of vibration although similar levels may also be generated during any hydraulic breaking for the removal of any hardstanding.
- H5.23 The peak particle velocity for a typical twin-drum vibratory roller (further details are provided in Appendix H9) has been predicted during start-up and run-down and during steady state operation, with a 33.3% confidence that the level will be exceeded, but a 66.6% chance that it will not.
- H5.24 In order for a significant effect to be experienced at a sensitive receptor based on the scale of effect as presented in Table Table H3.8, the vibratory roller would need to be within 20m of a sensitive receptor during steady state operation and 25m for start-up and run down.
- H5.25 The closest sensitive receptors to the construction works are 20m away (see Appendix H9 for worst-case distances). Consequently, effects of moderate adverse magnitude (significant) are anticipated but only during start-up and run down of the vibratory roller at properties in very close proximity to the works, namely:

- 1 Dwellings on Pyms Stables and at the northern-most end of the A509 London Road
- 2 The Holiday Inn Milton Keynes M1 East
- 3 Willen Road traveller's settlement
- 4 Dwellings associated with Phases 1 and 2 of the Proposed Development
- 5 Dwellings associated with Bloor Homes development

During Operation

- H5.26 This assessment considers the permanent operational road traffic noise effects of the Proposed Development on existing nearby sensitive receptors. The assessment has been based on the change in road traffic noise level arising from the operation of Proposed Development for the following scenarios:
- 1 Comparison 1: opening year without the Proposed Development vs. opening year with the Proposed Development (short-term change); and
 - 2 Comparison 2: opening year without the Proposed Development vs. future year with the Proposed Development (long-term change).
- H5.27 All road traffic noise predictions have been undertaken in accordance with the calculation methodology presented in the CRTN and Appendix A of DMRB LA111 and using traffic data provided by WSP as detailed in the Transport Assessment Chapter D.
- H5.28 To facilitate the assessment of operational road traffic noise, the 3D digital noise model has been used to predict the noise levels at sensitive receptors within the study area. The noise model has been set-up as described in Section H4.0.
- H5.29 The assessment considers not just the daytime period in terms of $L_{A10,18h}$, but also the night-time period in terms of $L_{night, outside}$, which is equivalent to the $L_{Aeq,8h}$.
- H5.30 The noise levels are calculated at the façade of buildings during the daytime (1m from the external façade) and free-field levels incident on the façade of buildings during the night-time. All levels are calculated at a default height of 4m relative to the surrounding ground level.
- H5.31 Where a building is predicted to experience different changes in noise level on different façades, the result on the façade experiencing the greatest magnitude of noise change has been reported in line with the guidance contained in the DMRB LA111.
- H5.32 The predicted short-term change in noise level (i.e. Comparison 1) at residential and other sensitive receptors within the study area are presented in Table H5.2 below.

Table H5.2: Sensitive Receptors, Short-term Noise Changes

Change in noise level		Magnitude of impact	Daytime		Night-time	
			Number of dwellings	Number of other sensitive receptors	Number of dwellings	Number of other sensitive receptors
Increase in noise level $L_{A10,18h} / L_{night}$	0.1 – 0.9 dB	Negligible	299	1	341	1
	1.0 – 2.9 dB	Minor Adverse	36	0	5	0
	3.0 – 4.9 dB	Moderate Adverse	0	0	0	0

Change in noise level		Magnitude of impact	Daytime		Night-time	
			Number of dwellings	Number of other sensitive receptors	Number of dwellings	Number of other sensitive receptors
	≥ 5 dB	Substantial Adverse	0	0	0	0
No change	0 dB	No change	8	0	173	0
Decrease in noise level $L_{A10,18h} / L_{night}$	0.1 – 0.9 dB	Negligible	397	1	233	1
	1.0 – 2.9 dB	Minor Beneficial	14	0	2	0
	3.0 – 4.9 dB	Moderate Beneficial	0	0	0	0
	≥ 5 dB	Substantial Beneficial	0	0	0	0

H5.33 The change in road traffic noise level at all receptors within the study area are negligible or minor (both adverse and beneficial) in the short-term.

H5.34 The 36 residential receptors predicted to experience a minor adverse impact are located in the following areas:

- 1 21 receptors along Newport Road near Moulsoe – increase as a result of increase in traffic flow along this route. All receptors are below the daytime and night-time SOAEL (see paragraph H3.52 for details) in the year of opening both with and without the Proposed Development, with the exception of one receptor which exceeds the night-time SOAEL by 0.2 dB in the year of opening both with the Proposed Development.
- 2 One receptor at Tickford Lodge Farm – increase as a result of new primary roads on site. Receptor below the daytime and night-time SOAEL in the year of opening both with and without the Proposed Development.
- 3 14 receptors along Tongwell Street – increase as a result of the new road layout on Tongwell Street. All receptors exceed the night-time SOAEL in the year of opening both with and without the Proposed Development. Nine receptors exceed the daytime SOAEL in the year of opening both with and without the Proposed Development, with the remaining falling below the daytime SOAEL in the year of opening both with and without the Proposed Development.

H5.35 With reference to Table H3.9, there is likely to be a negligible to minor adverse direct, permanent, short-term effect as a result of operational road traffic noise, which is considered not significant. However, as the Proposed Development is predicted to increase noise levels for dwellings along Tongwell Street which already exceed the SOAEL, mitigation in this area has been identified and is detailed further in Section H6.o.

H5.36 The predicted long-term change in noise level (i.e. Comparison 2) at residential and other sensitive receptors within the study area are presented in Table H5.3 below.

Table H5.3 Sensitive Receptors; Long-term Noise Changes

Change in noise level		Magnitude of impact	Daytime		Night-time	
			Number of dwellings	Number of other sensitive receptors	Number of dwellings	Number of other sensitive receptors
Increase in noise level LA10,18h / Lnight	0.1 – 2.9 dB	Negligible	389	1	395	1
	3.0 – 4.9 dB	Minor Adverse	9	0	0	0
	5.0 – 9.9 dB	Moderate Adverse	0	0	0	0
	≥ 10 dB	Substantial Adverse	0	0	0	0
No change	0 dB	No change	101	0	178	0
Decrease in noise level LA10,18h / Lnight	0.1 – 2.9 dB	Negligible	255	1	181	1
	3.0 – 4.9 dB	Minor Beneficial	0	0	0	0
	5.0 – 9.9 dB	Moderate Beneficial	0	0	0	0
	≥ 10 dB	Substantial Beneficial	0	0	0	0

- H5.37 The change in road traffic noise level at all receptors within the study area are negligible or minor adverse in the long-term.
- H5.38 The nine residential receptors predicted to experience a minor adverse impact are located along Newport Road near Moulsoe and Tickford Lodge Farm.
- H5.39 The short-term minor adverse impact at Moulsoe is a result of increases in traffic flow along this route. All receptors are below the daytime and night-time SOAEL (see paragraph H3.52 for details) in the year of opening without the Proposed Development and in the future year with the Proposed Development, with the exception of two receptors which exceed the night-time SOAEL by 0.1 dB in the future year with the Proposed Development.
- H5.40 The short-term minor adverse impact at Tickford Lodge Farm is a result a result of new primary roads on site. The predicted daytime and night-time noise levels fall below SOAEL in the year of opening without the Proposed Development and in the future year with the Proposed Development.
- H5.41 Consequently, and with reference to Table H3.9, there is likely to be a negligible to minor adverse direct, permanent, long-term effect as a result of operational road traffic noise, which is considered not significant.
- H5.42 With regards to the Noise Important Areas, receptors within these areas are predicted to experience impacts of negligible to minor adverse impact, which are considered not significant.

H6.0 **Mitigation and Monitoring**

During Construction

Construction Noise

- H6.1 The construction assessment described in Section H5.0 concluded that effects of negligible to minor adverse magnitude (not significant) are expected for the majority of receptors during the average case scenario, with the exception of those on Carteret Close during the night-time bridge construction works when effects of moderate adverse magnitude (significant) are expected.
- H6.2 For the worst-case scenario, when construction plant are operating in close proximity to the receptors, effects of moderate adverse magnitude (significant) are predicted at:
- 1 Dwellings on Pyms Stables and at the northern-most end of the A509 London Road
 - 2 The Holiday Inn Milton Keynes M1 East
 - 3 Dwellings on Carteret Close
 - 4 Willen Road traveller's settlement
 - 5 Dwellings associated with Phases 1 and 2 of the Proposed Development
 - 6 Dwellings associated with Bloor Homes development
- H6.3 With respect to the impacts on existing sensitive receptors (those listed as numbers 1-4 in the list above), construction works will be undertaken in compliance with the CEMP, including the adoption of BPM. No further mitigation measures have been identified at this stage; however it is recommended that a more detailed assessment be undertaken on any permission granted, which will require the developer and subsequently the Contractor to agree any site-specific mitigation for these receptors to minimise the potential impact.
- H6.4 With respect to the impacts on future sensitive receptors (those listed as number 5 and 6 in the list above), it is recommended that a condition be imposed on any permission granted, which will require the developer and subsequently the Contractor to agree the careful phasing and management of the construction works. With appropriate phasing and management, the distance between the noisiest construction activity and the occupied residential dwellings within the Proposed Development will be increased, thereby reducing the effects of construction noise.

Construction Vibration

- H6.5 The construction vibration assessment concluded that effects of moderate adverse magnitude (significant) would only be expected at the following dwellings during the start-up and run down of the vibratory roller:
- 1 Dwellings on Pyms Stables and at the northern-most end of the A509 London Road
 - 2 The Holiday Inn Milton Keynes M1 East
 - 3 Willen Road traveller's settlement
 - 4 Dwellings associated with Phases 1 and 2 of the Proposed Development
 - 5 Dwellings associated with Bloor Homes development
- H6.6 At all other times and receptors, effects of negligible to minor adverse magnitude (not significant) are expected.

H6.7 Consequently, it is recommended that a site-specific mitigation measure be included within the CEMP to prevent the start-up and run-down of any vibratory rollers within a distance of 25m of a sensitive receptor, wherever possible.

During Operation

H6.8 As stated in paragraph H5.34, the amendments to Tongwell Street as part of the Proposed Development result in minor adverse impacts on nine receptors which exceed the daytime SOAEL.

H6.9 In line with the NPSE, significant adverse impacts (i.e. noise levels above the SOAEL) should be avoided and mitigated and minimised through the effective management and control of environmental noise, within the context of Government policy on sustainable development. Consequently, mitigation measures have been identified to minimise the adverse impacts in this area along Tongwell Street.

A new 3m high acoustic barrier has been incorporated into the 3D noise model along the southern edge of Tongwell Street. A plan to show the location of the barrier is shown in

H6.10 Figure H6.1.

H6.11 The road traffic noise predictions at sensitive receptor within the study area have been re-calculated within the noise model, including the new 3m high Tongwell Street barrier. The results for the following comparison are presented in Table H6.1:

- 1 Comparison 3: opening year without the Proposed Development vs. opening year with the Proposed Development including Tongwell Street barrier (short-term change). The short-term change only has been presented as there were no minor adverse impacts predicted near Tongwell Street in the long-term.

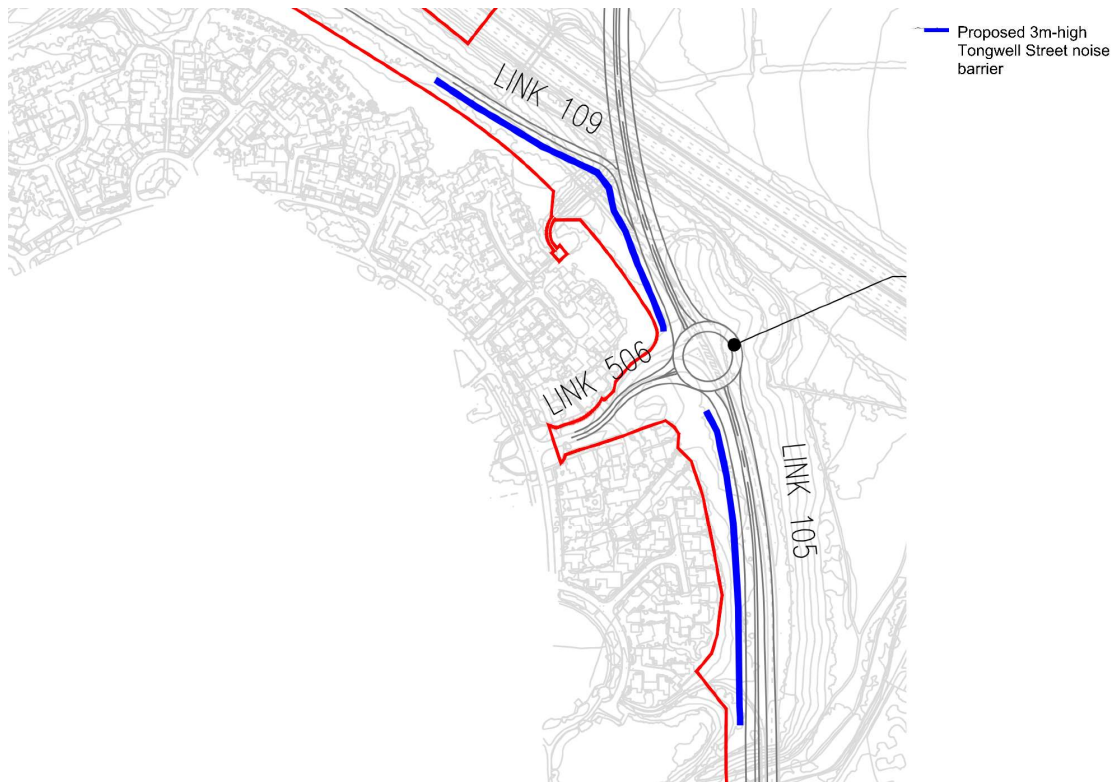
Table H6.1: Sensitive Receptors, Short-term Noise Changes including Tongwell Street barrier

Change in noise level		Magnitude of impact	Daytime		Night-time	
			Number of dwellings	Number of other sensitive receptors	Number of dwellings	Number of other sensitive receptors
Increase in noise level $L_{A10,18h} / L_{night}$	0.1 – 0.9 dB	Negligible	229	1	260	1
	1.0 – 2.9 dB	Minor Adverse	23	0	4	0
	3.0 – 4.9 dB	Moderate Adverse	0	0	0	0
	≥ 5 dB	Substantial Adverse	0	0	0	0
No change	0 dB	No change	10	0	185	0
Decrease in noise level $L_{A10,18h} / L_{night}$	0.1 – 0.9 dB	Negligible	434	1	271	1
	1.0 – 2.9 dB	Minor Beneficial	51	0	32	0
	3.0 – 4.9 dB	Moderate Beneficial	7	0	2	0
	≥ 5 dB	Substantial Beneficial	0	0	0	0

H6.12 The 23 receptors predicted to experience a minor adverse impact are located in the same areas as identified previously (see paragraph H5.34); namely Newport Road near Moulsoe, Tickford Lodge Farm and Tongwell Street. As before, and with reference to Table H3.6, there is likely to be a negligible to minor adverse direct, permanent, short-term effect as a result of operational road traffic noise, which is considered not significant. Only one receptor is identified on Tongwell Street to experience a minor adverse impact equivalent to a 1.1 dB noise level change. This predicted noise change value is towards the lower end of the minor adverse impact (i.e. near to the threshold for a negligible impact).

It should also be noted that there are seven receptors which are predicted to experience a moderate beneficial impact as a result of the Proposed Development, which is considered to be significant. The seven receptors are identified as being located in proximity to Tongwell Street and are predicted to experience a moderate beneficial impact as a result of the 3m high barrier proposed on Tongwell Street.

Figure H6.1: Location of proposed 3m-high Tongwell Street barrier



H7.0 **Residual Effects**

During Construction

Construction Noise

H7.1 Notwithstanding the requirement for careful phasing and management of the construction works as described in Section H6.0, it is anticipated that significant effects could still arise as a result of construction noise at sensitive receptors, as listed below:

- 1 Dwellings on Pyms Stables and at the northern-most end of the A509 London Road
- 2 The Holiday Inn Milton Keynes M1 East
- 3 Dwellings on Carteret Close
- 4 Willen Road traveller's settlement
- 5 Dwellings associated with Phases 1 and 2 of the Proposed Development
- 6 Dwellings associated with Bloor Homes development

H7.2 However, the construction activities that take place at the closest distances to the nearby receptors will be short-lived and temporary. As noted in Section H5.0 for the majority of the construction works, no significant effects will arise as a result of construction noise at nearby sensitive receptors.

Construction Vibration

H7.3 Notwithstanding the requirement for careful phasing and management of the construction works as described in Section H6.0, it is anticipated that significant effects could still arise as a result of construction vibration at sensitive receptors, as listed below:

- 1 Dwellings on Pyms Stables and at the northern-most end of the A509 London Road
- 2 The Holiday Inn Milton Keynes M1 East
- 3 Willen Road traveller's settlement
- 4 Dwellings associated with Phases 1 and 2 of the Proposed Development
- 5 Dwellings associated with Bloor Homes development

H7.4 However, the construction activities that take place at the closest distances to the nearby receptors will be short-lived and temporary. As noted in Section H5.0 for the majority of the construction works, no significant effects will arise as a result of construction vibration at nearby sensitive receptors.

During Operation

H7.5 The operational road traffic noise assessment described in Section H6.0 concluded that, with the inclusion of the Tongwell Street barrier, impacts of negligible to minor adverse magnitude (not significant) and up to moderate beneficial magnitude (significant) would be expected.

H8.0 Summary & Conclusions

- H8.1 This chapter has assessed the likely noise and vibration effects arising during the construction and operation phases of the Proposed Development.
- H8.2 A baseline noise survey has been conducted in the area of the Proposed Development to establish the existing noise levels on the Development Site. The results of the noise survey have been used to inform this assessment.
- H8.3 The construction noise assessment described in Section H5.0 concluded that significant effects will arise as a result of construction noise at sensitive receptors in closest proximity to the Development Site during the worst-case scenario. However, the duration of the construction scenarios that take place at the closest distances to the nearby receptors will be short, and careful management of the construction phasing will be undertaken. Consequently, for the majority of the construction phases, no significant effects will arise as a result of construction noise at nearby sensitive receptors with appropriate mitigation and controls in place.
- H8.4 The construction vibration assessment described in Section H5.0 concluded that significant effects will arise as a result of construction vibration at sensitive receptors in closest proximity to the Development Site during the worst-case scenario. However, the duration of the construction scenarios that take place at the closest distances to the nearby receptors will be short, and a minimum distance of 25m between the nearby receptors and the vibration intensive works will be enforced where possible. Consequently, for the majority of the construction works, no significant effects are anticipated as a result of construction vibration at sensitive receptors with appropriate mitigation and controls in place.
- H8.5 The operational road traffic noise assessment concluded that impacts of negligible to minor adverse magnitude are predicted at nearby sensitive receptors, and consequently no significant adverse effects are anticipated. In order to mitigate and minimise noise levels that exceed the SOAEL for dwellings in the vicinity of Tongwell Street as well as offset the minor adverse impacts in this area, a 3m high acoustic barrier is proposed. With the inclusion of this barrier, moderate beneficial impacts (significant) are predicted for dwellings in the vicinity of Tongwell Street.
- H8.6 A summary of the effects and proposed mitigation are set out in Table H8.1.

Table H8.1: Summary of Effects

Receptor	Embedded Mitigation	Effects	Mitigation	Residual Effects
During Construction				
Nearest dwellings to the construction works	Employment of embedded best practice measures set out in section H5.0 and adherence to the CEMP	Temporary impacts of negligible to moderate adverse magnitude (significant)	Employment of CEMP	Temporary impacts of negligible to moderate adverse magnitude (Significant)
During Operation				
Dwellings and other sensitive receptors within study area	30mph speed limit on primary roads through the Development Site	Permanent impacts of negligible to minor adverse magnitude (not significant)	3m high noise barrier along Tongwell Street	Permanent impacts of negligible to minor adverse magnitude (not significant) and up

Receptor	Embedded Mitigation	Effects	Mitigation	Residual Effects
	to help reduce noise at source			to moderate beneficial (significant)

H9.0 **Abbreviations & Definitions**

- °C - degree centigrade
- 3D - Three-dimensional
- BPM - Best Practicable Means
- BS - British Standard
- CEMP - Construction Environmental Management Plan
- CRTN - Calculation of Road Traffic Noise
- CoPA - Control of Pollution Act
- dB - decibel
- DCLG - Department for Communities and Local Government
- DCO - Development Consent Order
- DM - Do-minimum
- DMRB - Design Manual for Roads and Bridges
- DS - Do-something
- EC - European Commission
- EIA - Environmental Impact Assessment
- ES - Environmental Statement
- EU - European Union
- GIS - Geographic Information System
- Kph - kilometres per hour
- LOAEL - Lowest Observed Adverse Effect Level
- M - metres
- MIOA - Member of the Institute of Acoustics
- MKC - Milton Keynes Council
- m.s⁻¹ - metres per second
- NOEL - No Observed Effect Level
- NPPF - National Planning Policy Framework
- NPSE - Noise Policy Statement for England
- OS - Ordnance Survey
- PPG - Planning Practice Guidance
- PPV - Peak Particle Velocity
- ProPG - Professional Practice Guidance
- SOAEL - Significant Observed Adverse Effect Level
- TAN - Technical Advice Note
- TRL - Transport Research Laboratory
- UAE - Unacceptable Adverse Effect

- UKAS - United Kingdom Accreditation Service
- WHO - World Health Organisation

H10.0 References

- 1 Control of Pollution Act (CoPA), 1974
- 2 Noise Policy Statement for England (NPSE), 2010
- 3 National Planning Policy Framework (NPPF), 2012 (last updated 2019)
- 4 Planning Practice Guidance (PPG), 2019
- 5 Plan:MK 2016 – 2031, adopted 2019
- 6 Milton Keynes East Strategic Urban Extension – Development Framework – Supplementary Planning Document, March 2019
- 7 British Standard 4142, Methods for Rating and Assessing Industrial and Commercial Sound, BS 4142: 2014+A1:2019
- 8 British Standard 5228, Code of practice for noise and vibration control on construction and open sites, Part 1: Noise, BS 5228:2009+A1:2014
- 9 British Standard 5228, Code of practice for noise and vibration control on construction and open sites, Part 2: Vibration, BS 5228:2009+A1:2014
- 10 Calculation of Road Traffic Noise (CRTN). Department of Transport and Welsh Office, 1988
- 11 Abbott P. G. and Nelson P. M., TRL Limited, Project Report PR/SE/451/02 Converting the UK traffic noise index $L_{A10,18h}$ to EU noise indices for noise mapping, 2002
- 12 Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 7, LA 111 Noise and Vibration. Highways England, Transport Scotland, Welsh Government, Department for Infrastructure, Revision 2, May 2020
- 13 Professional Practice Guidance (ProPG) on Planning & Noise: New Residential Development, May 2017
- 14 British Standard 8233 Guidance on sound insulation and noise reduction for buildings. BS 8233:2014
- 15 Guidelines for Community Noise, World Health Organisation, 1999
- 16 Building Bulletin 93 Acoustic design of schools: performance standards, 2015
- 17 Association of Noise Consultants (ANC), Acoustics of schools: a design guide, 2015