

Statutory Consultation 2022

# Preliminary Environmental Information Report

Volume 2: Main Report  
**Chapter 8: Biodiversity**



# Contents

---

	Page
<b>8 Biodiversity</b>	<b>1</b>
8.1 Introduction	1
8.2 Legislation, policy and guidance	3
8.3 Scope of the assessment	17
8.4 Stakeholder engagement and consultation	28
8.5 Methodology	31
8.6 Assumptions and limitations	40
8.7 Baseline conditions	42
8.8 Embedded and good practice mitigation measures	65
8.9 Preliminary assessment	69
8.10 Additional mitigation	88
8.11 Residual effects	91
8.12 In-combination climate change effects	100
8.13 Monitoring	103
8.14 Preliminary assessment summary	105
8.15 Completing the assessment	142
<b>Competent Experts</b>	<b>143</b>
<b>Glossary and Abbreviations</b>	<b>144</b>
<b>References</b>	<b>147</b>

## Tables

Table 8.1: Biodiversity legislation

Table 8.2: Biodiversity policy

Table 8.3: How relevant Biodiversity requirements of ANPS are addressed in the PEIR.

Table 8.4: Biodiversity guidance

Table 8.5: Biodiversity Scoping Opinion comments

Table 8.6: ZOIs for ecological features considered of relevance to the assessment, biophysical changes and associated potential effects.

Table 8.7: Stakeholder engagement relating to biodiversity

Table 8.8: Protected and notable species surveys

Table 8.9: Hierarchy of Ecology and Nature Conservation Value

Table 8.10: Ecological interpretation of classification of significance.

Table 8.11: Non-statutory designated nature conservation sites scoped into the assessment of Proposed Development.

Table 8.12: Notable habitats present and scoped into the assessment of the Proposed Development

Table 8.13: Notable species present/surveyed and considered of relevance to the preliminary assessment of the Proposed Development

Table 8.14: Qualitative Sensitivity Analysis

Table 8.15: Biodiversity in-combination climate change impacts

Table 8.16: Biodiversity preliminary assessment summary

## 8 BIODIVERSITY

### 8.1 Introduction

- 8.1.1 This chapter presents the preliminary assessment of likely significant effects of the Proposed Development on biodiversity. Details of the Proposed Development are described in **Chapter 4** of this PEIR.
- 8.1.2 The EIA Scoping Report provided in **Appendices 1.1** and **1.2** in Volume 3 to this Preliminary Environmental Information Report (PEIR), set out the proposed scope for the assessment of biodiversity. In summary, the following have been assessed in this PEIR:
- a. designated nature conservation sites;
  - b. important habitats including Section 41 priority habitats listed under the Natural Environment and Rural Communities (NERC) Act 2006 (Ref. 8.1);
  - c. protected species; and
  - d. notable flora and fauna.
- 8.1.3 Within these, receptors are assessed in terms of whether there is the potential for an effect. Where there is a potential then these receptors are then scoped into the detailed assessment to determine if there is a significant effect. Where there are no pathways for an effect then these receptors are scoped out of the further assessment, refer to **Section 8.3**.
- 8.1.4 Where practicable, the Proposed Development has been designed to avoid or reduce adverse effects on important ecological features and deliver benefits for biodiversity in accordance with policy and best practice. This chapter documents measures to mitigate significant ecological effects.
- 8.1.5 This chapter includes an assessment of the potential effects on nationally and locally designated nature conservation sites and important ecological features. For internationally designated nature conservation sites, this chapter draws upon the Habitat Regulations Assessment (HRA) No Significant Effects Report (NSER) Report (**Appendix 8.3**, Volume 3 of this PEIR), which provides the necessary information for the competent authority (in this case the Secretary of State) to undertake an assessment under the Conservation of Habitats and Species Regulations 2017 (SI 2017 No. 1012) (the 'Habitats Regulations') (Ref. 8.5).
- 8.1.6 Both this chapter and the HRA NSER (**Appendix 8.3**, Volume 3 of this PEIR) are supported by evidence gathered from desk studies, field surveys, and the assessments for **Chapter 7** Air Quality, **Chapter 14** Landscape and Visual, **Chapter 16** Noise and Vibration, **Chapter 20** Water Resources and Flood Risk and **Chapter 21** In-combination and Cumulative Effects.
- 8.1.7 To provide a high-level quantification of the level of biodiversity that will be lost to the Proposed Development and the habitat creation/enhancement requirement, a Biodiversity Net Gain (BNG) calculation is being undertaken using the Defra (Department for Environment, Food and Rural Affairs) metric version 3.0 (Ref. 8.2), with an Applicant commitment to deliver 10% net gain

which is consistent with the Environment Act 2021 (Ref. 8.3). The BNG assessment will be presented as part of the Environmental Statement (ES).

8.1.8 This chapter also includes an overview of the measures that are proposed to mitigate the effects upon ecological receptors. Prescriptions for the establishment, long term management and monitoring of habitat creation measures are included within the Draft Landscape and Biodiversity Management Plan (LBMP) (**Appendix 8.2**, Volume 3 of this PEIR).

8.1.9 The remainder of this chapter consists of:

- a. **Section 8.2** Legislation, policy and guidance relevant to the scope and methodology of the biodiversity preliminary assessment;
- b. **Section 8.3** Scope of the assessment;
- c. **Section 8.4** Stakeholder engagement undertaken to inform the preliminary assessment;
- d. **Section 8.5** Methodology applied to the preliminary assessment;
- e. **Section 8.6** Assumptions and limitations at this stage of work;
- f. **Section 8.7** Baseline conditions;
- g. **Section 8.8** Embedded and good practice mitigation;
- h. **Section 8.9** Preliminary assessment;
- i. **Section 8.10** Additional mitigation;
- j. **Section 8.11** Residual effects;
- k. **Section 8.12** In-combination climate change;
- l. **Section 8.13** Monitoring;
- m. **Section 8.14** Assessment summary; and
- n. **Section 8.15** Completing the assessment - remaining work to complete the EIA for the Environmental Statement.

## 8.2 Legislation, policy and guidance

8.2.1 This section identifies the key legislation, policy and guidance relevant to the scope and methodology for the biodiversity assessment which may influence the type of mitigation measures that could be incorporated into the Proposed Development during construction and/or operation.

8.2.2 **Table 8.1 to Table 8.4** provides a description of the relevant legislation, policy and guidance, and identify how and where each of these have been addressed in the PEIR.

### Legislation

Table 8.1: Biodiversity legislation

Legislation	How and where addressed in PEIR
<p>European Union (Withdrawal Agreement) Act 2020 (“the Withdrawal Act”) (Ref. 8.4).</p> <p>The UK left the EU on 31 January 2020 under the terms set out in the European Union (Withdrawal Agreement) Act 2020 (“the Withdrawal Act”). This established a transition period, which ended on 31 December 2020. From 1 January 2021, the ecological protection previously afforded by the Conservation of Habitats and Species Regulations 2017 (as amended) continues, including by amendments set out in the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (these don’t replace the 2017 Regulations but make consequential amendments).</p>	<p>The biodiversity assessment provides a preliminary assessment of the potential effects that the Proposed Development will have on designated nature conservation sites, habitats and species protected under this legislation and forms part of the rationale for their stated importance in compliance with the 2017 Habitats Regulations (as amended)(see below).</p> <p>Addressed in <b>Section 8.9 and 8.14</b>, and also within the HRA NSER (<b>Appendix 8.3</b>, Volume 3 of this PEIR).</p>
<p>Environment Act 2021 (Ref. 8.3)</p> <p>The Environment Act 2021 requires NSIPs to include a 10% biodiversity net gain (BNG).</p> <p>The Environment Act 2021 requires the Secretary of State to set long-term targets (15-year minimum) for biodiversity. This target has not yet been set but will be kept under review.</p>	<p>A Defra BNG calculation is being undertaken following guidance produced by Defra and uses The Biodiversity Metric 3.0 developed by Natural England (Ref. 8.2) to allow biodiversity losses and gains to be quantified. The metric is being used to guide the habitat creation measures designed into the Proposed Development to ensure a net gain in biodiversity. The results of this will be presented within the ES.</p>
<p>The Conservation of Habitats and Species Regulations 2017 (as amended) (Ref. 8.5).</p> <p>The Conservation (Natural Habitats andc.) Regulations 1994 initially transposed the</p>	<p>The biodiversity assessment provides a preliminary assessment of the potential effects that the Proposed Development will have on designated nature conservation sites, habitats and species protected under</p>

Legislation	How and where addressed in PEIR
<p>provisions of Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna (Habitats Directive) into UK law.</p> <p>The Conservation of Habitats and Species Regulations 2017 further enact the Habitats Directive within England and Wales. Part 2 of these Regulations covers the selection, designation, registration and management of European sites (previously known as Natura 2000 sites and now the national site network). Schedule 2 of the Regulations lists the European protected species of animals whilst Schedule 5 lists the European protected species of plants. Conservation Objectives (referred to within Article 6(3) of the Habitats Directive) ensure that the European protected species identified as qualifying features of a national site network (Natura 2000) site remain or reach favourable condition (such as by maintaining the extent and distribution of habitats of qualifying features). This means that where the Proposed Development may affect a Conservation Objective of a European protected site, the design will need to include appropriate measures to ensure the Conservation Objectives are not adversely affected. From 1 January 2021, the ecological protection previously afforded by the Conservation of Habitats and Species Regulations 2017 (as amended) continues, including by amendments set out in the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (these don't replace the 2017 Regulations but make consequential amendments).</p>	<p>this legislation and forms part of the rationale for their stated importance in compliance with these regulations.</p> <p>Addressed in <b>Section 8.9 and 8.14</b>, and also within the HRA NSER (<b>Appendix 8.3</b>, Volume 3 of this PEIR).</p>
<p>Natural Environment and Rural Communities Act 2006 (Ref. 8.6).</p> <p>Section 40 of the Natural Environment and Rural Communities Act (NERC) 2006 sets out the duty for public authorities to conserve biodiversity in England. Habitats and species of principal importance for the conservation of biodiversity are identified by the Secretary of State, in</p>	<p>The biodiversity assessment provides a preliminary assessment of the potential effects that the Proposed Development will have on designated nature conservation sites, habitats and species protected under this legislation and forms part of the rationale for their stated importance in compliance with this act.</p> <p>Addressed in <b>Section 8.9 and 8.14</b>.</p>



Legislation	How and where addressed in PEIR
<p>consultation with Natural England, are referred to in Section 41 of the NERC Act for England. The list, known as the ‘England Biodiversity List’, of habitats and species can be found on the Natural England web site.</p> <p>The ‘England Biodiversity List’ is used as a guide for decision makers such as public bodies, including local and regional authorities, in implementing their duty under Section 40 of the NERC Act 2006 to have regard to the conservation of biodiversity in England when carrying out their normal functions.</p>	
<p>Countryside and Rights of Way Act 2000 (Ref. 8.7).</p> <p>The Countryside and Rights of Way (CRoW) Act 2000 applies to England and Wales only. Part III of the Act deals specifically with wildlife protection and nature conservation.</p> <p>The Act places a duty on Government departments to have regard for the conservation of biodiversity and maintain lists of species and habitats for which conservation steps should be taken or promoted, in accordance with the Convention on Biological Diversity.</p> <p>Schedule 9 of the Act amends the Sites of Special Scientific Interest (SSSI) provisions of the Wildlife and Countryside Act 1981 (as amended), including increased powers for the protection and management of SSSIs. The provisions extend powers for entering into management agreements; place a duty on public bodies to further the conservation and enhancement of SSSIs; increase penalties on conviction where the provisions are breached; and include an offence whereby third parties can be convicted for damaging SSSIs.</p> <p>Schedule 12 of the Act amends the species provisions of the Wildlife and Countryside Act 1981 (as amended), strengthening the legal protection for threatened species. The provisions make certain offences</p>	<p>The biodiversity assessment provides a preliminary assessment of the potential effects that the Proposed Development will have on designated nature conservation sites, habitats and species protected under this legislation and forms part of the rationale for their stated importance in compliance with this act.</p> <p>Addressed in <b>Section 8.9</b> and <b>8.14</b>.</p>

Legislation	How and where addressed in PEIR
<p>'arrestable', include an offence of reckless disturbance, confer greater powers to police and wildlife inspectors for entering premises and enable heavier penalties on conviction of wildlife offences.</p>	
<p>Hedgerows Regulations 1997 (Ref. 8.8).</p> <p>The wildlife, landscape and historical criteria specified in the Regulations are used to identify what constitutes an 'Important' hedgerow. 'Important' hedgerows are protected from removal (up-rooting or otherwise destroying) without permission from the relevant authority. The local planning authority is also the enforcement body for offences created by these Regulations.</p> <p>Local planning authority permission is normally required before removing hedges that are at least 20m (66 feet) in length, more than 30 years old and contain certain plant species.</p>	<p>The biodiversity assessment provides a preliminary assessment of the potential effects that the Proposed Development will have on hedgerows in compliance with these regulations.</p> <p>Addressed in <b>Section 8.9</b> and <b>8.14</b>.</p>
<p>Protection of Badgers Act 1992 (Ref. 8.10).</p> <p>Badgers (<i>Meles meles</i>) are protected by the Protection of Badgers Act 1992 and are listed under Annex II of the Bern Convention. These legislative measures are based primarily on the need to protect badgers from baiting and deliberate harm or injury.</p>	<p>The biodiversity assessment provides a preliminary assessment of the potential effects that the Proposed Development will have on badgers, and potential mitigation required in compliance with this act.</p> <p>Addressed in <b>Section 8.9</b> and <b>8.14</b>.</p>
<p>Wildlife and Countryside Act 1981 (Ref. 8.9).</p> <p>The Wildlife and Countryside Act 1981 (as amended) is the major domestic legal instrument for wildlife protection in the UK, and is the primary means by which the following are implemented:</p> <ol style="list-style-type: none"> <li>a. Convention on the Conservation of European Wildlife and Natural Habitats ('the Bern Convention');</li> </ol>	<p>The biodiversity assessment provides a preliminary assessment of the potential effects that the Proposed Development will have on designated nature conservation sites, habitats and species protected under this legislation and forms part of the rationale for their stated importance in compliance with this act.</p> <p>Addressed in <b>Section 8.9</b> and <b>8.14</b>.</p>

Legislation	How and where addressed in PEIR
<p>b. Convention on the Conservation of Migratory Species of Wild Animals (‘the Bonn Convention’); and</p> <p>c. Directive 2009/147/EC on the Conservation of Wild birds (the ‘Birds Directive’).</p>	
<p>The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.</p> <p>The Water Framework Directive (WFD) 2000/60/EC was adopted and came into force in 2000 and represents a culmination in European Union (EU) water resource protection. The WFD is transposed into law in England and Wales by The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (as amended). The Directive and enacting Regulations aim to achieve 'good status' for all groundwaters and surface waters (rivers, lakes, estuaries, coastal waters) according to biological, hydro morphological, physico-chemical and chemical criteria. From 1 January 2021, the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 has been retained in UK law following exit from the EU.</p>	<p>The biodiversity assessment provides a preliminary assessment of the potential effects that the Proposed Development will have on watercourse protected under this legislation and forms part of the rationale for their stated importance in compliance with these regulations.</p> <p>Addressed in <b>Section 8.9 and 8.14</b>. Refer to <b>Chapter 20</b> of this PEIR.</p>

## Policy

Table 8.2: Biodiversity policy

Policy	How and where addressed in PEIR
<p>National Planning Policy Framework (2021) (Ref. 8.10)</p> <p>The National Planning Policy Framework (NPPF) sets out the Governments planning policies for England and how these are expected to be applied by Local Authorities within their Local Development Frameworks (LDF). Chapter 15 of the NPPF ‘Conserving and enhancing the natural environment’ sets out the requirements to consider biodiversity in planning decisions.</p>	<p>The biodiversity assessment provides a preliminary assessment of the potential effects that the Proposed Development will have on designated nature conservation sites, habitats and species as per the policies listed within the NPPF.</p> <p>Addressed in <b>Section 8.9 and 8.14</b>.</p>

Policy	How and where addressed in PEIR
<p>Paragraphs 179 to 182 stipulate requirements to protect and enhance biodiversity (179), what principles a local planning authority should apply when determining planning applications (180), what sites that are currently afforded preliminary etc status should be given the same protection as habitat sites (181), and that the presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site (182).</p> <p>The NPPF is supported by Planning Practice Guidance (PPG) of which those in relation to biodiversity and ecosystems within the Natural Environment PPG are of relevance.</p>	
<p>National Policy Statement for National Networks – December 2014 (NPSNN) (Ref. 8.11)</p> <p>The NPSNN sets out the need for, and Government’s policies to deliver, development of nationally significant infrastructure projects on the national road and rail networks in England. It provides planning guidance for promoters of nationally significant infrastructure projects (NSIP) on the road and rail networks. The provisions of the NPSNN relevant to environmental assessment broadly mirror those as outlined in the ANPS.</p>	<p>There are no elements of the Proposed Development that would be classified as a NSIP on the national road or rail network. However, the NPSNN remains a relevant consideration as works are proposed on the SRN at Junction 10 as part of the Proposed Development. As provisions relevant to environmental assessment broadly mirror those as outlined in the ANPS they have been appropriately considered in this preliminary assessment. Further consideration of the proposals against relevant NPSNN policies will take place following this consultation and in preparation of the DCO application.</p>
<p>Biodiversity 2020: A strategy for England’s wildlife and ecosystem services (Ref. 8.12).</p> <p>This is a Strategy for England’s wildlife and ecosystem services in identifying how climate change is likely to affect the future environment (detailed within <b>Section 8-12</b>). It also reflects how ecological networks will be maintained through the use of a</p>	<p>The Proposed Development includes measures, such as habitat creation, to mitigate effects and contribute to achieving 10% net gain in biodiversity. The Proposed Development’s embedded and good practice mitigation measures are detailed within <b>Section 8.8</b> and potential additional mitigation measures are detailed within <b>Section 8.10</b>. A BNG</p>

Policy	How and where addressed in PEIR
<p>biodiversity offsetting metric and through studies into connectivity through the study area and wider landscape, for particularly sensitive/valuable species.</p>	<p>strategy will be provided within the ES consistent with the Biodiversity 2020 strategy.</p>
<p>Luton Local Plan 2011-2031 (adopted November 2017) (Ref. 8.13).</p> <p>The Luton Local Plan (2011–2031) sets out a set of policies, development allocations and actions to meet the environmental, social and economic challenges facing the area over the 20-year plan period.</p> <p>Policy LLP28 - Biodiversity and Nature Conservation states that;</p> <p><i>“The Council will work .... to positively assess, manage, and designate sites and ecological networks including giving support to development proposals that add to the net stock of wildlife habitats or where they help to deliver a net gain in the conservation and enhancement of such sites.”</i></p> <p><i>“Development proposals that impact adversely on statutory or other designated sites, and ecological networks will need to demonstrate....</i></p> <ol style="list-style-type: none"> <li>a. avoidance, wherever possible; otherwise....</li> <li>b. benefits of the proposal must clearly outweigh the intrinsic nature conservation interest .....</li> <li>c. mitigation must be used, .... and appropriate management to minimise any harm during and after development; and</li> <li>d. compensation, through acquisition and management of an alternative habitat of equivalent wildlife value in the vicinity.”</li> </ol> <p><i>“All existing habitats and ecological networks will be afforded a level of protection from harm according to statutory and non-statutory nature conservation hierarchy designations and the contribution they make to wider ecological networks.”</i></p>	<p>The biodiversity assessment provides a preliminary assessment of the potential effects that the Proposed Development will have on designated nature conservation sites, habitats and species as per the policies listed within the Plan.</p> <p>Addressed in <b>Section 8.9</b> and <b>8.14</b>.</p>

Policy	How and where addressed in PEIR
<p><i>“Development site layouts should retain any existing areas of National Priority Habitats wherever possible, and to enhance their visual and biodiversity value.”</i></p> <p>Central Bedfordshire Pre-submission Local Plan 2015- 2035: Pre-submission, January 2018 (Ref. 8.14).</p> <p>The Central Bedfordshire Local Plan is the key strategic planning document for Central Bedfordshire and will guide and support the delivery of new infrastructure, homes and jobs. It sets out the long-term vision and objectives for the area, what is going to happen, where, and how this will be achieved and delivered over the next 20 years.</p> <p>This CBC Local Plan adopted in July 2021 replaces the North Core Strategy and Development Management Policies Document (2009) and the majority of the remaining policies within the South Bedfordshire Local Plan (2004), the Mid Bedfordshire Local Plan (2004) and the remaining saved policies of the Bedfordshire and Luton Minerals and Waste Local Plan (2005) so far as they affect Central Bedfordshire.</p> <p>Policy EE2: Enhancing Biodiversity states that <i>“Development proposals will be permitted where they provide a net gain in biodiversity through the conservation, restoration, enhancement and creation of ecological networks of habitats, species and sites .....</i></p> <p><i>Development proposals will be permitted where they avoid negative impacts on biodiversity ....Where this is not possible, proposals must mitigate unavoidable impacts and, as a last resort, compensate for residual impacts.</i></p> <p><i>Development proposals within, or in close proximity to, an ecological corridor should enhance the functionality and connectivity of the corridor.</i></p>	<p>The biodiversity assessment provides a preliminary assessment of the potential effects that the Proposed Development will have on designated nature conservation sites, habitats and species as per the policies listed within the Plan.</p> <p>Addressed in <b>Section 8.9</b> and <b>8.14</b>.</p>



Policy	How and where addressed in PEIR
<p><i>Development that would impact on the strategic ecological network causing fragmentation or otherwise prejudice its effectiveness will not be permitted.”</i></p> <p>Policy EE3: Nature Conservation states that: <i>“Important habitats ..... will be protected, maintained and enhanced”</i> It states that <i>“Up to date, comprehensive ecological surveys ...will be required to support and inform development proposals.....demonstrating will deliver a net gain”</i></p> <p>Policy EE4: Trees, Woodlands and Hedgerows states that:  <i>“Development Proposals will be permitted where:</i></p> <ul style="list-style-type: none"> <li><i>a. They do not adversely affect ancient woodland and aged and veteran trees.</i></li> <li><i>b. Existing hedgerows and trees are incorporated to enhance developments.....</i></li> <li><i>c. Any removal of trees or hedgerows to accommodate development is justified, and lost assets are replaced within the development site with appropriate planting.....”</i></li> </ul>	
<p>North Hertfordshire District Council Proposed Submission Draft Local Plan for 2011-2031, October 2016 (Ref. 8.15).</p> <p>The North Hertfordshire District Council (NHDC) Proposed Submission Local Plan 2011-2031, submitted to Government on 9 June 2017 replaces the 1996 Local Plan, and includes policies on biodiversity. Relevant policies include:                      Policy NE5 states that <i>“planning permissions will be granted where they....</i></p> <ul style="list-style-type: none"> <li><i>a. incorporate an open space buffer(s) where necessary for landscape, visual, ecological or air quality reasons;</i></li> <li><i>b. contribute to net gains for biodiversity, ecological networks and the water environment and/or restores degraded or isolated habitats.”</i></li> </ul>	<p>The biodiversity assessment provides a preliminary assessment of the potential effects that the Proposed Development will have on designated nature conservation sites, habitats and species as per the policies listed within the Plan.</p> <p>Addressed in <b>Section 8.9</b> and <b>8.14</b>.</p>

Policy	How and where addressed in PEIR
<p>Policy NE5 states that “<i>planning permissions will only be granted for development proposals affecting designated sites that:</i></p> <p><i>Protect, enhance and manage designated sites in accordance with the following hierarchy of designations;</i></p> <ul style="list-style-type: none"> <li><i>a. internationally designated sites</i></li> <li><i>d. nationally designated sites</i></li> <li><i>e. national Planning Policy Framework sites</i></li> <li><i>f. locally designated sites</i></li> </ul> <p><i>Submit an ecological survey and demonstrate that adverse effects can be satisfactorily minimised....</i></p> <p><i>Manage construction impacts by:</i></p> <ul style="list-style-type: none"> <li><i>a. demonstrating how existing wildlife habitats will be retained,</i></li> <li><i>b. safeguarded and managed during construction; and</i></li> <li><i>c. providing a buffer of complimentary habitat for all connective</i></li> <li><i>d. features for wildlife habitats or priority habitats; and</i></li> <li><i>e. Provide a long term management plan including mitigation measures as necessary”</i> </li></ul>	
<p>Bedfordshire and Luton Local Biodiversity Action Plan (LBAP) (Ref. 8.16).</p> <p>Since 2001 the Bedfordshire and Luton Wildlife Working Group has been developing and maintaining the individual plans for species and habitats as part of this county's Biodiversity Action Plan (BAP). These include, but are not limited to otter (<i>Lutra lutra</i>), water vole (<i>Arvicola amphibius</i>), arable field margins, hedgerows and lowland calcareous grassland. This LBAP is listed in the Ecology Baseline Report (<b>Appendix 8.1</b>, Volume 3 of this PEIR).</p>	<p>The biodiversity assessment provides a preliminary assessment of the potential effects that the Proposed Development will have on habitats and species for which their inclusion within these LBAPs forms part of the rationale for their stated importance. These include, but are not limited to otter, water vole, natter’s bat (<i>Myotis nattereri</i>), woodland, neutral grassland and chalk grassland.</p> <p>Addressed in <b>Section 8.9</b> and <b>8.14</b>.</p>
<p>Hertfordshire LBAP (Ref. 8.17).</p>	<p>The biodiversity assessment provides a preliminary assessment of the potential</p>



Policy	How and where addressed in PEIR
<p>The Hertfordshire LBAP sets out a 50 year vision for the wildlife and natural habitats of Hertfordshire and reviews UK priority habitats and species within the local context. The Hertfordshire LBAP identifies 5 Species Action Plans and 8 Habitat Action Plans that guide work on protecting, restoring and re-creating a sustainable level of biodiversity in the county. This LBAP is listed in the Ecology Baseline Report (<b>Appendix 8.1</b>, Volume 3 of this PEIR).</p>	<p>effects that the Proposed Development will have on habitats and species for which their inclusion within these LBAPs forms part of the rationale for their stated importance.                      Addressed in <b>Section 8.9</b> and <b>8.14</b>.</p>
<p>Biodiversity Opportunity Area (BOA).                       BOA plans identify within a local area, where the greatest gains for biodiversity could be delivered. The Rebuilding Biodiversity in South Bedfordshire and Luton (2008) (Ref. 8.18) and Hertfordshire’s Ecological Networks: A report on the current situation and priorities for restoration (2018) (Ref. 8.19) plans have been consulted to inform the development of Green Infrastructure as part of the Proposed Development.</p>	<p>The Proposed Development includes measures, such as habitat creation, to mitigate effects and contribute to achieving BNG. This is taken into account the relevant BOA plans. The Proposed Development’s embedded and good practice mitigation measures are detailed within <b>Section 8.8</b> and potential additional mitigation measures are detailed within <b>Section 8.10</b>.</p>

8.2.3 The Airports National Policy Statement (ANPS) (Ref. 8.20) does not have effect in relation to an application for development consent for an airport development not comprised of an application relating to the Heathrow Northwest Runway. Nevertheless, as set out within paragraph 1.41 of the ANPS, the Secretary of State considers that the contents of the ANPS will be both important and relevant considerations in the determination of such an application, particularly where it relates to London or the south east of England.

8.2.4 Accordingly, whilst the ANPS does not have effect in relation to the Proposed Development, it will be an important and relevant consideration in the determination of the application for development consent. A summary of the relevant provisions for the biodiversity assessment and how these have been addressed in relation to ecological receptors in this PEIR is provided within **Table 8.3**.

Table 8.3: How relevant Biodiversity requirements of ANPS are addressed in the PEIR.

ANPS Section	How and where addressed in PEIR
<p>Paragraphs 5.89 – 5.91 set out the considerations for an assessment of biodiversity and ecological conservation, with a general aim of achieving no net loss to biodiversity.</p>	<p>The likely significant effects of the Proposed Development upon internationally, nationally and locally designated nature conservation sites are</p>

ANPS Section	How and where addressed in PEIR
<p><i>“The Government’s biodiversity strategy is set out in Biodiversity 2020: A Strategy for England’s wildlife and ecosystem services. Its aim is to halt overall biodiversity loss, support healthy, well-functioning ecosystems, and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people.”</i></p>	<p>detailed within <b>Section 8.9</b> and summarised in <b>Table 8.18</b>.</p> <p>The construction of the Proposed Development will result in the loss of Wigmore Park County Wildlife Site (CWS) (a hedgerow to the northeast will be retained and incorporated into the replacement open space). Additional locally designated nature conservation sites, including Winch Hill Wood CWS/Local Wildlife Site (LWS), Luton Parkway Verges District Wildlife Site (DWS), Dairyborn Scarp DWS and Burnt Wood LWS are located within or in close proximity to the Proposed Development.</p> <p>The assessment reflects the principles of Biodiversity 2020: A Strategy for England’s wildlife and ecosystem services in identifying how climate change is likely to affect the future environment (detailed within <b>Section 8.12</b>) It also reflects how ecological networks will be maintained through the use of a biodiversity offsetting metric and through studies into connectivity through the study area and wider landscape, for particularly sensitive/valuable species.</p> <p>The Proposed Development includes measures, such as habitat creation, to mitigate the effects of the Proposed Development and contribute to achieving BNG. The Proposed Development’s embedded and good practice mitigation measures are detailed within <b>Section 8.8</b> and potential additional mitigation measures are detailed within <b>Section 8.10</b>.</p>
<p>Paragraphs 5.92 to 5.95 describe the approach that should be taken to the incorporation of ecological mitigation measures into an airport development during construction or operation.</p> <p><i>“Compensation ratios relating to the effects of the preferred scheme should be considered in more detail during the design. The application of 2:1 compensation ratio is considered to</i></p>	<p>The measures detailed within <b>Sections 8.8</b> and <b>8.10</b> have been designed to ensure that impacts of the Proposed Development on ecological receptors are avoided, reduced or mitigated where effects are unavoidable. Furthermore, the measures detailed in <b>Sections 8.8</b> and <b>8.10</b> have been designed to achieve 10% BNG, as per the requirements of the Environment Act 2021 using the Defra biodiversity</p>

ANPS Section	How and where addressed in PEIR
<p><i>represent the minimum requirement. However, there are other mechanisms for establishing compensation ratios, such as Defra’s biodiversity offsetting metric. Equally, it is important to note that habitat ratios form only one part of potential compensation which should be considered, and the location and quality of any compensation land is of key importance. In this regard, habitat creation, where required, should be focused on areas where the most ecological and ecosystems services benefits can be realised.”</i></p>	<p>offsetting metric (now Natural England 3.0) (Ref. 8.2) as another mechanism. Detailed mitigation strategies and draft licence documents in relation to badgers and bats are intended to be submitted to, and agreed with, Natural England in order to agree a letter of no impediment as part of the ES.</p> <p>As detailed within <b>Section 8.5</b> a Defra biodiversity offsetting calculation has been undertaken which provides a measurable and transparent method for assessing the value of impacts, mitigation and compensation associated with the Proposed Development. The detailed results of the Defra metric BNG assessment will be provided within the ES.</p>
<p>Paragraph 5.104 discusses opportunities for enhancement of biodiversity as part of the design process.</p> <p><i>“The proposed development comprised in the preferred scheme should provide many opportunities for building in beneficial biodiversity as part of good design. When considering proposals, the Secretary of State will consider whether the applicant has maximised such opportunities in and around developments, and particularly to establishing and enhancing green infrastructure.”</i></p>	<p>In addition to the measures described within <b>Section 8.8</b> further off-site enhancement measures are proposed within <b>Section 8.10</b>, these are further detailed within the Draft Landscape and Biodiversity Management Plan (LBMP) <b>Appendix 8.2</b>, Volume 3 of this PEIR.</p>

## Guidance

Table 8.4: Biodiversity guidance

Legislation	How and where addressed in PEIR
<p>Office of the Deputy Prime Minister (ODPM) Circular 06/2005 (Ref. 8.21)</p> <p>This government circular provides guidance on the application of the law relating to planning and nature conservation as it applies in England. This circular remains referenced within the NPPF (footnote 61), where others have been withdrawn.</p>	<p>This circular has been taken into account in the production of this PEIR.</p> <p>The guidance is relevant to a number of sections of this chapter including <b>Sections 8.3</b> and <b>8.5</b>.</p>

Legislation	How and where addressed in PEIR
<p>Chartered Institute of Ecology and Environmental Management (CIEEM) (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland (Ref. 16.22)</p> <p>This provides guidance for Ecological Impact Assessment (EclA), and aims to promote good practice, promote a rigorous and transparent approach to EclA, provide a common framework, and provide decision makers with relevant information about the likely ecological effects of a project.</p>	<p>The CIEEM guidance is used as the basis for the assessment and is relevant to a number of sections of this chapter including <b>Sections 8.3, 8.5 and 8.9</b>.</p>
<p>Planning Inspectorate Advice Note Ten: Habitats Regulations Assessment relevant to nationally significant infrastructure projects (V8) (2017) (Ref. 8.23).</p> <p>This note provides advice for Applicants in relation to the preparation of the Habitats Regulations Assessment, which should accompany applications for NSIPs under the Planning Act 2008, as amended (PA2008), Applicants should consider the potential effects of the application on protected habitats.</p>	<p>This note has been taken into account in the production of this PEIR.</p> <p>The note is relevant to a number of sections of this chapter including <b>Sections 8.3 and 8.5</b> and also within the HRA NSER (<b>Appendix 8.3</b>, Volume 3 of this PEIR).</p>
<p>Civil Aviation Authority (CAA) (2014) Wildlife Hazard Management at Aerodromes. CAP 772 (Ref. 8.24).</p> <p>CAP 772 provides guidance to assist aerodrome operators in establishing and maintaining an effective Bird Control Management Plan (BCMP), including the measures necessary to assess the bird strike risk at the aerodrome, and the identification of appropriate action to minimise that risk.</p>	<p>This guidance has been taken into account in the production of this PEIR.</p> <p>The guidance is relevant to a number of sections of this chapter including: <b>Sections 8.3 and 8.5</b>, but primarily the Draft Bird Strike Risk assessment (<b>Appendix 8.4</b>, Volume 3 of this PEIR).</p>

## 8.3 Scope of the assessment

8.3.1 This section describes the scope of the biodiversity assessment, including how the assessment has responded to the Scoping Opinion. The temporal and spatial scope, the relevant receptors, and matters scoped in and out are identified. A description of engagement undertaken with relevant technical stakeholders to develop and agree this scope is provided in **Section 8.4**.

### Scoping Opinion

8.3.2 The EIA Scoping Report set out the proposed scope and assessment methodologies to be employed in the EIA and is provided in **Appendices 1.1 and 1.2** of Volume 3 to this PEIR.

8.3.3 In response to that Scoping Report, a Scoping Opinion was received from the Planning Inspectorate on 9 May 2019 and is provided in **Appendix 1.3** in Volume 3 of this PEIR.

8.3.4 **Table 8.5** describes the main matters highlighted by the Planning Inspectorate in the Scoping Opinion and how these have been addressed in this PEIR. Final responses to all comments received during Scoping will be provided in an appropriate format in the ES.

Table 8.5: Biodiversity Scoping Opinion comments

Scoping Opinion ID	Scoping Opinion comment	How is this addressed
4.1.5	The Scoping Report refers to local nature sites that lie within 2km of the Application Site and refers to the biodiversity aspect chapter as providing further detail on these. The ES should provide a full assessment of the air quality impacts on these designated nature conservation sites where significant effects are likely. Where information to support the assessment is to be presented in the biodiversity aspect chapter of the ES, clear cross referencing to the relevant sections of other chapters should be included and, where relevant, supporting plans provided in order to assist the reader.	While there is only a statutory requirement to assess air quality impacts at nationally and internationally designated nature conservation sites, potential air quality impacts (in terms of NO <sub>x</sub> and nitrogen deposition) at local sites are calculated and fully assessed within <b>Chapter 7</b> of this PEIR and <b>Section 8.14</b> of this chapter.
4.3.3	The Applicant should ensure that other consultation bodies with statutory responsibilities for other matters relevant to this aspect assessment (e.g. biodiversity),	Consultation with statutory bodies such as Natural England has been undertaken as summarised in <b>Section 8.4</b> . Discussions will

Scoping Opinion ID	Scoping Opinion comment	How is this addressed
	such as Natural England (NE), are consulted regarding the potential for climate change effects to influence the effectiveness of any proposed mitigation measures.	continue and information gathered will be used to inform the ES.
4.12.1	<p>The Inspectorate considers that indirect impacts could occur on the River Lea, and therefore its flora, fauna and the CWS. Similarly, other watercourses including those which are of conservation concern (e.g. chalk streams) could be affected by the Proposed Development. The ES must assess indirect impacts on watercourses and identify any significant effects on associated habitats, protected species, and other species of conservation concern.</p>	<p>Potential for initial indirect effects on nearby watercourses have been assessed within <b>Chapter 20</b> of this PEIR, and it has been determined that there will be no significant adverse effects. A preliminary WFD compliance assessment is provided within <b>Appendix 20.2</b> of Volume 3 of this PEIR. Further studies will be completed and presented within the ES, including a Hydrological Risk Assessment in line with the EA methodology, to inform the detailed assessment of potential impacts on the upper Lee Chalk WFD waterbody.</p> <p>In relation to protected species surveys, the initial decision to scope them out was made on the basis of the absence of suitable habitats within the Main Application Site. For the sake of completeness surveys have been undertaken on watercourses adjacent to the Proposed Development for their potential to support otter, water vole, white-clawed crayfish (<i>Austropotamobius pallipes</i>) and other aquatic invertebrates. Potential direct or indirect effects, as a result of the Proposed Development, have been assessed and presented in <b>Section 8.9</b> and <b>8.14</b></p>
4.12.2	The Inspectorate does not consider that sufficient information has been provided to confidently conclude that no significant effects could occur on hazel dormouse ( <i>Muscardinus</i>	Surveys have been undertaken for hazel dormouse and great crested newt confirming the likely absence of these species. Full methodologies and results for all ecological surveys to date are



Scoping Opinion ID	Scoping Opinion comment	How is this addressed
	<p><i>avellanarius</i>) and great crested newt (<i>Triturus cristatus</i>)], and therefore cannot agree to scope these matters out of the assessment. Accordingly, the ES should include an assessment of these matters where there is a likely significant effect.</p>	<p>included within the Draft Ecology Baseline Report within <b>Appendix 8.1</b> in Volume 3 of this PEIR, this includes maps illustrating survey extents and findings as appropriate.</p>
4.12.3	<p>Notwithstanding the existing paucity of habitats of ecological value (at off-site car parks and highway interventions) indicated by the Scoping Report, the proposed works could give rise to indirect impacts. The Inspectorate considers that the ecological effects from these works should be assessed in the ES where significant effects could arise and does not agree to scope them out of the ES.</p>	<p>Additional surveys of these off-site carpark and highway intervention areas have been undertaken. Relevant assessment has been undertaken, and potential effects are addressed in <b>Section 8.9</b> and <b>8.14</b>.</p>
4.12.4	<p>The Scoping Report describes the study area in relation to 'the Main Application Site'. Paragraphs 17.4.9 to 11 describe statutory nature conservation sites, including international nature conservation sites, in relation to the 'Main Application Site'. Table 17.2 lists non-statutory nature conservation sites within 2km of the 'Proposed Development'. The study area must be clearly defined in the ES, and any figures accompanying the ES should also clearly depict the study area applied to the assessment. The study area should be based on the anticipated geographical extent of impacts, and in the case of the Proposed Development this may include consideration of changes to ATMs for air quality and noise effects on ecological receptors.</p>	<p>The study area for the preliminary assessment is set out within <b>Section 8.3, Table 8.6</b> of this chapter. The anticipated geographical extent of impacts and required study area have been assessed for the PEIR and are presented in <b>Section 8.3.5</b>.</p>

Scoping Opinion ID	Scoping Opinion comment	How is this addressed
4.12.11	The Applicant should consider whether the proposed mitigation and enhancement has the potential to increase bird-strike risk. Design of new wetland habitats, such as through the drainage strategies, should minimise their attractiveness to species of birds hazardous to air traffic.	With the exception of one pond (or potentially a cluster of three very small ponds) within the Habitat Creation area to the east of the Main Application site, the Proposed Development does not currently include the provision of surface waterbodies. The landscape scheme for the Proposed Development is being designed to include management measures to avoid any significant increase in bird strike risk, refer to Draft Bird Strike Risk Assessment ( <b>Appendix 8.4</b> , Volume 3 of this PEIR) and this will be fully assessed within the ES.
4.12.12	The Inspectorate notes the reference to a lighting assessment and expects that this information will be applied to the biodiversity assessment. Lighting impacts on birds are mentioned in relation to the operation of the Proposed Development but not for the construction phase. The Inspectorate considers that impacts from lighting during construction should be assessed in the ES where significant effects are likely to occur. The Inspectorate considers that lighting impacts could result from the off-site car park and highways proposals and advises that any likely significant effects should be assessed in the ES.	An assessment of lighting impacts upon all sensitive ecological receptors, during both the construction and operational phases, is included, and potential effects are addressed in <b>Section 8.9</b> and <b>8.14</b> .
4.16.7	The proposed 1.5km Zol is not justified in the Scoping Report but appears to be based on potential effects on species. It is not clear why the Zol set within the Biodiversity chapter (Chapter 17) has not been applied, which extends up to 10km for statutory designated sites (up to 30km for those designated for bat and bird	Cumulative impacts on biodiversity are being considered (where applicable - i.e. where potential impact pathways (routes by which a change in activity can lead to an effect) are present to receptors) in relation to all ZOIs listed in the biodiversity chapter (including those for statutory and non statutory designated nature conservation



Scoping Opinion ID	Scoping Opinion comment	How is this addressed
	species). At 1.5km the cumulative Zol is likely to omit consideration of cumulative effects on designated sites in the wider area. The Inspectorate advises that the Zol should reflect that proposed in the Biodiversity assessment.	sites). Reporting of this has been updated and made clearer within <b>Section 8.3.5</b> of this chapter.
Chilterns Conservation Board	The Chilterns Beechwoods Special Area of Conservation (SAC) is in close proximity to motorways and major roads which are likely to experience increased traffic from the expansion of Luton Airport. The Aston Rowant SAC is possibly the only SAC in the UK, which is actually severed by a motorway, with the vast cutting of the M40 motorway constructed through this nature reserve in the 1960s. The M25 also cuts through the Chilterns through the AONB. Increased traffic for Luton Airport could have an effect on air quality, noise and habitats. Air pollution and effects on sensitive habitats and protected nature conservation sites of national and international importance must be carefully addressed through Environmental Impact Assessment and Habitat Regulations Assessment.	An assessment of the effect of construction traffic related NOx concentrations is provided within <b>Chapter 7</b> of this PEIR. An assessment of nitrogen deposition impacts upon those designated nature conservation sites that are sensitive to changes in air pollution such as NOx. has been made within the Draft HRA NSER, within <b>Appendix 8.3</b> (Volume 3 of this PEIR).

## Spatial scope

### *Study area*

- 8.3.5 Study areas have been established in accordance with standard best practice methodology including CIEEM. Definitions of the Proposed Development, Application Site and Main Application Site can be found in **Chapter 2** of this PEIR. The following study areas for biodiversity receptors have been adopted for the purposes of this preliminary assessment, with further details provided within the Ecology Baseline Report (**Appendix 8.1**, Volume 3 of this PEIR):

- a. statutory designated nature conservation sites within 10km of the Main Application Site (within 30km for those designated for bat species) (**Figure 8.1**);
- b. non-statutory designated nature conservation sites within 2km of the Main Application Site (**Figure 8.2**);
- c. section 41 of the NERC Act (2006) priority habitats within the Main Application Site; and
- d. protected and notable species:
  - i. badger within the Main Application Site, including mitigation areas, but excluding highways interventions due to lack of suitable habitat, with the exception of junction 10 of the M1. Plus additional areas of territory mapping extended to 500m east of the Main Application Site;
  - ii. bats and hazel dormouse (within appropriate habitats) within the Main Application Site, including mitigation areas, but excluding highways interventions due to lack of suitable habitat;
  - iii. riparian mammal surveys were undertaken up to 250m either side of highway intervention works where they cross watercourses, along accessible and suitable habitats, with the exception of the River Lea where a survey of several kilometres of bank to the south was conducted, and 50m north due to lack of suitability in this direction;
  - iv. reptiles, Roman snail (*Helix pomatia*), terrestrial invertebrates and other notable mammals within the Main Application Site;
  - v. great crested newt and other amphibians in waterbodies within 500m of the Main Application Site;
  - vi. breeding and wintering birds within 500m of the Main Application Site;
  - vii. barn owl (*Tyto alba*) and red kite (*Milvus milvus*) within 1.5km of the Main Application Site; and
  - viii. phase 1 habitat surveys and hedgerow assessments have been undertaken on habitats within or directly adjacent to the Main Application Site boundary, with walkover surveys conducted on off-site car parks and highways interventions (with the exception of the proposed highways intervention works at junction 10 of the M1, where vegetation clearance would be required).

### **Zone of influence**

#### 8.3.6

In order to establish whether the Proposed Development will result in a significant effect it is important to establish the 'zone of influence (ZOI)' for the Proposed Development. CIEEM defines ZOI as '*the area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities*'. The ZOIs differ depending on the ecological feature being considered and the type of biophysical changes that occur as a result of the Proposed Development.

- 8.3.7 The following are examples of potential effects as a result of biophysical changes associated with the construction and operation of the Proposed Development:
- a. direct loss of habitats and associated fauna due to site clearance for the project land take requirements;
  - b. disturbance and displacement of fauna as a result of increased noise pollution, light pollution and vibration;
  - c. degradation of habitats as a result of hydrological changes associated with earthworks and changes in land use;
  - d. fragmentation of habitats and breakdown of ecological connectivity as a result of habitat loss, degradation and disturbance;
  - e. degradation of habitats and/or injurious effects on species as a result of pollution events (such as release of dust, sediment and chemicals);
  - f. habitat degradation as a result of the spread of invasive species;
  - g. degradation of habitats and species as a result of changes in air quality associated with increased emissions;
  - h. direct killing or injury to flora as a result of collision with aircraft or land vehicle movements; and
  - i. degradation of habitats and disturbance to species as a result of increased recreational pressures due to changes in people, and associated pet, footfall within the proposed Development.
- 8.3.8 The avoidance of potential effects through implementation of good practice avoidance measures such as those described within the Draft Code of Construction Practice (i.e. control measures for dust suppression) (**Appendix 4.2**, Volume 3 of this PEIR) have been taken into account during the determination of the ZOI for ecological features and biophysical changes.
- 8.3.9 The ZOI of habitats and sedentary species lost to site clearance for construction are easiest to define as they should be restricted to the footprint of the Proposed Development. However, for those biophysical changes that can extend beyond the boundary of the Proposed Development, the ZOI has been determined by the nature of the biophysical change and the sensitivity to this change of the ecological feature in question. For example, a badger may be subject to disturbance from light pollution only such as sudden increases in light if directly adjacent to their sett or foraging site, whereas bats may be subject to disturbance and certain species, but not all, may actively avoid habitats subject to light pollution over a much wider area.
- 8.3.10 Taking account of this, the extent of the ZOI beyond the boundary of the Proposed Development was determined based on professional judgement, with reference to published data relating to the sensitivity of specific ecological features, and in consultation with other environmental technical specialists (i.e. air quality and water). This is broadly reflected within the study area for each receptor type listed above, to the extent at which the desk study and surveys have been conducted to. The ZOI for each ecological feature scoped into the

assessment, the broad potential biophysical changes and potential effects upon these ecological features are summarised within **Table 8.6**, and associated ZOI for each ecological feature scoped into the assessment.

8.3.11 The study areas described within **Section 8.3.5** are considered representative of the ZOIs for those receptors identified as important ecological features within this PEIR.

Table 8.6: ZOIs for ecological features considered of relevance to the assessment, biophysical changes and associated potential effects.

<b>Ecological feature</b>	<b>Biophysical change</b>	<b>Potential effect</b>	<b>ZOI</b>
SSSIs	Changes in air quality	Degradation/loss of flora and fauna	Within 200m of Affected Road Network (AFN) and/or flight path, refer to <b>Chapter 7</b> of this PEIR
CWS/LWS/DWS	Site clearance	Habitat loss or degradation	Within the Application Site only
CWS/LWS/DWS	Fragmentation of habitats	Reduction in ecological connectivity for flora/fauna that form the designation	Within the Application Site only
CWS/LWS/DWS	Hydrological changes/ indirect effects	Degradation of the habitat due to changes to hydrology/pollution/dust/shading/recreational pressures	Within the Application Site only and down stream where relevant
Ancient woodland/broadleaved semi-natural woodland/broadleaved plantation woodland	Site clearance	Habitat loss or degradation	Within the Main Application Site only
Ancient woodland/broadleaved semi-natural woodland/broadleaved plantation woodland	Fragmentation of habitats	Reduction in ecological connectivity for flora/fauna that use the habitat	Within the Main Application Site only
Ancient woodland/broadleaved semi-natural woodland/broadleaved plantation woodland	Hydrological changes/ indirect effects	Degradation of the habitat due to changes to hydrology/pollution/	Within the Main Application Site only

Ecological feature	Biophysical change	Potential effect	ZOI
		dust/recreational pressures	
Ancient woodland	Changes in air quality	Degradation/loss of flora and fauna	Within 200m of AFN and/or flight path, refer to <b>Chapter 7</b> of this PEIR
Ancient and veteran trees	Site clearance	Habitat loss or degradation	Within the Main Application Site only
Ancient and veteran trees	Changes in air quality	Degradation/loss of flora and fauna	Within 200m of AFN and/or flight path, refer to <b>Chapter 7</b> of this PEIR
Species-rich hedgerow	Site clearance	Habitat loss or degradation	Within the Application Site only
Species-rich hedgerow	Fragmentation of habitats	Reduction in ecological connectivity for flora/fauna that use the habitat	Within the Application Site and connected hedgerows
Semi-improved neutral grassland/semi-improved calcareous grassland/arable/orchids/arable plants/scrub/pond	Site clearance	Habitat loss or degradation	Within the Application Site only
Semi-improved neutral grassland/semi-improved calcareous grassland/arable/orchids/arable plants/scrub/pond	Fragmentation of habitats	Reduction in ecological connectivity for flora/fauna that use the habitat	Within the Application Site only
Semi-improved neutral grassland/semi-improved calcareous grassland/arable/orchids/arable plants/scrub/pond	Hydrological changes/in direct effects	Degradation of the habitat due to changes to hydrology/pollution/dust/recreational pressures	Within the Main Application Site only
Invasive species	Site clearance	Spread of INNS	Within the Application Site only
Badger/bats/other mammals (brown hare, hedgehog)/reptiles/amphibians/breeding birds/wintering birds/roman snail/other invertebrates	Site clearance	Risk or harm/injury	Within the Main Application Site only

Ecological feature	Biophysical change	Potential effect	ZOI
Badger/bats/other mammals (brown hare, hedgehog)/reptiles/amphibians/breeding birds/wintering birds/roman snail/other invertebrates	Site clearance	Habitat loss or degradation and fragmentation	Within the Main Application Site and connected habitats
Badger/bats/breeding birds/wintering birds	Increase in noise, vibration and lighting	Disturbance of fauna using habitats	Within the Main Application Site and suitable habitat within 100m
Other mammals (brown hare, hedgehog) /reptiles/amphibians/roman snail/other invertebrates	Increase in noise, vibration and lighting	Disturbance of fauna using habitats	Within the Main Application Site only
Riparian mammals	Changes in water quality	Degradation/loss of habitat	Within 250m of the Application Site
Schedule 1 birds	Site clearance	Habitat loss or degradation	Within the Main Application Site
Schedule 1 birds	Increase in noise, vibration and lighting	Disturbance of fauna using habitats	Within 1.5km of the Main Application Site

8.3.12 For the purposes of the cumulative assessment, and in the absence of identified effects upon more distant statutory or non-statutory designated nature conservation sites, a ZOI of 1.5km is considered appropriate as the maximum ZOI for a mobile ecological receptor, in this case barn owl, that could reasonably be considered to be impacted by the Proposed Development. The ZOI for otter can be considered as up to 20km based on the reported home range of male otters, however given that the Proposed Development does not directly impact upon watercourses there are no pathways to an effect at such a distance. The full cumulative effects assessment is provided in **Chapter 21** of this PEIR.

### Temporal Scope

8.3.13 The Proposed Development will be delivered over two phases, within which construction and operation may take place simultaneously. For the purposes of assessment, three assessment phases are considered as described in **Chapter 5** of this PEIR..

- 8.3.14 The biodiversity assessment considers the construction impacts and the operational impacts occurring in each phase in turn (Phase 1, Phase 2a and Phase 2b as described in **Table 5.3**), on each receptor with incremental effects, for example vegetation clearance within each phase.

### Receptors

- 8.3.15 The sensitive receptors for the biodiversity assessment are:
- designated nature conservation sites;
  - important habitats including section 41 priority habitats (Ref. 8.6);
  - protected species; and
  - notable flora and fauna.

- 8.3.16 These receptors are described further in **Section 8.7** baseline conditions and discussed within **Section 8.4** where agreed through stakeholder engagement.

### Matters scoped in

- 8.3.17 The EIA Scoping Report set out the proposed scope for the assessment of biodiversity. In summary, the following ecological features are scoped in for assessment; designated nature conservation sites, arable and field margins, grassland (neutral and calcareous), hedgerows, scrub, waterbodies, woodland (ancient, semi-natural, and broadleaved plantation), badger, bats, otter (in relation to the River Lea adjacent to highways interventions only), birds (breeding, wintering, barn owl and red kite), hazel dormouse, amphibian species, reptiles, Roman snail and other terrestrial invertebrates.
- 8.3.18 Due to the absence of watercourses within, or directly adjacent to, the Main Application Site, impacts upon riparian species such as otter, water vole and white-clawed crayfish were scoped out in the scoping report. Subsequent surveys for riparian mammals on the watercourses adjacent to areas of highways interventions in the Luton and Hitchin areas identified the presence of otter on the River Lea, but no confirmed water voles or white clawed crayfish, therefore riparian mammals are scoped in for indirect effects on the River Lea.
- 8.3.19 The works associated with the Offsite Car Parks and Offsite Highway Interventions were scoped out in the scoping report due to being undertaken within existing areas of hard standing with negligible ecological value. These have since been subject to a walkover assessment to confirm this, and further appropriate surveys were only required on junction 10 of the M1 where vegetation clearance would be required.

### Matters scoped out

- 8.3.20 Minor habitats such as amenity grassland as well as mixed and coniferous plantation are not considered within this assessment due their limited value and/or presence within the ZOI.



## 8.4 Stakeholder engagement and consultation

8.4.1 Engagement in relation to biodiversity has been undertaken with a number of prescribed and non-prescribed stakeholders. Engagement has taken the form of meetings/workshops, correspondence (including provision of draft technical documents for comments/discussion) and site visits. **Table 8.7** below provides a summary of engagement with relevant stakeholders undertaken to inform the EIA, PEIR and future ES. A discretionary advice service (DAS) request was submitted to Natural England in February 2018 as a mechanism to engage with Natural England at stakeholder meetings.

8.4.2 For biodiversity a working group was formed comprising representatives to date from the following, and the dates and summary of the discussions are presented in **Table 8.7**:

- a. Natural England (NE);
- b. Luton Borough Council (LBC);
- c. Central Bedfordshire Council (CBC);
- d. North Hertfordshire District Council (NHDC)/Hertfordshire County Council (HCC);
- e. Wildlife Trust for Bedfordshire, Cambridgeshire and Northamptonshire (WTBCN); and
- f. Herts and Middlesex Wildlife Trust (HMWT).

8.4.3 The **2019 Statutory Consultation Feedback Report** contains a full account of the previous statutory consultation process and issues raised in feedback. Matters raised regarding the scope, method, mitigation or compensation being considered as part of the biodiversity assessment were then subject to further discussions directly with stakeholders during working group meetings. The main matters/themes raised during consultation considered relevant to the biodiversity assessment were:

- a. potential effects on designated nature conservation sites, habitats and species;
- b. potential upgrade of three CWSs to SSSI and assessment of these sites as SSSIs;
- c. managing the risk of bird strike; and
- d. assessing the watercourses for riparian mammals.

8.4.4 **Table 8.7** provides a summary of engagement with relevant stakeholders, undertaken to inform the EIA and this PEIR to date, including the date and time of meetings and a summary of discussions to resolve matters raised.



Table 8.7: Stakeholder engagement relating to biodiversity

Meeting name and date	Attendees (organisation)	Summary of discussion
Biodiversity Technical Working Group Meeting 1 - 06.04.2018	LBC, HCC and CBC. NE were unable to attend.	Introduction to the Proposed Development and agreement on details of the proposed scope of habitat and species surveys being undertaken and methodologies used. General agreement that dormouse is absent but needs surveying.
Biodiversity Technical Working Group Meeting 2 - 20.11.2018	LBC, HCC, HMWT and WTBCN. CBC and NE were unable to attend.	Discussion on how the design evolved through assessment of design options by environmental disciplines, sharing of the emerging 'preferred option', summary of non-statutory consultation results and survey results and an early indication of likely mitigation measures. Discussion on bird strike risk assessment requirements and agree to include red kite and buzzard ( <i>Buteo buteo</i> ). To consider translocating invertebrates and not just their habitats.
Future LuToN LVIA and Ecology Pre-Scoping Meeting - 26.02.2019	LBC, HCC, CBC, HMWT and WTBCN. NE were unable to attend.	Provided update on ongoing landscape and ecology assessment work and associated methodologies. Discussion on Preferred Option Draft Layout and engineering requirements. Discussion on non-statutory consultation feedback followed by an accompanied site visit.
Future LuToN Landscape and Ecology Meeting 20.05.2019	LLAOL	Discussions about proposed landscape and ecological mitigation measures and their interaction with airside operations. The focus of the conversation was bird-strike and managing this risk throughout construction and operation of the Proposed Development.
Biodiversity Technical Working Group Meeting 3 – 24.06.2019	LBC, HCC, CBC and WTBCN. HMWT and NE were unable to attend.	Discussion about Planning Inspectorate responses to the EIA Scoping Report and proposed surveys and assessment to be contained within the ES. Current landscape proposals were also discussed, and feedback given.
Biodiversity Technical Working Group Meeting 4 – 18.02.2020	HCC, CBC, WTBCN, HMWT and NE. LBC were unable to attend.	Overview to bring NE up to speed. Discussion on land ownership of wider hedgerow network, clarified that the Applicant will seek to do through land owner agreement or acquire rights through DCO. Query on one pond proposed; to explore option of providing a small cluster instead.

Meeting name and date	Attendees (organisation)	Summary of discussion
		<p>Confirmed intention of commencing habitat creation as early as possible.</p> <p>BNG discussed, including the use of the spatial tool, difficulties regarding habitat type and condition.</p> <p>Mitigation strategies were discussed and it was agreed to use NE’s Discretionary Advice Service (DAS). Agreed further territory mapping for badgers to inform potential new sett location. Discussed bird mitigation restrictions regarding strike issue. Agreed to treat red kite as a schedule 1 species.</p> <p>Agreed to update certain surveys and confirmed riparian mammal results.</p>

8.4.5 Stakeholder engagement will continue as the Proposed Development progresses and will include further meetings with the biodiversity working group and LBC, HCC, CBC, HMWT, WTBCN, EA and NE to discuss results of the PEIR and next steps for the ES.

## 8.5 Methodology

### Overview

8.5.1 This section outlines the methodology employed for assessing the likely significant effects on biodiversity from the construction and operation of the Proposed Development, the details of which are described in **Chapter 4** of this PEIR. Full details of the methodology, including relevant assumptions and limitations, can be found in the Draft Ecology Baseline Report (**Appendix 8.1**, Volume 3 of this PEIR).

### Baseline methodology

#### *Desk study*

8.5.2 The biodiversity baseline data gathering exercise has focussed upon assembling information on international, national and local designated nature conservation sites and protected and notable habitats and species which falls within appropriate study and survey areas, as defined in **Section 8.3.5**. The following sources have been accessed:

- a. Bedfordshire and Luton Biodiversity Recording and Monitoring Centre (BLBRMC) (November 2020);
- b. Herts Environmental Records Centre (HERC) (November 2020);
- c. Multi-Agency Geographic Information for the Countryside (MAGIC) database interactive mapping tool (updated October 2021);
- d. aerial photography as a scale of 1:25,000; and
- e. Ordnance Survey mapping (at scales of 1:50,000 and 1:25,000).

#### *Field Surveys*

8.5.3 Ecological data gathering has been ongoing at the site of the Proposed Development for several years; this includes specific surveys for protected and notable habitats and species as summarised in **Table 8.8** below.

Table 8.8: Protected and notable species surveys

Survey type	Recommended survey period	Relevant survey guidance	Survey coverage	Survey period
Phase 1 habitat	April – September (optimal period)	JNCC Handbook for Phase 1 habitat survey (Ref. 8.25)	Main Application Site, and Offsite carparks (all 2018/19) Highways Interventions (walkovers only except for M1 J10) (Aug/Sept 2020)	May 2018 – June 2018, May 2019, and November 2019. May 2020 to September 2020

<b>Survey type</b>	<b>Recommended survey period</b>	<b>Relevant survey guidance</b>	<b>Survey coverage</b>	<b>Survey period</b>
National Vegetation Classification (NVC)	May – August (optimal period)	JNCC National Vegetation Classification users handbook (Ref. 8.26)	Main Application Site	May 2018 – June 2018, and May 2019
Hedgerow assessment	April - October	Defra Hedgerow Survey Handbook (Ref. 8.27)	Main Application Site, Offsite habitat creation areas	July 2019 and November 2019 <sup>1</sup>
Badger	All year (winter months optimal)	The Mammal Society: Surveying Badgers (Ref. 8.28), Natural England: Guidance on 'Current Use' in the definition of a Badger sett (Ref. 8.29)	Main Application Site, Junction 10 of M1. Territory mapping undertaken on Main Application Site and accessible land to the north and east within 500m	May 2018 – November 2019, additional bait marking completed in 2020
Bats	April – October (where hibernating potential absent).	The Bat Conservation Trust Bat surveys for professional ecologists: good practice guidelines (Ref. 8.30).	Main Application Site including AAR, and off site mitigation planting area	August 2016 – September 2020,
Hazel dormouse	April - November	English Nature: The Dormouse Conservation Handbook (Ref. 8.31).	Main Application Site	May 2018 – November 2018
Otter	All year in suitable weather conditions	English Nature: Ecology of the European Otter (Ref. 8.32), Environment Agency: Fourth Otter Survey of England 2000-2002 (Ref. 8.33)	Watercourses connected to the Highways Interventions (no watercourses/waterbodies connected to the Main Application Site)	June/July 2019 and September 2019
Water vole	April - October	The Mammal Society: The Water Vole Mitigation Handbook (Ref. 8.34)	Watercourses connected to the Highways Interventions (no watercourses/wate	June/July 2019 and September 2019

<sup>1</sup> Hedgerow surveys undertaken in sub-optimal period (November) relate only to the hedgerows proposed for enhancement planting as part of the offsite habitat creation, hedgerows that will be lost to construction of the Proposed Development were surveyed in the optimal period (July).

Survey type	Recommended survey period	Relevant survey guidance	Survey coverage	Survey period
			rbodies connected to the Main Application Site)	
Amphibians	March – June (pond based surveys)	English Nature: Great Crested Newt Mitigation Guidelines (Ref. 8.35), ARG UK: GCN HSI Advice Note 5 (Ref. 8.36)	Main Application Site plus 500m	February – May 2018, November 2019 (HSI), April to May 2020
Reptiles	March – June, September	Froglife: Reptile survey booklet (Ref. 8.37), Herpetofauna Groups of Britain and Ireland: Herpetofauna Workers Manual (Ref. 8.38)	Main Application Site	April 2018 – July 2019
Breeding birds	March - June	British Trust for Ornithology: Common Bird Census Instructions (Ref. 8.39), RSPB: Bird monitoring methods (Ref. 8.40)	Main Application Site plus 500m	April 2018 – July 2018, and April and June 2021
Wintering birds	November - February	British Trust for Ornithology: Common Bird Census Instructions (Ref. 8.39), RSPB: Bird monitoring methods (Ref. 8.40)	Main Application Site plus 500m	December 2017 – March 2018, and October 2018 – March 2019
Barn owl	Spring – Summer	Barn Owl Trust: Barn Owl Conservation Handbook (Ref. 8.41)	Main Application Site plus 1.5km	May 2019 – July 2019
Red kite	Spring – Summer	RSPB: Bird monitoring methods (Ref. 8.40)	Main Application Site plus 1.5km	April 2019
Roman snail	Spring – Autumn	E. Pollard: Aspects of the Ecology of <i>Helix pomatia</i> L (Ref. 8.42)	Main Application Site	June 2018 – June 2019, September 2020

Survey type	Recommended survey period	Relevant survey guidance	Survey coverage	Survey period
	(weather dependant)			
Terrestrial invertebrates	April - October	For the specific survey guidance relating to a range of different invertebrate species see Invertebrate report Appendix Z of the Ecology Baseline report ( <b>Appendix 8.1</b> , Volume 3 of this PEIR)	Main Application Site	April 2018 – June 2019

8.5.4 The approach to defining future baseline is described in **Section 5.4** of **Chapter 5** of this PEIR. The future baseline considered for biodiversity is described **Section 8.7** of this chapter.

### Assessment methodology

- 8.5.5 All relevant impacts to designated nature conservation sites, habitats and species that may occur as a result of the Proposed Development during construction and operation have been assessed. The method of determining ecological value and significant effects is in line with the CIEEM guidance on Ecological Impact Assessment (2018) (Ref. 8.43)
- 8.5.6 Wherever possible, maintaining favourable conservation status has been determined by reference to literature, including LBAP objectives and targets where applicable, and by professional judgement in the absence of clear guidance. An effect is considered 'beneficial' if it helps to deliver conservation policy or 'adverse' if it is contrary to conservation policy.
- 8.5.7 The scale at which impacts to habitats and species matter is determined according to the value of the ecological feature.
- 8.5.8 Design of the Proposed Development has evolved over the years and this has included building avoidance of sensitive ecological receptors such as Winch Hill Woods into the design, to retain the woodland along the ridgeline of Winch Hill, and to retain hedgerows where possible. Mitigation measures to avoid or reduce potentially significant adverse effects are proposed. The residual effects on impacted ecological features following the implementation of proposed mitigation is assessed. Should significant adverse effects remain after mitigation strategies have been devised and their success considered, then it would be necessary to provide appropriate compensation measures to offset significant residual adverse effects.

8.5.9 Opportunities have also been taken to provide biodiversity benefits in accordance with policy, best practice and the new requirements of the Environment Act 2021, such as the enhancement of hedgerows within the wider landscape to provide habitat opportunities for a range of species and improve ecological connectivity. A Defra BNG calculation is being undertaken to quantify impact, mitigation and compensation as part of the assessment. This calculation will follow guidance produced by Defra and will use the Biodiversity Metric 3.0 developed by Natural England (Ref. 8.2) to allow biodiversity losses and gains to be quantified. The metric is being used to guide the habitat creation measures designed into the Proposed Development to ensure a net gain in biodiversity. On completion, the results of this will be presented within the ES.

### ***Significance criteria***

#### **Determination of Important Ecological Features**

8.5.10 Ecological features can be important for a variety of reasons. Importance may relate, for example, to the quality or extent of designated nature conservation sites or habitats, to habitats/species rarity, to the extent to which they are threatened throughout their range, or to their rate of decline (Ref. 8.44).

8.5.11 The importance of each ecological feature is evaluated within a defined geographical context. The following frame of reference is used to define ecological importance of features, further definitions of each can be found in **Table 8.9**:

- a. international and European;
- b. national;
- c. regional;
- d. metropolitan, county, vice-county or other local authority-wide area (district/borough); and
- e. local.

Table 8.9: Hierarchy of Ecology and Nature Conservation Value

<b>Geographical Value</b>	<b>Criteria</b>	<b>Examples</b>
International	Very high ecological importance or rarity, internationally protected, limited potential for substitution.	Internationally designated nature conservation sites e.g. Special Protection Areas (SPA) and Special Areas of Conservation (SAC).  Sustainable area of a habitat listed on Annex I of the Habitats Directive where it is a qualifying feature of a national site network site, or where smaller areas of such habitat are essential to maintain the viability of a larger whole.  Sustainable population of a species listed on Annex IV of the Habitats Directive or Annex I of the Birds Directive



Geographical Value	Criteria	Examples
		where it is a qualifying feature of a national site network site.
National	High ecological importance or rarity, nationally protected or important, limited potential for substitution.	Nationally designated nature conservation sites e.g. SSSIs. Sustainable area of a legally protected habitat (e.g. priority habitat). Sustainable population of a legally protected species listed (e.g. such as listed under Schedules 1, 5 or 8 of the Wildlife and Countryside Act 1981, or a priority species, or a UK Red Data book species, or of a nationally rare species (15 or fewer 10 km squares in the UK).
County/district (this covers both Regional and County)	High – medium ecological importance or rarity, regional importance, some potential for substitution.	Regionally important sites with some potential for substitution. Locally designated nature conservation sites e.g. Local Nature Reserves (LNR), CWS. Nationally scarce species (e.g. recorded in 16 – 100 10 km squares in the UK) or Annex 1 habitats of the Habitats Directive, where not a qualifying feature of a national site network site.
Local	Low ecological importance or rarity, locally protected or important, potential for substitution.	Undesignated nature conservation sites that are good examples of a more widespread habitat, or species-poor examples of a habitat of note. Population of a species that is of low importance/rarity but of some value locally.

8.5.12 It should be noted that as the importance of ecological features is determined with regard to the extent of habitat or size of population that may be affected by the Proposed Development, each status can differ from that which would be inferred by legislative protection or through identification as a conservation notable species. For example, house sparrow (*Passer domesticus*) is important at a national level because it is a species of principal importance (as listed on Section 41 of the NERC Act 2006 (Ref. 8.6)) and features on the Birds of Conservation Concern red list (Ref. 8.45). However, a small population that could be affected by a development would often be assessed as being of less than national importance due to the large, albeit declining, national population (in excess of 5 million pairs (Ref. 8.46)). Similarly, a small length of hedgerow, which is a habitat of principal importance (as listed on Section 41 of the NERC Act 2006 (Ref. 8.6)), even if deemed to be 'important' with regard to the Hedgerows Regulations, may not be considered to be of national importance due to the extent of this habitat type across a given county. Consequently,



information regarding the extent and population size, population trends and distribution of the ecological features has been used to determine importance at the project level. Where detailed criteria or contextual data are not available, professional judgement has been used to determine importance.

- 8.5.13 With the exception of species receiving specific legal protection or subject to legal control (for example invasive species), all ecological features that were determined to be of negligible (site) importance have been scoped out of the assessment at this stage. Further, ecological features of local importance, where there is a specific technical justification, have also been scoped out.
- 8.5.14 The factors that contribute to the sensitivity of an ecological receptor in relation to the Proposed Development include pathways for physical, chemical or biological change such as direct loss, fragmentation or disturbance, size of the resource or feature such as area or number of individuals of a particular species affected, rarity/typicalness, adaptability/fragility and recreatability/sustainability.
- 8.5.15 As all ecological receptors will exhibit a greater or lesser degree of sensitivity to the magnitude of change brought about by the Proposed Development, establishing a common scale of measurement for both the severity of the effect and receptor sensitivity helps to ensure that the assessment is both transparent and robust.
- 8.5.16 As such, for the purposes of this assessment the following terminology for magnitude and sensitivity has been adopted, definitions for each of these are provided in **Tables 5.5 and 5.6 in Chapter 5** of this PEIR:
- a. very low (negligible);
  - b. low;
  - c. medium; and
  - d. high.

### **Determination of Significant Effects**

- 8.5.17 Impacts to ecological features, both adverse and beneficial, are identified and characterised with reference to the following factors:
- a. magnitude;
  - b. spatial extent;
  - c. duration;
  - d. reversibility;
  - e. timing; and
  - f. frequency.
- 8.5.18 For consistency across all disciplines, the factors listed above will be used to inform the determination of magnitude of impact and importance of receptor; however, the assessment of effects will follow the criteria detailed in **Section 5.4 of Chapter 5** of this PEIR. This will consider the value of the receptor, and

what the magnitude of the effect will have on the receptor, taking into account the sensitivity of the receptor to that effect.

- 8.5.19 Following these criteria (as a general rule) major and moderate effects are considered to be significant, whilst minor and negligible effects are considered to be not significant. However, professional judgement has also been applied where necessary. **Table 8.10** provides a translation summary of how the classification of significance has been interpreted for consistency with CIEEM EclA guidance (Ref. 8.43).
- 8.5.20 Note that the term 'significance' in this context is not the same as that applied under the Habitats Regulations. Significance in the context of the Habitats Regulations is used as the first stage of the process to determine whether it can be concluded the overall scale of the mechanism and possible pathway for an impact are not likely to have a significant effect. The potential for likely significant effects on national site network sites is assessed in the Draft HRA NSER, **Appendix 8.3** (Volume 3 of this PEIR).
- 8.5.21 Beneficial effects that are not likely to be significant have also been described, as information about these effects may assist the competent authorities in determining whether the Proposed Development complies with the guidance in the ANPS and references in the NPPF (which may be relevant and important to the Secretary of State's decision) relating to biodiversity enhancement, to which both significant and not significant effects can make a contribution.

Table 8.10: Ecological interpretation of classification of significance.

Significance	Description
Major adverse	<p>Medium term and/or moderate scale/moderate magnitude negative effect on integrity and/or conservation status of feature of national or international value.</p> <p>Permanent or long-term and/or large scale/large impact magnitude negative effect on integrity and/or conservation status of features of county or greater value.</p>
Moderate adverse	<p>Temporary and/or small scale/small magnitude negative effect on integrity and/or conservation status on features of national or international value.</p> <p>Short or medium term and/or moderate scale/moderate magnitude negative effect on integrity and/or conservation status of feature of county or greater value.</p> <p>Permanent or long-term and/or large scale/large magnitude negative effect on integrity and/or conservation status on feature of local value.</p>
Minor adverse	<p>Temporary and/or very small scale/very small magnitude negative effect on integrity and/or conservation status of feature of county or greater value.</p> <p>Temporary and/or small scale/small magnitude negative effect on integrity and/or conservation status of feature of local, district or county value.</p>

Significance	Description
	<p>Medium term and/or moderate scale/moderate negative effect on integrity and/or conservation status of feature of less than local, local or district value.</p> <p>Permanent or long-term and/or large scale negative effects on the conservation status of features of less than local value.</p>
Negligible	<p>Temporary and/or very small scale/ very small magnitude negative effect, unlikely to have discernible change on integrity and/or conservation status of features of local or district value.</p> <p>Permanent or long-term and/or small scale/small magnitude negative effect on integrity and/or conservation status of feature of less than local value.</p>
Minor beneficial	<p>Temporary and/or small scale/small magnitude positive effect on integrity and/or conservation status of local, district or county value.</p> <p>Permanent or long-term and/or large scale positive effects on the conservation status of features of less than local value.</p>
Moderate beneficial	<p>Temporary and/or small scale/small magnitude positive effect on integrity and/or conservation status on features of national or international value.</p> <p>Short or medium term and/or moderate scale/moderate magnitude positive effect on integrity and/or conservation status of feature of county or greater value.</p> <p>Permanent or long-term and/or large scale/large magnitude positive effect on integrity and/or conservation status on feature of local value.</p>
Major beneficial	<p>Permanent or long-term and/or large scale/large magnitude positive effect on integrity and/or conservation status on feature of county or greater value.</p>

## 8.6 Assumptions and limitations

- 8.6.1 This section provides a description of the assumptions and limitations to the biodiversity assessment.
- 8.6.2 Assumptions and limitations specific to designated sites, species and habitat surveys are included within the Ecology Baseline Report (**Appendix 8.1**, Volume 3 of the PEIR). It is considered that all surveys have been completed without significant limitations that would potentially compromise results.
- 8.6.3 Records obtained as part of the desk study provide some indication of the presence of certain species. They do not, however, represent a definitive inventory of all species present within the Study Area. The inclusion of a species, or conversely the absence of a species does not necessarily mean that species remains present or absent beyond the time of that record.
- 8.6.4 The desk study data purchase was undertaken in 2018 and updated in November 2020. A further update will be required to ensure latest records within the area are captured and included within the ES.
- 8.6.5 The assessment of the baseline conditions has assumed the following;
- a. all noted ancient and veteran trees, and potential veteran trees can be retained with the exception of one which is to be re-coppiced and translocated (**Appendix 14.2 and 14.3**, Volume 3 of this PEIR);
  - b. offsite car park works at Luton Parkway will be restricted during construction and operation to existing areas of hardstanding and will therefore avoid effects to designated features of Luton Parkway Verges DWS and habitats that could support protected species and orchids;
  - c. all highways intervention schemes, with the exception of junction 10 M1, will remain restricted to the highway boundary;
  - g. the assessment of the fuel pipeline that extends to the east of the Main Application Site is based on an assumed 20m working corridor, extending 10m either side of the line of the fuel pipeline route as mapped; and
  - h. the two buildings noted to be bat roosts (single common pipistrelle summer day roosts) will be retained. These include the pillbox and Winch Hill Cottage (2). Details of which are included within the Ecology Baseline Report (**Appendix 8.1**, Volume 3 of the PEIR).

### Reasonable Worst Case

- 8.6.6 **Chapter 5** Approach to the Assessment describes the general approach adopted to ensure that a reasonable worst case is assumed in this assessment including the use of parameters, accounting for uncertainty, and incorporating flexibility in design and demand forecasts.
- 8.6.7 Further relevant assumptions on worst case specific to this assessment include:
- a. vegetation clearance is undertaken to the extents of the areas mapped within the Site Clearance drawings **LLADCO-3C-ACM-WHS-SCL-DR-IN-0001 to 0003** provided in Volume 4 to this PEIR;

- b. assuming all of Wigmore Park CWS is lost as although there may be a remaining hedgerow, which is an important corridor to retain, this would not be considered a CWS on its own;
- c. potential loss of a main badger sett unless it can be determined through detailed design that it can be retained; and
- d. only the single location for a replacement pond (or small cluster of three small ponds to the same surface area) is permitted within the Proposed Development.

## 8.7 Baseline conditions

- 8.7.1 This section provides a summary of the description of the existing ecological baseline conditions within the Main Application Site and wider ZOI, concerning protected and notable species and sites designated for nature conservation. For full details, refer to **Appendix 8.1**, Volume 3 of the PEIR. **Figures 8.1** and **8.2** in Volume 4 to this PEIR show the locations of statutory and non-statutory designated nature conservation sites respectively, and **Figure 8.3** in Volume 4 of this PEIR illustrates the Ecological Constraints Plan associated with the Proposed Development. The Ecology Baseline Report Appendices (**Appendix 8.1**, Volume 3 of the PEIR) identifies the results of protected species surveys undertaken between 2016 and 2020.
- 8.7.2 The Main Application Site covers approximately 427ha which in addition to the airport infrastructure comprises previously undeveloped, predominantly arable land (some of which has since been sown with a grass seed mix and managed), with hedgerows, trees and shrub-lined margins. Occasional woodland blocks, copses, tree belts, areas of scrub, rough grassland, ruderal vegetation, conservation headlands and game cover adjacent to field edges.
- 8.7.3 The Proposed Development also includes Offsite Highway Interventions and Offsite Car Parks works outside of the Main Application Site, as defined in **Chapter 2** and covers approximately 472ha, which predominantly comprises previously developed land. The Offsite Highway Interventions are largely restricted to within existing highway boundaries. The proposed Offsite Car Parks are located to the west of the existing airport within brown field areas comprising access roads, temporary buildings, area of ephemeral/ short perennial vegetation, grassland margins and areas of landscaping comprising scrub and trees. The Off-site Planting areas are located to the north east of the Main Application Site, as defined in **Chapter 2**, comprising grassland field margins and hedgerows.
- 8.7.4 The existing airport is dominated by hardstanding with amenity grassland and small patches of scrub.

### Existing conditions

#### *Designated nature conservation sites*

- 8.7.5 There are no international designated nature conservation (national site network) sites including SACs candidate SACs (cSACs), SPAs, potential SPAs (pSPAs) and Ramsar sites within 10km of the Main Application Site, and no sites designated for bat species within 30km. The closest international designated nature conservation site is Chiltern Beechwoods SAC, located approximately 13km south west of the Main Application Site. The closest international designated nature conservation site designated for its bird assemblage is Lea Valley SPA, located approximately 24.4km south east of the Main Application Site (**Figure 8.1** in Volume 4 of this PEIR).
- 8.7.6 There are a further 21 statutory designated nature conservation sites within 10km of the Proposed Development. Fifteen of these sites are SSSIs, one of which is also designated as a National Nature Reserve (NNR), another is also

designated as a Local Nature Reserve (LNR), and eight further LNRs are present, as detailed in the Ecology Baseline Report in (**Appendix 8.1**, Volume 3 of this PEIR). The closest of these sites are:

- a. Dallow Downs and Winsdon Hill SSSI/DWS, located approximately 2.9km west of the Main Application Site;
- b. Wain Wood SSSI, located approximately 4.3km north east of the Main Application Site;
- c. Cowslip Meadows SSSI/DWS, located approximately 4.1km north west of Main Application Site; and
- d. Galley and Warden Hills SSSI/LNR, located approximately 4.5km north west of the Main Application Site.

8.7.7 Although the Proposed Development lies within the Impact Risk Zones (IRZ) of the three SSSI sites for the criteria 'Airports, helipads and other aviation proposals', given the designated features of these statutory sites and their distance from the Proposed Development it is not anticipated that the construction of the Proposed Development will result in significant effects upon them. Potential air quality impacts during operation at sites within 200m of the Affected Road Network (ARN) and of the flight path, are detailed within **Chapter 7** of this PEIR, including impacts on SSSIs where appropriate.

8.7.8 As discussed above, previously there were three CWS or DWS that had been proposed for designation as SSSI, two of which, Cowslip Meadows DWS, and Dallow Downs and Winsdon Hill DWS, are now SSSIs, as noted above. A third Bradgers Hill CWS (c.2.8km north of the Main Application Site), is not yet a SSSI as it was in earlier stages of the consideration process than the others.

8.7.9 There are 30 non-statutory designated nature conservation sites located within 2km of the Proposed Development. Local authorities use different terms to refer to wildlife sites, with Hertfordshire using LWS and Bedfordshire and Luton classifying them as CWS and DWS. Full details of these sites are included in the Ecology Baseline Report (**Appendix 8.1**, Volume 3 of this PEIR), and the six which have been assessed as potentially impacted by the Proposed Development, plus a further six potentially affected via air quality impacts as a result of the ARN and flight path, are therefore scoped in to this assessment, and summarised in **Table 8.11** below.

Table 8.11: Non-statutory designated nature conservation sites scoped into the assessment of Proposed Development.

Site Name	Description	Proximity to Main Application Site	Geographical Importance	Receptor Value
Wigmore Park CWS	Comprises species rich neutral grassland with scattered scrub, ruderal vegetation and a length of green lane. The site is recognised	Within	County	Medium



Site Name	Description	Proximity to Main Application Site	Geographical Importance	Receptor Value
	for its neutral grassland, calcareous grassland and hedgerows.			
Winch Hill Wood CWS/ LWS	This site is designated within both Bedfordshire (as a CWS) and Hertfordshire (as an LWS). It is recognised for its section of ancient woodland, as included on the ancient woodland inventory, comprising semi-natural broadleaved woodland with hedgerow, scrub and areas of open bracken. It is a remnant of a larger ancient semi-natural pedunculate oak ( <i>Quercus robur</i> )/ hornbeam ( <i>Carpinus betulus</i> ) with birch ( <i>Betula sp.</i> ) woodland, with ground flora dominated by bluebell <i>Hyacinthoides non-scripta</i> . The NVC included in the Ecology Baseline Report ( <b>Appendix 8.1</b> , Volume 3 of this PEIR) reports the site as half low and half low-mod botanical value, relating to the areas classed as ancient woodland and not ancient woodland.	Within	County	Medium
Dairyborn Scarp DWS	This site was formerly part of a larger site called Dairyborn Scarp CWS which had additional grassland interest (no longer present within this designation). It comprises a steep chalk scarp dominated by ruderal vegetation and scrub, with a small remnant of ancient woodland to the north of the site, but is not included within the ancient woodland inventory. It is also stated that it may be a remnant of Spittlesea Wood but does not meet the criteria for a DWS on this habitat type. The site is a habitat mosaic likely to be of value for invertebrates, based on the diversity of habitat features.	Within	District	Medium

Site Name	Description	Proximity to Main Application Site	Geographical Importance	Receptor Value
Burnt Wood LWS	Comprises an Ancient Woodland Inventory site of ancient semi-natural pedunculate oak/ hornbeam woodland largely replanted with conifers. The site includes old pits, wood banks and a diverse ground flora, including bluebells.	Immediately adjacent	County	Medium
Luton Parkway Verges DWS	Is recognised for its calcareous and neutral grassland with several calcareous/neutral grassland indicators recorded.	121m west (but immediately adjacent to the new off-site car park)	District	Medium
River Lea CWS	River with associated riparian habitats with fen, marsh and swamp in addition to neutral grassland, scrub, hedgerows and trees. The river supports a population of water vole.	224m south west but immediately adjacent to an area of highway intervention on the A1081	County	Medium
Slaughters Wood and Green Lane CWS	Ancient semi-natural woodland with an understorey of coppiced hazel. The site is recognised for ancient woodland and hedgerows with historical importance. Also present are neutral grassland, scrub and bracken.	366m north, but within 200m of the ARN	County	Medium
George Woods CWS	Ancient semi-natural woodland with mixed plantation and coniferous plantation.	740m south, but within 200m of the ARN	County	Medium
Kidney and Bull Woods CWS	Ancient semi-natural woodland and trailing tormentil ( <i>Potentilla erecta</i> ) with conifer and mixed plantation and neutral and marshy grassland.	940m west, but within 200m of the ARN	County	Medium
Stubbocks Wood LWS	Ancient Woodland Inventory site (part); remnant semi-natural canopy; ancient physical features; woodland indicators. Ancient semi-natural woodland part replanted	1.28km north, but within 200m of the ARN	County	Medium

Site Name	Description	Proximity to Main Application Site	Geographical Importance	Receptor Value
	with broadleaved and coniferous species. Thought to be oak and hornbeam in origin with hazel, ash and elm species. Further woody species and a field layer of bluebell and dog's mercury.			
Chalk Wood	Includes ancient woodland	Within 200m of the ARN	County	Medium
Furzen Wood	Includes ancient woodland	Within 200m of the ARN	County	Medium
Burnwell Spinneys	Includes ancient woodland	Within 200m of the ARN	County	Medium

### Habitats

8.7.10 The Main Application Site is located on the eastern edge of Luton, with industrial and residential properties to the west and north, and agricultural fields to the east and south. A number of habitat types are present, within the extent of the Proposed Development, forming a mosaic of inter-connected habitats across the local landscape. A brief summary of the notable habitat types and those considered of relevance to the assessment of the Proposed Development is provided in **Table 8.12** below. Full habitat descriptions are provided within the Ecology Baseline Report (**Appendix 8.1**, Volume 3 of this PEIR).

Table 8.12: Notable habitats present and scoped into the assessment of the Proposed Development

Habitat	Brief description and valuation	Geographical Importance	Receptor Value
Ancient woodland	Winch Hill Wood CWS/LWS (Woodland 6 - Ecology Baseline Report ( <b>Appendix 8.1</b> , Volume 3 of this PEIR)) (less than 2ha) is a remnant of ancient and semi-natural woodland in the east of the Main Application Site, north of the runway adjacent to the country road through Winch Hill. This woodland has been subject to National Vegetation Classification (NVC) surveys; the broad-leaved woodland found here varies in its composition from east to west. At the east the species composition is characteristic of NVC W10 <i>Quercus robur</i> - <i>Pteridium aquilinum</i> - <i>Rubus fruticosus</i> woodland, and the most western	County as designated as CWS and not higher values such as SSSI	Medium

Habitat	Brief description and valuation	Geographical Importance	Receptor Value
	<p>section is dominated by mature hornbeam, this section does not fit well into an NVC category and is considered an intermediate between W10 and W8 <i>Fraxinus excelsior</i> – <i>Acer campestre</i> – <i>Mercurialis perennis</i>.</p> <p>The woodland covers an area of approximately 2ha, of which 1.5ha is included on the ancient woodland inventory. The woodland qualifies as a habitat of principal importance listed under Section 41 of the NERC Act (2006) and a conservation priority of the Bedfordshire and Luton LBAP and Hertfordshire LBAP. Taking account of its small size, within the context of its designations, Winch Hill Wood CWS/LWS is of county value. In addition, Kidney and Bull Woods CWS, George Woods CWS, Stubbocks Wood LWS, Slaughters Wood CWS, Chalk Wood, Furzen Wood and Burnwell Spinneys are all areas of ancient woodland which lie outside of the Proposed Development, but within 200m of the ARN and/or flight path and therefore are included for air quality effects only.</p>		
Broadleaved semi-natural woodland	<p>In addition to Winch Hill wood there are four small broadleaved semi-natural woodlands located within the Main Application Site:</p> <ul style="list-style-type: none"> <li>a. woodland 1 (Ecology Baseline Report (<b>Appendix 8.1</b>, Volume 3 of this PEIR)), an area of ash and hornbeam dominated woodland, the species composition of which is characteristic of the NVC W8 <i>Fraxinus excelsior</i> – <i>Acer campestre</i> – <i>Mercurialis perennis</i> community. This woodland is located within the east of the site;</li> <li>b. woodland 5, a small area of hornbeam and oak dominated woodland within the south east of the site;</li> <li>c. woodland 7, and an area of oak and ash dominated woodland to the south east of Wigmore Park; and</li> </ul>	District	Medium

Habitat	Brief description and valuation	Geographical Importance	Receptor Value
	<p>d. woodland 14, a small woodland strip within Dairyborn Scarp, in the west of the site.</p> <p>These woodlands qualify as lowland mixed deciduous woodland, a habitat of principal importance and a conservation priority of the Bedfordshire and Luton LBAP and Hertfordshire LBAP. Broadleaved semi-natural woodland within the Proposed Development area is of district value.</p>		
Broadleaved plantation woodland	<p>Areas of broadleaved plantation woodland are present within the Main Application Site. These include patches of replanted woodland within the semi-natural woodland in the south east of the Main Application Site as described above (woodland 5). A larger area of plantation woodland is present at the east of the Main Application Site.</p> <p>Broadleaved plantation woodland within the Proposed Development area is of no more than local value.</p>	Local	Low
Ancient and veteran trees	<p>The Tree Survey Report and Arboricultural Impact Assessment (AIA) provided in (<b>Appendix 14.2 and 14.3</b>, within Volume 3 of this PEIR) identifies one ancient and veteran tree to the south east of Wigmore Park CWS within the east of the Main Application Site; an ancient ash coppice stool, which will be affected by the Proposed Development.</p> <p>A further eight other ancient and veteran trees or potential ancient and veteran trees have been identified within the Main Application Site and wider area, however all will be retained as part of the Proposed Development. Additional future potential veteran trees will also be retained.</p> <p>Veteran trees support features such as rot holes and dead wood which provide habitat opportunities for a range of other flora and fauna species. As such each of the veteran and potential veteran trees</p>	District	High

Habitat	Brief description and valuation	Geographical Importance	Receptor Value
	within the Proposed Development are of district value.		
Species-rich hedgerows	<p>A limited number of hedgerows across the Main Application Site are species-rich and intact, as shown on the Phase 1 Habitats Plan within Ecology Baseline Report (<b>Appendix 8.1</b>, Volume 3 of this PEIR). The majority of those noted were found within the wider replacement open space and habitat creation areas where they will be retained. The hedgerows within the Main Application Site form part of a network across the wider landscape, which provides important habitat and ecological corridors. Hedgerows are a habitat of principal importance and a conservation priority of the LBAPs.</p> <p>Detailed hedgerows surveys have confirmed the presence of sixteen hedgerows, within or immediately adjacent to the Main Application Site, that meet the Hedgerow Regulations 1997 criteria of an 'important' hedgerow, but all appear to be within areas of replacement open space or habitat creation areas, and therefore will be retained. The hedgerow network that extends across the Proposed Development site and adjacent land is of district value.</p>	District	Medium
Scrub – dense and scattered	<p>Dense and scattered scrub are found within areas of Wigmore Park where a lack of management has resulted in stands of dense hawthorn (<i>Crataegus monogyna</i>), blackthorn (<i>Prunus spinosa</i>), willow (<i>Salix sp.</i>) or bramble (<i>Rubus spp.</i>) scrub. They are also found within areas of derelict farmland, either outgrown from hedgerows or adjacent to derelict farm buildings. Extensive patches of dense scrub dominated by low growing bramble are also present within open areas immediately east of woodlands 1 and 2 respectively. Dairyborn Scarp DWS has extensive areas of dense scrub mostly dominated by hawthorn, elder (<i>Sambucus</i></p>	Local	Very low

Habitat	Brief description and valuation	Geographical Importance	Receptor Value
	<p><i>nigra</i>) and bramble on the steep areas of west facing escarpment.</p> <p>This habitat does not qualify as a habitat of principal importance and is of low value. This habitat is likely to have interest for faunal species.</p>		
Semi-improved neutral grassland	<p>Species rich and species poor semi-improved neutral grassland habitat is the dominant grassland habitat type within the Main Application Site. The largest areas of this habitat were previously associated with the southern part of Wigmore Park and four set aside areas within arable fields. NVC surveys of the set aside areas identified species composition characteristic of MG1 <i>Arrhenatherum elatius</i> grassland with MG1a <i>Festuca rubra</i> and MG1b <i>Urtica dioica</i> sub-communities, and MG6 <i>Lolium perenne</i> – <i>Cynosurus cristatus</i> grassland with MG6a typical sub-community. Other grassland headlands around arable fields could not be classified to any particular NVC community and were instead mapped as Neutral grassland – unclassified.</p> <p>Elsewhere this habitat was fragmented and present adjacent to hedgerows, roadside verges or areas of unmanaged habitat within the airfield.</p> <p>Since the 2018 surveys were conducted, a number of previously arable fields within Area G have been sown with a grass seed mix and managed. These extensive fields have been allowed to become vegetated and as a result the floral communities are relatively diverse, and they have been classified as semi-improved grassland.</p> <p>The grassland qualifies as lowland meadow, a habitat of principal importance and a conservation priority of the Bedfordshire and Luton LBAP, neutral grassland is a conservation priority of the Hertfordshire LBAP. The semi-improved neutral grassland within the Proposed Development site is of district value.</p>	District	Low



Habitat	Brief description and valuation	Geographical Importance	Receptor Value
Calcareous grassland	<p>An area of calcareous grassland was present within the Main Application Site at the south western periphery of the airport however during 2020 large areas of this were noted to be encompassed by the construction footprint of the Luton DART (described in <b>Chapter 2</b>). Whilst access to this active construction area was restricted, it appeared unlikely that significant areas remained due to the scale of the works, though representative species could persist on and around the steep exposed chalk slopes to the north and west of this construction area. Other smaller areas of this habitat are restricted to disturbed ground and calcareous exposures including areas of MG6c <i>Lolium perenne</i> – <i>Cynosurus cristatus/ Trisetum flavescens</i> sub-community within arable headlands. Lowland calcareous grassland is a habitat of principal importance and a conservation priority of the Bedfordshire and Luton LBAP and Hertfordshire LBAP. The calcareous grassland within the Proposed Development site is of district value.</p>	District	Medium
Poor semi-improved grassland	<p>Species-poor grassland forms most of the grassland habitats within the airport complex and at the bases of the hedgerows within Area C, areas of low diversity grassland associated with fallow fields or areas of set aside. These areas are either dominated with perennial rye grass (<i>Lolium perenne</i>), false oat-grass (<i>Arrhenatherum elatius</i>) or smooth meadow grass (<i>Poa pratensis</i>); or are dominated by red fescue (<i>Festuca rubra</i>) and/or false oat-grass but are relatively species-poor examples.</p> <p>Grassland 16 (Ecology Baseline Report (<b>Appendix 8.1</b>, Volume 3 of this PEIR)) is a large expanse of undulating set-aside between arable fields due west of Winch Hill. Grassland 17 is an area of set-aside located to the east of Winch Hill within the Main Application Site.</p>	Local	Very low

Habitat	Brief description and valuation	Geographical Importance	Receptor Value
	This habitat does not qualify as a habitat of principal importance but is likely to have interest for faunal species.		
Arable	Large arable fields were present to the east and west of Winch Hill at the east of the Main Application Site. Several of the larger fields west of Winch Hill had associated arable plant species which included some notable species, but have since been taken out of agricultural use from 2018 to 2020, with some sown and now establishing as grasslands. The field to the north of Woodland 1 and Grassland 5 has also been taken out of agricultural use and has been colonised by a range of agricultural associated species with patches of bare ground. Fewer arable weeds are associated with the fields east of Winch Hill possibly due to current herbicide application practices at the field edges. Arable field margins are a habitat of principal importance and a conservation priority of the Bedfordshire and Luton LBAP and the Hertfordshire LBAP. While the majority of the arable fields are of negligible ecological value, the arable field margins within the Proposed Development site are of district value.	District	Low
Ponds	<p>Within the Main Application Site there are ten named pond habitats, with a further ten ponds within 500m.</p> <p>Two Thames Water surface water attenuation ponds are present to the north-east of Wigmore Park (Pond 1) and north of Wigmore Park (Pond 2). These ponds have no apparent aquatic vegetation and limited marginal vegetation.</p> <p>Ponds 5, 6, 8, 9, 13, 14 and 15 are present within the airport infrastructure and are associated with airfield drainage or used as fire training pools. Pond 12 is situated within semi-improved neutral grassland habitat at the western side of Wigmore Park. In mid-2018, this appeared to be very shallow, recently formed and regularly dries. Pond 16, a man-made pond habitat,</p>	Local	Very low

Habitat	Brief description and valuation	Geographical Importance	Receptor Value
	<p>was discovered in 2020 and comprises a series of water treatment beds/walled compartments within a fenced area to the northern periphery of Dairyborn Scarp DWS.</p> <p>None of the pond habitats present and subject to amphibian surveys, qualify as the priority habitat due to the absence of diverse macrophytes, and a lack of notable plant or faunal species.</p>		

### Species

- 8.7.11 The habitats within and directly adjacent to the Main Application Site support a wide range of plant and animal species, including protected and notable species. A summary of the species present through surveys undertaken between 2018 to 2021 is provided in **Table 8.13**. The results of the baseline surveys are provided within the Ecology Baseline Report (**Appendix 8.1**, Volume 3 of this PEIR).

Table 8.13: Notable species present/surveyed and considered of relevance to the preliminary assessment of the Proposed Development

Species/ species group	Brief description	Geographical Importance	Receptor Value
Orchids	<p>Field surveys identified that populations of common spotted orchid (<i>Dactylorhiza fuchsii</i>), pyramidal orchid (<i>Anacamptis pyramidalis</i>), bee orchid (<i>Ophrys apifera</i>) and common twayblade (<i>Neottia ovata</i>) are present at Wigmore Park CWS within the Main Application Site and form part of the reason for designation of Wigmore Park as a CWS. Common spotted orchid are also present within an area of semi-improved grassland set-aside at the edge of an arable field within the area of proposed replacement open space in the Main Application Site. Bee orchid records were provided for Luton Parkway verges DWS.</p> <p>The orchid assemblage within the Proposed Development, includes a high number of individual plants and given that the population is relatively isolated within an urban and intensive agricultural landscape the orchid assemblage is of district value.</p>	District	Medium

Species/ species group	Brief description	Geographical Importance	Receptor Value
Arable plants	<p>The margins of the arable fields within the Main Application Site supported a diverse range of species including notable arable plants. These include common poppy (<i>Papaver rhoeas</i>), yellow rattle (<i>Rhinanthus minor</i>), cornflower (<i>Cyanus cyaneus</i>) and field madder (<i>Sherardia arvensis</i>). Cornflower, along with many other arable plants present, are species of principal importance. Several of the larger fields west of Winch Hill have been taken out of agricultural use from 2018 to 2020, with several sown and establishing as grasslands. Arable plants are a conservation priority of the Bedfordshire and Luton LBAP, cornflower is a conservation priority of the Hertfordshire LBAP. The arable plant assemblage within the Proposed Development site is of district value.</p>	District	Low
Invasive species	<p>Desk studies identified the presence of invasive species within the Main Application Site. Field surveys confirmed the presence of Japanese knotweed (<i>Reynoutria japonica</i>) (Target Note 7 within the Ecology Baseline Report (<b>Appendix 8.1</b>, Volume 3 of this PEIR), Japanese rose (<i>Rosa rugosa</i>) and invasive cotoneaster species wall cotoneaster (<i>Cotoneaster horizontalis</i>), Himalayan cotoneaster (<i>C.simonsii</i>) and small-leaved cotoneaster (<i>C.microphyllus</i>). Japanese rose and Japanese knotweed were identified within and around Wigmore Park. Cotoneaster species were identified within the amenity areas of Wigmore Park and throughout the business and industrial estate to the north of the airport.</p> <p>These species are all listed as non-native invasive species within Schedule 9 part II of the Wildlife and Countryside Act (as amended) 1981. The invasive species within the Proposed Development are of negligible value.</p>	Negligible	Very low
Badger	<p>The Main Application Site includes woodland, hedgerow and grassland habitats suitable for badger foraging, dispersal and sett building. Field surveys identified high levels of badger activity across the Main Application Site and immediately adjacent land. Four main setts</p>	Local	Low

Species/ species group	Brief description	Geographical Importance	Receptor Value
	<p>have been identified within the Main Application Site, with one additional main sett lying outside and to the east, no setts fall within main areas of works, but three are located adjacent, and/or within areas of habitat creation. In addition, three active annexe setts, three active subsidiary setts, and 15 active and eight disused outlier setts were found. No evidence of badger activity was found within the off-site car park areas. A badger bait marking survey confirmed the presence of four distinct badger groups, of which the core territory of two groups fall within the Main Application Site. No territory was noted for the main sett outside of the site, so it is assumed that it falls further to the east and south and outside the area surveyed.</p> <p>The badger groups within the Proposed Development are of local value.</p>		
Bats	<p>The Main Application Site includes a range of suitable foraging and commuting habitats for bats including semi-improved grassland, waterbodies, scrub, hedgerow and woodland. Trees and buildings within the Main Application Site also offer roosting opportunities for bats. Field activity surveys between 2016 and 2018, identified key commuting routes for common bat species along the wooded belts that run between Wigmore Park and the adjacent arable fields to the east, and along the green lane within Wigmore Park CWS that connects to Winch Hill Wood ancient woodland and divides the airport runway from the arable fields to the east.</p> <p>Bat species recorded in 2016 utilising habitats within Wigmore Park and at the east of the Main Application Site included common (<i>Pipistrellus pipistrellus</i>), soprano (<i>Pipistrellus pygmaeus</i>) and Nathusius' pipistrelle, (<i>Pipistrellus nathusii</i>), noctule (<i>Nyctalus noctule</i>), Leisler's bat (<i>Nyctalus leisleri</i>), Serotine (<i>Eptesicus serotinus</i>), Myotis species, brown long-eared (<i>Plectotus auratus</i>) and barbastelle (<i>Barbastella barbastelleus</i>).</p>	District	Medium

Species/ species group	Brief description	Geographical Importance	Receptor Value
	<p>Further field surveys within the Main Application Site undertaken between 2018 and 2019 included ground-based assessments of tree and building roost features, tree climbing inspections of potential tree roost features, emergence and re-entry surveys of potential bat roost features and trapping surveys within key woodland areas within the Main Application Site. Updates were undertaken in 2020, along with assessment of buildings within the footprint of the AAR, and back tracking surveys were also conducted in August 2020 on the ridgeline of the woodland in the centre of the Proposed Development, and the Winch Hill Ancient woodland east of the boundary.</p> <p>Four trees (T104, T120, T124, T126), were identified as supporting common pipistrelle bat roosts within the Main Application Site of the Proposed Development. All four trees were classed as summer day roosts for low number of common pipistrelles, ranging from one to three bats in a survey, and none observed on several visits. A further two common pipistrelle bat roost were identified within buildings (Pillbox and Winch Hill Cottage (2)) adjacent to the Main Application Site, that will not be directly affected. Low numbers of bats confirmed, as maximum survey count of one bat for both buildings, but could also offer hibernacula potential.</p> <p>Soprano pipistrelle, noctule, brown long-eared bats and barbastelle are species of principal importance and Natterer's bat are a conservation priority of the Hertfordshire LBAP. The bat assemblage predominantly comprises common and widespread species, however with the presence of less common species such as serotine, myotis and barbastelle, the bat assemblage within the Proposed Development is of district value.</p> <p>The details of the bat surveys are provided within the Ecology Baseline Report (<b>Appendix 8.1</b>, Volume 3 of this PEIR).</p>		

Species/ species group	Brief description	Geographical Importance	Receptor Value
Hazel dormouse	<p>The Main Application Site supports small semi-natural broadleaved and plantation woodlands, areas of scrub and hedgerows that have some connectivity to the network of hedgerows and woodlands within the wider landscape. These habitats have the potential to support hazel dormice, however it is noted that the wider landscape comprises intensively managed arable land and many of the hedgerows within the network are gappy and heavily flailed. This could limit the ability of any hazel dormice present to disperse across the landscape and colonise new habitats. A review of desk study data returned no recent records of hazel dormouse within 2km of the Main Application Site. However, a historic record exists in the new park area to the east, recorded in 1995, and hazel dormouse have been recorded within Laysbury Dells LWS in 1996, over 1km south east.</p> <p>Hazel dormouse are a species of principal importance and a conservation priority of the Hertfordshire LBAP.</p> <p>Dedicated field surveys undertaken 2018 across the Main Application Site did not identify any evidence for the presence of hazel dormouse. This species is therefore assumed to be absent from the Main Application Site. The scope, methodology and results of the survey completed are included within Ecology Baseline Report (<b>Appendix 8.1</b>, Volume 3 of this PEIR).</p> <p>Dormouse are therefore considered to be absent and not discussed further in this assessment.</p>		
Riparian mammals	<p>A review of desk study data returned no recent records of otter or water vole within 2km of the Main Application Site. Consideration was given to the presence of these species during the assessment of habitats within the Main Application Site. Given the heavily engineered nature of the ponds within the Main Application Site and their poor connectivity to other waterbodies or watercourses, the habitats within the Main Application Site were not</p>	District	Medium



Species/ species group	Brief description	Geographical Importance	Receptor Value
	<p>considered suitable to support riparian mammals such as otter or water vole. However, a historic record of water vole exists from the River Lea, recorded in 1995, and water vole are included within the citation for the River Lea CWS, located 230m to the west of the Main Application Site. The highway interventions for the Proposed Development include the A1081 and gyratory junction, which cross the River Lea.</p> <p>Surveys of the River Lea and associated minor watercourses within proximity to the Proposed Development, undertaken in 2019 identified the presence of otter field signs on the stretch of the River Lea downstream of the A1081, away from potential effects resulting from the works. Otter may utilise any of the other watercourses within the study area but given the lack of prey and sheltering opportunities, it is considered likely that this is only transiently to commute between areas of more suitable habitat. This stretch of the River Lea was also assessed as supporting habitats of moderate suitability for water vole, however no definitive field signs to confirm presence were identified. A single small mammal burrow was recorded, however in the absence of other field signs it is considered too ambiguous to derive presence. Water vole and otter are species of principal importance and a conservation priority of the Bedfordshire and Luton LBAP and the Hertfordshire LBAP.</p> <p>The otter population using the stretch of the River Lea that is crossed by the Proposed Development is of district value.</p> <p>The details of the riparian mammal surveys are provided within the Ecology Baseline Report (<b>Appendix 8.1</b>, Volume 3 of this PEIR).</p>		
Other mammals	<p>The desk study revealed several records of brown hare (<i>Lepus europaeus</i>), hedgehog (<i>Erinaceus europaeus</i>) and one of polecat (<i>Mustela putorius</i>) within proximity to the Main Application Site. The Main Application Site supports open grassland, scrub, hedgerows and woodland habitats that are likely to be</p>	Local	Very low

Species/ species group	Brief description	Geographical Importance	Receptor Value
	<p>used for foraging, shelter and as dispersal corridors by a range of mammals potentially including these species. Field surveys undertaken between 2016-2021 recorded incidental sightings of brown hare and hedgehog within the Main Application Site and taking a precautionary approach polecat are also considered likely to be present.</p> <p>Brown hare, hedgehog and polecat are species of principal importance.</p> <p>The brown hare, hedgehog and polecat populations within the Proposed Development site are of no more than local value.</p>		
Breeding birds	<p>The desk study revealed multiple records of breeding birds within the study area, those of relevance to the assessment include 13 Red List species such as skylark (<i>Alauda arvensis</i>), linnet (<i>Linaria cannabina</i>) and yellowhammer (<i>Emberiza citronella</i>), eight Amber List species such as kestrel (<i>Falco tinnunculus</i>), willow warbler (<i>Phylloscopus trochilus</i>) and bullfinch (<i>Pyrrhula pyrrhula</i>). Refer to Ecology Baseline Report (<b>Appendix 8.1</b>, Volume 3 of this PEIR) for full lists.</p> <p>The Main Application Site includes woodland, scrub, hedgerows, semi-improved grassland and arable land that are utilised by a range of common bird species for foraging and nesting. During 2018 and 2019, a total of 23 breeding species and 86 breeding territories were recorded across both transects, including four Red List species and three Amber List species. During the 2021 surveys, a total of 20 breeding species and 86 breeding territories were recorded, including four Red List species and one Amber List species. Of these, Red and Amber List species were represented by less than ten breeding territories with the exception of skylark with 12 territories in 2018 and 11 in 2021. The species assemblage is typical of the habitats present. The breeding bird assemblage within the Proposed Development site is of local value.</p>	Local	Low

Species/ species group	Brief description	Geographical Importance	Receptor Value
Wintering birds	<p>The desk study revealed multiple records of wintering birds within the study area, those of relevance to the assessment include 10 Red List species such as grey partridge (<i>Perdix perdix</i>), starling (<i>Sturnus vulgaris</i>), red wing (<i>Turdus iliacus</i>) and nine amber list species such as yellow-legged gull (<i>Larus michahellis</i>), stock dove (<i>Columba oenas</i>) and meadow pipit (<i>Anthus pratensis</i>). Refer to Ecology Baseline Report (<b>Appendix 8.1</b>, Volume 3 of this PEIR) for full lists.</p> <p>The Main Application Site includes a range of habitats, most notably the amenity and semi-improved grasslands that support over-wintering populations of birds. Field surveys identified a total of 51 species, including twelve Red List and nine Amber List species. These species are largely typical of the habitats present, but included a notable flock of approximately 220 linnet, a Red List species within the arable set-aside east of Wigmore Park. A golden plover (<i>Pluvialis apricaria</i>) flock frequented the bean fields at Tankards Farm, Tea Green approximately 500m north-east of the Main Application Site, only two were observed flying over the Main Application Site. The wintering bird assemblage within the Proposed Development site is of district value.</p>	District	Medium
Schedule 1 birds (Ref.. 8.9))	<p>The desk study revealed records for barn owl and red kite within the study area. The desk study also revealed wintering records of Schedule 1 species red kite and barn owl. Barn owl and red kite have been recorded using the habitats within the Main Application Site as a foraging resource. Barn owl presence was confirmed during field surveys between 2016 and 2018 through the identification of pellets within the Main Application Site, and red kite were observed during field survey work.</p> <p>Further surveys undertaken in 2019 within 1.5km of the Main Application Site identified the presence of two red kite occupied nests and another territory, within woods to the south east of the Main Application Site. The surveys</p>	County	Medium

Species/ species group	Brief description	Geographical Importance	Receptor Value
	<p>also identified the presence of a barn owl occupied nest to the south of the Main Application Site, and a separate barn owl breeding territory to the east of the Main Application Site. The barn owl and red kite populations utilising the habitats within and adjacent to the Proposed Development site are of county value. No breeding territories of Schedule 1 species were recorded during 2021. However, targeted surveys within an expanded survey area were not carried out as they were for 2019.</p>		
Reptiles	<p>A review of the desk study data identified one record of slow-worm (<i>Anguis fragilis</i>) within 1km of the Main Application Site in the last 10 years. Some additional historic records (between 1973 and 2007) of common lizard (<i>Zootoca vivipara</i>), grass snake (<i>Natrix helvetica</i>) and slow worm were also returned. The Main Application Site includes grassland, scrub, hedgerows and waterbodies suitable for reptile foraging, dispersal and shelter. Field surveys undertaken during 2018 and 2019 identified two low populations of slow worm within grassland margins adjacent to Wigmore Park allotments, and within a small area of unmanaged calcareous grassland to the east of Wigmore Park; both of which are within the Main Application Site. An additional nine surveyed areas yielded no results. Given the habitats present on site it is also considered possible that grass snake are present in low numbers. Slow-worm and grass snake are species of principal importance. The reptile populations within the Proposed Development site are of local value.</p>	Local	Low
Amphibians	<p>A review of the desk study data confirmed the presence of common toad (<i>Bufo bufo</i>), common frog (<i>Rana temporaria</i>), and smooth newt (<i>Lissotriton vulgaris</i>) within the wider landscape, no recent great crested newt records were received for within the study area. Twenty ponds are present within the</p>	Local	Low

Species/ species group	Brief description	Geographical Importance	Receptor Value
	<p>study area, but only wet ponds within 500m of the Main Application Site that were accessible and not on the far side of a dispersal barrier were subject to surveys. There are nine ponds within the Proposed Development, two of which are not within areas of works and will be retained. Therefore the works areas within the Main Application Site includes seven ponds with associated grassland, woodland, scrub and hedgerow habitats suitable for amphibians.</p> <p>Field surveys undertaken in 2018, 2019 and 2020 identified a small population of smooth newt utilising eight of the ponds and associated habitats, six of which lie within the Main Application Site. The presence of common toad was also confirmed within the Main Application Site during reptile surveys.</p> <p>Field and environmental DNA (eDNA) surveys revealed negative results for great crested newts. This species is therefore assumed to be absent and is no longer discussed within this assessment.</p> <p>Common toad are species of principal importance. The amphibian populations within the Proposed Development site are of local value.</p>		
Roman snail	<p>The Main Application Site includes calcareous grassland habitats with an associated mosaic of scrub, woodland and hedgerows which offer suitable foraging and shelter habitats for Roman snail. Field surveys undertaken in connection to the Luton DART planning application in 2017 identified 20 live Roman snails along the south west boundary of the airport. A further record was associated with Dairyborn Scarp DWS.</p> <p>Dedicated surveys undertaken in 2019 and 2020 to confirm the extent of the Roman snail population did not identify Roman snail within the Main Application Site, however a high number of individuals (113) were identified just beyond the boundary to the south west of the Main Application Site. In addition, a shell fragment was identified within Dairyborn Scarp</p>	Local	Low

Species/ species group	Brief description	Geographical Importance	Receptor Value
	DWS in 2020. Given the historic record from this site and the fragment identified, low numbers of Roman snail are assumed to be present on a precautionary basis in the absence of a full survey. The Roman snail population utilising the habitats adjacent to the Proposed Development site are of local value.		
Other invertebrates	<p>The Main Application Site includes a mosaic of habitat types including calcareous and neutral grasslands, bare/disturbed ground, scrub, hedgerows, woodland and waterbodies. This sits within a wider landscape of connected hedgerows, field margins and woodland. Such habitats offer opportunities for a range of invertebrate species.</p> <p>Field surveys undertaken in 2015-2016 and 2018-2019 identified an invertebrate assemblage comprising 1,550 species, 91 of which are regarded as 'Key Species' (i.e. with rare, scarce, threatened or near threatened conservation status). The assemblage includes the presence of the rare picture-winged fly (<i>Dorycera graminum</i>), set-aside downy-back beetle (<i>Ophonus laticollis</i>) and dingy skipper butterfly (<i>Erynnis tages</i>) all of which are species of principal importance. Beetles were particularly prevalent; of the 570 species of beetle recorded, 49 have no previous Bedfordshire record and 11 have no previous Hertfordshire record.</p> <p>The assemblage of invertebrates utilising the habitats within the Proposed Development is of county value.</p>	County	Medium

## Future baseline

- 8.7.12 In the absence of the Proposed Development, there is likely to be a change to the future baseline conditions as a result of other factors and developments in proximity to the Application Site. These are the conditions that would prevail 'Without Development' in place. The 'Without Development' scenario is used, where appropriate, as a comparator for the assessed case, to show the effect of the Proposed Development against an appropriate reference point. The approach to defining future baseline and the developments identified for consideration are described in **Section 5.4** of **Chapter 5** of this PEIR.

- 8.7.13 Construction of Phase 1 of the Proposed Development would be likely to commence in 2025 and be completed in 2027. Within these timescales, or even if construction did not commence until year five following grant of the DCO, there are not expected to be any significant changes in the habitats and species present.
- 8.7.14 A number of the fields to the east of Wigmore Park CWS were previously in use as arable fields, but have since been sown with a grass seed mix and managed, in anticipation of the New Century Park planning permission (LBC ref: 17/02300/EIA), for which further details are provided in **Section 2.4 of Chapter 2** of this PEIR, and have been reclassified as other habitats including semi improved neutral grassland and ephemeral. Without the Proposed Development going ahead, or if it is subject to long delays, these fields could be returned to use as arable or succession of the habitat could occur if they are not returned to use as arable. Succession could lead to improved habitats attracting other protected species, and improving the overall biodiversity value of the site. The assessment is based upon the existing baseline for the Proposed Development and the fields currently as classified as semi improved neutral grassland and ephemeral habitats, and not the previously arable fields. If the Proposed Development did not go ahead it is likely that the New Century Park development would proceed as consented, and these fields would be maintained as lower biodiversity value amenity parkland.



## 8.8 Embedded and good practice mitigation measures

8.8.1 This section describes the embedded and good practice mitigation for biodiversity that has been incorporated into the Proposed Development design or assumed to be in place before undertaking the assessment. A definition of these classifications of mitigation and how they are considered in the EIA is provided in **Chapter 5** of this PEIR.

### Embedded

8.8.2 The Proposed Development has been designed, as far as possible, to avoid effects on biodiversity through option identification, appraisal, selection and refinement.

8.8.3 The design of the Proposed Development and the planned approach to its construction have been developed with an overarching principle of avoidance where possible, for example avoiding loss of ancient woodland.

8.8.4 Mitigation measures have been integrated (embedded) into the Proposed Development for the purpose of minimising effects related to ecological receptors. These measures focus on implementing the mitigation hierarchy where possible to minimise the effects.

8.8.5 A summary of measures that have been embedded into the design of the Proposed Development through design iterations are set out below.

- a. The landscape design for the Proposed Development will include large areas of habitat creation to partially mitigate the loss of habitats from construction of the Proposed Development. Areas of habitat creation will be designed and managed to ensure their target condition exceeds that of the habitats lost and thereby contributes to achieving a net gain in biodiversity.
- b. Much of the habitat creation referred to above is included within a large area of replacement open space, which will be created within the north east of the Main Application Site. This replacement open space will connect to the retained areas of Wigmore Park, providing east west connectivity within the Main Application Site and wider landscape. This area of open space will include habitat creation measures to mitigate for those habitats lost within Wigmore Park CWS. The replacement habitat, once established, will mitigate for the loss of foraging, dispersal and shelter habitats which are used by a range of species including badger, bats, birds, reptiles, amphibians and invertebrate species.
- c. The measures to establish, manage and monitor areas of habitat creation within the Proposed Development are detailed within the Draft LBMP (**Appendix 8.2**, Volume 3 of this PEIR). The Draft LBMP has been developed in consultation with local stakeholders (listed in **Section 8.4** above) and includes details for implementation, establishment, maintenance and monitoring of created/enhanced habitats. It provides detailed management and monitoring requirements for the first five years from time of planting, up to a period of 50 years, with a requirement for review initially every five years, to ensure that management is appropriate

and habitats created/enhanced are in line with those proposed. In addition, the Draft LBMP includes appropriate measures to control recreational pressures on the habitats within the open space such as litter, trampling and disturbance.

- d. Grassland habitats within the airport boundary at the south of the Proposed Development between the runway and external fencing will continue to be managed from now and through to operation of the Proposed Development (as part of the Draft LBMP), at a short sward height to avoid the establishment of rough grassland and scrub. This would be to discourage encroachment of Roman snail from the adjacent habitats immediately to the south into the Proposed Development, where they would be at risk of being killed, and given their legal protection would subsequently represent a constraint to the construction and operation of the Proposed Development.
- e. The Proposed Development will incorporate a buffer of semi-natural habitats, at least 15m in width, around areas of ancient woodland within or adjacent to the Proposed Development. No ground works will be permitted within this buffer to ensure trees within ancient woodland are protected from root damage and soil compaction. This is in accordance with Natural England guidance (Ref.. 8.47).
- f. The Proposed Development has been designed to retain veteran/ancient trees and potential veteran/ancient trees where possible. Where such trees have been retained within or directly adjacent to the Proposed Development a buffer zone will be established to protect the roots. The buffer zone around an ancient or veteran tree will be at least 15 times larger than the diameter of the tree, the buffer will also be at least 5m from the edge of the tree's canopy (if that area is larger than 15 times diameter) (Ref. 8.48). Veteran trees offer important habitats for a range of species including rare saproxylic invertebrates and fungi. Felled dead wood from potential veteran/ancient trees that could be lost will be kept in as large sections as possible and incorporated into the landscape design of the new areas of habitat creation within the open space. Large sections of felled trunks will be reinstalled vertically in the ground within the habitat creation areas to create 'monoliths', which will encourage the deadwood to decay in a similar way to how it would naturally as standing deadwood in-situ.
- g. The Proposed Development will incorporate an area of new habitat, within the area of replacement open space in the eastern section of the Main Application Site, and newly created habitat in the north east of the Main Application Site, as shown in the Landscape Mitigation Plans **Figures 14.11 to 14.13** in Volume 4 to the PEIR, to mitigate the loss of grassland supporting orchids. This replacement habitat will be designed with consideration of soil conditions, geology and local topography, and will be managed to replicate the requirements of the orchid species present.
- h. Where woodland and hedgerow belts are being retained within the Proposed Development design, the adjacent arable margins will also be

retained. These margins will be managed to encourage retention and proliferation of the notable arable plant species and invertebrates that have been identified within the survey area.

- i. The Proposed Development will incorporate artificial bat roosting provision on buildings and retained trees to mitigate the roosting opportunities lost to the Proposed Development.
- j. The landscape mitigation has been designed to be appropriate given its proximity to the airport and the potential that certain types of habitat creation could attract additional birds and thereby increase the bird strike risk. Newly created habitats will be managed appropriately for their proximity to the airport's airspace to ensure the risk of bird strike does not significantly increase (a Draft Bird Strike Risk Assessment is provided as **Appendix 8.4** in volume 3 of this PEIR).
- k. Offsite Car Parks works at Luton Parkway will be restricted to existing areas of hardstanding and will therefore avoid direct effects to designating features of Luton Parkway Verges DWS and habitats that could support protected species.

## Good Practice

8.8.6 A summary of best practice measures (mitigation which will be in place as a result of standard good practice and due to legislative requirements) are set out below:

- a. The assessment assumes implementation of measures described within the Draft Code of Construction Practice (CoCP) (**Appendix 4.2**, Volume 3 of this PEIR) including control of dust, control of water quality, control of noise and light pollution, management and eradication protocols for invasive species such as Japanese knotweed, protection of adjacent water courses and erection of tree protection fencing to ensure root protection zones are adhered to.
- b. Any vegetation clearance required for construction of the Proposed Development will be undertaken at an appropriate time of year to avoid impacts to legally protected species where possible. Where appropriate or timing avoidance is not possible, supervision of vegetation clearance by a suitably qualified ecologist will be undertaken to avoid injuring or killing protected species such as nesting birds, reptiles, and amphibians.
- c. Pre-construction surveys will be conducted to establish any subsequent changes to the results, such as newly created badger setts.
- d. Obvious mammal trails would be kept clear of obstructions where possible.
- e. The Proposed Development will incorporate directional lighting methods such as smart LED lighting with integrated baffles, cowls or hoods, to avoid light spill onto retained and adjacent habitats and the species they support, notably Winch Hill Wood ancient woodland and nocturnal species such as bats and badger.

- f. Minimising working areas and vegetation clearance within designated nature conservation sites and areas of protected habitat to only that essential for works.
- g. Demarcation of non-working areas within designated nature conservation sites and areas of protected habitat and close to sensitive species to protect habitat.
- h. Retained hedgerows and trees will be protected by clearly defined root protection areas to prevent damage/compaction of roots by plant and other machinery.

## 8.9 Preliminary assessment

8.9.1 This section presents the results of the preliminary assessment of likely significant effects with the embedded and good practice mitigation measures, described in the previous section, in place. This assessment is made prior to additional mitigation applied, as per **Section 8.10**, before residual effects are presented in **Section 8.11**.

8.9.2 A summary of the assessment of full effects is provided in **Table 8.18** in **Section 8.14**. Significant effects, and those deemed appropriate, have been extracted and are discussed in further detail in this section. Please refer to **Section 8.3** for details of how this section is constructed, in particular Temporal Scope.

### Construction

#### *Designated nature conservation sites*

#### **Wigmore Park CWS**

##### *Phase 1*

8.9.3 The Phase 1 construction works for the Proposed Development will result in the loss of c.6.7ha (43%) of Wigmore Park CWS, including semi-improved neutral grassland, calcareous grassland and hedgerow habitats for which the site is designated, through site clearance and temporary surface car parks creation. The Proposed Development includes measures to replace those habitats lost within Wigmore Park CWS. However, it is recognised that time is required for these new areas of habitat to become established to a level at which they provide an equivalent biodiversity value to that lost to the Proposed Development at Wigmore Park CWS, therefore the Proposed Development does not initially fully mitigate the loss of biodiversity at the CWS. In the short term, even with embedded habitat mitigation replacing the equivalent size and habitats in close proximity to the existing CWS, as part of the replacement open space, the majority loss of the key habitats of Wigmore Park CWS to the Phase 1 works for the Proposed Development represents a permanent adverse impact. This will be of high magnitude, on the structure and function of the county value site, which equates to a **major adverse effect**, in the short term, which is **significant**. However this will reduce to **moderate** adverse in the medium term, which remains **significant**, decreasing to a **minor adverse effect** when vegetation reaches maturity in the long term (within 10-12 years), which is **not significant**.

##### *Phase 2a*

8.9.4 The Phase 2a construction works for the Proposed Development will result in the loss of the majority of the remaining c.7.3ha (47%) of Wigmore Park CWS (hedgerows to the north to be incorporated into the open space). The habitat creation measures to replace those lost within Wigmore Park CWS in Phase 1 will have matured to various levels by Phase 2a, depending on the habitat types. However, it is recognised that time is required for Phase 2a measures to establish to a level at which they provide an equivalent biodiversity value to that

lost to the Proposed Development at Wigmore Park CWS, therefore the Proposed Development does not yet fully mitigate the loss of biodiversity at the CWS. The further loss of the key habitats of Wigmore Park CWS to the Phase 2a works for the Proposed Development represents a permanent adverse impact of medium magnitude (smaller loss at this Phase and already matured replacement habitat from Phase 1) on the structure and function of the county value site. This equates to a **moderate adverse effect**, which is **significant** in the short term decreasing to a **minor adverse effect** when vegetation reaches maturity in the long term (within 10-12 years), which is **not significant**.

### ***Phase 2b***

- 8.9.5 Wigmore Park CWS is almost entirely lost to previous construction Phases of the Proposed Development, with the exception of hedgerows incorporated into the replacement open space, therefore the Phase 2b construction works for the Proposed Development cannot result in additional adverse impacts upon Wigmore Park CWS.

## **Winch Hill Wood CWS/LWS Ancient Woodland**

### ***Phase 1***

- 8.9.6 No significant construction effects are anticipated in Phase 1, therefore please refer to the summary of the assessment of effects provided on **Table 8.9** in **Section 8.14**.

### ***Phase 2a***

- 8.9.7 Winch Hill Wood CWS/LWS is located wholly within the Main Application Site but will not be subject to any direct habitat loss and will therefore be retained within the Proposed Development. It comprises part Ancient Woodland, however the NVC survey included in the Ecology Baseline Report (**Appendix 8.1**, Volume 3 of this PEIR) reports this woodland as part low and part low/moderate botanical value. Phase 2a earthworks to allow extension of the airport platform will result in changes to the topography of the land (outside of the 15m buffer zone) adjacent to Winch Hill Wood CWS/LWS. These works have the potential to result in changes to the hydrological conditions within the woodland, however the implementation of a drainage strategy as part of the Proposed Development (described in **Appendix 20.4** in Volume 3 of this PEIR) will avoid substantial changes to the existing hydrological conditions within Winch Hill Wood CWS/LWS. Indirect effects related to dust, noise, water pollution will be managed through embedded measures and good practice within the Draft CoCP (**Appendix 4.2** of Volume 3 of this PEIR).
- 8.9.8 The Phase 2a construction of the Proposed Development will also result in further isolation of the ancient woodland, through the removal of connected belts of trees and hedgerows, especially those that offer ecological corridors between the habitats. This isolation may result in the loss of dispersal routes for the flora and fauna leading to the degradation of the ancient woodland community that forms the designating feature of Winch Hill Wood CWS/LWS. The Proposed Development includes the provision of habitat creation measures, including meadow grassland, scrub and woodland, within land which

has been intensively managed for agriculture, directly adjacent to Winch Hill Wood CWS/LWS. These measures will reduce the impact of the loss of connecting ecological corridors; however, given the time required for habitats to establish to a level at which they provide an equivalent biodiversity resource to that lost, a temporary adverse impact, of low magnitude, on the structure and function of the county value site. This equates to a **minor adverse effect**, which is **not significant** in the short term decreasing to a **negligible effect** when vegetation reaches maturity in the long term (within 10-12 years), which is **not significant**.

### ***Phase 2b***

- 8.9.9 No significant construction effects are anticipated in Phase 2b, therefore please refer to the summary of the assessment of effects provided on **Table 8.9** in **Section 8.14**.

## **Dairyborn Scarp DWS**

### ***Phase 1***

- 8.9.10 No significant construction effects are anticipated in Phase 1, therefore please refer to the summary of the assessment of effects provided on **Table 8.9** in **Section 8.14**

### ***Phase 2a***

- 8.9.11 The Phase 2a construction works for the Proposed Development will result in the loss of c.2.18ha (29%) of Dairyborn Scarp DWS, including a mosaic of calcareous grassland, dense and scattered scrub and ruderal habitats for which the remainder of the site is designated, along with stating a small remnant of ancient woodland to the north of the site. This would lie outside of the Proposed Development and is not included within the ancient woodland inventory. It is also stated that it may be a remnant of Spittlesea Wood but does not meet the criteria for a DWS on this habitat type. The Proposed Development includes habitat creation measures to replace those lost within Dairyborn Scarp DWS, however it is recognised that time is required for these measures to establish to a level at which they provide an equivalent biodiversity value to that lost to the Proposed Development at Dairyborn Scarp DWS, therefore the Proposed Development does not initially fully mitigate the loss of biodiversity at the DWS. These measures comprise the management of 0.5ha of existing woodland, the planting of 0.15ha of native scrub, the seeding of 1.1ha of neutral meadow grassland and the creation of 650m<sup>2</sup> of exposed chalk on lower-lying shallow slope. The partial loss of the key habitats of Dairyborn Scarp DWS to the Phase 2a works for the Proposed Development represents a temporary adverse impact of medium magnitude on the structure and function of the district value site. This equates to a **moderate adverse effect** in the short term, which is **significant**. Embedded habitat mitigation will reduce this to a **minor adverse effect** when vegetation reaches maturity within 5-10 years, which is **not significant**.



### ***Phase 2b***

- 8.9.12 No significant construction effects are anticipated in Phase 2b, therefore please refer to the summary of the assessment of effects provided on **Table 8.9** in **Section 8.14**.

## **Habitats**

### **Ancient Woodland**

- 8.9.13 There is one ancient woodland site directly affected by the construction of the Proposed Development, Winch Hill Wood, which is located within the Main Application Site. This ancient woodland forms the basis for the designation of Winch Hill Wood CWS/LWS, as such the impacts upon the ancient woodland as a result of each phase of the construction works for the Proposed Development are reported within the designated nature conservation sites **Section 8.9.6 to 8.9.8**.

### **Broadleaved Semi-natural Woodland**

#### ***Phase 1***

- 8.9.14 No significant construction effects are anticipated in Phase 1, therefore please refer to the summary of the assessment of effects provided on **Table 8.9** in **Section 8.14**.

#### ***Phase 2a***

- 8.9.15 Loss of approximately 1.6ha of broadleaved semi-natural woodland, including an area of priority habitat, of which 0.2ha lies outside of designated nature conservation sites, with the remaining mainly comprising the loss of 1.15ha of woodland 7 within the remainder of Wigmore Park CWS to works including car parks P8 and P11, and an area within Dairyborn Scarp DWS. Although some of the habitat losses have been considered in regards to impacts to wildlife site above, the full losses for this habitat type are considered here to allow a full assessment of impact on this habitat type.
- 8.9.16 This temporary adverse impact, of medium magnitude, on the structure and function of the district value habitat, equates to a **moderate adverse effect** level that is **significant**. Embedded mitigation will reduce this to a **minor adverse effect** over time following establishment of replacement habitat, which is **not significant**.

#### ***Phase 2b***

- 8.9.17 No significant construction effects are anticipated in Phase 2b, therefore please refer to the summary of the assessment of effects provided on **Table 8.9** in **Section 8.14**.

## Species

### Orchids

#### *Phase 1*

- 8.9.18 The Phase 1 works for the Proposed Development will result in the loss of most of Wigmore Park CWS including the associated populations of common spotted orchid, pyramidal orchid, bee orchid and common twayblade. The existing orchid populations within the set-aside areas of the arable fields that will be used to create the replacement open space will be retained and protected during construction of the Proposed Development, and long term management will be implemented to encourage long term viability of the orchid population in this area, as detailed within the Draft LBMP (**Appendix 8.2**, Volume 3 of this PEIR). Despite these measures the partial loss of the orchid assemblage to the Phase 1 works for the Proposed Development represents a temporary adverse impact, of medium magnitude, on this district value receptor. This equates to a **moderate adverse effect**, which is **significant**; however with embedded mitigation discussed above to manage the orchids within the replacement open space, this decreases to a **minor adverse effect** when vegetation reaches maturity within 5 years, which is **not significant**.

#### *Phase 2a*

- 8.9.19 The Phase 2a construction of the Proposed Development will result in the loss of the remaining area of Wigmore Park CWS, including the remaining populations of orchids,. As discussed above, areas of existing orchid populations within the replacement Wigmore Park will be retained and management measures put in place to support long term viability of these populations. Further areas of grassland creation on calcareous soils will be established to the east of the replacement park, which will be managed to encourage a diverse flora including orchids. Despite these measures the loss of the orchid assemblage to the Phase 2a construction works represents a temporary adverse impact, of medium magnitude, on this district value receptor. This equates to a **moderate adverse effect**, which is **significant**; however with embedded mitigation discussed above to manage the orchids within the replacement open space, this decreases to a **minor effect** when vegetation reaches maturity within 5 years, which is **not significant**.

#### *Phase 2b*

- 8.9.20 The Phase 2a construction works for the Proposed Development will not result in any further impacts upon the orchid population.

### Badger

#### *Phase 1*

- 8.9.21 The Phase 1 works for the Proposed Development will result in the loss of at least three outlier setts for works including car park creations e.g. P6 and P7, as well as grassland, scrub, hedgerow and woodland habitats that offer a foraging resource and form part of the territories for at least two badger groups. Four

main badger setts and their associated outlier/annexe/subsidiary setts and partial territories are located within the replacement open space and habitat creation areas, and will be retained based on current design. The Phase 1 works for the Proposed Development includes habitat creation within the area of replacement open space. This will reduce the impact of the loss of habitats upon the local badger social group; however, given the time required for replacement habitats to establish to a level at which they provide an equivalent foraging resource, an impact remains. With embedded mitigation for retention and replacement of habitats, the loss of outlier setts and associated habitats to the Phase 1 works for the Proposed Development represents a temporary adverse impact, of medium magnitude, on this local value receptor in the short term. This equates to a **minor adverse effect**, which is **not significant**. This will reduce to a **negligible effect**, which is **not significant** in the long term once habitats have matured.

### ***Phase 2a***

- 8.9.22 The Phase 2a construction of the Proposed Development may result in the potential loss or disturbance of one main badger sett to earthworks and creation of the fuel storage facility and water treatment plant, but there may be sufficient space to retain it depending upon detailed design. There will also be disturbance to one other main badger sett and loss of three subsidiaries and loss and/or disturbance of outlier badger setts within the working corridor of the new fuel pipeline as it passes through the woodland at Winch Hill House, along with creation of the landscape restoration and habitat creation areas. The Phase 2a construction of the Proposed Development will also result in the loss of grassland, scrub, hedgerow and woodland habitats that offer a foraging resource and form part of the territories of at least two different badger social groups. Unlike the affected area for Phase 1 primarily comprising the creation of the open space and habitat creations areas where in close proximity to main setts, Phase 2a will incur loss of habitats in close proximity to retained main setts, which will require fencing to prevent harm to badger during construction. The loss of setts, including potentially a main sett, and associated habitats, plus disturbance during construction to multiple setts, to the Phase 2a construction of the Proposed Development represents a temporary adverse impact, of high magnitude, on this local value receptor for loss of habitats and disturbance. This equates to a **moderate adverse effect**, which is **significant** in the short term, and **minor adverse effect** which is **not significant** in the long term once the habitats have matured. A permanent **moderate** adverse effect of loss of a main sett will occur if it is unavoidable, which is **significant**. Detailed design will seek to retain and limit disturbance to this main sett if possible but there remains a residual risk that there will be impact at this stage.

### ***Phase 2b***

- 8.9.23 The Phase 2b construction of the Proposed Development includes further earthworks and establishment of a long-stay car park, plus landscape restoration, which has the potential to result in further disturbance to retained badger setts located within the boundary between the replacement open space and the Phase 2b construction area, and within and around the woodland near Winch Hill. Further areas of habitat will be lost, however by this time, the habitat

creation areas in earlier phases, and replacement open space will have matured. Following the implementation of the measures described within the Draft CoCP (**Appendix 4.2**, Volume 3 of this PEIR), any disturbance impacts upon the local badger social group will represent a temporary adverse impact, of low magnitude, on this local value receptor. This equates to a **negligible effect**, which is **not significant**.

## **Bats**

### ***Phase 1***

- 8.9.24 The Phase 1 works for the Proposed Development will result in the loss of grassland, scrub, waterbodies and woodland habitats at Wigmore Park that are utilised by foraging bats, along with small amounts of tree loss around Winch Hill Wood (for arboricultural requirements only), and further trees within and around the area of Winch Hill House and Cottages.
- 8.9.25 The removal or disturbance of foraging and commuting habitat features that are utilised by bats during the maternity season, hibernation or while migrating between roosts is considered to have the potential to result in adverse effects on the bat populations during construction. The implementation of habitat creation measures within the Proposed Development, will reduce the impact of the loss and fragmentation of habitats used by the local bat assemblage. However, it is recognised that time is required for replacement habitats to establish to a level at which they provide an equivalent foraging resource to that lost. The loss of foraging habitats to the Phase 1 works for the Proposed Development, therefore, represents a temporary adverse impact of medium magnitude on this district value bat assemblage which would result in a **moderate adverse effect**, which is **significant**, decreasing to a **minor adverse effect** when vegetation reaches maturity within 10-12 years, which is **not significant**.
- 8.9.26 Single common pipistrelle summer day roosts were identified within a cottage at Winch Hill, a tree (T126) within nearby woodland, and a further roost at the Pillbox to the north of Wigmore Park. Both structures and the tree will be surrounded by or adjacent to the land required for the Phase 1 works for the replacement open space. Construction works associated with the Phase 1 works for the Proposed Development have the potential to introduce disturbance, through construction related noise, lighting and vibration, to roosts within retained buildings adjacent to the Proposed Development. This represents a temporary adverse impact, of low magnitude upon this local value bat roost which would equate to a **negligible effect**, which is **not significant**. Following the implementation of embedded measures to reduce noise and light pollution, as described in the Draft CoCP (**Appendix 4.2**, Volume 3 of this PEIR), the effect upon the local bat assemblage will be reduced to a level that is **not significant**.

### ***Phase 2a***

- 8.9.27 The Phase 2a construction of the Proposed Development will result in the loss of grassland, hedgerow, scrub, waterbodies and woodland habitats that are utilised by foraging and commuting bats. The Phase 2a construction of the

Proposed Development will result in the loss of one tree and disturbance of two trees that have been identified as supporting single common pipistrelle summer day roosts.

- 8.9.28 The Phase 2a construction of the Proposed Development will also result in a small amount of severance of some of the most utilised bat commuting routes that have been identified along the boundary of Wigmore Park and connecting Wigmore Park to the Winch Hill Wood ancient woodland. The removal or disturbance of habitat features that are utilised by bats during breeding, hibernation or migrating between roosts is considered to have the potential to result in adverse impacts on the bat populations during construction. The implementation of embedded habitat creation measures within the Proposed Development, will reduce the impact of the loss of habitats used by the local bat assemblage. However, in addition to the loss of commuting routes, it is also recognised that time is required for replacement habitats to establish to a level at which they provide an equivalent foraging resource to that lost, although by Phase 2a, the habitat creation and landscape mitigation areas for Phase 1 will have begun to mature. The loss of foraging habitats and well used commuting routes to the Phase 2a construction of the Proposed Development represents a temporary adverse impact of medium magnitude on this district value receptor. This equates to a **moderate adverse effect**, which is **significant**, decreasing to a **minor adverse effect** when Phase 2a vegetation also reaches maturity within 10-12 years, which is **not significant**.
- 8.9.29 Works associated with Phase 2a construction of the Proposed Development will result in the loss of one common pipistrelle tree roost within the woodland in the remaining southern area of Wigmore Park CWS, and also have the potential to introduce disturbance, through construction related noise, lighting and vibration, to roosts within retained trees and buildings adjacent to the Proposed Development, including disturbance of two common pipistrelle tree roosts within the woodland belt to the west of Winch Hill Wood. Following the implementation of embedded measures to reduce noise and light pollution, as described in the Draft CoCP (**Appendix 4.2**, Volume 3 of this PEIR), this represents an adverse impact, of low magnitude, upon these local value bat roosts which would equate to a **minor adverse effect**, that is **not significant**. This will be a temporary effect for disturbance and a permanent impact for the loss of a roost.

### ***Phase 2b***

- 8.9.30 The Phase 2b construction of the Proposed Development will result in the loss of grassland, hedgerow, scrub, and woodland habitats that are utilised by foraging and commuting bats, to a smaller extent than previous stages, and within proximity to the existing and new areas of the airport, comprising mostly habitats already affected such as the woodland belt to the west of Winch Hill Wood.
- 8.9.31 The implementation of embedded habitat creation measures within the Proposed Development, will reduce the impact of the loss of habitats used by the local bat assemblage. However, in addition to the loss of commuting routes, it is also recognised that time is required for replacement habitats to establish to a level at which they provide an equivalent foraging resource to that lost,

although by Phase 2b, the habitat creation and landscape mitigation areas for Phase 2a will also have begun to have mature. The loss of foraging habitats and well used commuting routes to the Phase 2b construction of the Proposed Development represents a temporary adverse impact, of low magnitude, on this district value receptor. This equates to a **minor adverse effect**, which is **not significant**, decreasing to a **negligible effect** when Phase 2b vegetation also reaches maturity within 10-12 years, which is **not significant**.

- 8.9.32 The Phase 2b construction of the Proposed Development will result in the loss of two common pipistrelle tree roosts within the woodland belt to the west of Winch Hill Wood, and further disturbance of a tree near to Winch Hill. Implementation of embedded measures will reduce noise and light pollution, as described in the Draft CoCP (**Appendix 4.2**, Volume 3 of this PEIR). Common pipistrelle are a common and widespread species therefore the loss of two roosts associated with this species and disturbance of others, represents an adverse impact, of low magnitude, on this local level receptor, which would result in a **minor adverse effect**, which is **not significant**. This will be temporary for disturbance and a permanent impact for the loss of a roost.

## Amphibians

### *Phase 1*

- 8.9.33 The Phase 1 works for the Proposed Development will result in the loss of one pond and associated terrestrial habitats of grassland, scrub, hedgerow and woodland that are likely to be used by amphibians such as smooth newt, common frog and common toad. In addition, the construction works have the potential to kill or injure amphibians during clearance of their terrestrial habitat. The embedded mitigation measures, including staged vegetation clearance, and appropriate timing of works within proximity to ponds, will reduce the risk of killing or injuring amphibians during the Phase 1 works; however, this risk remains, especially during the removal of the pond. Therefore, the risk of killing or injuring amphibians during the Phase 1 works for the Proposed Development represents a temporary adverse impact, on this local value receptor. With the embedded mitigation, the likelihood of impacts to amphibians of this medium magnitude, equates to a **minor adverse effect**, which is **not significant**.
- 8.9.34 The embedded terrestrial habitat creation measures within the Proposed Development will reduce the effect of the loss of habitats. However, it is recognised that time is required for the replacement habitats to establish to a level at which they provide an equivalent resource to that loss. The loss of amphibian habitats to the Phase 1 works for the Proposed Development represents a temporary adverse impact, of medium magnitude, on this local value receptor. This equates to a **minor adverse effect**, which is **not significant**, reducing to **negligible** once the habitats are established, which is **not significant**.

### *Phase 2a*

- 8.9.35 The Phase 2a construction of the Proposed Development will result in the loss of six waterbodies and associated terrestrial habitats of grassland, scrub, hedgerow and woodland that are likely to be used by amphibians such as



smooth newt, common frog and common toad. In addition, the Phase 2a construction works have the potential to kill or injure amphibians during clearance of their habitat. The good practice mitigation measures, including staged vegetation clearance and the appropriate timing of these works, will reduce the risk of amphibians being killed or injured during the Phase 2a construction works, however this risk remains, especially during removal of ponds. With embedded mitigation the likelihood of impacts to amphibians is of medium magnitude on this local value receptor equating to a **minor adverse effect**, which is **not significant**

- 8.9.36 The embedded habitat creation measures within the Proposed Development will reduce the effect of the loss of habitats. However, it is recognised that time is required for the replacement habitats to establish to a level at which they provide an equivalent resource to that loss, although by Phase 2a, the habitats within Phase 1 will have matured. The loss of amphibian habitats to Phase 2a construction of the Proposed Development represents a temporary adverse effect, of medium magnitude on this local value receptor. This equates to a **minor adverse effect**, which is **not significant**.

#### ***Phase 2b***

- 8.9.37 The Phase 2b construction of the Proposed Development will result in no further loss of waterbodies, however smaller areas of associated grassland, scrub, hedgerow and woodland habitats that are likely to be used by amphibians such as smooth newt, common frog and common toad will still be affected, including in the north in proximity to retained ponds. The Phase 2b construction works have the potential to kill or injure amphibians during clearance of their habitat. The good practice mitigation measures, including staged vegetation clearance and the appropriate timing of these works will reduce the risk of amphibians being killed or injured during the Phase 2b construction works, however this risk remains. This represents an adverse impact, on this local value receptor. The embedded mitigation reduces the likelihood of impacts to amphibians of this low magnitude, to a **negligible effect**, which is **not significant**
- 8.9.38 The embedded habitat creation measures within the Proposed Development will reduce the effect of the loss of habitats. However, it is recognised that time is required for the replacement habitats to establish to a level at which they provide an equivalent resource to that loss, although by Phase 2b, the habitats created within Phases 1 and 2a will have matured. The loss of amphibian habitats to Phase 2b construction of the Proposed Development represents a temporary adverse effect of low magnitude on this local value receptor. This equates to a **negligible effect**, which is **not significant**.

### **Terrestrial invertebrates**

#### ***Phase 1***

- 8.9.39 The Phase 1 works for the Proposed Development will result in the loss of a habitat mosaic which includes calcareous and neutral grasslands, arable margins, bare/disturbed ground, scrub, woodland and waterbodies. This mosaic of habitats supports a notable assemblage of invertebrates including the species of principal importance; a picture-winged fly, the set-aside downy-back



beetle and the dingy skipper butterfly. The habitat creation measures within the Proposed Development, including meadow grasslands, edges habitats, early successional habitats, hedgerows, and woodland, are included to reduce the impact of the loss of invertebrate habitats. However, it is recognised that time is required for the replacement habitat to establish, following appropriate management regimes, to provide an equivalent resource to that lost. The loss of invertebrate habitats to the Phase 1 works for the Proposed Development represents a temporary medium adverse effect at the county level, which equates to a **moderate adverse effect**, which is **significant**, decreasing to a **minor adverse** effect when habitats have established, within five years, which is **not significant**.

- 8.9.40 Work during this construction phase involving large earthworks and heavy machinery would inevitably result in the death of a range of ground dwelling invertebrates, particularly slower moving, flightless arthropods, which cannot avoid the area. This is unlikely to permanently affect the population dynamics of any community. Direct mortality caused by the construction of Phase 1 would constitute an impact of low magnitude at the county level, that equates to a **minor adverse** effect, which is **not significant**.

#### ***Phase 2a***

- 8.9.41 The Phase 2a construction of the Proposed Development will result in the further loss of a habitat mosaic which includes calcareous and neutral grasslands, bare/disturbed ground, scrub, hedgerows, woodland and waterbodies, this mosaic of habitats supports a notable assemblage of invertebrates as listed in Phase 1 effects above. The habitat creation measures within the Proposed Development, including meadow grasslands, edge habitats, early successional habitats, hedgerows, and woodland, will reduce the impact of the loss of invertebrate habitats. However, it is recognised that time is required for the replacement habitat to establish to a level at which they provide and equivalent resource to that lost, but that created for Phase 1 would now have matured. The loss of invertebrate habitats to the Phase 2a construction of the Proposed Development represents a temporary adverse impact of medium magnitude on this county value receptor, which equates to a **moderate adverse effect**, which is **significant**, decreasing to a **minor adverse** effect when habitats have established, within five years, which is **not significant**.
- 8.9.42 Risk of harm during construction, as per Phase 1.

#### ***Phase 2b***

- 8.9.43 The Phase 2b construction of the Proposed Development will result in the loss of smaller areas of a habitat mosaic which includes grasslands, bare/disturbed ground, scrub, and woodland, this mosaic of habitats may still support part of the notable assemblage of invertebrates as listed in Phase 1 effects above. The remaining habitat creation measures within the Proposed Development, including additional areas of calcareous grasslands, will reduce the impact of the loss of invertebrate habitats. However, it is recognised that time is required for the replacement habitat to establish to a level at which they provide and equivalent resource to that lost, but that created for Phase 1 and Phase 2a

would now have matured. The loss of invertebrate habitats to the Phase 2b construction of the Proposed Development represents a temporary adverse impact of low magnitude on this county value receptor. This represents a medium adverse effect at the county level, which equates to a **minor adverse effect**, which is **not significant**, decreasing to a **negligible adverse effect** when habitats have established which is expected to be within five years, which is **not significant**.

8.9.44 Risk of harm during construction, as per Phase 1.

## **Operation**

### ***Designated nature conservation sites***

#### **Wigmore Park CWS**

##### ***Phase 1***

8.9.45 The operation of phase 1 of the Proposed Development and creation of temporary surface car parks P5-7 within close proximity to the remaining area of Wigmore Park CWS, has the potential to locally impact on the quantity and direction of surface runoff, and increase lighting pressures. The embedded drainage strategy and lighting design, including directional lighting to limit light spill onto adjacent habitats, will reduce these effects to a temporary **Minor adverse effect** that is **not significant** until these remaining habitats are lost to Phase 2a.

##### ***Phase 2a***

8.9.46 The operation of phase 2a of the Proposed Development will not result in additional effects upon Wigmore Park CWS as it will no longer exist.

##### ***Phase 2b***

8.9.47 The operation of phase 2b of the Proposed Development will not result in additional effects upon Wigmore Park CWS as it will no longer exist.

#### **Winch Hill Wood CWS/LWS Ancient Woodland**

8.9.48 No significant operation effects are anticipated in addition to the air quality effects, therefore please refer to the summary of the assessment of effects provided on **Table 8.9** in **Section 8.14**. Details of Air Quality assessments associated with Phase 1 are however noted below.

##### ***Phase 1***

8.9.49 Winch Hill Wood CWS/LWS has been subject to an air quality assessment within **Chapter 7** of this PEIR, as it falls within 200m of the flight path (but not the ARN). The assessment used the critical load of 10kgN/ha/yr as the threshold as this is the lowest part of the critical load range for woodland. In terms of the impact of changes in air quality on the ancient woodland, the

contribution of the Proposed Development to change just exceeds 1%<sup>2</sup> (Ref. 8.49) of the relevant air quality objective and Critical Loads, however the maximum nitrogen dose is 0.4 kgN/ha/yr at the edge of the woodland. This dose falls at the 0.4 kgN/ha/yr guideline<sup>3</sup> (Ref. 8.50) for a minimum dose associated with a reduction in 'species richness', reducing to below this value immediately into the woodland, and is therefore considered to be **not significant**. This represents a permanent adverse impact, of low magnitude, on this county value receptor. This equates to a **minor adverse**, effect which is **not significant**

- 8.9.50 With regard to NOx itself, the Air Pollution Information System (APIS) identifies that negative effects of NOx/NO<sub>2</sub> in atmosphere (as distinct from its role in nitrogen deposition) are most likely to arise in the presence of equivalent concentrations of sulphur dioxide (SO<sub>2</sub>). Vehicle exhausts do not emit SO<sub>2</sub> and APIS indicates that background SO<sub>2</sub> concentrations at this site are very low (a maximum of 0.88 µgm<sup>-3</sup>) compared to critical levels for SO<sub>2</sub> of 10-20 µgm<sup>-3</sup>. Since the SO<sub>2</sub> concentrations are so low, no synergistic effect with NOx is expected. This applies to all phases of the Proposed Development.

### **Phase 2a**

- 8.9.51 The Air Quality assessment for Phase 2a determined that the contribution of the Proposed Development to change exceeds 1% of the relevant air quality objective and Critical Loads. Two transects through the woodland were assessed and the maximum nitrogen dose was found to be 0.35 kgN/ha/yr for one transect, which falls below the 0.4 kgN/ha/yr guideline for a minimum dose associated with a reduction in 'species richness', and is therefore considered to be not significant. The second transect was found to be 0.66 kgN/ha/yr at the woodland edge, and falling to 0.39 kgN/ha/yr at the end of the transect (200m), and is therefore considered to be significant as it is above 0.4 kgN/ha/yr. This represents a permanent adverse impact, of medium magnitude, on this county value receptor. This equates to a **moderate adverse**, effect which is **significant**.
- 8.9.52 However, it should be noted that, this is a precautionary assessment since it freezes the vehicle fleet and emission factors at 2030. It therefore takes no account of the shift from combustion engine vehicles to ultra-low emission vehicles that is likely to occur in the decade following the government's 2030 ban on the sale of new petrol and diesel cars and vans and thus probably overestimates fleet emissions for later years. This is relevant for all air quality assessments below for all sites in Phases 2a and 2b.

<sup>2</sup> '1% of critical load/ level are considered by Natural England's air quality specialists (and by industry, regulators and other statutory nature conservation bodies) to be suitably precautionary, as any emissions below this level are widely considered to be imperceptible... There can therefore be a high degree of confidence in its application to screen for risks of an effect'

<sup>3</sup> Guidance from Highways England (Design Manual for Roads and Bridges LA 105 is based on published nitrogen dose-response relationships for a range of habitats, and advises that even if the nitrogen dose exceeds 1% of the critical load, a conclusion of no significant adverse effect can still be drawn if the maximum nitrogen dose is less than 0.4 kgN/ha/yr. This is on the basis that Highways England considers this to be the minimum dose that has been identified to be associated with a reduction in 'species richness' of one species, irrespective of background deposition rate.

### ***Phase 2b***

- 8.9.53 The Air Quality assessment for Phase 2b determined that the contribution of the Proposed Development to change exceeds 1% of the relevant air quality objective and Critical Loads. Two transects through the woodland were assessed and the maximum nitrogen dose was 0.76 to 0.85 kgN/ha/yr for one transect, moving from the edge of the woodland to 200m, and 1.6 to 0.9 kgN/ha/yr for the second transect moving from the edge of the woodland and up to 200m. All of these values are above the 0.4 kgN/ha/yr guideline for a minimum dose associated with a reduction in 'species richness', and is therefore considered to be **significant**. This represents a permanent adverse impact, of medium magnitude, on this county value receptor. This equates to a **moderate adverse**, effect which is **significant**.

### **Luton Parkway Verge DWS**

#### ***Phase 1***

- 8.9.54 Phase 1 – there will be no operational effect on Luton Parkway Verges DWS.

#### ***Phase 2a***

- 8.9.55 The area of Luton Parkway Verges DWS that falls within the Applicants ownership will be subject to management measures to promote the diverse botany for which the site is designated. This will include measures such as mowing and removal of arisings, and scrub management to prevent encroachment and shading. In order to reduce trampling pressures and littering, upon the designating habitats of the DWS, post and rail fencing will be established to deter 'cut throughs' from the new car park, interpretation boards will be erected to explain the value of the DWS, and monitoring and management for litter removal will be enacted. These measures will be detailed within the Draft LBMP (**Appendix 8.2**, Volume 3 of this PEIR). The multi storey car park built immediately adjacent to the DWS could cause shading of habitats of the site which could impair the quality of the habitats in the long term. The shading, together with trampling and recreational littering pressures will be a permanent adverse impact, of low magnitude, on the function of the county value site, which equates to a **minor adverse effect** that is **not significant**.

#### ***Phase 2b***

- 8.9.56 Phase 2b – there will be no additional operational effect on Luton Parkway Verges DWS

### **Kidney and Bull Woods CWS/Ancient Woodland**

#### ***Phase 1***

- 8.9.57 Kidney and Bull Woods CWS/Ancient Woodland has been subject to an air quality assessment within **Chapter 7** Air Quality, as it falls within 200m of the ARN (but not the flight path). The assessment used the critical load of 10 kgN/ha/yr as the threshold as this is the lowest part of the critical load range for woodland. In terms of the impact of changes in air quality on the ancient

woodland, the contribution of the Proposed Development to change just exceeds 1% (Ref. 8.49) of the relevant air quality objective and Critical Loads. However as the maximum nitrogen dose is 0.27 kgN/ha/yr which falls below the 0.4 kgN/ha/yr guideline (Ref. 8.50) for a minimum dose associated with a reduction in 'species richness'. This represents a permanent adverse impact, of low magnitude, on this county value receptor. This equates to a **minor adverse**, effect which is **not significant**.

- 8.9.58 With regard to NO<sub>x</sub> itself, APIS identifies that negative effects of NO<sub>x</sub>/NO<sub>2</sub> in atmosphere (as distinct from its role in nitrogen deposition) are most likely to arise in the presence of equivalent concentrations of sulphur dioxide (SO<sub>2</sub>). Vehicle exhausts do not emit SO<sub>2</sub> and APIS indicates that background SO<sub>2</sub> concentrations at this site are very low (a maximum of 1.34 µgm<sup>-3</sup>) compared to critical levels for SO<sub>2</sub> of 10-20 µgm<sup>-3</sup>. Since the SO<sub>2</sub> concentrations are so low no synergistic effect with NO<sub>x</sub> is expected. This applies to all phases of the Proposed Development.

#### ***Phase 2a***

- 8.9.59 The Air Quality assessment for Phase 2a determined that the contribution of the Proposed Development to change exceeds 1% of the relevant air quality objective and Critical Loads, however the maximum nitrogen dose is 0.45 and 0.38 kgN/ha/yr at the edge of the woodland for each of the two transects (composite site), which for one part of the site falls just above the 0.4 kgN/ha/yr guideline for a minimum dose associated with a reduction in 'species richness'. However, this falls below 0.4 kgN/ha/yr (0.24 and 0.25) before it reaches 10m into the woodland at each site and is therefore considered to be **not significant**. Transect air quality data through the woods show this to decrease to 0.06 kgN/ha/yr once 200m along the transect. This represents a permanent adverse impact, of low magnitude, on this county value receptor. This equates to a **minor adverse**, effect which is **not significant**.

#### ***Phase 2b***

- 8.9.60 The Air Quality assessment for Phase 2b determined that the contribution of the Proposed Development to change exceeds 1% of the relevant air quality objective and Critical Loads. The maximum nitrogen dose is 0.55 and 0.59 kgN/ha/yr at the edge of the woodland for each transect (composite site), which falls above the 0.4 kgN/ha/yr guideline for a minimum dose associated with a reduction in 'species richness'. However, this falls below 0.4 kgN/ha/yr (0.36 and 0.31) before it reaches 10m into the woodland, and drops to 0.09 and 0.06 kgN/ha/yr by 200m in, and is therefore considered to be **not significant**. This represents a permanent adverse impact, of low magnitude, on this county value receptor. This equates to a **minor adverse**, effect which is **not significant**.

### ***Habitats***

#### **Ancient Woodland**

- 8.9.61 There are a number of ancient woodland sites affected by the operation of the Proposed Development. Winch Hill Wood, which is located within the Main Application Site and Kidney and Bull Woods which is located within 200m of the

ARN. Ancient woodland forms the basis for the designation of Winch Hill Wood CWS/LWS and Kidney and Bull Woods CWS, and as such the impacts upon these ancient woodlands as a result of each phase of the operation works for the Proposed Development are reported within the designated nature conservation sites within this **Section 8.9** and **Section 8.14**.

- 8.9.62 Chalk Wood, George Wood, Furzen Wood, Slaughters Wood, and Burnwell Wood are all also wildlife sites assessed for air quality impacts but will not be significantly affected, and are therefore included within the preliminary assessment summary **Table 8.18**.
- 8.9.63 No other Ancient Woodland sites located with 200m of the ARN and/or flight path assessed within **Chapter 7** Air Quality are included in this chapter as the contribution of the Proposed Development to change in air quality were found to be less than 1% (Ref. 8.49) of the relevant air quality objective and Critical Loads for this habitat.

## ***Species***

### **Orchids**

#### ***Phase 1***

- 8.9.64 The operation of the replacement open space will introduce additional recreational pressures into the retained area that supports orchid populations. Such pressures may include trampling and a change in soil pH due to nitrification through dog urine. The orchids are located within an area that, is currently, a set-aside on the southern edge of an arable field to the south of Wandon End. An existing public right of way runs through this area, however the footfall will increase once the replacement open space is established. The replacement open space has been designed to include defined footpaths to channel the public away from sensitive retained habitats, and this will reduce the impact on the orchid population, however it is anticipated that an impact will remain. The degradation of the orchid population retained within the replacement open space as a result of recreational pressures represents a permanent adverse impact, of low magnitude, on this district value receptor. This equates to a **minor adverse effect** which is **not significant**.

#### ***Phase 2a and Phase 2b***

- 8.9.65 It is not anticipated that the operation of Phase 2a or 2b of the Proposed development will result in additional impacts upon the local orchid population.

### **Badger**

#### ***Phase 1***

- 8.9.66 The Phase 1 works for the Proposed Development include the provision of temporary car parks in the former location of Wigmore Park CWS, as well as the provision of the replacement open space. The operation of the car park will introduce additional noise and lighting disturbance to the retained adjacent habitats at Wigmore Park which are utilised as a foraging and sett building resource by badgers. The replacement open space will introduce additional



people and dogs within proximity to retained main badger setts and badger foraging habitats. Given the existing high levels of background noise, lighting and visual disturbance associated with the operational airport, it is anticipated that the local badger social groups will have a high tolerance for such disturbance. The replacement open space has been designed with defined footpaths to try to channel people away from retained habitats and sensitive ecological features such as the main badger sett. These measures will help to reduce any disturbance impacts on badgers utilising the adjacent habitats. The disturbance to badger foraging habitats and setts, as a result of the operation of the Phase 1 Works of the Proposed Development, represents a permanent adverse impact, of very low magnitude, on this local level receptor. This equates to a **negligible effect**, which is **not significant**.

### ***Phase 2a***

- 8.9.67 The Phase 2a works for the Proposed Development include the provision of car parks, roads, water treatment plant, and fuel storage facility, as well as the provision of further areas of habitat creation and landscape restoration. The fuel line will be underground and therefore would incur no operational effects. The operation of the car parks, road and airport facilities will introduce additional noise and lighting disturbance to the retained surrounding habitats which are utilised as a foraging and sett building resource by badger. At this stage, the replacement open space and habitat creation areas for Phase 1 would have matured and be available for use by badger. Given the existing high levels of background noise, lighting and visual disturbance associated with the operational airport, it is anticipated that the local badger social groups will have a high tolerance for such disturbance. The disturbance to badger foraging habitats and setts, as a result of the operation of the Phase 2a Works of the Proposed Development, represents a permanent adverse impact, of very low magnitude, on this local level receptor. This equates to a **negligible effect**, which is **not significant**.

### ***Phase 2b***

- 8.9.68 It is not anticipated that the operation of Phase 2b of the Proposed Development will result in additional impacts upon the local badger social groups.

## **Bats**

### ***Phase 1***

- 8.9.69 The Phase 1 works include the provision of temporary car parks adjacent to the retained section of Wigmore Park, along with increased take-off/landing activity. The light spill from these temporary carparks has the potential to result in displacement and loss of foraging habitats. Embedded mitigation includes lighting design, creation of a bund south west of the retained part of Wigmore Park CWS and habitat creation at the margin of the Proposed Development will act as a screen once matured. These works therefore have the potential to represent a temporary adverse impact until habitats mature, of low magnitude on this district value receptor. However, with the embedded mitigation, including



measures detailed within the Draft CoCP, this equates to a **minor adverse effect** in the short term, reducing to a **negligible** level, which is **not significant**.

### ***Phase 2a***

- 8.9.70 Phase 2a of the Proposed Development includes the extension of the airport platform and associated infrastructure within close proximity to retained habitats such as woodlands and retained commuting routes. This in combination with the increased take-off/landing activity will result in an increase in noise and lighting levels. This has the potential to impact upon bats that utilise these habitats as a commuting, foraging or roosting resource, by introducing additional disturbance through noise and vibration. Where the infrastructure is used in the hours of darkness there is the potential for disturbance to commuting and foraging bats; where used in the day time there is the potential to disturb the roosting sites of common bat species in adjacent retained habitats. Embedded mitigation includes sensitive lighting design to reduce light spill, creation of a bund south west of the retained part of Wigmore Park CWS, and habitat creation at the margin of the Proposed Development to act as a screen. Phase 2a therefore has the potential to represent a temporary adverse impact, of medium magnitude on this district value receptor due to close proximity to retained habitats. This equates to a **moderate adverse effect** in the short term, which is **significant**, reducing to a **minor adverse** level in the long term as habitats mature, which is **not significant**.

### ***Phase 2b***

- 8.9.71 The increased take-off/landing activity and the operation of the airport infrastructure within proximity to retained habitats will result in an increase in noise and light levels. This has the potential to impact upon bats that utilise these habitats as a commuting, foraging or roost resource, by introducing additional disturbance through noise and vibration. Where the infrastructure is used in the hours of darkness there is the potential for disturbance to commuting and foraging bats; where used in the daytime, there is the potential to disturb the roosting sites of common bat species in adjacent retained habitats. Embedded mitigation includes sensitive lighting design to reduce light spill, creation of a bund south west of the retained part of Wigmore Park CWS, and habitat creation at the margin of the Proposed Development to act as a screen, along with maturing of the Phase 1 and 2b habitat creation areas further from the airport. This has the potential to represent a temporary adverse impact, of low magnitude on this district value receptor. This equates to a **minor adverse effect**, reducing to a **negligible** level as screening habitats mature, which is **not significant**.

## **Sensitivity Analysis**

- 8.9.72 There are certain known scenarios or risks that may occur that could influence the conclusions of the core assessment. These scenarios and the general approach to considering them in this assessment are described in **Section 5.4** of **Chapter 5** Approach to the Assessment.

8.9.73 **Table 8.14** provides a qualitative assessment of any likely changes to the conclusions of the assessment reported in this chapter, in the event that that scenario or risk is realised.

Table 8.14: Qualitative Sensitivity Analysis

<b>Sensitivity scenario</b>	<b>Potential impact and change</b>	<b>Likely effect</b>
1-19 mppa Application	An increase in the assumed baseline capacity from 18 to 19 mppa is considered not to change the assessed impacts on biodiversity assuming no change in the footprint and layout of the Proposed Development occurs.	No change
2- Faster growth	A rise in passenger demand and higher passenger throughput quicker than predicted is considered not to change the assessed impacts on biodiversity assuming no change in the footprint and layout of the Proposed Development occurs, with the exception of air quality as an assumed increase in traffic and predicted increase in air transport movements leads to higher air quality effects on one of the biodiversity receptors, please refer to <b>Chapter 7</b> of this PEIR.	The air quality assessment for Phase 1 faster growth, changes from a <b>minor adverse</b> effect before mitigation on Winch Hill Wood CWS/LWS/AW which is <b>not significant</b> , and brings in an earlier <b>moderate adverse</b> effect for Phase 1 faster growth, which is <b>significant</b> . The <b>significant</b> effect would otherwise not occur until Phase 2a, however this is to a lesser extent than Phase 2a. Following additional mitigation to improve the quality of the woodland at Winch Hill as part of the Draft LBMP ( <b>Appendix 8.2</b> of this PEIR), however this will take time to provide improvements and will therefore remain a <b>moderate adverse</b> effect in the short term which remains <b>significant</b> , before it reduces to a <b>minor adverse</b> in the medium to long term, which is <b>not significant</b> .
3 - Slower growth	A lower rate of forecast passenger demand and passenger throughput being achieved later than predicted is considered not to change the assessed impacts on biodiversity assuming no change in the footprint	No change

Sensitivity scenario	Potential impact and change	Likely effect
	and layout of the Proposed Development occurs.	

## 8.10 Additional mitigation

8.10.1 This section describes the additional mitigation measures identified as a result of the assessment process, that are proposed in addition to those already considered to be in place as described in **Section 8.8** Embedded and good practice mitigation measures. These are proposed to reduce or mitigate those effects on biodiversity as a result of the construction and operation of the Proposed Development.

### Design

8.10.2 Woodland habitat creation (4.7ha) and improvements to the ecological connectivity of the woodlands in the local area through strengthening of connected hedgerows and woodland belts, combined with visual screening benefits. A long-term management strategy will be in place to maintain and enhance the site during operation of the Proposed Development, for details please refer to Draft LBMP (**Appendix 8.2**, Volume 3 of this PEIR).

8.10.3 In addition to the habitat creation measures within the replacement open space, a large habitat creation area (over 43ha) will be created to the east, as indicated on Landscape Mitigation Plans **Figures 14.11 to 14.13** in Volume 4 to the PEIR. This will include areas of low intensity grazed calcareous and neutral grassland as well as neutral meadow grassland. These grasslands would be managed, through measures such as a reduction in fertilizer and herbicide inputs, to encourage the establishment of the notable arable plant species lost to construction of the Proposed Development. It is anticipated that such measures will reduce the effect of the loss of arable field margins, and their associated notable arable plants, as a result of the construction of the Proposed Development to a level that is not significant.

8.10.4 Areas of these habitat creation fields would be managed appropriately to provide replacement resource for local over-wintering farmland bird populations through variation. These areas will comprise strips of rough grassland to provide suitable cover and foraging for these species. The management will be aimed at small passerine bird species such as finches and buntings and will focus on the outer areas of the habitat creation fields at greatest distance from the runway and flight lines to minimise the risk of increasing bird strike.

### Construction

8.10.5 Tree clearance works would be under a watching brief and/or monitored by an Ecological Clerk of Works or bat licence appointed person where appropriate. Any trees which are to be removed that have been identified as having low, moderate or high bat roost potential (but are not confirmed roosts) within the Proposed Development will be soft felled. Those confirmed as bat roosts will also be soft felled but under a bat licence.

- 8.10.6 In addition to the habitat creation measures within the replacement open space, measures will be adopted to mitigate the loss of invertebrate habitats. This includes:
- a. translocation of bird's-foot trefoil (*Lotus corniculatus*) turfs from Wigmore Park to the habitat creation areas;
  - b. offsite hedgerow restoration within the wider landscape around the Main Application Site to provide green corridors for invertebrates;
  - c. retention of deadwood from trees felled for the Proposed Development and placement of this within hedgerows, and other retained habitats (where practicable this will be erected as standing dead wood to replicate veteran trees); and
  - d. agricultural management to a low intensity grazing regime and limited herbicide, insecticide and fertilizer use, to encourage species diverse margins.
- 8.10.7 Due to the risk of attracting large birds and thus increasing the bird strike risk, it is not possible to include large replacement waterbodies for amphibians within the Proposed Development. A wildlife pond(s) is provided within the habitat creation area to the east of the replacement open space, this pond will be managed to provide aquatic habitats for amphibians and reptiles such as grass snake while adhering to management to minimise the risk of bird strike. A translocation exercise will be undertaken to move animals from the ponds lost to the construction of the Proposed Development to the newly created pond.
- 8.10.8 Artificial bird nesting opportunities will be provided on buildings and retained trees within the Proposed Development appropriate for the species recorded within the Main Application Site; and, on arable land outside of the Main Application Site, which could include specific measures for tree sparrow (*Passer montanus*) (an LBAP species). Artificial bird nesting provision will comply with bird strike restrictions.
- 8.10.9 Where bat roosts are lost or directly disturbed a Natural England licence is required to permit the loss of these features. Such a licence will require the provision of artificial roost features within retained habitats within proximity to the lost roost. Such artificial roosts will need to be provided prior to the loss/disturbance of any bat roost.
- 8.10.10 No excavation works involving heavy machinery will be undertaken within 30m of an active badger sett entrance hole without a Natural England licence. Where badger setts are located within the construction zone these must be closed by a suitably qualified ecologist under licence from Natural England.
- 8.10.11 Badger setts lost to construction of the Proposed Development will be closed prior to construction under a Natural England badger development licence. Any works carried out to exclude badgers from and close a badger sett will be carried out between July and November inclusive in accordance with current best practice. A replacement artificial sett will be required should any main sett be lost to the Proposed Development, although detailed design stage will seek to retain it if possible. Artificial setts will be located in suitable areas of habitat

away from sources of disturbance such as dog walkers. Artificial setts will also ideally be located within 100m of the sett they are replacing and within habitats currently used by the badger social group. The exact location of artificial setts will be agreed with Natural England as part of the badger development licence application.

- 8.10.12 An orchid translocation exercise will be undertaken to relocate orchids and their associated soils to a pre-prepared receptor site within the replacement open space. Orchids have an intricate relationship with their soil and the fungi they support. The receptor site will, therefore, be carefully prepared to ensure the soil, geological, aspect and hydrological conditions replicate those lost within Wigmore Park. The newly created habitats, particularly any areas of bare chalk, will also provide further opportunities for orchid growth and colonisation.
- 8.10.13 In addition to the habitat creation measures within the Main Application Site as described above, the wider hedgerow network within the immediate landscape around the Proposed Development will be strengthened through appropriate management of hedgerows, planting up gaps in existing hedgerows and planting new hedgerows where appropriate (7.5km). This will be provided for ecological corridors between retained and created habitats within the Proposed Development with those foraging and shelter sites within the wider landscape and compensate for the loss of habitats utilised by species such as badgers, bats and birds within the Main Application Site.
- 8.10.14 Opportunities will be sought to provide barn owl nesting boxes within the wider landscape at a safe distance from the airport, to avoid increasing the bird strike risk, to provide alternative barn owl nesting opportunities to those lost to construction of the Proposed Development.

## Operation

- 8.10.15 The area of Luton Parkway Verges DWS that falls within the LLAL ownership will be subject to management measures to promote the diverse botany for which the site is designated. This will include measures such as mowing and removal of arisings, and scrub management to prevent encroachment and shading. In order to reduce pressures, such as trampling by pedestrians and littering, upon the designating habitats of the DWS, post and rail fencing will be established to deter 'cut throughs' from the new car park, interpretation boards will be erected to explain the value of the DWS, monitoring and management for litter removal will be enacted. These measures are included within the Draft LBMP (**Appendix 8.2**, Volume 3 of this PEIR).
- 8.10.16 The value of veteran trees is as a result of their age and the weather/disease/management processes that have occurred over the life of the tree. As such, the value of veteran trees cannot be replicated. Opportunities will be sought to implement sensitive management of retained veteran trees within the wider landscape, this may include measures such as thinning of young trees around veteran trees to reduce stresses upon the tree. Opportunities will also be explored to undertake 'veteranisation' of mature trees within the Applicant's ownership, this involves wounding the tree to encourage rot features to form and replicate the beneficial features of naturally occurring veteran trees.

## 8.11 Residual effects

8.11.1 In addition to embedded design and good practice mitigation measures, further habitat creation and management measures have been proposed to mitigate the loss of habitats, and the species which they support, due to construction of the Proposed Development as detailed above. It is, however, recognised that there is a lag time between the loss of habitats to construction and the establishment of replacement habitats to a level where they provide equivalent biodiversity value to those lost. Residual effects are detailed in the assessment summary **Table 8.18**.

### Construction

#### *Designated nature conservation sites*

#### Wigmore Park CWS

##### *Phase 1*

8.11.2 The Proposed Development includes additional land for habitat creation where required as part of the net gain strategy as shown in **Figures 14.11 to 14.13** in Volume 4 of this PEIR, to those habitat creation measures included in the design. It is, however, recognised that time is required for these measures to establish to a level at which they provide an equivalent biodiversity value to that lost to the Proposed Development at Wigmore Park CWS. Therefore, the proposed habitat does not initially fully mitigate the loss of biodiversity at the CWS. There will be a temporary **minor adverse residual effect** while the additional habitats creation areas establish, rising to a residual **negligible effect** following maturation after 15-30 years due to the increased area, which is **not significant**.

##### *Phase 2a*

8.11.3 No additional mitigation has been proposed with respect to construction effects on Wigmore Park CWS. As such the effects would be as reported in **Section 8.9**.

##### *Phase 2b*

8.11.4 Wigmore Park CWS is almost entirely lost to previous construction Phases of the Proposed Development, therefore the Phase 2b construction works for the Proposed Development cannot result in additional impacts upon Wigmore Park CWS.

#### Winch Hill Wood CWS/LWS Ancient Woodland

##### *Phase 1*

8.11.5 No significant residual construction effects are anticipated in Phase 1, therefore please refer to the summary of the assessment of effects provided in **Table 8.18** in **Section 8.14**.



**Phase 2a**

- 8.11.6 The Proposed Development includes additional land for habitat creation where required as part of the net gain strategy as shown in **Figures 14.11 to 14.13** in Volume 4 of this PEIR, to those habitat creation measures included in the design. This includes linking of habitats (e.g. planting new/ enhancing existing hedgerows) to improve connectivity within the wider landscape. This woodland will also be managed to improve its condition, as described in the Draft LBMP (**Appendix 8.2**, Volume 3 of this PEIR). These measures will reduce the impact of the loss of connecting ecological corridors; however, given the time required for habitats to establish to a level at which they provide an equivalent biodiversity resource to that lost, a temporary adverse impact, of low magnitude, on the structure and function of the county value site. This equates to a **minor adverse effect** in the short term, which is **not significant**, leading to a residual **negligible effect** in the long term which is **not significant**.

**Phase 2b**

- 8.11.7 Effects will be as provided in **Table 8.18** in **Section 8.14**.

**Dairyborn Scarp DWS****Phase 1**

- 8.11.8 No significant residual construction effects are anticipated in Phase 1, therefore please refer to the summary of the assessment of effects provided on **Table 8.18** in **Section 8.14**.

**Phase 2a**

- 8.11.9 The Proposed Development includes additional land for habitat creation where required as part of the net gain strategy as shown in **Figures 14.11 to 14.13** in Volume 4 of this PEIR, to those habitat creation measures included in the design. This site will also be managed to improve its condition, as per the LBMP (**Appendix 8.2**, Volume 3 of this PEIR). These measures will reduce the impact of the loss of connecting ecological corridors; however, given the time required for habitats to establish to a level at which they provide an equivalent biodiversity resource to that lost, a temporary adverse impact, of low magnitude, on the structure and function of the county value site. This equates to a **minor adverse effect** in the short term, which is **not significant**, leading to a residual **negligible effect** in the long term which is **not significant**.

**Phase 2b**

- 8.11.10 No significant residual construction effects are anticipated in Phase 2b, therefore please refer to the summary of the assessment of effects provided on **Table 8.18** in **Section 8.14**.



## Habitats

## Species

## Orchids

### *Phase 1*

- 8.11.11 An orchid translocation exercise together with additional neutral and calcareous grassland creation are proposed, as described in **section 8.10**, to mitigate the partial loss of the orchid assemblage at Wigmore Park to the Phase 1 works for the Proposed Development. It is recognised that there is a lag time between the loss of the original orchid habitats and establishment of replacement habitats to a level where they provide an equivalent biodiversity value to that lost. On the successful completion of the orchid translocation exercise, a temporary adverse impact, of low magnitude, on this district value receptor remains. This equates to a residual **minor adverse effect**, which is **not significant**, decreasing to a residual **negligible effect** once the calcareous and neutral grasslands have established within 10 years of suitable management, which is **not significant**.

### *Phase 2a*

- 8.11.12 As per Phase 1 for the loss of the remaining assemblage of orchids within Wigmore Park CWS to Phase 2a construction.

### *Phase 2b*

- 8.11.13 The Phase 2b construction of the Proposed Development is not anticipated to result in residual effects upon orchids.

## Badger

### *Phase 1*

- 8.11.14 The Phase 1 works for the Proposed Development will result in the loss of three outlier setts and associated areas of habitat. In addition, landscape and habitat creation works will affect/disturb four main setts and their associated outlier/annexe/subsidiary setts and partial territories, but it is assumed they can be retained. Following the closure of the outlier badger setts, in accordance with Natural England approved method statements, and following the establishment of habitat creation measures, as described in **Section 8.10**, the loss of the outlier setts and associated habitats to the Phase 1 works for the Proposed Development will be reduced to a temporary adverse impact, of low magnitude, on this local value receptor. This equates to a **minor adverse** residual effect while replacement habitats establish, rising to residual **negligible** in the long term, which is **not significant**.

### *Phase 2a*

- 8.11.15 The Phase 2a construction for the Proposed Development will result in the potential loss or disturbance of a main badger sett and associated habitats to earthworks and creation of the fuel storage facility and water treatment plant, and disturbance to one other main badger sett and loss of three subsidiaries,

and loss/disturbance to multiple outlier badger setts for the fuel pipeline, along with creation of the landscape restoration and habitat creation areas. Following the closure of the main badger sett, if needed, in accordance with Natural England approved method statements, and once the badger social group has taken up residence within the artificial sett and following establishment of habitat creation measures, as described in **Section 8.10**, the potential loss of a main badger sett and associated foraging habitats, plus disturbance to another main and loss/disturbance to several outlier setts to the Phase 2a construction of the Proposed Development will be reduced to a temporary adverse impact, of low magnitude, on this local value receptor. This equates to a residual **minor adverse effect**, which is **not significant**, decreasing to a residual **negligible effect** once the grassland, scrub and hedgerow habitats have established within 10-15 years, which is **not significant**.

### ***Phase 2b***

- 8.11.16 The phase 2b construction will result in disturbance of badger setts during works and habitat creation, landscape restoration. A temporary adverse impact, of low magnitude, will occur on these local value populations resulting in a **negligible effect** in the long term, which is **not significant**. As by Phase 2b, the habitat creation for earlier phases will have matured, which will lead to a residual **minor beneficial effect** in the long term, which is **not significant**

## **Bats**

### ***Phase 1***

- 8.11.17 Additional habitat creation measures, as described within **Section 8.10**, are proposed to mitigate the loss of foraging habitats and severance of a commuting route used by the local bat assemblage to the Phase 1 construction of the Proposed Development. It is recognised that there is a lag time between the loss of habitat to construction and the establishment of replacement habitats to a level at which they provide connectivity to existing and newly created foraging habitats within the wider landscape. A temporary adverse impact, of medium magnitude, remains on this district value receptor. This equates to a residual **minor adverse effect**, which is **not significant**, decreasing to a residual **negligible effect** once habitats have established in 10-15 years, which is **not significant**.
- 8.11.18 The Phase 1 construction of the Proposed Development will result in the disturbance of three common pipistrelle bat roosts. Following the implementation of a Natural England approved method statement, and provision of suitably located artificial bat roost provision, as described in **Section 8.10**, the disturbance of the roosts during the Phase 1 construction of the Proposed Development will be reduced to a permanent adverse impact, of very low magnitude, on this local value receptor. This equates to a residual **negligible effect**, which is **not significant**.

### ***Phase 2a***

- 8.11.19 Additional habitat creation measures, as described within **Section 8.10** are proposed to mitigate the loss of foraging habitats and severance of well used

commuting routes used by the local bat assemblage to the Phase 2a construction of the Proposed Development. It is recognised that there is a lag time between the loss of habitat to construction and the establishment of replacement habitats to a level at which they provide connectivity to existing and newly created foraging habitats within the wider landscape. A temporary adverse impact, of medium magnitude, remains on this district value receptor. This equates to a residual **minor adverse effect**, which is **not significant**, decreasing to a residual **negligible effect** once habitats have established in 10-15 years, which is **not significant**.

- 8.11.20 The Phase 2a construction of the Proposed Development will result in the loss of one and disturbance of two common pipistrelle bat roosts. Following the implementation of a Natural England approved method statement, and provision of suitably located artificial bat roost provision, as described in **Section 8.10**, the effect on the roosts from the Phase 2a construction of the Proposed Development will be reduced to a permanent adverse impact, of very low magnitude, on this local value receptor. This equates to a residual **negligible** residual effect, which is **not significant**.

### ***Phase 2b***

- 8.11.21 Additional habitat creation measures, as described within **Section 8.10** are proposed to mitigate the loss of foraging habitats and severance of well used commuting routes used by the local bat assemblage to the Phase 2b construction of the Proposed Development. It is recognised that there is a lag time between the loss of habitat to construction and the establishment of replacement habitats to a level at which they provide connectivity to existing and newly created foraging habitats within the wider landscape. A temporary adverse impact, of medium magnitude, remains on this district value receptor. This equates to a residual **minor adverse effect**, which is **not significant**, decreasing to a negligible residual effect once habitats have established in 10-15 years, which is **not significant**.
- 8.11.22 The Phase 2b construction of the Proposed Development will result in the loss of two common pipistrelle bat roosts. Following the implementation of a Natural England approved method statement, and provision of suitably located artificial bat roost provision, as described in **Section 8.10**, the effect on the roosts from the Phase 2b construction of the Proposed Development will be reduced to a permanent adverse impact, of very low magnitude, on this local value receptor. This equates to a residual **negligible** residual effect, which is **not significant**.

## **Amphibians**

### ***Phase 1***

- 8.11.23 Pond (s) habitat creation and an amphibian translocation exercise are proposed, as described within **Section 8.10**, to mitigate the loss of pond and terrestrial habitats and associated risk of killing or injuring amphibians during the Phase 1 works for the Proposed Development. The pond(s) will be created at least one year in advance of the existing pond being lost to ensure it has time to become established and for the water chemistry to settle. However, it is recognised that there is a lag time between the loss of the original pond and the

establishment of the replacement pond to a level where they provide an equivalent biodiversity resource. It is also recognised that there is a lag time between the loss of terrestrial habitat to construction and the establishment of replacements within the habitat creation areas, to a level at which they provide connectivity to existing and newly created foraging habitats within the wider landscape. Translocation of amphibians will be undertaken to suitable replacement habitat during drain-down of ponds within the Main Application Site. A temporary adverse impact, of medium magnitude, remains on this district value receptor. This equates to a residual **minor adverse effect**, which is **not significant**, decreasing to a **negligible** residual effect once habitats have established in 5-10 year, which is **not significant**.

### ***Phase 2a and 2b***

- 8.11.24 No additional ponds will be created as further mitigation, and although additional areas of terrestrial habitat will be created, there will remain a **negligible** adverse effect, which is **not significant**.

## **Operation**

### ***Designated nature conservation sites***

#### **Winch Hill Wood CWS/LWS Ancient Woodland**

##### ***Phase 1***

- 8.11.25 Management of Winch Hill Wood CWS/LWS/AW is included within the Draft LBMP (**Appendix 8.2**, Volume 3 of this PEIR). This has the aim of improving the condition of the site over a 50 year period from Phase 1. The woodland will also be subject to an existing level of air quality effects from the current use of the airport. The air quality impacts of the Proposed Development will be a **minor adverse** effect, which is **not significant**. The management practices implemented will commence at Phase 1 and will lead to improvement of the woodland overall, but as this will take time to achieve, the air quality impact will remain as a **minor adverse** effect, which is **not significant**.

##### ***Phase 2a***

- 8.11.26 Management of Winch Hill Wood CWS/LWS/AW is included within the Draft LBMP (**Appendix 8.2**, Volume 3 of this PEIR). This has the aim of improving the condition of the site over a 50 year period from Phase 1. The woodland will also be subject to an existing level of air quality effects from current use of the airport. The additional and long term management of the woodland will mean that there will be a temporary **moderate adverse** effect as a result of air quality in the short term, falling to a **minor adverse** impact in the long term, which is **not significant** once the management practices implemented shows improvement of the woodland overall. These management practices will commence at Phase 1 and so would already be showing benefit by Phase 2a.

##### ***Phase 2b***

- 8.11.27 Management of Winch Hill Wood is included within the Draft LBMP (**Appendix 8.2**, Volume 3 of this PEIR) with the aim to improve the condition of the site over

a 50 year period from Phase 1. The woodland will also be subject to an existing level of air quality effects from current use of the airport. The additional and long term management of the woodland will mean that there will be a temporary **moderate adverse** effect as a result of air quality in the short term, falling to a **minor adverse** impact in the long term, which is **not significant** once the management practices implemented shows improvement of the woodland overall.. These management practices will commence at Phase 1 and so would already be showing benefit by Phase 2b.

## **Luton Parkway Verges DWS**

### ***Phase 1***

8.11.28 No operation effects on Luton Parkway Verges DWS.

### ***Phase 2a***

8.11.29 In order to reduce trampling pressures and littering, upon the designating habitats of the DWS, post and rail fencing will be established to deter 'cut throughs' from the new car park. Interpretation boards will be erected to explain the value of the DWS, and monitoring and management for litter removal enacted. These measures are detailed within the Draft LBMP (**Appendix 8.2**, Volume 3 of this PEIR). Following implementation of these measures the operation of Phase 2a there will remain a **negligible** residual effect, which is **not significant** on all but the shading effects. No mitigation can be provided for the potential shading effect which remains a residual **minor adverse effect**, which is **not significant**.

### ***Phase 2b***

8.11.30 Effects will be as per Phase 2a.

## **Kidney and Bull Woods CWS / Ancient Woodland**

8.11.31 No additional mitigation has been proposed/is practicable with respect to operation effects on Kidney and Bull Woods CWS and ancient woodland. As such the effects would be as reported in **Section 8.9**.

### ***Habitats***

8.11.32 No additional mitigation has been proposed with respect to operational effects on habitats. As such the effects would be as reported in **Section 8.9**.

### ***Species***

#### **Orchids**

### ***Phase 1***

8.11.33 An orchid translocation exercise and additional calcareous grassland creation are proposed, as described in **Section 8.10**, to mitigate the loss of orchid habitats. The translocation exercise will utilise two receptors sites, one within the replacement open space, where the orchids will be accessible by members of the public and therefore subject to a degree of recreational pressure, and

another location within the wider habitat creation area away from areas of anticipated high footfall. Following the successful establishment of translocated orchids to the two receptor areas, a permanent adverse impact, of very low magnitude, on this district value receptor remains. This equates to a residual **negligible effect**, which is **not significant**.

### ***Phase 2a and 2b***

- 8.11.34 It is not anticipated that the operation of Phase 2a and 2b of the Proposed development will result in additional impacts upon the local orchid population.

## **Bats**

### ***All Phases***

- 8.11.35 Additional habitat creation measures, such as strengthening of hedgerow and woodland ecological corridors in the wider landscape, are proposed as detailed within **Section 8.10**. These measures will provide connectivity to alternative habitat resources within the wider landscape for bats, leading them away from the Proposed Development. It is recognised that there is a lag time between the operational impact of Phase 1 of the Proposed Development upon bat habitats and the establishment of habitat creation measures, therefore a temporary adverse impact, on this district value receptor remains. This equates to a residual **negligible residual** effect once habitats have established in 5-10 years, which is **not significant**.

## **Badger**

### ***All Phases***

- 8.11.36 The replacement open space has been designed with defined footpaths to try to channel people away from retained habitats. These measures will help to reduce any disturbance impacts on badgers utilising the adjacent habitats. The disturbance to badger foraging habitats and setts, as a result of the operation of all phases of the Proposed Development, represents a permanent adverse impact, of very low magnitude, on this low value receptor remains. This equates to a residual **negligible effect**, which is **not significant**.

## **Bird strike risk**

### ***All Phases***

- 8.11.37 The creation of suitable nesting and foraging habitats further from the Proposed Development may result in these areas being preferentially used by species such as red kite and barn owl and others which may pose a bird strike risk, with known nesting sites immediately south and east of the Proposed Development.
- 8.11.38 Once habitat creation areas further from the Proposed Development have matured, it may encourage their use instead of those habitat which were closer to the existing airport, thereby leaving a potential residual **minor beneficial effect**, which is **not significant**.

## Schedule 1 birds – Barn owl and Red kite

### *All Phases*

- 8.11.39 Offsite artificial roost provision will be included at a suitable distance from the airport for both species, in addition to the embedded mitigation.
- 8.11.40 Additional off-site creation of grassland, hedgerows and woodland will provide alternative foraging and nesting opportunities for these species away from the Proposed Development which will encourage them to remain at a distance, where disturbance and risk of bird strike will be reduced. There will remain a temporary **minor adverse** residual effect while replacement habitats establish, reducing to **negligible** in the long term, which is **not significant**.



## 8.12 In-combination climate change effects

- 8.12.1 This section provides a preliminary assessment of potential changes to the findings of the biodiversity assessment, taking into account the predicted future conditions as a result of climate change, known as In-combination Climate Change Impacts (ICCI).
- 8.12.2 This assessment has been undertaken using the methodology and climate change predictions described in **Chapter 9** of this PEIR. The results are provided in **Table 8.15**.

Table 8.15: Biodiversity in-combination climate change impacts

Climate hazard	Likely ICCI	Consequence of ICCIs considering embedded environmental measures/good practice	Significance of ICCI effects
Increase in mean annual air temperature	Degradation of ecosystem services and reduced food availability.	The proposed habitat creation/enhancement will include plant food sources, as well as habitats suitable to support those species present on site and will be selected based on resilience to future temperature changes. This will avoid any significant changes to the food chain and the interactions that shape the flow of energy/ distribution of biomass within the ecosystem. Regular monitoring in accordance with the Draft LBMP	Not significant
Decrease in annual precipitation rate	Further impacts to retained sensitive habitats and reduced success of new planting	The drainage strategy will ensure that there is no significant change to water availability within retained habitats and has accounted for future climate changes, including reduced water	Not significant

<b>Climate hazard</b>	<b>Likely ICCI</b>	<b>Consequence of ICCIs considering embedded environmental measures/good practice</b>	<b>Significance of ICCI effects</b>
		availability. Resilience of landscaping to climate change will be ensured by the habitat creation/enhancement requirements provided within the PEIR to ensure that climate change is taken into consideration in the choice of species and adequate monitoring post-planting occurs in accordance with the Draft LBMP. The consequence of the ICCI is therefore deemed to be minimal.	
Increased number and frequency of hot days; increase of droughts	Reduced success of establishment of new planting due to hotter drier conditions	Resilience of landscaping to climate change will be ensured by the habitat creation/enhancement requirements provided within landscape design to ensure that climate change is taken into consideration in the choice of species and adequate monitoring post-planting occurs in accordance with the Draft LBMP. The consequence of the ICCI is therefore deemed to be minimal.	Not significant
Increased rainfall; increase of flooding	Reduced success of establishment of new	Resilience of landscaping to climate change will be	Not significant

<b>Climate hazard</b>	<b>Likely ICCI</b>	<b>Consequence of ICCIs considering embedded environmental measures/good practice</b>	<b>Significance of ICCI effects</b>
	planting due to wetter conditions	ensured by the habitat creation/enhancement requirements provided within landscape design to ensure that climate change is taken into consideration in the choice of species and adequate monitoring post-planting occurs in accordance with the Draft LBMP. The consequence of the ICCI is therefore deemed to be minimal.	

## 8.13 Monitoring

### Construction monitoring

- 8.13.1 The lead contractors will be responsible for undertaking suitable monitoring throughout the construction works. The lead contractors will also hold responsibility for the implementation of mitigation measures to enable the effectiveness of these measures to be identified.
- 8.13.2 Prescriptions for the creation, establishment and monitoring of habitat creation measures are included within the Draft LBMP (**Appendix 8.2**, Volume 3 of this PEIR) which will occur before and during construction.
- 8.13.3 Monitoring of installed exclusion zones and measures, including fences, to prevent accidental incursions on sensitive designated nature conservation sites and habitats such as, but not limited to, ancient woodland, semi natural woodland, ancient and veteran trees, calcareous grassland, watercourses and ponds.
- 8.13.4 Monitoring of INNS species, including those listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), and their proposed management and removal to ensure that no spread of these species occurs during construction.
- 8.13.5 Monitoring of measures implemented for biosecurity to reduce the risk that invasive non-native species and diseases are spread as a consequence of the Proposed Development.
- 8.13.6 Monitoring of measures included within the Draft Bird Strike Risk Assessment (**Appendix 8.4**, Volume 3 of this PEIR), to ensure that no conditions occur that could pose a risk to aircraft, as a result of increased risk/severity of bird strike, including but not limited to ensuring no formation of large areas of surface water pooling.
- 8.13.7 Monitoring of the mitigation measures for badger during construction, including the creation of the main sett for badger (created in advance) will be conducted in accordance with the Natural England licence.
- 8.13.8 Monitoring of the mitigation measures for bats, including of the use and maintenance of the installed bat boxes will be conducted in accordance with the Natural England licence.
- 8.13.9 Monitoring of the mitigation measures, including of the use of the site and the maintenance of the installed bird boxes will be conducted.
- 8.13.10 Monitoring of the hydrology of Winch Hill Wood.

### Operational monitoring

- 8.13.11 Prescriptions for the establishment, long term management and monitoring of habitat creation measures are included within the Draft LBMP (**Appendix 8.2**, Volume 3 of this PEIR).
- 8.13.12 Monitoring and management for litter removal will be enacted as per the Draft LBMP (**Appendix 8.2**, Volume 3 of this PEIR).

- 8.13.13 Continuation of the monitoring and control measures employed by the airport operator to ensure no significant increase in bird strike risk, Bird Strike Risk Assessment (**Appendix 8.3**, Volume 3 of this PEIR).
- 8.13.14 Post construction monitoring of the mitigation measures for badger, including the use of the main sett for badger will be conducted in accordance with the Natural England licence.
- 8.13.15 Post construction monitoring of the mitigation measures for bats, including use of the site and the use and maintenance of the installed bat boxes will be conducted in accordance with the Natural England licence.
- 8.13.16 Post construction monitoring of the mitigation measures, including of the use of the site and use and maintenance of the installed bird boxes will be conducted.
- 8.13.17 Post construction monitoring of the orchid receptor sites will be conducted.
- 8.13.18 Post construction monitoring of the Roman snail sites will be conducted.
- 8.13.19 Monitoring of the hydrology of Winch Hill Woods.

## 8.14 Preliminary assessment summary

- 8.14.1 **Table 8.16** provides a summary of all of the identified impacts, mitigation and likely effects of the Proposed Development on biodiversity. Additional mitigation and how it will be secured are described and its efficacy shown by the reported residual effect.
- 8.14.2 Please note that this table only includes receptors that remain scoped in to the assessment. Those already scoped out are discussed within **Section 8.3**.

Table 8.16: Biodiversity preliminary assessment summary

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
<b>Construction</b>						
<b>Wigmore Park CWS</b>						
Phase 1 Loss of c.6.7ha (43%) of Wigmore Park CWS	Replacement habitat creation areas, and the replacement open space comprising 48.3ha ( <b>Section 4.9, Chapter 2</b> of this PEIR).	High	Medium	The majority loss of the key habitats of Wigmore Park CWS Phase 1, through site clearance and temporary surface car parks creation, represents a permanent adverse impact, of high magnitude, on the structure and function of the county value site. This could equate to a <b>major adverse effect</b> , which is <b>significant</b> . However, embedded habitat mitigation will reduce this to <b>moderate adverse</b> in the medium term, which remains <b>significant</b> , decreasing to a <b>minor adverse effect</b> when vegetation reaches maturity in the long term, within 15-30 years.	Additional land for habitat creation where required as part of the net gain strategy for project as shown in <b>Figures 14.11 to 14.13</b> in Volume 4 to the PEIR, will further add to the area of compensation habitats provided.	Temporary <b>minor adverse residual</b> effect while additional habitat creation areas establish, rising to a <b>negligible effect</b> following maturation after 15-30 years, which is <b>not significant</b> .
Phase 2a Loss of almost all remaining c.7.3ha (47%) of Wigmore Park CWS		Medium - smaller loss and already matured replacement	Medium	The loss of almost all of the remainder of the key habitats of Wigmore Park CWS (hedgerows to the north to be incorporated into the open space) to the Phase 1 works represents a permanent adverse impact, of medium magnitude, on the structure and function of the county value site as the small amount left by Phase 1 will be lost, but Phase 1 habitat creation will have matured to some extent.  This equates to a <b>moderate adverse effect</b> , which is <b>significant</b> in the short term. This will reduce to a <b>minor adverse effect</b> in the long term, which is <b>not significant</b> , when vegetation reaches maturity within 15-30 years.		
Phase 2b No additional impact to Wigmore Park CWS		N/A	Medium	Wigmore Park CWS no longer exists by Phase 2b of the Proposed Development, with the exception of hedgerows incorporated into the replacement open space.		



Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
				At this stage, the replacement open space and habitat creation area for Phases 1 and 2a will have matured, with additional areas created within Phase 2b.		which is <b>not significant</b> .
<b>Winch Hill Wood CWS/LWS Ancient Woodland</b>						
Phase 1 Winch Hill Wood – minor loss of perimeter trees for arboriculture reasons	Retention of the woodland, with exception of minor tree removal on the perimeter, as recommended for arboricultural reasons. Further woodland habitat creation within the Proposed Development, located within the replacement open space.	Very Low	Medium (as CWS and not SSSI for AW, also NVC reports site as low to low-mod botanical value)	<b>Minor adverse effect</b> as ancient woodland habitat which cannot be replaced, however the loss only relates to a small number of perimeter trees that were recommended for removal for arboricultural reasons, and may be partially in keeping with future management of the habitat. Permanent adverse impact, of very low magnitude, on the structure and function of the county value site. This equates to a <b>minor adverse effect</b> , which is <b>not significant</b> .	Woodland habitat creation and linking of habitats (e.g. planting new/ enhancing existing hedgerows) to improve connectivity within the wider landscape. Management of woodland for improvement, as per the Draft LBMP ( <b>Appendix 8.2</b> , Volume 3 of this PEIR).	<b>Negligible effect</b> , which is <b>not significant</b> .
Phase 2a Winch Hill Wood – deterioration of habitat due to isolation. Indirect effects from dust, noise and pollution. Changes to hydrological conditions.	CoCP measures to avoid indirect effects. Retention of the woodland, and inclusion of a buffer of at least 15m to avoid root damage and soil compaction to woodland trees. Further woodland habitat creation within the Proposed Development, located within the replacement open space. Also, hydrological management through the drainage design (described in <b>Appendix 20.4</b> of this PEIR), to avoid significant changes to the existing hydrological conditions within Winch Hill Wood.	Low	Medium	Potential hydrological impacts are mitigated through the drainage strategy, refer to <b>Chapter 20</b> of this PEIR. Further isolation and degradation through connecting habitat loss. Habitat creation measures partially mitigate the loss of connectivity. Implementation of habitat creation measures, including removing adjacent land from intensive agriculture, reduces the impact of the loss of connecting ecological corridors; however, given the time required for habitats to establish to a level at which they provide an equivalent biodiversity resource to that lost, a temporary adverse impact, of low magnitude, on the structure and function of the county value site will occur. This equates to a <b>minor adverse effect</b> , which is not <b>significant</b> in the short term, decreasing to a <b>negligible adverse effect</b> when vegetation		These measures will reduce the impact of the loss of connecting ecological corridors; however, given the time required for habitats to establish to a level at which they provide an equivalent biodiversity resource to that lost, a temporary adverse impact, of low magnitude, on the structure and function of the county value site. This equates to a <b>minor adverse effect</b> in the short term, which is <b>not</b>

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
Phase 2b Winch Hill Wood – slight further habitat isolation, maturation of previous habitat creation areas, and new area created. Indirect effects from dust, noise and pollution. Changes to hydrological conditions.		Very Low	Medium	reaches maturity in the long term (within 15-30 years). Potential hydrological impacts are mitigated through the drainage strategy, refer to <b>Chapter 20</b> of this PEIR. Indirect effects from dust, noise and pollution mitigated through the measures within the CoCP. Slight additional isolation through connecting habitat loss, however by this Phase, the earlier habitat creation measures will have matured, and new areas further mitigate the loss of connectivity. With implementation of new habitat creation measures and maturation of previous, where removed adjacent land from intensive agriculture, this is reduced to <b>minor adverse effect</b> , which is <b>not significant</b> .		<b>significant</b> , leading to a <b>negligible effect</b> in the long term which is <b>not significant</b> .
<b>Dairyborn Scarp DWS</b>						
Phase 1 Indirect impacts through construction related dust deposition, pollution events.	Implementation of measures within the Draft CoCP ( <b>Appendix 4.2</b> , Volume 3 of this PEIR).	Very Low	Medium	Indirect impacts could occur through construction related dust deposition, and pollution events for works including highways interventions and new roads, such as the AAR, A505 and also car park P3. Construction related dust, pollution events, controlled through implementation of Draft CoCP will reduce this temporary adverse impact, of low magnitude, on the structure and function of the county value site will to a <b>minor adverse effect</b> , which is <b>not significant</b> .	N/A	<b>Minor adverse effect</b> level that is <b>not significant</b> .
Phase 2a Loss of c.2.18ha (29%) of Dairyborn Scarp DWS for AAR and associated works.	Replacement habitat creation within the DWS itself, and habitat creation areas east of the scheme, comprising the management of 0.5ha of existing woodland, the planting of 0.15ha of native scrub, the seeding of 1.1ha of neutral meadow grassland and the creation of 650m <sup>2</sup> of exposed chalk on lower-lying shallow slope	Medium	Medium	The partial loss of the key habitats of Dairyborn Scarp DWS for creation of the AAR and associated works represents a temporary adverse impact, of medium magnitude, on the structure and function of the district value site. This equates to a <b>moderate</b>	Additional land for habitat creation where required as part of the net gain strategy for project.	These measures will reduce the impact of the loss of habitats; however, given the time required for habitats to establish to a level

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
				<b>adverse</b> effect, which is <b>significant</b> decreasing to a <b>minor adverse effect</b> with embedded mitigation, when vegetation reaches maturity within 5-10 years which is <b>not significant</b> .		at which they provide an equivalent biodiversity resource to that lost. Temporary <b>minor adverse</b> residual effect while replacement habitats establish, rising to a <b>negligible</b> effect following maturation after 5-10 years within the DWS and the habitat creation areas. <b>Negligible effect, not significant</b>
Phase 2b Indirect impacts through construction related dust deposition, pollution events for AAR.	Implementation of measures within the Draft CoCP ( <b>Appendix 4.2</b> , Volume 3 of this PEIR).	Very Low	Medium	Construction related dust, pollution events, controlled through implementation of Draft CoCP will reduce this temporary adverse impact, of very low magnitude, on the structure and function of the county value site to a <b>minor adverse effect</b> level that is <b>not significant</b> .	N/A	<b>Minor adverse effect, which is not significant.</b>
<b>Luton Parkway Verges DWS</b>						
Phase 1 Indirect impacts through construction related dust deposition, pollution events.	Implementation of measures within the CoCP ( <b>Appendix 4.2</b> , Volume 3 of this PEIR).	Very low	Medium	Construction related dust, pollution events, degradation of water quality or change to water flows for works related to the A1081 Gipsy Lane and AAR, will be controlled through implementation of Draft CoCP which will reduce this temporary adverse impact, of very low magnitude, on the structure and function of the county value site, to a <b>minor adverse effect</b> level that is <b>not significant</b> .	N/A	<b>Minor adverse effect level that is not significant.</b>
Phase 2a Indirect impacts only (assumed that verge is	Implementation of measures within the Draft CoCP ( <b>Appendix 4.2</b> , Volume 3 of this PEIR).	Very low	Medium	Construction related dust, pollution events, degradation of water quality or change to water flows for	N/A	<b>Minor adverse effect, which is not significant.</b>

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
not lost during construction of P1 car park).				works related to car park P1 will be controlled through implementation of Draft CoCP will reduce this temporary adverse impact, of very low magnitude, on the structure and function of the county value site to a <b>minor adverse effect</b> that is <b>not significant</b> .		
Phase 2b - No additional construction impacts on Luton Parkway Verges DWS during Phase 2b of the Proposed Development.						
<b>River Lea DWS</b>						
Phase 1 Indirect effects upon the River Lea and connected watercourses.	Pollution control measures described in and secured through the Draft CoCP ( <b>Appendix 4.2</b> , Volume 3 of this PEIR) including runoff from highways works to avoid impacts to the River Lea.	Low	Medium	Highway intervention work crossing the River Lea will not directly affect the watercourse. With the implementation of pollution control measures there will be no significant effect on the River Lea and associated watercourses. A temporary effect of low magnitude on a district value site resulting in a <b>minor adverse effect</b> , which is <b>not significant</b> .	None required	<b>Minor adverse effect</b> , which is <b>not significant</b> .
Phase 2a and 2b	No direct or indirect effects upon the River Lea are anticipated as a result of construction in Phases 2a and 2b of the Proposed Development.					
<b>Habitats</b>						
<b>All habitats</b>						
All phases - Indirect impacts on retained and created habitats, resulting from dust, pollution or hydrology.	Implementation of measures within the Draft CoCP ( <b>Appendix 4.2</b> , Volume 3 of this PEIR).	Very low	Medium to Very low	Construction related dust, pollution events, degradation of water quality or change to water flows during construction for all retained and created habitats. Embedded and good practice mitigation within the Draft CoCP will reduce this temporary adverse impact to a very low magnitude, on the district to local value habitats, resulting in a <b>minor to negligible adverse effect</b> that is <b>not significant</b> .	N/A	<b>Minor to negligible adverse effect</b> that is <b>not significant</b> .
<b>Broadleaved semi-natural woodland</b>						
Phase 1 No loss of this habitat in Phase 1. Indirect effects are captured above.						
Phase 2a Loss of approx. 1.6ha of broadleaved semi-natural woodland	Approximately 6.5ha of woodland habitat creation has been included within the area of replacement open space in Phase 1.	Medium	Medium (including HoPI)	I Loss of approximately 1.6ha of broadleaved semi-natural woodland, to works including car	A further 4.7ha of broadleaved semi-natural woodland created to the east of	Temporary <b>negligible</b> residual effect while habitats establish,

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
(including 1.15ha of woodland 7 within the last of Wigmore Park CWS, and a small area in Dairyborn Scarp DWS).				parks P8 and 11. Woodland with the replacement open space is retained. This temporary adverse impact, of medium magnitude, on the district value habitat, equates to a <b>moderate adverse effect</b> level that is <b>significant</b> . Embedded mitigation will reduce to a <b>minor adverse effect</b> over time following establishment of replacement habitat, which is <b>not significant</b> .	the Proposed Development as mitigation/enhancement.	rising to a <b>minor beneficial</b> effect after 10-30 years within the open space and the habitat creation areas, <b>not significant</b> .
Phase 2b Loss of approx. 0.27ha of broadleaved semi-natural woodland (including the remaining linear line/double hedgerow of Wigmore Park CWS that connected to Winch Hill wood).		Very Low (due to small area and early stages of maturation of Phase 1 and 2b woodland planting by this point).	Medium	Loss of approximately 0.27ha of broadleaved semi-natural woodland. Embedded mitigation including from Phase 1, will reduce this temporary adverse impact, of very low magnitude, on the district value habitat, to a <b>minor adverse effect</b> level that is <b>not significant</b> , reducing to a <b>negligible effect</b> over time following establishment of replacement habitat, which is <b>not significant</b> .		Temporary <b>negligible</b> residual effect while habitats establish, rising to a <b>minor beneficial</b> effect after 10-30 years within the open space and the habitat creation areas, <b>not significant</b> .
<b>Broadleaved plantation woodland</b>						
Phase 1 Loss of approx. 0.61ha of broadleaved plantation woodland (0.5ha of woodland 7 within Wigmore Park CWS.)	Approximately 6.5ha of woodland habitat creation has been included within the area of replacement open space.	Low (due to small area)	Low	Loss of approximately 0.61ha of broadleaved plantation woodland, to works including temporary car parks P6 and 7. Woodland with the replacement open space is retained. This temporary adverse impact, of low magnitude, on the local value habitat, equates to a <b>minor adverse effect</b> level that is <b>not significant</b> . Embedded mitigation will reduce to a <b>negligible effect</b> over time following establishment of replacement habitat, which is <b>not significant</b> .	A further 4.7ha of broadleaved woodland created to the east of the Proposed Development as mitigation/enhancement.	Temporary <b>negligible</b> residual effect while habitats establish, rising to a <b>minor beneficial</b> effect after 10-30 years within the open space and the habitat creation areas, <b>not significant</b> .
Phase 2a Loss of approximately 1.15ha of broadleaved plantation woodland (including a small area in Dairyborn Scarp DWS).		Medium	Low	Loss of approximately 1.6ha of broadleaved semi-natural woodland, to works including car parks P9 and the AAR. Embedded mitigation including from Phase 1 will reduce this temporary adverse impact, of		



Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
				medium magnitude, on the local value habitat, to a <b>minor adverse effect</b> level that is <b>not significant</b> , reducing to a <b>negligible effect</b> over time following establishment of replacement habitat, which is <b>not significant</b> .		within the open space and the habitat creation areas, <b>not significant</b> .
Phase 2b Loss of approx. 0.25ha of broadleaved plantation woodland.		Low (due to small area)	Low	Loss of approximately 0.25ha of broadleaved plantation woodland. Woodland with the replacement open space is retained. Embedded mitigation including from Phase 1 and 2a will reduce this temporary adverse impact, of low magnitude, on the local value habitat, to a <b>minor adverse effect</b> level that is <b>not significant</b> , reducing to a <b>negligible effect</b> over time following establishment of replacement habitat, which is <b>not significant</b> .		Temporary <b>negligible</b> residual effect while habitats establish, rising to a <b>minor beneficial</b> effect after 10-30 years within the open space and the habitat creation areas, <b>not significant</b> .
<b>Scrub – dense and scattered</b>						
Phase 1 Loss of approx. 3.73ha of dense scrub and 2.09ha of scattered scrub (5.54ha within Wigmore Park CWS).	Approximately 1.8ha of scrub habitat creation has been included within the area of replacement open space.	Medium	Very Low	Loss of approximately 3.73ha of dense scrub and 2.09ha of scattered scrub, to works including temporary car parks P6 and 7. Temporary adverse impact, of medium magnitude, on the local value habitat, equates to a <b>minor adverse effect</b> level that is <b>not significant</b> . Embedded mitigation will reduce this to a <b>negligible effect</b> over time following establishment of replacement habitat, which is <b>not significant</b> .		Temporary <b>negligible</b> residual effect while habitats establish, rising to a <b>minor beneficial</b> effect after 5-10 years within the open space and the habitat creation areas, <b>not significant</b> .
Phase 2a Loss of approximately 2.25ha of dense scrub and 0.3ha of scattered scrub (including within Wigmore Park CWS and Dairyborn Scarp DWS).		Medium	Very Low	Loss of approximately 2.55ha of scrub, to works including car parks P9 and the AAR. Embedded mitigation including from Phase 1 will reduce this temporary adverse impact, of medium magnitude, on the local value habitat, to a <b>minor adverse effect</b> level that is <b>not significant</b> , reducing to a <b>negligible effect</b>		Temporary <b>negligible</b> residual effect while habitats establish, rising to a <b>minor beneficial</b> effect after 5-10 years within the open space and the habitat creation

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
				over time following establishment of replacement habitat, which is <b>not significant</b> .		areas, <b>not significant</b> .
Phase 2b Loss of approximately 0.52ha of dense scrub and 0.5ha of scattered scrub.		Low (due to small area)	Low	Loss of approximately 0.57ha of scrub. Embedded mitigation including from Phase 1 and 2a will reduce this temporary adverse impact, of low magnitude, on the local value habitat, to a <b>minor adverse effect</b> level that is <b>not significant</b> , reducing to a <b>negligible effect</b> over time following establishment of replacement habitat, which is <b>not significant</b> .		Temporary <b>negligible</b> residual effect while habitats establish, rising to a <b>minor beneficial</b> effect after 5-10 years within the open space and the habitat creation areas, <b>not significant</b> .
<b>Neutral semi-improved grassland</b>						
Phase 1 Loss of approx. 3.74ha of neutral semi-improved grassland from within Wigmore Park CWS.	Approximately 20ha of neutral grassland habitat creation has been included within the area of replacement open space.	Medium	Low	Loss of approximately 3.74ha of neutral semi-improved grassland, to works including temporary car parks P6 and 7. This temporary adverse impact, of medium magnitude, on the district value habitat, equates to a <b>minor adverse effect</b> level that is <b>not significant</b> . Embedded mitigation will reduce to a <b>negligible effect</b> over time following establishment of replacement habitat, which is <b>not significant</b> .	A further 30ha of neutral grassland created as mitigation/enhancement.	Temporary <b>negligible</b> residual effect while habitats establish, rising to a <b>minor beneficial</b> effect after 5-10 years within the open space and the habitat creation areas, <b>not significant</b> .
Phase 2a Loss of approx. 28.5ha of neutral semi-improved grassland.		Medium	Low	Loss of approximately 28.5ha of neutral semi-improved grassland, to works including car parks, fuel storage and water treatment facilities, earthworks and the AAR. The majority of this (27.7ha) includes previously arable fields now sown and managed to develop into neutral grassland. Embedded mitigation including from Phase 1 will reduce this temporary adverse impact, of medium magnitude, on the local value habitat, to a <b>minor adverse effect</b> level that is <b>not significant</b> , reducing to a <b>negligible effect</b> over time following establishment		Temporary <b>negligible</b> residual effect while habitats establish, rising to a <b>minor beneficial</b> effect after 5-10 years within the open space and the habitat creation areas, <b>not significant</b> .



Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
				of replacement habitat, which is <b>not significant</b> .		
Phase 2b Loss of approx. 0.42ha of neutral semi-improved		Low (due to small area)	Low	Loss of approximately 0.42ha of neutral semi-improved grassland. Embedded mitigation including from Phase 1 and 2a will reduce this temporary adverse impact, of low magnitude, on the local value habitat, to a <b>minor adverse effect</b> level that is <b>not significant</b> , reducing to a <b>negligible effect</b> over time following establishment of replacement habitat, which is <b>not significant</b> .		Temporary <b>negligible</b> residual effect while habitats establish, rising to a <b>minor beneficial</b> effect after 5-10 years within the open space and the habitat creation areas, <b>not significant</b> .
<b>Calcareous grassland</b>						
Phase 1 Loss of approx. 0.09ha of calcareous grassland	None provided in replacement open space	Very low (due to small area)	Medium	Loss of approx. 0.09ha of calcareous grassland (0.07ha from within Wigmore Park CWS), to works including temporary car park P6. This permanent adverse impact, of low magnitude, on the district value habitat, equates to a <b>minor adverse effect</b> level that is <b>not significant</b> .	None proposed	<b>Minor adverse effect</b> level that is <b>not significant</b> .
Phase 2a Loss of approx. 0.34ha of calcareous grassland		Low (due to small area)	Medium	Loss of approx. 0.34ha including within Wigmore Park CWS and Dairyborn Scarp DWS) of calcareous grassland, to works including car parks, earthworks and the AAR. This temporary adverse impact, of low magnitude, on the district value habitat, equates to a <b>minor adverse effect</b> level that is <b>not significant</b> .	12.5ha of calcareous grassland created as mitigation/ enhancement, plus creation of bare chalk slopes.	With habitat creation, this <b>negligible</b> residual effect while habitats establish, rises to a <b>minor beneficial</b> effect after 5-10 years within the habitat creation areas, which is <b>not significant</b> .
Phase 2b Loss of approx. 0.02ha of calcareous grassland		Very low (due to small area)	Low	Loss of approximately 0.02ha of calcareous grassland. This temporary adverse impact, of low magnitude, on the district value habitat, equates to a <b>minor adverse effect</b> level that is <b>not significant</b> .	12.5ha of calcareous grassland created as mitigation/ enhancement, plus bare chalk slopes.	Temporary <b>negligible</b> residual effect while habitats establish, rising to a <b>minor beneficial</b> effect, after 5-10 years, and habitat creation from

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
						previous phases within the habitat creation areas, which is <b>not significant</b> .
<b>Poor semi-improved grassland</b>						
Phase 1 Loss of approx. 6.33ha of poor semi-improved grassland	Approximately 20ha of neutral grassland habitat creation has been included within the area of replacement open space, which is intended to be managed as grassland of higher value than poor semi-improved grassland.	Low	Low	Loss of approx. 6.33ha of poor semi-improved grassland (1.03ha from within Wigmore Park CWS), to works including temporary car park P6. Embedded mitigation includes for the creation of higher value grassland habitats in place of the loss of this habitat type. This temporary adverse impact, of low magnitude, on the local value habitat, equates to a <b>minor adverse effect</b> level that is <b>not significant</b> in the short term. Embedded mitigation which provides a replacement of higher value than poor semi improved grassland, will reduce to a <b>negligible effect</b> over time following establishment of replacement habitat, which is <b>not significant</b>	A further 30ha of higher value than semi-improved grassland created as mitigation/enhancement.	With habitat creation, this <b>negligible</b> residual effect while habitats establish, rises to a <b>minor beneficial</b> effect after 5-10 years within the habitat creation areas, which is <b>not significant</b> .
Phase 2a Loss of approx. 5.58ha of poor semi-improved grassland		Low	Low	Loss of approx. 5.58ha of poor semi-improved grassland, to works including car parks, earthworks and the AAR. This temporary adverse impact, of low magnitude, on the local value habitat, equates to a <b>minor adverse effect</b> level that is <b>not significant</b> in the short term. Embedded mitigation including within Phase 1 which provides a replacement of higher value than poor semi improved grassland, will reduce to a <b>negligible effect</b> over time following establishment of replacement habitat, which is <b>not significant</b>	A further 30ha of higher value than semi-improved grassland created as mitigation/enhancement.	With habitat creation, this <b>negligible</b> residual effect while habitats establish, rises to a <b>minor beneficial</b> effect after 5-10 years within the habitat creation areas, which is <b>significant</b> .
Phase 2b Loss of approx. 0.81ha of poor semi-improved grassland		Very low (due to small area)	Low	Loss of approximately 0.81ha of poor semi-improved grassland. This temporary adverse impact, of low magnitude, on the local value	30ha of higher value than semi-improved grassland created as	Temporary <b>negligible</b> residual effect while habitats establish,

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
				habitat, equates to a <b>minor adverse effect</b> level that is <b>not significant</b> in the short term. Embedded mitigation including within Phase 1 and 2b which provides a replacement of higher value than poor semi improved grassland, will reduce to a <b>negligible effect</b> over time following establishment of replacement habitat, which is <b>not significant</b>	mitigation/enhancement.	rising to a <b>minor beneficial</b> effect, after 5-10 years, and habitat creation from previous phases within the habitat creation areas, <b>not significant</b> .
<b>Arable (including field margins and arable plants)</b>						
Phase 1 – No arable land will be lost in Phase 1 as arable fields previously to be lost have been left sown and managed as grasslands, and have now been reclassified as other habitats. Arable fields lost to habitat creation is not included as field margins are retained.						
Phase 2a Loss of approx. 12.47ha of arable land potentially inc. arable field margins and their associated arable plants	Retention of arable margins along retained woodland belts and hedgerows where possible. Implementation of suitable management regime of retained and created habitats to encourage establishment of notable arable plant species through Draft LBMP ( <b>Appendix 8.2</b> , Volume 3 of this PEIR).	Medium	Low	Loss of approx. 12.47ha of arable land with associated field margins and plants, to landscape restoration, earthworks, fuel pipeline and fuel storage and water treatment facilities. This permanent adverse impact, of low magnitude, on the local value habitat, equates to a <b>minor adverse effect</b> level that is <b>not significant</b> .	The habitat creation areas will include neutral and calcareous grassland habitat creation. These habitats will be managed with a low input, low intensity regime to encourage the establishment of those arable plant species lost to construction of the Proposed Development.	With habitat creation, this residual <b>minor adverse</b> effect while habitats establish, rises to a <b>negligible</b> effect after 5 years within the habitat creation areas, <b>not significant</b> .
Phase 2b – No further arable land will be lost to the Main application works.						
<b>Ancient and veteran trees</b>						
All phases - Damage/loss of potential future veteran trees	Avoidance and retention within design where possible. Any felled deadwood to be retained in landscape design. Tree protection measures described with the Draft CoCP ( <b>Appendix 4.2</b> , Volume 3 of this PEIR).	Low	Medium (not actual veterans – just future potential veterans)	Nine ancient and veteran or potential veteran trees have been identified have been retained within the Main Application Site through arboricultural surveys. These trees, along with ancient and veterans trees, will be retained and have been incorporated into the landscape design for the replacement open space and habitat creation areas with the exception of one, ((T343 – coppiced ash -( <b>Appendix 14.2</b> and <b>14.3</b> , Volume 3 of this PEIR)) which lies directly within the main works.	Tree 343 will be re-coppiced and translocated in order to retain the tree ( <b>Chapter 14</b> , of this PEIR). Explore opportunities to contribute to veteran tree management offsite or 'veteranisation' of mature trees to replicate the beneficial features of veteran trees.	The value of veteran trees cannot be replicated therefore a <b>minor adverse</b> residual effect will remain, which is <b>not significant</b> .

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
				Ancient and veteran trees are irreplaceable therefore the potential damage of potential future veteran trees to the construction of the Proposed Development will result in a permanent adverse impact, of low magnitude with embedded mitigation providing protection, on these district value receptors. This equates to a residual <b>minor adverse</b> effect, which is <b>not significant</b> .		
<b>Species Rich Hedgerows</b>						
Phase 1 Potential damage to retained hedgerows. No loss in this Phase.	Avoidance and retention within design where possible. Creation or restoration of more than 3.85km of mixed-species hedgerows with hedgerow trees included within landscape design. The area proposed as the replacement open space is bordered by hedgerows, many of which are species-rich and qualify as important under the criteria outlined within the Hedgerows Regulations 1997. Indirect effects of earthworks within Root Protection Zones (RPZs) of retained hedgerows controlled through Draft CoCP measures ( <b>Appendix 4.2</b> , Volume 3 of this PEIR).	Very low	Medium	Retained hedgerows within Phase 1, could be indirectly affected where works fall within the RPZ of the hedgerows and their trees. Embedded mitigation including within the Draft CoCP measures will ensure that these hedgerows are protected. 117his represents an adverse impact of very low magnitude on this district value receptor, resulting in a <b>minor adverse effect</b> , which is <b>not significant</b> .	Replacement of 4.5km and strengthening of over 7.5km of hedgerows within the wider landscape to restore hedgerow network and their ecological corridors.	Temporary <b>minor adverse</b> residual effect while replacement habitats establish, rising to a <b>minor beneficial</b> effect following maturation after 5 years, which is <b>not significant</b> .
Phase 2a Loss of c.555.6m section of species-rich hedgerow with trees.		Low (relatively small length of ubiquitous local habitat)	Medium	Phase 1 construction of the Proposed Development will result in the loss of an approximately c. 555.6m section of species-rich hedgerow, none of which are Important. Given the small length and isolated nature of section being lost this represents an adverse impact of low magnitude on this district value receptor, resulting in a <b>minor adverse effect</b> , which is <b>not significant</b> decreasing to a <b>negligible effect</b> when vegetation reaches maturity within 5 years, which is <b>not significant</b> .		
Phase 2b Loss of c.550m section of species-rich hedgerow with trees.		Low (relatively small length of ubiquitous local habitat)	Medium	As per Phase 2a		
<b>Ponds</b>						

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
Phase 1 Loss of one pond.	None proposed in replacement open space	Low	Low	Loss of one pond in Phase 1 to car parks P6 and P7. This represents a low adverse effect at the local level which equates to a <b>minor effect</b> , which is <b>not significant</b> .	Bird strike risk restricts creation of large ponds within the Proposed Development however a wildlife pond (or small group of small ponds) is proposed in the habitat creation area, east of the Proposed Development.	Even with habitat creation in Phase 1, by Phase 2a there will be a net loss of ponds, the residual <b>minor adverse</b> effect for Phase 2a onwards remains, which is <b>not significant</b> .
Phase 2a Loss of six ponds.	None proposed in replacement open space	Medium	Low	Loss of six ponds in Phase 1 to new taxi way and isolation stands, new apron for stands taxi lanes and taxiways, car park P10. This represents a medium adverse effect at the local level which equates to a <b>minor effect</b> , which is <b>not significant</b> .		
Phase 2b – No loss of ponds within Phase 2b						
<b>Species</b>						
<b>Orchids</b>						
Phase 1 Loss of populations of orchids (common spotted, pyramidal, common twayblade and bee orchid).	Retention of set-aside habitat within the replacement open space and additional replacement habitat included within landscape design. However, the embedded mitigation which forms part of phases 1, 2a and 2b construction includes creation of neutral and calcareous grassland, and also bare chalk slopes, which are highly suitable for pyramidal and bee orchids, as detailed within the Draft LBMP ( <b>Appendix 8.2</b> , Volume 3 of this PEIR).	Medium (loss of majority of population)	Medium (due to low tolerance for change)	Phase 1 includes the loss of most of Wigmore Park CWS including the part of the populations of orchid. The orchids within the set-aside areas of the arable fields that will be used to create the replacement Wigmore Park, will be retained and protected during the work, and long-term management will be implemented in this area to encourage long term viability of the orchid population in this area. A temporary adverse impact, of medium magnitude, will occur on this district value population, resulting in a <b>moderate adverse effect</b> , which is <b>significant</b> decreasing to a <b>minor effect</b> when managed retained areas of orchid populations in the replacement open space, reaches maturity within 5 years, which is <b>not significant</b> .	Translocation of orchids to appropriate location within replacement open space, during appropriate season following best practice guidance and detailed within the Draft LBMP ( <b>Appendix 8.2</b> , Volume 3 of this PEIR). Receptor site to be prepared in advance of translocation to increase chances of long-term success.	Temporary <b>minor adverse residual</b> effect while replacement habitats and translocated orchids establish, rising to a <b>negligible effect</b> following maturation after 10 years of suitable management.
Phase 2a Loss of populations of orchids (common spotted, pyramidal, common twayblade and bee orchid).		Medium (partial loss of population)	Medium (due to low tolerance for change)	The Phase 2a construction of the Proposed Development will result in the loss of the remaining area of Wigmore Park CWS (that not lost during Phase 1), including the remaining populations of common spotted orchid, pyramidal orchid,		



Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
				bee orchid and common twayblade. A temporary adverse impact, of medium magnitude, will occur on this district value population, resulting in a <b>moderate adverse effect</b> , which is <b>significant</b> decreasing to a <b>minor effect</b> when managed retained areas of orchid populations in the replacement open space reaches maturity within 5 years, which is <b>not significant</b> .		
Phase 2b works - No additional impact. Wigmore Park CWS no longer exists by Phase 2b of the Proposed Development.						
<b>Japanese knotweed</b>						
Phase 1 Risk of the spread of Schedule 9 invasive species - Japanese Knotweed.	Japanese knotweed management protocols required to eradicate this invasive species and ensure no spread as a result of the construction works. Restriction of working areas to avoid spread of Schedule 9 invasive species or specialist treatment/removal required as detailed within the Draft CoCP ( <b>Appendix 4.2</b> , Volume 3 of this PEIR).	Very Low	Very Low	A large stand of Japanese knotweed is located within woodland immediately adjacent to the east of the Phase 1 works at Wigmore Park. Specialist treatment / removal required as explained within the Draft CoCP. The equates to a permanent impact, of very low magnitude, on this species which would result in a <b>negligible effect</b> , however eradication of this invasive species from the site would be a <b>minor beneficial effect</b> .	None required.	<b>Minor beneficial effect</b> , that is <b>not significant</b>
Phase 2a Risk of the spread of Schedule 9 invasive species - Japanese Knotweed.		Very Low	Very Low	A large stand of Japanese knotweed is located within the broadleaved woodland at Wigmore Park that will be lost to Phase 2a construction works of the Proposed Development. Specialist treatment / removal required as explained within the Draft CoCP. The equates to a permanent impact, of very low magnitude, on this species which would result in a <b>negligible effect</b> , however eradication of this invasive species from the site would be a <b>minor beneficial effect</b> .	None required.	<b>Minor beneficial effect</b> , that is <b>not significant</b>
Phase 2b No additional impact.	N/A	N/A	N/A	Wigmore Park CWS no longer exists by Phase 2b of the Proposed Development and it is anticipated that this species and	N/A	N/A

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
				other INNS will have been eradicated by Phase 2b.		
<b>Badger</b>						
Phase 1 Loss of badger territory including outlier setts and associated habitats and disturbance of retained setts.	Habitat creation to provide replacement foraging, dispersal and sett building opportunities. Appropriate fencing of construction areas and provision of exit routes from excavation, as detailed in the Draft CoCP ( <b>Appendix 4.2</b> , Volume 3 of this PEIR).	Medium	Low	The Phase 1 works for the Proposed Development will result in the loss of at least three outlier setts for works including car park creation, as well as grassland, scrub, hedgerow and woodland habitats that offer a foraging resource and form part of the territories for at least two badger groups. In addition, landscape and habitat creation works will affect/disturb four main setts and their associated outlier/annexe/subsidiary setts and partial territories, but it is assumed they can be retained. With embedded mitigation for retention and replacement of habitats, a temporary adverse impact, of medium magnitude, will occur on these local value populations resulting <b>Minor adverse effect</b> which is <b>not significant</b> in the short term, and <b>negligible</b> which is <b>not significant</b> in the long term once the habitats have matured.	Closure and disturbance of setts will be secured under licence from Natural England with associated method statements. An artificial sett will be created for the main sett if it will be lost to the Proposed Development (to be confirmed through detailed design), within land owned by the client, and within the territory of the badger social groups concerned. Off-site strengthening of 'green corridors' in the form of hedgerows and grassland creation will provide connections to offsite foraging opportunities.	Temporary <b>minor adverse</b> residual effect while replacement habitats establish, rising to <b>negligible</b> in the long term, which is <b>not significant</b>
Phase 2a Loss of badger territory including potentially a main sett, outlier setts and associated habitats and disturbance of retained setts.	Habitat creation to provide replacement foraging, dispersal and sett building opportunities. Appropriate fencing of construction areas and provision of exit routes from excavation, as detailed in the Draft CoCP ( <b>Appendix 4.2</b> , Volume 3 of this PEIR).	High (potential loss of a main sett and loss of multiple others)	Low	The phase 2a construction may result in the potential loss of one main badger sett to earthworks and creation of the fuel facility and water treatment facility but there may be sufficient space to retain it depending upon detailed design. There will also be disturbance to one other main badger sett and loss of three subsidiaries, and loss/disturbance to multiple outliers due to the main works and fuel pipeline installation, as well as loss of habitats. With embedded mitigation for retention and replacement of		Temporary <b>minor adverse</b> residual effect while replacement habitats establish, and the replacement sett becomes used, decreasing to <b>negligible</b> in the long term, which is <b>not significant</b> .



Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
				habitats, a temporary adverse impact for loss of habitat, of high magnitude, will occur on these local value populations resulting in a <b>moderate adverse effect</b> which is <b>significant in the short term</b> , and <b>minor adverse effect</b> which is <b>not significant</b> in the long term once the habitats have matured. A permanent <b>moderate</b> adverse effect of loss of a main sett will occur if it is unavoidable.		
Phase 2b Loss of badger territory and associated habitats and disturbance of retained setts.	Habitat creation to provide replacement foraging, dispersal and sett building opportunities. Appropriate fencing of construction areas and provision of exit routes from excavation, as detailed in the Draft CoCP ( <b>Appendix 4.2</b> , Volume 3 of this PEIR).	Low	Low	The phase 2b construction will result in further disturbance of badger setts during works and habitat creation, landscape restoration. A temporary adverse impact, of low magnitude, will occur on these local value populations resulting in a <b>negligible effect</b> , which is <b>not significant</b> .		Temporary <b>negligible</b> residual effect, earlier phases habitat creation will have matured, leading to <b>minor beneficial effect</b> in the long term, which is <b>not significant</b> .
<b>Bats - Habitats</b>						
Phase 1 Bats – loss of foraging habitats.	Replacement habitat creation within landscape design.	Medium	Medium (due to important invertebrate prey at Wigmore Park)	Phase 1 will result in the loss of grassland, scrub, waterbodies and woodland habitats at Wigmore Park that are utilised by foraging bats. The loss of foraging habitats to the Phase 1 works for the Proposed Development, therefore, represents a temporary adverse impact, of medium magnitude, on this district value bat assemblage which would result in a <b>moderate adverse effect</b> , which is <b>significant</b> decreasing to a <b>minor effect</b> when vegetation reaches maturity within 10-12 years, which is <b>not significant</b> .	Offsite strengthening of 'green corridors' in the form of hedgerows to connect offsite foraging opportunities.	Taking into account the increased connectivity of the habitats within the wider area as a result of the offsite planting, there will be a temporary <b>minor adverse effect</b> while replacement habitats establish, rising to <b>negligible effect</b> in the long term, which is <b>not significant</b> .
Phase 2a Bats – loss of foraging habitats.		Medium (well used commuting route loss as well as large areas of habitat)	Medium	The phase 2a construction will result in the loss of grassland, hedgerow, scrub, waterbodies and woodland habitats that are utilised by foraging and commuting bats. It will also result in some severance of the well-used bat commuting routes that have been		

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
				identified along the boundary of Wigmore Park and connecting Wigmore Park to the Winch Hill Wood ancient woodland. A temporary adverse impact, of medium magnitude, will occur on this district value bat assemblage resulting in a <b>moderate adverse effect</b> , which is <b>significant</b> decreasing to a <b>minor effect</b> when vegetation reaches maturity within 10-12 years, which is <b>not significant</b> .		
Phase 2b Bats – loss of foraging habitats.		Low (affects areas close to or within the airport and habitats already affected).	Medium	Phase 2b affects areas within and around the existing and new areas of the airport, comprising mostly habitats already affected. Embedded habitat mitigation measures, some of which will have matured by this point, reduce this from moderate adverse to <b>minor adverse effect</b> which is <b>not significant</b> decreasing to a <b>negligible effect</b> when vegetation reaches maturity within 10-12 years.		
<b>Bats - roosts</b>						
Phase 1 Disturbance to roosts.	Implementation of measures to reduce noise and light pollution, as described in the Draft CoCP ( <b>Appendix 4.2</b> , Volume 3 of this PEIR).	Low	Low (small local value roosts of common and widespread species)	Single common pipistrelle summer day roosts were identified within a cottage at Winch Hill, tree T126 within nearby woodland, and the Pillbox. Each roost is surrounded on three sides or adjacent to the land required for the replacement open space within the Phase 1 works. Construction works associated with the Phase 1 works have the potential to introduce disturbance, through construction related noise, lighting and vibration, to roosts of local value within retained buildings and trees adjacent to the Proposed Development.  A temporary adverse impact, of low magnitude, will occur on these local value roosts resulting in a	Loss and disturbance of bat roosts will be done under licence from Natural England with associated method statements being implemented in full. Provision of artificial roosting opportunities on retained trees and buildings within the Proposed Development prior to the works, within land owned by the client.	Taking into account artificial roost replacement, and careful/licensed approach to roost removal, there will be a <b>negligible effect</b> which is <b>not significant</b> .

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
				<b>minor adverse effect, which is not significant.</b>		
Phase 2a Disturbance to roosts.	Implementation of measures to reduce noise and light pollution, as described in the Draft CoCP ( <b>Appendix 4.2</b> , Volume 3 of this PEIR).	Low	Low (small local value roosts of common and widespread species)	The phase 2a construction of the Proposed Development will also result in the loss of one and disturbance of two trees that have been identified as supporting single common pipistrelle summer day roosts. Construction works associated with the Phase 2b works have the potential to introduce disturbance, through construction related noise, lighting and vibration, to roosts of local value within retained buildings and trees adjacent to the Proposed Development. An adverse impact, of low magnitude, will occur on these local value roosts resulting in a <b>minor adverse effect, which is not significant.</b> This will be temporary for disturbance and a permanent impact for the loss of a roost.		Taking into account artificial roost replacement, there will be a <b>negligible effect</b> which is <b>not significant.</b>
Phase 2b Disturbance to roosts.	Implementation of measures to reduce noise and light pollution, as described in the Draft CoCP ( <b>Appendix 4.2</b> , Volume 3 of this PEIR).	Low	Low (small local value roosts of common and widespread species)	The phase 2b construction of the Proposed Development will also result in the loss of two trees that have been identified as supporting single common pipistrelle summer day roosts. An adverse impact, of low magnitude, will occur on these local value roosts resulting in a <b>minor adverse effect, which is not significant.</b> This will be temporary for disturbance and a permanent impact for the loss of a roost.		Taking into account artificial roost replacement, there will be a <b>negligible effect</b> which is <b>not significant.</b>
<b>Riparian mammals</b>						
Phase 1 Indirect effects upon riparian mammals present on the River Lea and connected watercourses.	Pollution control measures described in and secured through the Draft CoCP ( <b>Appendix 4.2</b> , Volume 3 of this PEIR) including runoff from highways works to avoid impacts to the River Lea.	Low	Medium	Highway intervention work crossing the River Lea will not directly affect the watercourse. With the implementation of pollution control measures there will be no significant effect on the otter or water vole populations assumed to be using the River Lea and associated watercourses. A	None required	<b>Minor adverse effect, which is not significant.</b>

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
				temporary effect of low magnitude on a district value species resulting in a <b>minor adverse effect</b> , which is <b>not significant</b> .		
Phase 2a and b	No direct or indirect effects upon the River Lea are anticipated as a result of construction of phase 2a and b of the Proposed Development					
<b>Other mammals</b>						
Phase 1 Loss of habitat.	Replacement habitat within landscape design and habitat creation areas.	Low	Low	Each Phase of the works will result in the loss of habitats including arable, grassland, scrub, waterbodies and woodland. These habitats are likely to offer foraging, dispersal and shelter opportunities for a range of mammals, potentially including hedgehogs, brown hare and polecat. It is recognised that time is required for replacement habitats creation measures to establish to a level at which they provide an equivalent foraging resource to that lost, and each Phase improves on the maturity of those habitats.  The loss of habitats represents a temporary adverse impact, of low magnitude, on these local level receptors. Which equates to a <b>minor adverse effect</b> which is <b>not significant</b> , increasing to a <b>minor beneficial effect</b> when habitats have established within 10-12 years.	Additional habitat creation/ enhancement measures to the east of the Proposed developments including grassland, scrub and woodland habitats.	<b>Minor beneficial effect</b> which is <b>not significant</b> .
Phase 2a Loss of habitat.		Low	Low			<b>Minor beneficial effect</b> which is <b>not significant</b> .
Phase 2b Loss of habitat.		Low	Low			<b>Minor beneficial effect</b> which is <b>not significant</b> .
<b>Breeding birds - nesting</b>						
Phase 1 - Risk of damage/ disturbance to nesting birds.	Timing of vegetation clearance works to avoid bird nesting period (March – Aug inclusive). Nesting bird check where this is not possible. Noise and light pollution control measures. Captured within the Draft CoCP ( <b>Appendix 4.2</b> , Volume 3 of this PEIR).	Very low	Low	For all Phases, the clearance of vegetation could cause the loss of nests or damage/disturbance to nests during construction of the Proposed Development. However, with embedded mitigation which reduces the likelihood of impacts to nesting birds, this represents a very low adverse effect at the local level which equates to a <b>negligible effect</b> , which is <b>not significant</b> .	None required	<b>Negligible effect</b> , which is <b>not significant</b>
Phase 2a Risk of damage/ disturbance to nesting birds		Very low	Low		None required	<b>Negligible effect</b> , which is <b>not significant</b>
Phase 2b Risk of damage/ disturbance to nesting birds.		Very low	Low		None required	<b>Negligible effect</b> , which is <b>not significant</b>
<b>Breeding birds – loss of habitat</b>						

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
Phase 1 Loss of habitats.	Replacement habitat within landscape design and habitat creation areas.	Medium	Low	For all phases, the habitat creation measures included as part of the Proposed Development will reduce the impact of the loss of habitats used by nesting and foraging birds. However, it is recognised that time is required for replacement habitats to establish to a level at which they provide an equivalent resource to that loss, which will improve with each Phase as the previous Phase habitats mature. The loss of habitats used by nesting birds, as a result of the works for the Proposed Development, represents a temporary adverse impact, of medium magnitude, on this local value receptor. This equates to a <b>minor adverse effect</b> , increasing to a <b>minor beneficial effect</b> when habitats have established within 10-12 years, which is <b>not significant</b> .	Nest box provision appropriate for species present on retained trees/ structures within the Proposed Development and off-site on adjacent arable land e.g. tree sparrow boxes.	Temporary <b>minor adverse</b> residual effect while replacement habitats establish, reducing to <b>negligible</b> in the long term, which is <b>not significant</b> .
Phase 2a Loss of habitats.		Medium	Low			<p><b>Negligible effect</b> as less habitats lost, becoming <b>Minor beneficial effect</b> in the long term, which is <b>not significant</b>.</p>
Phase 2b Loss of habitats.		Medium	Low			
<b>Schedule 1 birds – Barn owl and Red kite - disturbance</b>						
Phase 1 Risk of disturbance to Sch. 1 nesting birds.	Timing of vegetation clearance works to avoid bird nesting period (March – Aug inclusive). Draft CoCP ( <b>Appendix 4.2</b> , Volume 3 of this PEIR) contains requirement for ornithological watching brief to reduce the risk of disturbance to Schedule 1 species breeding in proximity to the Proposed Development. Noise and light pollution control measures also captured within the draft CoCP.	Low	Medium	For all Phases, the clearance of vegetation could cause the loss of nests or damage/disturbance to nests of Schedule 1 birds during construction of the Proposed Development, as all areas include potential nest sites, however no known sites were identified within the main application site. However, embedded mitigation reduces the likelihood of impacts to schedule 1 nesting birds to a temporary low adverse effect at the county level which equates to a <b>minor adverse effect</b> , which is <b>not significant</b> .	None required	<b>Minor adverse effect</b> , which is <b>not significant</b>
Phase 2a Risk of disturbance to Sch. 1 nesting birds.		Low	Medium		None required	<b>Minor adverse effect</b> , which is <b>not significant</b>
Phase 2b Risk of disturbance to Sch. 1 nesting birds.		Low	Medium		None required	<b>Minor adverse effect</b> , which is <b>not significant</b>
<b>Wintering birds - habitats</b>						
Phase 1 Loss of habitats utilised for foraging / resting.	Replacement habitat within landscape design.	Medium	Low	Loss of habitats including arable and semi-improved grasslands that are used for foraging and shelter by an assemblage of over-wintering birds, including farmland birds such as linnet and skylark. The habitat creation measures will reduce the impact of the loss of	The habitat creation area to the east of the replacement open space will include neutral and calcareous grassland habitat creation. The outer areas (to avoid the	Temporary <b>minor adverse residual effect</b> while replacement habitats establish, reducing to <b>negligible</b> in the
Phase 2a Loss of habitats utilised for foraging / resting.	Replacement habitat within landscape design.	Medium	Low			



Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
Phase 2b Loss of habitats utilised for foraging / resting.	Replacement habitat within landscape design.	Medium	Low	habitats used by nesting and foraging birds. However, it is recognised that time is required for replacement habitats to establish to a level at which they provide an equivalent resource to that loss. The loss of habitats used by over-wintering birds to Phase 1 construction of the Proposed Development represents a temporary adverse impact, of medium magnitude, on this district value receptor. This would result in a <b>minor adverse effect</b> , which is <b>not significant</b> .	runway and flight lines) of these fields will be managed, in accordance with bird strike minimisation measures, to establish rough grassland strips to provide suitable cover and foraging for farmland bird species.	long term which is <b>not significant</b> .
<b>Wintering birds - disturbance</b>						
Phase 1 Risk of disturbance.	Noise and light pollution control measures. Captured within the draft CoCP ( <b>Appendix 4.2</b> , Volume 3 of this PEIR).	Very low	Low	Noise, visual and light pollution generated by construction has the potential to disturb foraging and resting birds using adjacent habitats. This disturbance can result in birds expending additional energy to locate new foraging grounds, which can be detrimental to their ability to maintain sufficient energy to survive the winter. With the implementation of measures, as detailed within the draft CoCP ( <b>Appendix 4.2</b> , Volume 3 of this PEIR) to control noise and light pollution, the disturbance of habitats used by wintering birds as a result of the works represents a temporary adverse impact, of very low magnitude, on this district value receptor. This would equate to a <b>negligible effect</b> , which is <b>not significant</b> .	None required	<b>Negligible effect</b> , which is <b>not significant</b>
Phase 2a Risk of disturbance.		Very low	Low		None required	<b>Negligible effect</b> , which is <b>not significant</b>
Phase 2b Risk of disturbance.		Very low	Low		None required	<b>Negligible effect</b> , which is <b>not significant</b>
<b>Schedule 1 birds – Barn owl and Red kite - loss of habitat</b>						
Phase 1 Loss of foraging habitat.	Replacement foraging habitats within landscape design. These will be located away from the main flight path to avoid bird strike issues.	Low	Medium	Each phase of works will result in the loss of woodland, grassland, arable margin and scrub habitats, which provide foraging opportunities for a local population of barn owl and red kite. No known nest sites are located within proximity to the land required for	Offsite artificial roost provision a suitable distance from the airport. Additional off-site creation of grassland, hedgerows, arable margins and woodland providing	Temporary <b>minor adverse</b> residual while replacement habitats establish, reducing to <b>negligible</b> in the long term.
Phase 2a Loss of foraging habitat.		Low	Medium			

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
Phase 2b Loss of foraging habitat.		Low	Medium	the Phase 1 Works, and therefore it will not result in the loss of any known barn owl or red kite nest sites. Given the time required for replacement habitats to establish to a level at which they support an equivalent foraging resource, the loss of habitats remains a temporary adverse impact, of low magnitude, on these county value receptors. This would equate to a <b>minor adverse effect</b> , which is <b>not significant</b> , decreasing to a <b>negligible effect</b> when vegetation reaches maturity within 10-20 years, which is <b>not significant</b> .	alternative foraging and nesting opportunities for this species.	<b>Negligible effect</b> as less habitats lost, becoming <b>Minor beneficial effect</b> in the long term when previous Phase habitat mitigation matures, which is <b>not significant</b> .
<b>Reptiles – risk of harm</b>						
Phase 1 Risk of killing/injuring.	Supervised, staged clearance of habitats to displace reptiles within the construction site at an appropriate time of year (April – October), as detailed within the Draft CoCP ( <b>Appendix 4.2</b> , Volume 3 of this PEIR).	Low	Low	Phase 1 will result in the loss of grassland, scrub and waterbody habitats at Wigmore Park which are considered likely to provide foraging and shelter opportunities for grass snake (assumed to be present across the site). The works to establish the replacement open space have the potential to impact upon slow worm populations that have been identified in the north of this area, through small scale habitat loss in these margins and the potential to kill or injure reptiles during clearance and habitat establishment. Embedded mitigation reduces this to a low adverse effect at the local level which equates to a <b>minor adverse effect</b> , which is <b>not significant</b> .	Translocation of slow worms (and grass snake if present) to suitable replacement habitat during site clearance within the Main Application Site.	<b>Negligible effect</b> , which is <b>not significant</b>
Phase 2a Risk of killing/injuring.		Low	Low	Phase 2a and 2b will result in the further loss of grassland, scrub and waterbody habitats which are considered likely to provide foraging and shelter opportunities for grass snake (assumed to be present across the site). The removal of which has the potential to kill or injure reptiles during clearance and habitat establishment. Embedded mitigation reduces this to a low		<b>Negligible effect</b> , which is <b>not significant</b>
Phase 2b Risk of killing/injuring.		Low	Low			<b>Negligible effect</b> , which is <b>not significant</b>



Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
				adverse effect at the local level which equates to a <b>minor adverse effect</b> , which is <b>not significant</b> .		
<b>Reptiles - habitat</b>						
Phase 1 Loss of habitat.	Provision of suitable replacement habitat within landscape design.	Medium	Low	The replacement open space and habitat creation measures within the Proposed Development will reduce the effect of the loss of habitats used by reptiles. However, it is recognised that time is required for the replacement habitats to establish to a level at which they provide an equivalent resource to that loss. The loss of foraging habitats to the Phase 1 construction of the Proposed Development represents a temporary adverse impact, of medium magnitude, on these local level receptors. This equates to a <b>minor adverse effect</b> , which is <b>not significant</b> , increasing to a <b>negligible</b> effect when habitats have established, within 5 years following each phase, which is <b>not significant</b> .	Provision of hibernacula/log piles within suitable locations in new and retained habitats, along with further suitable habitat creation and appropriate management.	<b>Minor beneficial effect</b> which is <b>not significant</b> due to the increased areas of appropriate habitat that is secured and managed long term.
Phase 2a Loss of habitat.		Medium	Low			
Phase 2b Loss of habitat.		Medium	Low			
<b>Amphibians (common species) – risk of killing/injuring</b>						
Phase 1 Risk of killing/injuring.	Supervised, staged clearance of suitable habitats within the construction site at an appropriate time of year (April – October) as detailed within the Draft CoCP ( <b>Appendix 4.2</b> , Volume 3 of this PEIR).	Medium	Low	Risk of killing/injuring amphibians species (smooth newts, likely common toad and common frog) during site clearance works required for construction of the Proposed Development. This represents an adverse effect at the local level. However, embedded mitigation reduces the likelihood of impacts to amphibians to a medium magnitude which equates to a <b>minor effect</b> , which is <b>not significant</b> .	Translocation of amphibians to suitable replacement habitat during drain-down of ponds within the Main Application Site.	Temporary <b>minor adverse</b> residual effect while new habitats establish, rising to a <b>negligible effect</b> , which is <b>not significant</b> .
Phase 2a Risk of killing/injuring.		Medium	Low			
Phase 2b Risk of killing/injuring.		Low (small loss of habitat and no ponds)	Low	Risk of killing/injuring amphibians species remains during site clearance works, although for a smaller area of habitat and no loss of ponds. This represents an adverse effect at the local level. However, embedded mitigation reduces the likelihood of impacts to		

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
				amphibians to a low magnitude, which equates to a <b>minor effect</b> , which is <b>not significant</b> .		
<b>Amphibians – loss of aquatic and terrestrial habitats</b>						
Phase 1 Loss of habitat.	Provision of suitable replacement terrestrial habitat within landscape design.	Medium	Low	Loss of one pond and large areas of associated suitable terrestrial habitats, that are likely to be utilised by common amphibians for foraging, shelter and breeding. This represents a medium adverse effect at the local level which equates to a <b>minor effect</b> , which is <b>not significant</b> .	Bird strike risk restricts creation of large waterbodies within the Proposed Development however a wildlife pond and associated terrestrial habitats are proposed within the habitat creation area at the east of the development. This pond (or small group of small ponds) will be designed specifically for amphibians.	Temporary <b>minor adverse</b> residual effect while new habitats establish, rising to a <b>negligible effect</b> which is <b>not significant</b> . impact in the long term, which is <b>not significant</b> .
Phase 2a Loss of habitat.		Medium	Low	Loss of six ponds and associated suitable terrestrial habitats, that are likely to be utilised by common amphibians for foraging, shelter and breeding. This represents a medium adverse effect at the local level which equates to a <b>minor effect</b> , which is <b>not significant</b> .		
Phase 2a Loss of habitat.		Low (small loss of habitat and no ponds)	Low	Loss of associated suitable terrestrial habitats, that are likely to be utilised by common amphibians for foraging, shelter and breeding. This represents a medium adverse effect at the local level which equates to a <b>negligible effect</b> , which is <b>not significant</b> .		
<b>Roman snail – loss of habitat</b>						
Phase 1 Loss of habitat	No habitat loss where Roman snail are present are anticipated as a result of construction of phase 1 of the Proposed Development					
Phase 2a Loss of habitat.	Provision of suitable replacement terrestrial habitat within landscape design.	Medium	Low	Roman snail are present immediately adjacent to the south west of the Proposed Development and potentially within Dairyborn Scarp DWS. Existing habitat management between the fence-lines present at the south west of the Proposed Development already deters this species from the Main Application Site so habitat lost within proximity to the nearby population would not be detrimental to them. However, should any remain present within Dairyborn Scarp DWS, then the	None required	A temporary medium adverse effect at the local level, which equates to a <b>minor adverse effect</b> , which is <b>not significant</b> , decreasing to a <b>negligible</b> effect when habitats have established, within 5 years, which is <b>not significant</b> .

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
				loss of the areas of suitable habitat as part of the AAR would present a loss. This represents a temporary medium adverse effect at the local level, which equates to a <b>minor adverse effect</b> , which is <b>not significant</b> , decreasing to a <b>negligible</b> effect when habitats have established, within 5 years, which is <b>not significant</b> .		
Phase 2b Loss of habitat.	No habitat loss where Roman snail are present are anticipated as a result of construction of phase 2b of the Proposed Development as the existing habitat management between the fence-lines present at the south west of the Proposed Development already deters this species from the Main Application Site so habitat lost within proximity to the nearby population would not be detrimental to them.					
<b>Roman snail - Risk of killing / injury</b>						
Phase 1 Risk of killing / injury.	No direct or indirect effects upon the habitat where Roman snail are present are anticipated as a result of construction of phase 1 of the Proposed Development					
Phase 2a Risk of killing / injury.	To avoid roman snail entering the Proposed Development then appropriate habitat management is required to ensure minimal suitable vegetation between the interior and exterior fence-lines present at the south west of the Proposed Development. This is captured within the Draft LBMP ( <b>Appendix 8.2</b> , Volume 3 of this PEIR).	Medium	Low	Roman snail are present immediately adjacent to the south west of the Proposed Development and potentially within Dairyborn Scarp DWS. Risk of killing/injuring Roman snail during site clearance works required for construction of the Proposed Development. This represents an adverse effect at the local level. Embedded mitigation reduces the likelihood of roman snail entering the construction zone of the Proposed Development in the south west area only. Any remaining population within Dairyborn Scarp DWS could be harmed during site clearance for the AAR. This represents a medium magnitude, on these local level receptors. This equates to a <b>minor adverse effect</b> , which is <b>not significant</b> .	Translocation of Roman snails to suitable remaining habitat during site clearance within the Main Application Site under a Natural England conservation licence.	<b>Negligible effect</b> , which is <b>not significant</b>
Phase 2b Risk of killing / injury.	To avoid roman snail entering the Proposed Development then appropriate habitat management is required to ensure minimal suitable vegetation between the interior and exterior fence-lines present at the south west of the Proposed Development. This is captured within the Draft LBMP ( <b>Appendix 8.2</b> , Volume 3 of this PEIR).	Very low	Low	Roman snail are present immediately adjacent to the south west of the Proposed Development. Risk of killing/injuring Roman snail during site clearance works required for construction of the Proposed Development. This	None required	<b>Negligible effect</b> , which is <b>not significant</b>

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
				represents an adverse effect at the local level. However embedded mitigation reduces the likelihood of roman snail entering the construction zone of the Proposed Development to a very low magnitude, on these local level receptors. This equates to a <b>negligible effect</b> , which is <b>not significant</b> .		
<b>Invertebrates</b>						
Phase 1 Loss of habitat.	Habitat creation within landscape design: edge habitats, early successional bare ground with ruderal habitats and hedgerows.	Medium	Medium	Loss of habitats supporting a notable assemblage of invertebrates to construction of the Proposed Development. This represents a temporary medium adverse effect at the county level, which equates to a <b>moderate adverse effect</b> , which is <b>significant</b> , decreasing to a <b>minor adverse effect</b> when habitats have established, within 5 years, which is <b>not significant</b> .	Enhancement through management of wider 'green corridor' network of hedgerows and trees, translocation of birds-foot trefoil turfs, dead wood retention including standing dead wood where possible as well as off-site agricultural management to create margins with no insecticide usage, and introduction of low intensity grazing regimes are proposed to further mitigate for the loss of invertebrate habitats.	Temporary <b>minor adverse</b> and <b>negligible</b> residual effects while new habitats establish, rising to a <b>negligible</b> impact in the long term, which is <b>not significant</b> once the new grassland, hedgerow and scrub habitats have established within 10-15 years.
Phase 2a Loss of habitat.		Medium	Medium			
Phase 2b Loss of habitat.		Low (smaller area)	Medium			
<b>Invertebrates</b>						
Phase 1 Risk of harm	N/A	Low	Medium	Work during the construction would inevitably result in the death of a range of ground dwelling invertebrates, particularly slower moving, flightless arthropods, which cannot avoid the area. This is unlikely to permanently affect the population dynamics of any community. Direct mortality caused by the construction of Phase 1 would constitute an impact of low magnitude at the county level, that	N/A	<b>Minor adverse</b> residual effect, which is <b>not significant</b> .
Phase 2a Risk of harm		Low	Medium			
Phase 2b Risk of harm		Low	Medium			

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
				equates to a <b>minor adverse</b> effect, which is <b>not significant</b>		
<b>Operation</b>						
<b>SSSIs which fall within 200m of the ARN, comprising Galley and Warden Hills SSSI, Cowslip Meadow SSSI, Dallow Downs and Winsdon Hill SSSI, Smithcombe, Sharpenhoe and Sundon Hills SSSI</b>						
Phase 1 - Air quality changes. No effects on these SSSIs are anticipated as air quality modelling results placed them all well below a 1% change during Phase 1, maximum of 0.007 kgN/ha/yr, and some showing an improvement of 0.004 kgN/ha/yr.						
Phase 2a - Air quality changes. No effects on these SSSIs are anticipated as air quality modelling results placed them all well below a 1% change during Phase 1, maximum of 0.017 kgN/ha/yr, and some showing an improvement of 0.007 kgN/ha/yr.						
Phase 2b - Air quality changes. No effects on these SSSIs are anticipated as air quality modelling results placed them all well below a 1% change during Phase 1, maximum of 0.027 kgN/ha/yr.						
<b>Wigmore Park CWS</b>						
Phase 1 Surface water runoff, and increase lighting.	Drainage Strategy, Lighting design including directional lighting to limit light spill onto adjacent habitats.	Low	Medium	The operation of the temporary surface car parks P5-7 within close proximity to the remaining area of Wigmore Park CWS, has the potential to locally impact on the quantity and direction of surface runoff, and increase lighting, on the temporarily remaining area 8.74ha (56.6%) of CWS resulting in a temporary adverse effect, of low magnitude, on this county value receptor. This equates to a <b>minor adverse effect</b> , which is <b>not significant</b> .	N/A	Temporary <b>adverse effect</b> , of low magnitude, on this county value receptor. <b>Minor adverse effect</b> , which is <b>not significant</b>
Phase 2a and b - No effect as CWS will no longer exist.						
<b>Winch Hill Wood CWS/LWS Ancient Woodland – non Air Quality related effects</b>						
Phase 1 - No anticipated operational impacts on Winch Hill Wood CWS/LWS Ancient Woodland during Phase 1 of the Proposed Development, other than air quality which is captured below.						
Phase 2a Potential for extension of airport platform including car parks P10 and fuel storage facility to locally impact on the quantity and direction of surface runoff, and increase lighting.	Directional lighting to limit light spill onto adjacent habitats. Habitat creation at the margins of the Proposed Development to act as a screen for adjacent habitats.  Drainage design to ensure no substantial change to surface water run off to woodland.	Low	Medium	The extension of the airport platform and creation of long-stay car parking within close proximity to Winch Hill Wood has the potential to change the quantity and direction of surface runoff (due to increased impermeable surfaces and steep bund slopes to the west and north of the woodland), which could lead to degradation of the ancient woodland community. This has the potential to represent an adverse effect at the county level. However, this is reduced to a <b>Minor adverse effect</b> with embedded mitigation that is <b>not significant</b> .	N/A.	<b>Minor adverse</b> , effect which is <b>not significant</b>



Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
Phase 2b Potential for extension of long stay car parks P11 and fuel storage facility to locally impact on the quantity and direction of surface runoff, and increase lighting.	Directional lighting to limit light spill onto adjacent habitats. Additional habitat creation at the margins of the Proposed Development to act as a screen for adjacent habitats.  Drainage design to ensure no substantial change to surface water run off to woodland.	Low	Medium	The extension of the long-stay car parking within close proximity to Winch Hill Wood has the potential to change the quantity and direction of surface runoff (due to increased impermeable surfaces and steep bund slopes to the west and north of the woodland), which could lead to degradation of the ancient woodland community. This has the potential to represent a permanent adverse effect at the county level. However, this is reduced to a <b>Minor adverse effect</b> with embedded mitigation that is <b>not significant</b> .	N/A.	<b>Minor adverse, effect which is not significant</b>
<b>Winch Hill Wood CWS/LWS Ancient Woodland – Air Quality effects</b>						
Phase 1 Air quality changes.	Draft Air Quality Plan measures.	Low	Medium	Winch Hill Wood CWS/LWS/AW was assessed within <b>Chapter 7</b> of this PEIR, as it falls within 200m of the flight path. The assessment used the critical load of 10 kgN/ha/yr and determined that the contribution of the Proposed Development to change exceeds 1% of the relevant air quality objective and Critical Loads, however the maximum nitrogen dose is 0.4 kgN/ha/yr at the edge of the woodland, falling to below this value before moving 10m into the woodland. This lies at the 0.4 kgN/ha/yr guideline for a minimum dose associated with a reduction in 'species richness'. This represents a permanent adverse impact, of low magnitude, on this county value receptor. This equates to a <b>minor adverse, effect which is not significant</b>	Management of woodland for improvement in condition over a 50 year period, as per the Draft LBMP ( <b>Appendix 8.2</b> , Volume 3 of this PEIR).	<b>Minor adverse, effect which is not significant</b>
Phase 2a Air quality changes	Draft Air Quality Plan measures.	Medium	Medium	The Air Quality assessment for Phase 2a determined that the contribution of the Proposed Development to change exceeds 1% of the relevant air quality objective and Critical Loads. Two transects through the woods were assessed and the maximum nitrogen dose was 0.35 kgN/ha/yr	Management of woodland for improvement in condition over a 50 year period, as per the Draft LBMP ( <b>Appendix 8.2</b> , Volume 3 of this PEIR).	Temporary <b>moderate adverse</b> effect in the short term, falling to a <b>minor adverse</b> impact in the long term, which is <b>not significant</b> once the management

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
				for one, which falls below the 0.4 kgN/ha/yr guideline for a minimum dose associated with a reduction in 'species richness', and is therefore considered to be <b>not significant</b> . The second transect was 0.66 kgN/ha/yr at the edge and falling to 0.39 kgN/ha/yr 200m along the transect. This represents a permanent adverse impact, of medium magnitude, on this county value receptor. This equates to a <b>moderate adverse</b> , effect which is <b>significant</b> .		practices implemented shows improvement in the woodland condition overall. These management practices will commence at Phase 1 and so would already be showing benefit by Phase 2a.
Phase 2b Air quality changes	Draft Air Quality Plan measures.	Medium	Medium	The Air Quality assessment for Phase 2b determined that the contribution of the Proposed Development to change exceeds 1% of the relevant air quality objective and Critical Loads. Two transects through the woods were assessed and the maximum nitrogen dose was 0.76 to 0.85 kgN/ha/yr for one moving from the edge of the woods to 200m along the transect, and 1.6 to 0.9 kgN/ha/yr for the second transect moving from the edge of the woods to 200m along the transect. All of these values are above the 0.4 kgN/ha/yr guideline for a minimum dose associated with a reduction in 'species richness'. This represents a permanent adverse impact, of medium magnitude, on this county value receptor. This equates to a <b>moderate adverse</b> , effect which is <b>significant</b> .	Management of woodland for improvement in condition over a 50 year period, as per the Draft LBMP ( <b>Appendix 8.2</b> , Volume 3 of this PEIR).	Temporary <b>moderate adverse</b> effect in the short term, falling to a <b>minor adverse</b> impact in the long term, which is <b>not significant</b> once the management practices implemented shows improvement in the woodland condition overall. These management practices will commence at Phase 1 and so would already be showing benefit by Phase 2b.
<b>Luton Parkway Verges DWS</b>						
Phase 1 – there will be no operational effect on <b>Luton Parkway Verges DWS</b> .						
Phase 2a Potential for shading impacts and trampling	The area of Luton Parkway Verges DWS that falls within the LLAL ownership will be subject to management measures to	Low	Medium	Multi storey car park shading of habitats of DWS together with trampling and littering pressures	In order to reduce recreational pressures, such as trampling and	The mitigation will reduce the recreational



Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
(cut through) as a result of construction of multi-storey carpark directly adjacent to DWS.	promote the diverse botany for which the site is designated, this will include measures such as mowing and removal of arisings, and scrub management to prevent encroachment and shading.			will be a permanent adverse impact, of low magnitude, on the function of the county value site, which equates to a <b>minor adverse effect</b> that is <b>not significant</b> .	littering, upon the designating habitats of the DWS, post and rail fencing will be established to deter 'cut throughs' from the new car park, interpretation boards will be erected to explain the value of the DWS, monitoring and management for litter removal will be enacted. These measures will be detailed within the LBMP ( <b>Appendix 8.2</b> , Volume 3 of this PEIR)	pressure to a <b>negligible</b> residual effect, which is <b>not significant</b> . However no mitigation can be provided for the potential shading effect which remains a <b>minor adverse effect</b> , which is <b>not significant</b>
Phase 2b – there will be no additional operational effect on <b>Luton Parkway Verges DWS</b>						
<b>Kidney and Bull Woods CWS/ Ancient Woodland</b>						
Phase 1 Air quality changes.	Draft Air Quality Plan measures.	Low	Medium	Kidney and Bull Woods CWS/AW was assessment within <b>Chapter 7</b> Air Quality, as it falls within 200m of the flight path. The assessment used the critical load of 10 kgN/ha/yr and determined that the contribution of the Proposed Development to change just exceeds 1% of the relevant air quality objective and Critical Loads, however the maximum nitrogen dose is 0.27 kgN/ha/yr which falls below the 0.4 kgN/ha/yr guideline for a minimum dose associated with a reduction in 'species richness', and is therefore considered to be <b>not significant</b> . This represents a permanent adverse impact, of low magnitude, on this county value receptor. This equates to a <b>minor adverse</b> , effect which is <b>not significant</b> .	N/A	<b>Minor adverse</b> , effect which is <b>not significant</b>
Phase 2a Air quality changes	Draft Air Quality Plan measures.	Low	Medium	The Air Quality assessment for Phase 2a determined that the contribution of the Proposed Development to change exceeds 1% of the relevant air quality objective and Critical Loads,	N/A	<b>Minor adverse</b> , effect which is <b>not significant</b>

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
				<p>however the maximum nitrogen dose is 0.45 and 0.38 kgN/ha/yr at the edge of the woods for each of the two transects (composite site), which for one part of the site falls just above the 0.4 kgN/ha/yr guideline for a minimum dose associated with a reduction in 'species richness'. However, this falls below 0.4 kgN/ha/yr (0.24 and 0.25) before it reaches 10m into the woods. and down to 0.06 kgN/ha/yr once 200m along the transect. This represents a permanent adverse impact, of low magnitude, on this county value receptor. This equates to a <b>minor adverse</b>, effect which is <b>not significant</b>.</p>		
<p>Phase 2b Air quality changes</p>	<p>Draft Air Quality Plan measures.</p>	<p>Low</p>	<p>Medium</p>	<p>The Air Quality assessment for Phase 2b determined that the contribution of the Proposed Development to change exceeds 1% of the relevant air quality objective and Critical Loads. The maximum nitrogen dose is 0.55 and 0.59 kgN/ha/yr at the edge of the woods for each transect (composite site), which falls above the 0.4 kgN/ha/yr guideline for a minimum dose associated with a reduction in 'species richness'. However, this falls below 0.4 kgN/ha/yr (0.36 and 0.31) before it reaches 10m in, and drops to 0.09 and 0.06 kgN/ha/yr by 200m along the transect. This represents a permanent adverse impact, of low magnitude, on this county value receptor. This equates to a <b>minor adverse</b>, effect which is <b>not significant</b>.</p>	<p>N/A</p>	<p><b>Minor adverse</b>, effect which is <b>not significant</b></p>
<p><b>Ancient Woodland and Wildlife Sites in addition to those assessed separately above. Comprising Chalk Wood, George Wood, Furzen Wood, Slaughters Wood, and Burnwell Wood – all of which fall within 200m of the ARN and/or flightpath</b></p>						
<p>Phase 1 - Air quality changes. No effects on these sites of Ancient Woodland and Wildlife Sites are anticipated as Air Quality modelling results placed them all below a 1% change during Phase 1.</p>						

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
Phase 2a Air quality changes	Draft Air Quality Plan measures.	Low	Medium	These sites were assessment within <b>Chapter 7</b> of this PEIR, as they fall within 200m of the ARN and/or flight path. The assessment used the critical load of 10 kgN/ha/yr for all of these woodland sites, and determined that the contribution of the Proposed Development to change just exceeds 1% of the relevant air quality objective and Critical Loads, however the maximum nitrogen dose is 0.27 kgN/ha/yr which falls below the 0.4 kgN/ha/yr guideline for a minimum dose associated with a reduction in 'species richness'. This represents a permanent adverse impact, of low magnitude, on these county value receptors. This equates to a <b>minor adverse</b> , effect which is <b>not significant</b> .	N/A	<b>Minor adverse</b> , effect which is <b>not significant</b>
Phase 2b Air quality changes	Draft Air Quality Plan measures.	Low	Medium	These sites were assessment within <b>Chapter 7</b> Air Quality, as they fall within 200m of the ARN and/or flight path. The assessment used the critical load of 10 kgN/ha/yr for all of these woodland sites, and determined that the contribution of the Proposed Development to change just exceeds 1% of the relevant air quality objective and Critical Loads, however the maximum nitrogen doses range from 0.11 to 0.23 kgN/ha/yr which falls below the 0.4 kgN/ha/yr guideline for a minimum dose associated with a reduction in 'species richness'. Transect data shows the value for each site decreases going into the woodlands. This represents a permanent adverse impact, of low magnitude, on these county value receptors. This equates to a <b>minor adverse</b> , effect which is <b>not significant</b> .	N/A	<b>Minor adverse</b> , effect which is <b>not significant</b>
<b>Habitats – none – refer to the designated site and ancient woodland section for effects on those areas of ancient woodland scoped in to the assessment for air quality effects</b>						

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
<b>Species</b>						
<b>Orchids</b>						
Phase 1 Recreational pressure.	The park has been designed to include defined footpaths to channel the public away from sensitive retained habitats. The embedded mitigation which forms part of phases 1, 2a and 2b construction includes creation of neutral and calcareous grassland, and also bare chalk slopes, which are highly suitable for pyramidal and bee orchids, as detailed within the Draft LBMP ( <b>Appendix 8.2</b> , Volume 3 of this PEIR).	Low	Medium	The degradation of the orchid population in the replacement open space as a result of recreational pressures represents a permanent adverse impact, of low magnitude, on this district value receptor. This equates to a <b>minor adverse</b> , effect which is <b>not significant</b> .	The translocation exercise will utilise two receptors sites, one within the replacement open space, where the orchids will be accessible by members of the public and therefore subject to a degree of recreational pressure although the footpaths will reduce this, and another location within the wider habitat creation area away from areas of anticipated high footfall.	Following the successful establishment of translocated orchids to the two receptor areas, a permanent adverse impact, of very low magnitude, on this district value receptor remains. This equates to a residual <b>negligible effect</b> , which is <b>not significant</b> .
Phase 2a and b	The operation of Phase 2a and b of the Proposed Development are not anticipated to result in residual effects upon the orchid assemblage					
<b>Badger</b>						
All phases – disturbance through noise, lighting and recreational pressure.	Directional lighting to limit light spill onto adjacent habitats. Additional habitat creation at the margins of the Proposed Development to act as a screen for adjacent habitats.	Very low	Low	The disturbance of retained setts and habitats used by badger through lighting, noise and as a result of recreational pressures to social groups already used to high levels of disturbance associated with the existing airport and open spaces, represents a permanent adverse impact, of very low magnitude, on this low value receptor. This equates to a <b>negligible effect</b> , which is <b>not significant</b> . By later stages, habitats created in Phase 1 and Phase 2a will have matured and provide additional screening of effects.	The park has been designed to include defined footpaths to channel the public away from sensitive retained habitats.	A permanent adverse impact, of very low magnitude, on this low value receptor remains. This equates to a residual <b>negligible effect</b> , which is <b>not significant</b> .
<b>Bats</b>						
Phase 1 Disturbance of habitats and roosts.	Lighting design including directional lighting to limit light spill onto adjacent habitats. Landscape mitigation at the margins of the airport development and associated infrastructure to act as a screen between the Proposed Development and adjacent	Low	Medium	The Phase 1 works include the provision of temporary car parks adjacent to the retained section of Wigmore Park, along with increased take-off/landing activity. The increased light and noise spill onto adjacent habitats, including	Strengthening of hedgerows and woodland corridors within the wider landscape to provide ecological connectivity	<b>Negligible effect</b> , which is <b>not significant</b>

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
	habitats, including bund and landscape planting. Habitat creation measures within the Proposed Development, i.e. at distance from the noise source, to provide alternative roosting and foraging opportunities.			those utilised as bat flight lines, could result in displacement and loss of foraging habitat. This has the potential to represent an adverse effect at the district level assemblage. However, the embedded mitigation measures reduces this to a <b>minor adverse effect</b> , in the short term, which is <b>not significant</b> , reducing to a <b>negligible effect</b> in the long term as screening habitats mature.	and new commuting routes for bats.	
Phase 2a Disturbance of habitats and roosts.		Medium (closer to more important habitats)	Medium	Increased take-off/landing activity and the extension of the airport platform and associated infrastructure has the potential to result in increased light and noise spill onto adjacent habitats, including those utilised as bat flight lines, resulting in displacement and loss of foraging habitat from larger areas of retained habitats in close proximity. This has the potential to represent an adverse effect at the district level assemblage. However, the embedded mitigation measures reduces this to a <b>moderate adverse effect</b> , in the short term, which is <b>not significant</b> , reducing to a <b>minor adverse effect</b> in the long term as habitats mature.		<b>Negligible effect, which is not significant</b>
Phase 2b Disturbance of habitats and roosts.		Low	Medium	The increased take-off/landing activity and the operation of the airport infrastructure within proximity to retained habitats will result in an increase in noise and light levels. This has the potential to represent an adverse effect at the district level assemblage. However, the embedded mitigation measures reduces this to a <b>minor adverse effect</b> , in the short term, which is <b>not significant</b> , reducing to a <b>negligible effect</b> in the long term as screening habitats mature.		<b>Negligible effect, which is not significant</b>
<b>Bird assemblage</b>						



Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
All phases Bird strike risk.	Landscape design includes habitats appropriate to manage the bird strike risk to an acceptable level. Appropriate habitat management regime described in the Draft LBMP ( <b>Appendix 8.2</b> , Volume 3 of this PEIR).	Very Low	Low	The increased frequency of aircraft movements associated with the airport expansion may increase the risk of bird strike. However, a detailed assessment of the potential for a significant increase in bird strike risk has been undertaken, and is reported within <b>Appendix 8.3</b> , Volume 3 of this PEIR. In summary the Bird Strike Risk Assessment, concludes that with the continuation of the monitoring and control measures employed by the airport operator there will be no significant increase in bird strike risk.  Due to the implementation of appropriate management of habitats within proximity of the aerodrome to deter birds, there would be a <b>negligible</b> impact on bird populations in the local area, which is <b>not significant</b> .	The creation of suitable nesting and foraging habitats further from the Proposed Development may result in these areas being preferentially used by species such as red kite and barn owl, that are currently a bird strike risk, with known nesting sites immediately south and east of the Proposed Development.	Once habitat creation areas further from the Proposed Development have matured, there may be a <b>negligible effect</b> , which is <b>not significant</b> .
<b>Schedule 1 birds – Barn owl and Red kite</b>						
All Phases Disturbance to Schedule 1 birds (such as barn owl and red kite).	Replacement foraging habitats within landscape design. These will be located away from the main flight path to avoid bird strike issues.  The park has been designed to include defined footpaths to channel the public away from sensitive retained habitats	Low	Medium	The increased frequency of vehicle movements on roads around the airport, and increase in flights may increase disturbance to Schedule 1 birds, such as barn owl and red kite, nesting within proximity to these roads, and changes to the location of the public open space in relation to these sites.  This has the potential to represent an adverse effect at the district level assemblage. However, embedded mitigation measures reduces this to a low magnitude on these county level receptors, resulting in a <b>minor adverse effect</b> , which is <b>not significant</b> .	Offsite artificial roost provision a suitable distance from the airport.  Additional off-site creation of grassland, hedgerows and woodland providing alternative foraging and nesting opportunities for this species.	Temporary <b>minor adverse residual effect</b> while replacement habitats establish, rising to <b>negligible</b> in the long term, which is <b>not significant</b> .
<b>Roman snail</b>						
All Phases Risk of killing / injury.	To avoid roman snail entering the operational site then appropriate habitat management is required to ensure minimal vegetation between the interior and exterior fence-lines present at the south west of the Proposed Development.	Very low	Low	Roman snail are present immediately adjacent to the south west of the Proposed Development.  Risk of killing/injuring Roman snail during operation of the Proposed	None required	<b>Negligible effect</b> , which is <b>not significant</b> .



Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Value	Description of effect and significance	Additional Mitigation	Residual Effect
				Development through their encroachment into the active airport. However embedded mitigation reduces the likelihood of roman snail entering the Proposed Development to a very low magnitude, on these local level receptors. This equates to a <b>negligible effect</b> , which is <b>not significant</b> .		

## 8.15 Completing the assessment

- 8.15.1 The desk based assessment and data purchase will need updating prior to the ES, in order to refresh the data and check for more recent information. Both Bedfordshire and Luton Biodiversity Recording and Monitoring Centre (BLBRMC) and Herts Environmental Records Centre (HERC) data will be refreshed.
- 8.15.2 A series of detailed field surveys have already been completed and are included within this report. Wintering bird surveys remain ongoing during the 2021/22 winter season and will inform the baseline for the assessment for the ES.
- 8.15.3 Further surveys will be conducted as appropriate should any be deemed necessary during the detailed design process as a result of potential changes to the Proposed Development.
- 8.15.4 A Draft Ecology Baseline Report is provided as **Appendix 8.1**, Volume 3 of this PEIR. Where relevant additional data is collected the baseline report will be updated and appended to the ES.
- 8.15.5 Further assessment will be undertaken of potential air quality impacts as a result of the Proposed Development upon designated nature conservation sites (including local sites) within 200m of the ARN and flightpath, that are sensitive to changes in air pollution such as NO<sub>x</sub>. This will be used to inform the ES.

**COMPETENT EXPERTS**

<b>Topic</b>	<b>Role</b>	<b>Company</b>	<b>Qualifications/competencies/experience of author</b>
Biodiversity	Author	Arup	BSc Biology, MSc Ecology and Management of the Natural Environment, 10 years experience as an ecology consultant - specialising in terrestrial ecology, MCIEEM.
Biodiversity	Author	AECOM	BSc Zoology and Marine Biology, MSc Ecology, 18 years experience as an ecology consultant – specialising in terrestrial ecology, MCIEEM
Biodiversity	Technical Reviewer	AECOM	BSc Environmental Science, MSc Estuarine and Coastal Zone Management, 25 years experience in environmental management including 12 years as an ecology consultant – specialising in terrestrial and aquatic ecology
Biodiversity	Technical Reviewer	Arup	BSc Geography, MSc Environmental Management, 21 years experience as an environmental consultant – specialising in terrestrial ecology, MCIEEM, CEnv.

## GLOSSARY AND ABBREVIATIONS

<b>Term</b>	<b>Definition</b>
AAR	Airport Access Road
AIA	Arboricultural Impact Assessment
ANPS	Airports National Policy Statement
APIS	Air Pollution Information System
ARN	Affected Road Network
AW	Ancient Woodland
BAP	Biodiversity Action Plan
BLBRMC	Bedfordshire and Luton Biodiversity Recording and Monitoring Centre
BNG	Biodiversity Net Gain
BOA	Biodiversity Opportunity Area
CAA	Civil Aviation Authority
CBC	Central Bedfordshire Council
CIEEM	Chartered Institute of Ecology and Environmental Management
CIIC	In-combination Climate Change Impact
CoCP	Code of Construction Practice
CRoW	Countryside and Rights of Way
cSAC	candidate Special Area of Conservation
CWS	County Wildlife Site
DAS	Discretionary Advice Service
dDCO	draft Development Consent Order
DWS	District Wildlife Site
EA	Environment Agency
EclA	Ecological Impact Assessment
ECoW	Ecological Clerk of Works
eDNA	environmental DNA
EIA	Environmental Impact Assessment
ES	Environment Statement
EU	European Union
ha	Hectare
HCC	Hertfordshire County Council
HERC	Herts Environmental Records Centre
HMWT	Herts and Middlesex Wildlife Trust
HoPI	Habitat of Principal Importance

<b>Term</b>	<b>Definition</b>
HRA	Habitat Regulations Assessment
ICCI	In-combination Climate Change Impacts
IRZ	Impact Risk Zone
kgN/ha/yr	Kilogram of Nitrogen per hectare per year
km	Kilometre
LLAL	London Luton Airport Limited
LBC	Luton Borough Council
LBAP	Local Biodiversity Action Plan
LBC	Luton Borough Council
LBMP	Landscape and Biodiversity Management Plan
LDF	Local Development Frameworks
LLAOL	London Luton Airport Operations Limited (the airport operator)
LNR	Local Nature Reserve
LWS	Local Wildlife Site
m	Metre
m <sup>2</sup>	Metre squared
m <sup>3</sup>	Metre cubed
µgm-3	Microgram per cubic metre
mppa	Million passenger per annum
MAGIC	Multi-Agency Geographic Information for the Countryside
NE	Natural England
NERC	Natural Environment and Rural Communities
NHDC	North Hertfordshire District Council
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxide
NPPF	National Planning Policy Framework
NSER	No Significant Effects Report
NSIPs	Nationally Significant Infrastructure Projects
NVC	National Vegetation Classification
ODPM	Office of the Deputy Prime Minister
PPG	Planning Practice Guidance
PEIR	Preliminary Environmental Information Report
pSPA	potential Special Protection Area
SAC	Special Area of Conservation

<b>Term</b>	<b>Definition</b>
SO <sub>2</sub>	Sulphur Dioxide
SPA	Special Protection Area
SSSI	Sites of Special Scientific Interest
TCPA	Town and Country Planning Act
WFD	Water Framework Directive
WTBCN	Wildlife Trust for Bedfordshire, Cambridgeshire and Northamptonshire
ZOI	Zone of Influence



## REFERENCES

---

- Ref 8.1 Natural Environment and Rural Communities (NERC) Act (2006). *Natural Environment and Rural Communities Act 2006, Chapter 16*. Her Majesty's Stationary Office, London.
- Ref 8.2 Natural England. (2021). The Biodiversity Matrix 3.0 (JP039). July 20201.
- Ref 8.3 Environment Act (2021). Her Majesty's Stationary Office, London.
- Ref 8.4 European Union (Withdrawal Agreement) Act 2020. Her Majesty's Stationary Office, London.
- Ref 8.5 The Conservation of Habitats and Species Regulations 2017 (as amended). Her Majesty's Stationary Office, London.
- Ref 8.6 Natural Environment and Rural Communities (NERC) Act (2006). *Natural Environment and Rural Communities Act 2006, Chapter 16*. Her Majesty's Stationary Office, London.
- Ref 8.7 Countryside and Rights of Way Act (2000). Her Majesty's Stationary Office, London.
- Ref 8.8 The Hedgerows Regulations (1997). Her Majesty's Stationary Office, London.
- Ref 8.9 Wildlife and Countryside Act (1981) (as amended). Her Majesty's Stationary Office, London.
- Ref 8.10 Ministry of Housing, Communities & Local Government, (2021). Revised National Planning Policy Framework.
- Ref 8.11 Department for Transport (2014) National Planning Statement for National Networks
- Ref 8.12 Department for Environment Food and Rural Affairs (2011). *Biodiversity 2020: A strategy for England's wildlife and ecosystem services*. August 2011. Defra, London.
- Ref 8.13 Luton Borough Council. (2017) Local Plan 2011–2031.
- Ref 8.14 Central Bedfordshire Council. (2021) Central Bedfordshire Local Plan 2015-2035.]
- Ref 8.15 North Hertfordshire District Council. (2016) Proposed Submission Draft Local Plan for 2011-2031.
- Ref 8.16 Bedfordshire and Luton Biodiversity Recording and Monitoring Centre. Biodiversity Action Plan
- Ref 8.17 <https://www.hertfordshire.gov.uk/microsites/building-futures/a-sustainable-design-toolkit/technical-modules/landscape-and-biodiversity/basic-principles.aspx>
- Ref 8.18 Bedfordshire County Council. (2008). The Rebuilding Biodiversity in South Bedfordshire and Luton.
- Ref 8.19 Herts and Middlesex Wildlife Trust. (2018). Hertfordshire's Ecological Networks: A report on the current situation and priorities for restoration.
- Ref 8.20 Department for Transport. (2018). Airports National Policy Statement: new runway capacity and infrastructure at airports in the South East of England. (June 2018).
- Ref 8.21 Office of the Deputy Prime Minister (ODPM) (2005) Circular 06/2005: Biodiversity and Geological Conservation - Statutory Obligations and Their Impact Within The Planning System. (August 2005) ODPM.]
- Ref 8.22 Chartered Institute of Ecology and Environmental Management (CIEEM) (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine, (Version 1.1 updated September 2019). CIEEM, Winchester
- Ref 8.23 The Planning Inspectorate (November 2017) Advice note Ten: Habitats Regulations Assessment relevant to nationally significant infrastructure projects (V8) (2017) The Planning Inspectorate. Bristol
- Ref 8.24 Civil Aviation Authority. (2017) *Wildlife Hazard Management at Aerodromes. CAP 772*. West Sussex: Civil Aviation Authority.
- Ref 8.25 Joint Nature Conservation Committee (2010). *Handbook for Phase 1 habitat survey – a technique for environmental audit*.
- Ref 8.26 Joint Nature Conservation Committee (2006). *National Vegetation Classification: Users' handbook..*
- Ref 8.27 Defra (2007). Hedgerow Survey Handbook: A standard procedure for local surveys in the UK. 2<sup>nd</sup> Edition..
- Ref 8.28 The Mammal Society. *Surveying Badgers* (1989)..
- Ref 8.29 Natural England. *Protection of Badgers Act 1992 (as amended): Guidance on 'Current Use' in the definition of a Badger Sett* (2009)..
- Ref 8.30 Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3<sup>rd</sup> Edition). London: The Bat Conservation Trust
- Ref 8.31 English Nature. (2006). *The Dormouse Conservation Handbook. 2nd Edition* (2006). English Nature..
- Ref 8.32 Chanin, P. (2003). *Ecology of the European Otter. Conserving Natura 2000 Rivers Ecology Series No. 10*. English Nature, Peterborough.
- Ref 8.33 Crawford, A. (2003). *Fourth Otter Survey of England 2000-2002*. Environment Agency, Bristol.
- Ref 8.34 Dean, M, Strachan, R., Gow, D. and Andrews, R. 2016. *The Water Vole Mitigation Handbook (the Mammal Society Mitigation Guidance Series)*. Eds Fiona Matthews and Paul Chanin. The Mammal Society, London.

- 
- Ref 8.35 English Nature (2001). *Great Crested Newt Mitigation Guidelines*. English Nature, Peterborough.
- Ref 8.36 Amphibian and Reptile Group UK (2010). Advice Note 5: Great Crested Newt Habitat Suitability Index..
- Ref 8.37 Froglife. (2016). *Surveying for reptiles*..
- Ref 8.38 Gent, T. & Gibson, S. (eds). (2003) *Herpetofauna Workers' Manual (revised reprint)*. Peterborough: JNCC
- Ref 8.39 Marchant J.H. (1983). *BTO Common Bird Census Instructions*. British Trust for Ornithology, Tring.
- Ref 8.40 Gilbert G., Gibbons D.W. and Evans J. (1998). *Bird Monitoring Methods: A Manual of Techniques for Key UK Species*. Sandy: Royal Society for the Protection of Birds.
- Ref 8.41 The Barn Owl Trust. (2012). *Barn Owl Conservation Handbook: A comprehensive guide for ecologists, surveyors, land managers and ornithologists*. Pelagic Publishers, UK.
- Ref 8.42 E. Pollard (1975) Aspects of the Ecology of *Helix pomatia* L. *Journal of Animal Ecology*. Vol 44. No.1.
- Ref 8.43 Chartered Institute of Ecology and Environmental Management (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.1 updated September 2019*.
- Ref 8.44 Ratcliffe, D.A. (1977). *A Nature Conservation Review*, Cambridge University Press
- Ref 8.45 Eaton MA, Aebischer NJ, Brown AF, Hearn RD, Lock L, Musgrove AJ, Noble DG, Stroud DA and Gregory RD, (2015). Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man. *British Birds*, 108, 708-746.
- Ref 8.46 Royal Society for the Protection of Birds (RSPB). *Wildlife guides birds A-Z: House Sparrow*.
- Ref 8.47 Forestry Commission, Natural England. (2018). *Ancient Woodland, Ancient Trees and Veteran Trees: Protecting them from Development*. Natural England.
- Ref 8.48 Ancient Woodland, Ancient Trees and Veteran Trees: Protecting them from Development. Natural England.
- Ref 8.49 Natural England. (2018) .Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations. Version: June 2018'
- Ref 8.50 Highways England (2019). *Design Manual for Roads and Bridges, LA 105 Air quality*. (Revision 0, November 2019).