7 ECOLOGY

7.1 INTRODUCTION

7.1.1 This Chapter addresses the ecological impacts of the Proposed Development and has been prepared by Harris Lamb Property Consultancy (HLPC). This Chapter is based on details set out in **Chapter 1- Introduction** and **Chapter 3- Application Site and Proposed Development** of the ES and Illustrative Landscape Strategy (**Figure 3.4**).

7.1.2 In accordance with the EIA Regulations (2017) the ecological assessment and ES chapter have been carried out by competent experts, comprising ecologists within the Chartered Institute for Ecology and Environmental Management (CIEEM). The ES Chapter has been undertaken by Dr Holly Smith MCIEEM who has over 17 year's ecological consultancy experience and demonstrable experience in producing Ecological Impact Assessments (EcIA) for similar developments in recent years.

7.1.3 This EcIA identifies potential ecological constraints to the Proposed Development and indicates where avoidance and mitigation measures are necessary. It also identifies opportunities for ecological enhancement to the Site.

7.2 METHODOLOGY

7.2.1 An EcIA has been undertaken in line with current best practice guidance (CIEEM, 2018)[1] and includes:

- A desk-based assessment to identify any records of protected and/or notable habitats and species, and designated nature conservation sites in the vicinity of the Site.
- A Site survey comprising an UK Habitats classification Survey including the recording of any evidence of the presence of protected, priority and/or Invasive Non-Native Species (INNS).
- An assessment of the potential impacts of the works on the habitats and species present at the Site and the surrounding areas.
- The design of suitable mitigation and avoidance measures to ensure ecological impacts are kept to a minimum and proposals for suitable enhancement measures.

7.2.2 No consideration of decommissioning was undertaken in this assessment as the Proposed Development is considered to be permanent.

7.2.3 At the time of writing this report formal EIA Scoping had not been undertaken with the LPA.

7.2.4 A Preliminary Ecological Appraisal (PEA) was initially commissioned which included the results of Phase 2 ecology surveys considered to be required to determine the likely presence/absence of key species (Appendix 7.1). **Appendix 7.1- PEA** provides the basis for this EcIA and information is not repeated here. Based on the findings of the PEA the following ecological species receptors were scoped into this EcIA:

- Amphibians and reptiles
- Birds

[1] CIEEM (2018) Guidelines for Preliminary Ecological Appraisal, 2nd edition. Chartered Institute of Ecology and Environmental Management, Winchester

- Bats
- Badgers (see separate confidential **Appendix 7.2- Confidential Badger Addendum** submitted with the planning application)
- Hedgehogs
- Invertebrates

7.2.5 The following ecological receptors were scoped out of this EcIA (details and justification together with an assessment of non-EIA impacts can be found in **Appendix 7.1-PEA**):

- Hazel dormice
- Otters and water voles and white-clawed crayfish
- Legally controlled species

7.2.6 The ecological assessment is based on a search for existing information combined with field surveys. The different elements are discussed below.

Desk-based assessment

7.2.7 The desktop study was undertaken in July 2021 and included:

- Thames Valley Environmental Records Centre (TVERC),
- Northamptonshire Biodiversity Records Centre (NBRC),
- Multi Agency Geographic Information for the Countryside (MAGIC) website[2],
- Ordnance Survey (OS)[3], and
- Aerial imagery[6].

7.2.8 The geographical extent of the search area for biodiversity information was related to the significance of sites and species and potential zones of influence which might arise from development within the Site. For this Site the following search areas were considered to be appropriate:

- 10km around the site boundary for sites of International Importance (e.g. Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar site));
- 2km around the site boundary for sites of National or Regional Importance (e.g. Sites of Special Scientific Interest (SSSI)), protected or otherwise notable species and non-statutory designated sites of County Importance (e.g. Local Wildlife Sites (LWS);
- 1km for ancient woodland, and
- 2km for biological records.

7.2.9 The relative proximity and/or accuracy and age of records for protected and notable species were considered during the appraisal to assist in determining the potential impact of the Proposed Development on these key ecological components.

7.2.10 No previous ecological information relating to the Site was identified.

Field survey

Flora

[2] www.magic.gov.uk accessed June 2021

[3] www.bing.co.uk accessed June 2021

7.2.11 In June 2021, HLPC carried out a UK Habitats classification Survey[4] of the Site. The survey was carried out by Principal Ecologist Rob Harrison MCIEEM. The survey was undertaken in accordance with guidance from UK Habitats Classification methodology[5] and included identification of flora of importance e.g., rare or vulnerable species as well as invasive non-native species.

7.2.12 The Minimum Mappable Units (MMU) for the survey was set at the standard 25m2 and 5m lengths for high value sites.

Fauna

7.2.13 The fauna included within this assessment is based on the habitats present, data from the desk-based searches, and took into consideration the following legislation[6]:

- Wildlife and Countryside Act 1981 (as amended);
- The Protection of Badgers Act 1992;
- The Conservation of Habitats and Species (as amended) 2017;
- The Countryside and Rights of Way Act 2000;
- The NERC Act 2006, and
- Environment Act 2021.

Amphibians

7.2.14 Waterbodies within 250m of the Site boundary were identified using online Ordnance Survey maps and aerial imagery[7] and were assessed, for their suitability to support great-crested newts *Triturus cristatus* (GCN) using a Habitat Suitability Index (HSI). The HSI is a numerical index, between 0 and 1. Values close to 0 indicate unsuitable habitat, 1 represents optimal habitat (Oldham et al., 2000)[8].

7.2.15 A total of 12 ponds were identified within 250m of the Proposed Development, with 10 not separated by a potential barrier to amphibian dispersal. A Habitat Suitability Index (HSI) assessment was undertaken of accessible ponds where considered approrpaite with guidance produced by Oldham *et al* in June 2021. The assessment involved determining the overall quality of the ponds for GCN inhabitancy based on the scoring of ten suitability indices. **Figure 6** within **Appendix 7.1- PEA** shows the location of identified ponds.

7.2.16 Subsequent eDNA samples were taken from ponds that met the habitat suitability threshold and where access was permitted. Water environmental DNA (eDNA) samples were taken by an ecologist and were sent for analysis at Sure Screen Scientific, in accordance with methodology approved by Natural England (Biggs et

[4] Survey methodology was completed under licence agreement: © UKHAB LTD, under licence. No onward licence implied or provided. All rights reserved https://ukhab.org/commercial-eula/.

[5] UK Habitats Classification (https://ukhab.org/) [accessed February 2022]

[6] See www.legislation.gov.uk

[7] www.bing.com/maps accessed June 2021

[8] Oldham *et al*., 2000. Evaluating the suitability of habitat for the Great Crested Newt (*Triturus cristatus*). Herpetological Journal 10, 143-155

al., 2014[9]). Twenty samples were taken from the pond, spaced as evenly as possible around the pond margin, and targeted to areas where there is vegetation which may be being used as egg laying material and open water areas which newts may be using for displaying. Subsequent samples were returned to Sure Screen Scientific for DNA processing.

Birds

7.2.17 Bird species identified at the time of survey were noted and nesting birds recorded as seen. An assessment of habitats was undertaken to determine the likely value to breeding and foraging birds.

7.2.18 A three-visit breeding bird survey was undertaken by Steve Haynes, a professional ornithologist on behalf of Falco Ecology Ltd. The territory mapping methodology was based on a reduced survey effort of the Common Bird Census (CBC) as described in both Gilbert *et al*., 1998[10] and Bibby *et al.,* 2000[11]. The surveys were carried out during the mid-June to early July 2021 period. Full details are provided in **Appendix 7.1-PEA.**

7.2.19 At the time of writing this report an additional two survey visits were being undertaken in April and May 2022 to provide an early season survey. The result will be issued as an addendum.

7.2.20 Details on the survey timings and conditions are given in **Table 7.2** & **7.3.**

Table 7.1: Breeding bird survey timings.

Visit	Date	Time (h)
1	19.06.2021	05:35 - 08:35
2	30.06.2021	05:15 - 08:00
3	07.07.2021	05:30 - 08:20

Table 7.2: Breeding bird survey weather conditions.

Visit	Visibility	Wind direction	Wind speed	Rain	Cloud	Air Temperature °C
1	Good	SE	1	Slight rain until 07:00 h	8/8	Not recorded
2	Good	NE	0-1	Nil	8/8	13-15
3	Good	SSW	1-2	Nil	8/8	13-15

7.2.21 Birds heard and seen outside the site were recorded to an approximate distance of 100m. Accurate territory counts outside the site were not obtained; however, the data collected provides an indication of what key species are in the vicinity of the site. The direction of travel of the BBS route was reversed on each visit to prevent temporal bias. The survey route followed the site boundary and along hedgerows within the site.

[9] Biggs J *et al*., (2014). Analytical and methodological development for improved surveillance of the Great Crested Newt. Defra Project WC1067. Freshwater Habitats Trust: Oxford.

[10] Gilbert, G., Gibbons, D.W. & Evans, J. 1998. Bird Monitoring Methods. Royal Society for the Protection of Birds. Pelagic Publishing Limited: Exeter.

[11] Bibby, C.J., Burgess, N.D. & Hill, D.A. 2000. Bird Census Techniques. Second edition. London: Academic Press.

Bats

Tree Assessments

7.2.22 At the time of survey the trees to be felled were not confirmed. A general appraisal of the trees was undertaken from ground level to inform the likelihood of further survey being required in respect of roosting bats at the reserved ,matters stage when it is confirmed which trees would be affected by the Proposed Development.

Building Assessments

7.2.23 The initial PEA (**Appendix 7.1**) survey identified seven buildings with potential to support roosting bats (see **Figure 2** within **Appendix 7.1** for building map). Brief architectural descriptions of the buildings are given in **Table 7.4**.

Table 7.3: Brief building descriptions.

Building number	Description
B1	Abandoned farmhouse building with a double pitched roof.
B2	An open fronted single storey brick-built barn with a corrugated roof over timber roof beams.
B3	A double height brick-built barn with a pitched roof clad in corrugated metal to the front and corrugated cement board to the rear over timber trusses.
B4	A single storey open fronted barn constructed from brick in a similar shape and style to Building 2 and forms the eastern wing to the barn complex. The barn contains a metal clad roof over timber trusses.
B5	An open fronted and sided timber framed shed with partial timber walls and a pitched metal clad roof with some missing sections. Internally the shed is open to the roof with no loft area.
B6	A single storey, single pitched lean-to canopy with open front and sides with a metal tin roof. The building is located behind the northern gable of building 2.
B7	A large, prefabricated concrete framed open barn with concrete sheet cladding to two walls. The barn contains a corrugated concrete sheet roof with concrete ridge tiles.

7.2.24 An inspection of these buildings, to assess suitability to support roosting bats and look for evidence of bat inhabitancy, was undertaken on 12/05/2021 by HLPC Associate Ecologist Stuart Silver MCIEEM (licence reference 2015-14674-CLS-CLS) and Dr Holly Smith MCIEEM. With reference to guidance contained within the Bat Conservation Trust's (BCT) Good Practice Guidelines, 2nd edition (Collins, 2016), the survey comprised an internal (where accessible) and external inspection of the building using a Clulite torch, ladders, and binoculars where necessary.

7.2.25 The building was searched for signs of roosting bats (i.e., live, or dead bats, guano, feeding remains, staining etc.) and all potential bat roosting locations within the structure were recorded. During the survey Potential Roosting Features (PRF) for bats were recorded following current best practice. On the basis of visual inspection findings, the building was assigned a level of bat roosting potential from the categories negligible, low, moderate, and high.

Automated Static Bat Detector and Transect Surveys

7.2.26 The potential for the site and immediate surrounds to support foraging and commuting bats was also assessed across the whole site with particular regard given to the presence of habitat features such as continuous treelines and hedgerows providing good connectivity across the site and wider landscape.

7.2.27 A monthly transect survey was carried out between June and October 2021 by licenced bat ecologist James Pattenden (Class 2 licence number 2015-106-CLS-CLS and Bat Low Impact Class Licence RC162, Annex B and D) of Cotswold Ecology Ltd. Due to late instruction, surveys in April and May were not able to be carried out. Surveys in June and July were carried out to include the bat breeding period (mid-May to August).

7.2.28 Due to the overall size of the site, the survey area was split into three separate transect routes with all routes walked simultaneously by three experienced ecologists. The transect routes are shown on **Figure 3** in **Appendix 7.1- PEA**. The surveys targeted habitats and features suitable for foraging and commuting activity, including woodland edges, hedgerows and standing water.

7.2.29 The surveyors were equipped with Echo Meter Touch Pro and Elekon Batlogger M bat detectors to listen and view the echolocations of bats during the surveys. The transect routes were walked at a steady pace, during which all visual and audible bat activity was recorded and if required, later analysed using BatSound, Bat Explorer and Kaleidoscope Pro software.

7.2.30 Weather conditions during the surveys were considered suitable for bat activity and are shown in **Table 7.5** below. All timings were based on best practice guidelines by Collins, 2016[12].

Table 7.4: Transect survey timings and weather conditions.

Survey Month	June		July		August		September		October	
Date	10.06.2021		21.07.2021		24.08.2021		22.09.2021		21.10.2021	
Sunset Time (h)	21:24		20:17		20:11		19:04		17:59	
Survey Time (h)	Start	End	Start	End	Start	End	Start	End	Start	End
	21:20	23:33	20:15	22:20	20:11	22:15	19:04	21:05	17:59	20:00
Temperature (°C)	20	19	21	19	16	15	18	16	8	8
Cloud (Octas)	8	8	0	0	1	1	1	1	4	3
Wind (Beaufort)	1	3	1	1	2	2	2	2	2	2
Precipitation	None		None		None		None		None	
General	Warm but overcast with fresh breeze at end of the		Very hot week (>30°C in the day)		Light cloud and a gentle breeze		Dry following week of showers		Cold, clear and calm	

[12] Bat Conservation Trust (BCT) 2016. Bat Surveys for Professional Ecologists, Good Practice Guidelines, 3rd Edition

Survey Month	June	July	August	September	October
	survey				

7.2.31 Three static detectors were deployed on the site per month in areas of the site aimed to obtain an appraisal of bat activity across the site. Within the areas, locations of the static detectors were chosen based on those locations most likely to be used by foraging and commuting bats and locations where static detectors were able to be deployed without interference from cattle (see **Figure 4** within **Appendix 7.1- PEA**).

7.2.32 During June and July, two Song Meter (SM) Mini detectors and one SM2 detector were deployed. Following the destruction of the SM2 detector by cattle during the July survey, three SM Mini detectors were deployed in August, September, and October. Recordings made were subsequently analysed using Kaleidoscope Pro software and bat species and the number of passes were identified.

7.2.33 The static detector surveys were completed monthly between June and October 2021, between 7 and 12 nights per month. The detectors were programmed to begin recording 30 minutes before sunset and cease recording 30 minutes after sunrise each night. Details on the survey timings and conditions are given in **Table 7.6.**

Table 7.5: Static detector survey timings and weather conditions.

Date Deployed	Date Collected	No. of Survey Nights	Nightly Temperature Range (°C)
09.06.2021	17.06.2021	8	09.06.21: 16-21°C 10.06.21: 17-21°C 11.06.21: 12-18°C 12.06.21: 12-26°C 13.06.21: 15-24°C 14.06.21: 10-18°C 15.06.21: 15-28°C 16.06.21: 15-25°C
21.07.2021	01.08.2021	11	21.07.21: 16-28°C 22.07.21: 16-27°C 23.07.21: 15-19°C 24.07.21: 16-19°C 25.07.21: 16-19°C 26.07.21: 18-23°C 27.07.21: 16-18°C 28.07.21: 12-17°C 29.07.21: 15-19°C 30.07.21: 14-15°C 31.07.21: 15-16°C
01.08.2021	13.08.2021	12	01.08.21: 12-18°C 02.08.21: 11-15°C 03.08.21: 14-17°C

Date Deployed	Date Collected	No. of Survey Nights	Nightly Temperature Range (°C)
			04.08.21: 13-19°C 05.08.21: 15-16°C 06.08.21: 13-17°C 07.08.21: 14-17°C 08.08.21: 14-17°C 09.08.21: 13-16°C 10.08.21: 13-20°C 11.08.21: 14-19°C 12.08.21: 16-20°C
08.09.2021	20.09.2021	11	08.09.21: 16-27°C 09.09.21: 17-19°C 10.09.21: 16-19°C 11.09.21: 13-19°C 12.09.21: 13-18°C 13.09.21: 14-18°C 14.09.21: 14-16°C 15.09.21: 11-18°C 16.09.21: 12-21°C 17.09.21: 13-19°C 19.09.21: 13-20°C
21.10.2021	28.10.2021	7	21.10.21: 8-13°C 22.10.21: 8-9°C 23.10.21: 10-12°C 24.10.21: 11-12°C 25.10.21: 10-13°C 26.10.21: 14-15°C 27.10.21: 13-14°C

Nocturnal Surveys (Buildings)

7.2.34 The surveys followed guidance produced by BCT (Collins, 2016) and involved up to five surveyors equipped with Echo Meter Touch Pro detectors and positioned strategically around the buildings to capture all identified access/egress points. An infrared capable video recorder and infrared flood light were also used during the surveys as required to provide enhanced coverage of key areas. The camera(s) were positioned to cover key areas during each survey visit to provide enhanced monitoring on surveys after dark when observations by human eye can no longer be made. All camera surveys were recorded with video footage reviewed after the survey to identify potential access and egress of roosting bats. All surveys were led by licenced bat ecologist Stuart Silver MCIEEM, (licence reference 2015-14674-CLS-CLS).

7.2.35 The dusk emergence surveys commenced 15 minutes prior to sunset and ceased 90 minutes after sunset and the dawn re-entry surveys commenced 90 minutes prior to sunrise and ceased 15 minutes after sunrise. Details on the survey timings and weather conditions are given in **Table 7.7**. These conditions were considered optimal for bat activity.

Table 7.6: Nocturnal survey timings and weather conditions.

Date	Sunset / Sunrise (h)	Start Time (h)	End Time (h)	Air Temperature (°C)	Weather
28.06.2021	21:30	21:15	23:00	16	Mild, dry, dull, and very overcast.
29.06.2021	04:48	03:00	05:03	13	Dry and overcast with a light breeze.
19.07.2021	21:14	20.59	22:46	25	Dry, calm, and warm with clear skies.
20.07.2021	05:09	03:41	05:24	17	Dry and calm with clear skies.
02.08.2021	20:54	20:39	22:24	16	Cloudy, and cool but dry.
03.08.2021	05:30	04:00	05:45	11	Foggy and cool but dry.

Hibernation

7.2.36 Hibernation surveys were undertaken on 13th January 2022 and 15th February 2022 by licenced bat ecologists Stuart Silver and Josh Randhawa. The survey consisted of a visual inspection of features of potential interest to hibernating bats located on the exterior of the farmhouse (B1) and internally and externally to the barn buildings (B2 – B7) (where accessible) for hibernating bats. Searches included inspection of gaps to masonry, gaps around doors and lintels both internally and externally and any other crevice forming features around the building. Inspection was carried out by torch and video endoscope as required with ladders used where required to access identified features.

Badgers

7.2.37 Full survey results are provided in a separate confidential appendix (**Appendix 7.2- Confidential Badger Addendum**).

Other notable species

7.2.38 Signs of other notable species were recorded as seen. An assessment of the habitat species-richness and diversity was undertaken to determine the likelihood of the of supporting populations of rare invertebrate assemblages.

7.3 METHODS OF ASSESSMENT AND LEGISLATIVE AND POLICY FRAMEWORK

Nature Conservation Evaluation

7.3.1 This section evaluates the nature conservation importance of the Site in terms of its relative importance in a geographical context.

7.3.2 The nature conservation sites, habitats and species that have been identified as important ecological features have been evaluated based on the criteria given in **Table 7.9**. The importance of the feature is defined with reference to the geographical context of the Site i.e., the specific importance of the Site to each of

the habitats or species populations identified as being present within it or making use of it.

7.3.3 Individual ecological receptors (habitats and species that could be affected by the Proposed Development) were assigned levels of importance for nature conservation in one of the following categories:

- International.
- UK.
- National.
- County.
- District.
- Local, or
- Within the immediate zone of influence only which is considered to be Site level.

7.3.4 For a given receptor, determination of value includes consideration of the size, conservation status and quality of the species, population, or habitat feature.

Valuation of Habitats

7.3.5 Some sites are automatically assigned a nature conservation value through designation. The reason for designation is taken into account in assessing potential impacts. Designated sites are considered at the following levels:

- • International – Special Areas of Conservation (SAC), Special Protected Areas (SPA) and Ramsar Sites.
- • National – Sites of Special Scientific Interest (SSSI) in England.
- • County or District – sites designated by Local Authorities or County Wildlife Trusts and others.

7.3.6 The reason for designation is taken into account in assessing potential impacts. Habitats that are not subject to specific nature conservation designations have been valued against habitats included in the Section 41 list (list of species and habitats of principal importance in England) as required under Section 41 of the Natural Environment and Rural Communities [NERC] Act, 2006.

7.3.7 In determining values of habitats consideration has also been given to national and local Habitat Action Plans and the Ancient Woodland Inventory (AWI). This consideration has been given in conjunction with critical appraisal of the size, status and quality of the habitat affected.

Valuation of Species Populations

7.3.8 In ascribing values to populations of species, consideration has been given to the legal status of species, as well as their population size and conservation status on the Site and within the geographic area. Certain species receive protection under various pieces of legislation, and this has been taken into account when determining value. Legislation considered includes:

- Wildlife and Countryside Act 1981 (as amended);
- The Protection of Badgers Act 1992;
- The Conservation of Habitats and Species Regulations 2017 (as amended)
- The NERC Act 2006
- The CRoW Act 2000
- The Environment Act 2021

7.3.9 The rarity of the species in the context of status, i.e., whether populations of a species are declining either nationally or at a more local level has also been considered.

7.3.10 The presence of invasive alien species or injurious weeds is considered to represent an ecological dis-benefit.

Method of impact assessment

7.3.11 The assessment of ecological impacts has been undertaken following current best practice provided by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018).

7.3.12 This assessment identifies the potential effects of the Proposed Development on biodiversity within the Site boundary and wider Zone of Influence extending up 10km from the Site depending on the type of impact and ecological feature under consideration. It determines the significance of the identified effects for the construction and operational phases.

7.3.13 Ecological features include nature conservation sites, habitats, species assemblages / communities or populations or groups of species. The assessment of the significance of predicted impacts on ecological features is based on both the 'importance' of a feature and the nature and magnitude of the impact that the project will have on it. Impacts may be direct (e.g., the loss of species or habitats), or indirect (e.g. effects due to noise, dust or disturbance). The impact assessment process involves:

- Identifying and characterising impacts;
- Incorporating measures to avoid and mitigate (reduce) these impacts;
- Assessing the significance of any residual effects after mitigation;
- Identifying appropriate compensation measures to offset residual effects; and
- Identifying opportunities for ecological enhancement.

7.3.14 The assessment includes potential impacts (direct, indirect, secondary and cumulative) on each ecological feature determined as important from all phases of the project and describes in detail the impacts that are likely to be significant, making reference to the following characteristics as set out in CIEEM (2018):

- Positive or negative
- Extent
- Magnitude
- Duration
- Timing
- Frequency
- Reversibility

7.3.15 The key sources of impact to the nature conservation interests of the area resulting from the implementation of the Proposed Development may arise as direct and indirect effects, examples of which are given below:

<u>Direct Effects:</u>

- Direct mortality as a result of construction activity.
- Habitat loss (land-take), where the severity of impact is directly related to the amount of habitat lost and the conservation value of that habitat.

- Habitat fragmentation (severance of habitats and/or wildlife corridors linking them). This can lead to reduced genetic diversity and increase the likelihood of species being lost.

Indirect Effects:

- Including disturbance (visual, noise or vibration), dust deposition, incidental vehicle trafficking, water discharges and surface runoff. These impacts may affect habitats both within and outside the footprint of the Proposed Development.

7.3.16 Impacts may be either temporary or permanent in nature. Temporary effects typically occur during the construction phase of a scheme. It should be appreciated that temporary impacts on habitats of high ecological value may have as great or greater impact as permanent loss of less valuable habitats.

7.3.17 The magnitudes of impacts are evaluated in terms of their predicted effect on the integrity of an ecological receptor, where integrity is defined as **"the coherence of ecological structure and function that enables the feature to be maintained in its present condition"** (IEEM, 2006). Consideration is given to the nature and duration of the disturbance, its reversibility, timing, and frequency as well as any cumulative effects and the potential for impact avoidance or minimisation.

Defining significance

7.3.18 After assessing the impacts of the proposal, all attempts should be made to avoid and mitigate ecological impacts. Once measures to avoid and mitigate ecological impacts have been finalised, assessment of the residual impacts are undertaken to determine the significance of their effects on ecological features (CIEEM, 2018).

7.3.19 For the purpose of EcIA, 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Conservation objectives may be specific (e.g., for a designated site) or broad (e.g., national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local (CIEEM, 2018).

7.3.20 Significant effects encompass impacts on the structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance, and distribution). Significant effects are qualified with reference to a geographic scale; European, national, regional, county, district, local and Site (CIEEM, 2018).

7.3.21 For the purposes of the EIA Regulations effects at a district or above level are generally considered to be 'significant' under the EIA Regulations, unless otherwise stated.

7.3.22 **Table 7.9** shows the factors that have been considered in the determination of significant effects on ecological features.

Table 7.7: Determining ecologically significant effects.

Ecological Feature	Consideration
Designated sites	Will the project undermine the site's conservation objectives? Will the project positively or negatively affect the conservation status of habitats or species for which the site is designated? Will the project have positive or negative effects on the condition of the site or its interest/qualifying features?

	Will the project remove or change any key characteristics? Will there be an effect on the nature, extent, structure, and function of component habitats? Will there be an effect on the average population size and viability of component species? Will there be an impact on wider ecosystem functions and processes?
Habitats	Will the project positively or negatively affect the conservation status of the habitat? Will it affect its extent, structure, and function as well as its distribution and its typical species within a given geographical area?
Species	Will the project positively or negatively affect the conservation status of the species? Will it affect its abundance and distribution within a given geographical area?

Cumulative effects

7.3.23 The project team confirmed any relevant plans or projects with the potential to act in-combination with the proposed development which could increase the impact on the Site's biodiversity.

Scoping Criteria

7.3.24 A Scoping Opinion has not been determined with the Local Planning Authority and the chapter has therefore been written based on professional judgement. Accordingly, the ecological assessment considers the following potential effects:

- Construction phase- Loss of vegetation, loss of habitat supporting the following protected species identied through the PEA; invertebrates, amphibians, reptiles, birds, bats, badgers, hedgehogs. Pollution impacts arising during construction, temporary construction lighting.

- Operation phase -Habitat creation, habitat creation for supporting known protected/notable species, recreational impacts.

Assessment limitations and assumptions

7.3.25 The assessment for designated sites is based on site citations provided by the local biological record holder and no visits have been made to designated sites.

7.3.26 Ecological surveys are limited by factors that affect the presence of plants and animals, such as the time of year, weather, migration patterns and behaviour. The initial survey was undertaken in June which is an optimal time of year to undertake botanical surveys and to categorise the habitats present.

7.3.27 UK Habitats Classification survey aimed to characterise the habitat on site and is not intended to give a complete list of plant species present. All surveys capture a snap shot of data recorded on the day.

7.3.28 The UK Habitats Classification survey does not constitute a full botanical survey, or a Phase 2 pre-construction survey that would include accurate GIS mapping for invasive or protected plant species.

7.3.29 Any absence of desk study records cannot be relied upon to infer absence of a species/habitat as the absence of records may be a result of under-recording within the given search area.

7.3.30 The badger survey was undertaken at an ideal time of year when vegetation had died back, and sett entrances could be easily observed. Access was possible to the majority of the site; however, some mammal paths were unable to be followed entirely due to dense vegetation and areas of cattle grazing retricted safe access in some areas.

7.3.31 Bat survey limitations cattle in barn preventing internal deployment of camera during last survey.

7.3.32 It was not considered safe to enter the house (B1) due to the building being structurally damaged and dangerous and surveys were limited to external surveys. Dense vegetation around the farmhouse (B1) made survey observations difficult tatthe southern and western elevations.

7.3.33 The majority of ecological data remain valid for only short periods due to the inherently transient nature of the subject. The survey results contained in this report are considered accurate for one to two years, assuming no significant considerable changes to the site conditions.

7.3.34 This report assumes that construction will commence within 1-2 years of the date of the assessment in accordance with the British Standard 42020:2013 unless otherwise stated.

7.3.35 Cattle were grazing the majority of the fields throughout all survey visits and on occasion limited access where surveyors considered it unsafe to work.

7.3.36 It was not possible to access P9 outwith the site which are located within private gardens and permission to request access was not granted at the time of survey.

7.3.37 Not all hedgerows could be inspected along their full length due to safety concerns with cattle being present on site. However all hedgerows were considered to be largely the same composition based on observations where safe to do so with limited species diversity and frequent management as s such the general conditional of hedgerows on site was considered possible to determine.

7.4 EXISTING BASELINE CONDITIONS

Baseline Data and Survey Information

Internationally designated sites for nature conservation

7.4.1 No internationally designated sites for nature conservation were identified within 10km of the Site.

Nationally designated sites for nature conservation designation

7.4.2 No nationally designated sites for nature conservation were recorded within 2km of the Site.

Non-statutorily designated sites for nature conservation designation

7.4.3 Two non-statutorily designated sites were identified within 2km of the Site (**Table 7.10**). None were recorded on Site.

Table 7.8: Non-statutorily designated sites identified within 2km of the site.

Name of Site	Approx. Distance and Direction from the Site	Brief Description
Disused railway west of Chacombe LWS	1.4km north	This is a section of the disused railway that runs east of Banbury has large areas of scrub habitat. Scrub is an uncommon habitat throughout much of Oxfordshire and provides important habitat for birds. The Cherwell Biodiversity Action Plan recognises the importance of scrub as there are especially few areas of scrub in the district. Without management scrub develops into woodland as trees establish which is the case on parts of this site. There are also areas of rough grassland with colourful wildflowers.
Grimsbury reservoir and wood DWS	1.3km west	Grimsbury Reservoir is the largest area of standing water in North Oxfordshire. It is fed by the River Cherwell and used both as a water supply and for sporting activities. There is a walk around two sides of the reservoir accessible for members of the public which link up with the canal towpath. It allows good views of any birds using the waterbody. To the north of the reservoir, there is a small plantation woodland. It is a nature reserve managed by Banbury Ornithological Society Reserve for Thames Water.

7.4.4 Numerous potential Local Wildlife Sites (pLWS) were also identified within 2km during the data search, with the closest being Cherwell Country Park, c. 500m west of the site. Cherwell Country Park includes wet grassland and fen on the floodplain of the River Cherwell. There are also sedge filled ditches and areas of rough grassland along a section of a disused railway.

7.4.5 These sites are considered to be of importance to nature conservation up to a district to county level.

Known Priority Habitat

7.4.6 Two sections of Priority Habitat were identified on site or adjacent to Site using www.magic.gov.uk. One stand of deciduous woodland occurs within the north-eastern corner of the Site and extends beyond the boundaries. A second area of deciduous woodland lies adjacent to the Site boundary on the south-eastern aspect. These sites are considered to be of importance to nature conservation up to Local level.

Ancient woodland

7.4.7 No ancient or semi-natural woodlands were identified within 1 km of the Site.

Habitats on site

7.4.8 The habitats described below are mapped in **Figure 7.4** Site photographs provided in **Appendix 7.1-PEA**.

Modified grassland – g4 11 59 75 190 364

7.4.9 The majority of the site is comprised of modified grassland (see **Figure 5** within **Appendix 7.1-PEA** for habitat map). The grassland is heavily cattle grazed with hedgerows forming the field boundaries. A small number of fields have stands of scattered gorse *Ulex europaeus* scrub and field ponds. Species recorded included perennial rye-grass *Lolium perenne*, Yorkshire fog *Holcus lanatus*, daisy *Bellis perennis*, dandelion *Taraxacum officinalis* agg., cock's foot *Dactylis glomerata*, ribwort plantain *Plantago lanceolata,* white clover *Trifolium repens*, common stinging nettle *Urtica dioica*, meadow foxtail *Alopecurus pratensis* and greater stitchwort *Stellaria holostea*. Density of species was recorded at five per m^2.

7.4.10 The grassland on site is classified as g4 (modified grassland) under the primary hierarchy of the UK Habitats Classification with the secondary codes 10 (scattered scrub), 59 (cattle grazed), 75 (active management), 190 (hedgerow with trees) and 364 (natural pond).

7.4.11 This habitat is widespread both locally and nationally and is considered to be of importance to conservation at the Site level only.

Modified grassland – g4 11 16

7.4.12 In association with the farm buildings is a further area of modified grassland but with a different character. This area has grown rank and appears to have been a former garden and contains a large proportion of tall ruderal herbs typically associated with nutrient enrichment, presumably from the use of this area for cattle movements.

7.4.13 Species recorded included perennial rye-grass, Yorkshire fog, cock's foot, ribwort plantain, cleavers *Gallium aparine*, common stinging nettle, bramble *Rubus fruticosus* agg. and greater willowherb *Epilobium hirsutum*.

7.4.14 This habitat is widespread both locally and nationally and is considered to be of importance to conservation at the Site level only.

Mixed scrub – h3h 10

7.4.15 Areas of scrub are present in areas associated with boundaries and field corners.

7.4.16 Species recorded include hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, bramble, bracken *Pteridium aquilinum*, White bryony *Bryonia dioica* and guelder rose *Viburnum opulus*.

7.4.17 This habitat is widespread both locally and nationally and considered to be of Site level importance to nature conservation.

Scrub – h3e 10

7.4.18 Small areas of scattered scrub are present within fields to the eastern part of the site. The scrub is predominantly common gorse *Ulex europaeus*.

7.4.19 The scrub on site is classified as h3e (gorse scrub) under the primary hierarchy of the UK Habitats Classification with the secondary codes 10 (scattered scrub).

7.4.20 This habitat is widespread both locally and nationally and considered to be of Site level importance to nature conservation.

Hedgerows – h2 47 81 190

7.4.21 There are 42 hedgerows present on site, consisting of those forming the site boundaries and those forming internal field boundaries. Some hedgerows on site contain mature trees. Not all hedgerows could be inspected along their full length due to safety concerns with cattle being present on site.

7.4.22 Species recorded included; Hawthorn Crataegus monogyna, blackthorn Prunus spinosa, bramble Rubus fruticosus agg., holly Ilex aquifolium, oak Quercus robur, Ash Fraxinus excelsior hazel Corylus avellana, elder Sambucus nigra, beech Fagus sylvatica, holly Ilex aquifolium. Hedgerows typically had standard trees and some were banked. No hedgerow surveyed had greater than five species and as such due to the lack of species diversity recorded within accessible portions and lack of supportive features of hedgerows the hedgerows are not considered to be important hedgerows under the Wildlife and Landscape criteria of Hedgerow Regulations (1997).

7.4.23 The linear habitat of hedgerows is classified as h2 (hedgerows) under the primary hierarchy of the UK Habitats Classification with the secondary codes of 47 (native), 81 (managed), and 190 (hedgerow with trees).

7.4.24 The hedgerows are considered to qualify as Priority Habitat due to consisting predominantly (i.e. 80% or more cover) of at least one woody UK native species.

7.4.25 Collectively the hedgerows on site are considered to be of Site to Local importance for nature conservation, primarily due to the habitat connectivity they provide.

Coniferous Woodland – w2 36 48 77

7.4.26 Coniferous woodland is present on Site in the north east corner. This is plantation coniferous woodland and consists predominantly of Scot's pine *Pinus sylvestris* and leylandii *Cupressus* × *leylandii* which has become overgrown with no significant visible ground flora.

7.4.27 The coniferous woodland is classified as w2 (coniferous woodland) under the primary hierarchy of the UK Habitats Classification with the secondary codes of 36 (plantation), 48 (non-native) and 77 (neglected).

7.4.28 This habitat is considered to provide limited opportunity for biodiversity due to the monoculture nature of the plantation and dense shading leading to lack of understorey.

7.4.29 This habitat is considered to be of Site level importance to nature conservation.

Mixed Woodland – w1h 36

7.4.30 Mixed woodland is present in the north east corner of the site. Species recorded include Scott's pine, beech, hazel, birch, oak and horse chestnut.

7.4.31 The mixed woodland is classified as w1h (Other woodland; mixed) under the primary hierarchy of the UK Habitats Classification with the secondary code 36 (plantation).

7.4.32 This habitat is considered to provide good opportunity for biodiversity due to the mix of species present and diversity of habitats this provides within a woodland structure.

7.4.33 This habitat is considered to be of Local level importance to nature conservation.

Other broadleaved Woodland – w1g 37

7.4.34 Several small pockets of broadleaved woodland are also present across the site. Species in these areas include oak, birch, hawthorn, hazel, beech, ash and horse chestnut.

7.4.35 The broad woodland is classed as w1g (Other broadleaved woodland) under the primary hierarchy of the UK Habitats Classification with the secondary code 37 (semi-natural woodland).

7.4.36 This habitat type is considered of high value for biodiversity and offers good habitat structure for a range of fauna.

7.4.37 This habitat is considered to be of Site to Local level importance to nature conservation.

Buildings – u1b5 88

7.4.38 Buildings on site are associated with the farmhouse and barns to the north of the site. These buildings have been assessed for their potential to support bats and are discussed fully within Section 7.6 and are scoped out of further habitat assessment.

Bare ground – u1b 69 73 115

7.4.39 Bare ground is present on site associated with access tracks. These areas are considered to offer negligible potential for biodiversity and are not considered further within this report.

Ponds – r1 19 39 362

7.4.40 Twelve ponds were recorded within 250m of the site. Of those five are located within the site boundary, namely Pond 1, 3, 4, 6 and 7 as shown on **Figure 6** within **Appendix 7.1- PEA.**

7.4.41 Pond 1 on site held some water at the time of survey and was surrounded and encroached by terrestrial vegetation including creeping bent *Agrostis stolonifera*, nettle *Urtica dioica* and bramble *Rubus fruticosus* agg. It had high algae cover. A small area of open water was surrounded by reed canary grass *Phalaris arundinacea*.

7.4.42 Pond 3 on site was a shallow field pond with surrounding common hawthorn. The pond held minimal water and was very shallow at approximately 10cm deep. The pond showed signs of heavy poaching by cattle. Species present included perennial rye-grass, creeping bent, floating sweet-grass *Glyceria fluitans* and other species that had encroached from the surrounding modified grassland community.

7.4.43 Pond 4 on site was dry at the time of survey and completely encroached and shaded by bramble. It was considered not to typically hold water.

7.4.44 Pond 6 on site was a small field pond shaded by hawthorn. The pond was very heavily poached by cattle and heavily churned up with poor water clarity and water quality. The water was approximately 10cm deep and did not contain any aquatic plants other than sparse occurrences of the algae *Cladophora glomerata* agg.

7.4.45 Pond 7 on site was another field pond shaded by hawthorn and bramble. The water depth was approximately 0.5m deep. The pond contained a sparse aquatic

plant cover, but species included water forget-me-not *Myosotis scorpiodes*, creeping bent, the algae *Cladophora glomerata* agg. and lesser duckweed *Lemna minor*.

7.4.46 Ponds on site are classified as r1 (Standing open water and canals) under the UK Habitat Classification with the secondary codes 19 (Ponds (Priority habitat)), 39 Freshwater – man-made) and 362 (Artificial lake or pond).

7.4.47 Ponds on site were not considered to qualify as a UK Priority Habitat as they are heavily affected by cattle with low water and high eutrophication and therefore not considered likely to support exceptional assemblages of key biotic groups or ppecies of high conservation importance.

7.4.48 Collectively pond habitat within the site is considered to be of Site level importance to nature conservation.

Species

Amphibians

7.4.49 No records of great crested newt were identified by TVERC and NBRC. A single record of common toad *Bufo bufo*, which is a species of principal importance, was identified c. 1.4 km from the site in 2012.

7.4.50 The habitats on site were considered suitable for foraging and sheltering opportunities for great crested newt and common amphibians. The mixture of grassland, hedgerow, scrub, and woodland habitat provides terrestrial habitat for the species.

7.4.51 Twelve ponds were identified within 250m of the site from aerial mapping, five of which lie within the site boundaries (P1, 3, 4, 6 and 7 (on Figure 6 within Appendix 7.1). P8 and P10 were removed from consideration as they are separated from site by a major road network, creating a barrier to dispersal. P11 and P12 were no longer present on inspection and were also removed from this assessment.

7.4.52 It was not possible to access P5 which was located within private gardens and permission to request access was not granted at the time of survey. P9 upon review was a swimming pool associated with a school and was scoped out of further assessment.

7.4.53 The remaining six ponds (Ponds 1, 2, 3, 4, 6, and 7) were subject to HSI assessments and subsequent eDNA samples were taken from those that met the habitat suitability threshold, with two ponds considered to have suitability (P1, P7). The HSI results are presented below in Table 7.12. Pond 2 was completely dry during the amphibian breeding season and P3 and P4 were heavily cattle poached, highly visibly nutrified and very shallow.

Table 7.9: Habitat Suitability Index results.

ARGUK GCN HSI Calculator							
	Pond Name	P1	P2	P3	P4	P6	P7
	Grid Ref	SP 48022 42608	SP 48146 42620	SP 47563 42287	SP 47799 42026	SP 47664 41726	SP 47325 41890
SI No	SI Description	SI Value	SI Value	SI Value	SI Value	SI Value	SI Value
1	Geographic location	1	1	1	1	1	1
2	Pond area	0.4	0.2	0.2	0.3	0.5	0.8
3	Pond permanence	0.1	0.1	0.1	0.1	0.1	1
4	Water quality	0.01	0.01	0.01	0.01	0.01	0.67
5	Shade	0.5	0.2	1	0.2	0.3	0.3
6	Water fowl effect	1	1	1	1	1	0.67
7	Fish presence	1	1	1	1	1	1
8	Pond Density	1	1	1	1	1	1
9	Terrestrial habitat	0.67	0.67	0.67	0.67	0.67	0.67
10	Macropyhyte cover	0.3	0.3	0.4	0.3	0.3	0.4
	HSI Score	**0.36**	**0.31**	**0.37**	**0.32**	**0.35**	**0.70**
Pond suitability (see below)		Poor	Poor	Poor	Poor	Poor	Good

Categorisation of HSI Score by Lee Brady	
HIS Score	**Pond Suitability**
< 0.50	Poor
0.50 - 0.59	Below average
0.60 - 0.69	Average
0.70 - 0.79	Good
> 0.80	Excellent

7.4.54 Only Pond 7 was considered to have 'good' suitability to support amphibians. All other ponds scored as 'poor' in the assessment. An eDNA sample was taken from Pond 7 and additionally from Pond 1 (as vegetation suggested it would hold water for a good proportion of the year, albeit it was nutrified and shallow with very limited egg-laying material present). P1 and P7 both returned negative eDNA results which are presented in **Appendix 7.1-PEA**.

7.4.55 Suitable habitat for common amphibians is present on and adjacent to site. No records of great crested newt were identified during the data consultation or 2021 survey effort and based on these data it is not considered likely that great-crested newts will be a receptor with respect to the Proposed Development.

7.4.56 The ponds on site, whilst likely to dry out and have signs of high levels of eutrophication, could support populations of common amphibians such as common frog, and common toad and smooth newts. The terrestrial habitats are largely of limited value being heavily grazed by cattle, but hedgerows and areas of woodland and scrub may provide terrestrial habitats for these species at a Site level.

Birds

7.4.57 Multiple records of bird species within 2 km of the site were identified by TVERC and NBRC. Some species recorded are listed on the Birds of Conservation Concern Red List such as cuckoo *Cuculus canorus*, grasshopper warbler *Locustella naevia,* grey wagtail *Motacilla cinerea,* and kittiwake *Rissa tridactyla*. In addition, records of barn owl *Tyto alba*, peregrine *Falco peregrinus*, osprey *Pandion haliaetus,* redwing *Turdus iliacus* and kingfisher *Alcedo atthis* were identified, which are listed on Schedule 1 Part 1 of the Wildlife and Countryside Act 1981. All records were identified within the nearby District Wildlife Site Grimsbury Reservoir and surrounding areas.

7.4.58 The pasture fields are considered to be of negligible value to birds of conservation concern with exception of skylark *Alauda arvensis* which was recorded on site but given the high levels of disturbance of grassland habitats by grazing cattle which are rotated around the site, the grassland habitats are considered to be of only limited value to skylark. Habitat features such as hedgerows and wooded areas supported most of the bird species recorded on site.

7.4.59 A total of 43 species were recorded during the 2021 BBS survey (see Appendix 7.1 PEA report for full details) Of these, 17 were species of conservation concern, including ten that showed evidence of breeding or holding territory within the site. Territory holding and non-territory holding species of conservation concern are summarised in **Table 7.13** and **Table 7.14**, respectively.

Table 7.10: Species of conservation concern breeding or holding territory within the site and wider survey area.

Species	Number of territories recorded within site (number within survey area)	Notes
Cuckoo	0(1)	One bird present to the east of the site on Visit 1 of the survey. A probable breeding species given the time of year of the sighting and the presence of suitable host species in the local area.
Stock Dove	9(10)	Commonly recorded within the site with nine territories identified. Pairs were utilising natural nest sites (e.g., in trees) and within farm buildings (e.g., Huscote Farm).
Kestrel	1(1)	An active nest was present within the site. Breeding was confirmed with chicks in the nest.
Skylark	1(1)	One territory in grassland in the west of the site.
Song Thrush	5(5)	Five territories identified from suitable areas (woodland and hedgerow with scattered trees) within the site.
Mistle Thrush	1(1)	One territory within woodland in the south of the site was the only one identified during the survey.
Dunnock	12(16)	Common within the site with 12 pairs considered to be holding territory in areas of scrub, woodland, and hedgerows. Four pairs in the southeast of the survey area outside the site.
Bullfinch	1(1)	One territory in a hedgerow in the centre of the site.
Linnet	3(3)	Three pairs considered to be holding territory in scrub and hedgerow areas within the site.

Species	Number of territories recorded within site (number within survey area)	Notes
Yellowhammer	3(3)	Three pairs considered to be holding territory in scrub and hedgerow areas within the south of the site.

Table 7.11: Species of conservation concern not considered to be holding territory.

Species	Notes
Swift	No swift territories were located within the site or the survey area during the surveys. Small foraging flocks were observed over the site on visits 2 and 3. Likely to be breeding in period properties beyond the survey area.
Little ringed plover	No observations of little ringed plover were recorded within the site during the survey. An observation of a single individual was recorded within the adjacent western field, which appeared to have a sustainable urban drainage systems (SuDS) pond created within it. The bird was present in suitable breeding habitat.
Black-headed gull	Steady streams of birds recorded in flight over the site. Not observed foraging within the site during the surveys. No breeding habitat was present within the site or survey area.
Lesser black backed gull	No territories were located within the site during the survey period. Birds were recorded foraging within the site during the survey period. A peak flock count of 60 birds was recorded on Visit 2, although it was considered that there ~150 individuals within the site on Visit 2.
Red kite	Two records during the survey period. A bird flew west over the site on Visit 2. One flew over the northern survey area on Visit 3. No breeding behaviour was observed during the surveys and limited suitable nesting habitat exists.
Peregrine	One flew south over the site on Visit 1. No breeding habitat was present within the site; however, pylons were present within the northern survey area which are known to provide suitable nesting sites.
Starling	Starlings were not recorded breeding within the site. Suitable nesting habitat was present at Huscote Farm. Post breeding foraging flocks were recorded within the site with a peak count of 35 birds on Visit 3.

7.4.60 A further 26 bird species (not of conservation concern) were recorded, many of which were considered likely to be breeding or holding territory within site and/or surrounds but none were recorded in particularly notable numbers or densities. Further information and a full species list can be found in **Appendix 7.1-PEA**.

7.4.61 Foraging and nesting birds could be a potential receptor to the Proposed Development of the site. Nesting bird habitat on site is considered importance to bird species at a Local level due to the abundance of trees and similar habitat in the local area.

Bats

7.4.62 Bat species reported within 2 km of the site by TVERC and NBRC were common pipistrelle *Pipistrellus pipistrellus*, noctule *Nyctalus noctula*, and Daubenton's bat *Myotis daubentonii*. The nearest records is of a noctule bat c. 1.3km west of site at Grimsbury Reservoir and Woods DWS, dated 2010.

Foraging and commuting

7.4.63 The site boundaries support hedgerows that are generally intact and thick but managed and generally limited in species richness. However, the hedgerows together with the mature trees, provide good foraging and commuting potential for bats throughout the site.

7.4.64 The transect surveys returned a large number of total passes across the survey months, with the most activity recorded in September with 415 passes and the least activity in October with 12. The highest level of activity was recorded by common pipistrelle. No rare bat species, such as barbastelle *Barbastella barbastellus,* were recorded on the site during the transect surveys. At least 6 species were recorded during the transect surveys although this number includes *Myotis* bat species and so is likely to be up to 9 species. A summary of the transect survey results are given in **Table 7.15**. **Appendix 7.1-PEA** provides details of the survey results.

Table 7.12: Summary of transect survey results.

Species	Month and no. of bat passes recorded per species					
	June	**July**	**August**	**September**	**October**	**Total**
Common pipistrelle	169	73	127	176	-	545
Soprano pipistrelle	29	40	29	19	10	127
Noctule	54	24	49	173	-	300
Leisler's bat	14	3	27	45	2	91
Brown long-eared bat	2	-	4	2	-	8
Myotis sp.	1	10	5	-	-	16
Total no. of passes	**269**	**150**	**241**	**415**	**12**	**1087**

7.4.65 Most of the hedgerows on the site were used by bats, but some areas of the Site appear to be used more significantly, particularly the areas associated with mature trees. These main areas of bat activity are shown as Areas 1-3 on 7 within **Appendix 7.1-PEA**. Area 1 is a hedgerow that has been fenced off from browsing cattle. The hedgerow contains several mature oak trees and connects to woodland in the north-east of the site. Area 1a was particularly active with several transects recording common pipistrelle foraging around the trees at this location. This area also connects hedgerows leading north to south and east to west and so may also be used by bats commuting through the site.

7.4.66 The static detectors only count bat passes and do not differentiate between commuting and foraging behaviour. As a result, a single bat passing the detector on multiple occasions whilst foraging would result in a spike in the number of passes on a detector, which can account for higher counts on some static detectors. A summary of the static detector surveys are given in **Table 7.16**.

Table 7.13: Summary of static detector survey results.

Species	Location	No. of species	Total no. bat passes	Average passes per night
09.06.21 – 17.06.21 (8 nights)	1	6	2262	283
09.06.21 – 17.06.21 (8 nights)	2	7	2236	280
09.06.21 – 17.06.21 (8 nights)	3	7	855	182
21.07.21– 01.08.21 (23 nights)	4	8	16816	732
21.07.21– 01.08.21 (23 nights)	5	5	552	24
08.09.21 – 20.09.21 (11 nights)	8	8	1701	155
08.09.21 – 20.09.21 (11 nights)	9	7	2991	272
21.10.21 – 28.10.21 (7 nights)	10	8	639	91
21.10.21 – 28.10.21 (7 nights)	11	7	1133	162
21.10.21 – 28.10.21 (7 nights)	12	7	511	73
Total			23318	2254

7.4.67 Based in the survey data gathered, the site is used by a number of common bat species for foraging and commuting throughout the period which bats are active. The Site is therefore considered to be of Local importance to foraging and commuting bats.

Roosting

Trees

7.4.68 A number of mature trees are present within hedgerows throughout the site with the majority of mature trees comprising pedunculate oak *Quercus robur* and ash trees. Ground based assessment of mature hedgerow trees found the majority to contain features of potential interest to roosting bats including lifting bark, rot holes, knot holes, woodpecker holes and areas of dead wood and the majority of trees were considered to be of at least low potential to be used by bats and a smaller number considered to be moderate to high. No specific bat activity surveys were undertaken to trees at the time of the assessment as it was not known at the time of survey which would require felling at an outline stage.

Buildings

7.4.69 A total of seven buildings were recorded on site comprising a derelict farm house with associated barns and outbuildings. Building descriptions are provided in **Table 7.17**, along with an assessment of their potential to be used by roosting bats.

Table 7.14: Buildings and associated BRP & PRF details.

Building number	Description	Bat Roost Potential (BRP)
B1	Abandoned farmhouse building with a double pitched roof with front pitch containing concrete tiles and the rear pitch covered in blue slate. The building contains 2 main loft areas within pitched roofs with holes in the front upper floor ceiling observed. The building is missing windows and doors and is open to the elements. The building is rendered/pebble dashed to all sides and there are signs of significant movement and subsidence with large cracks down the front and sides of the structure. The building is structurally compromised and was not considered safe to enter so internal inspection has not been carried out.	High
B2	An open fronted single-story brick-built barn with a corrugated roof over timber roof beams. The building forms the western wing to a horseshoe shaped complex of barns and is split internally by partition walls into 3 rooms. All rooms contain large openings to the front and some to the rear. Internally the roof is open with no loft area.	Moderate
B3	A double height brick-built barn with a pitched roof clad in corrugated metal to the front and corrugated cement board to the rear over timber trusses. The building forms the northern portion of the horseshoe of barns set around an open courtyard area. Internally the building contains a small open mezzanine area to the eastern gable and is open to the roof throughout. The original oak trusses and some original spars are present within. Walls are double thickness brick with a number of arrow slit type windows and the southern roof pitch contains a number of roof light sections. There is a window opening to the upper gable on the western end and a small opening to the upper eastern gable. Gaps are present within internal brickwork; gaps are present between timber lintels and brickwork and a number of gaps are present around windows. Further gaps are likely to be present in mortice joints in the roof trusses.	High

B4	Building 4 is a single story open fronted barn constructed from brick in a similar shape and style to Building 2 and forms the eastern wing to the barn complex. The barn contains a metal clad roof over timber trusses. Features present in and around the building include gaps to brickworks internally, gaps between timber lintels and brickwork and the roof in Building 4 is lined with timber sarking with gaps to the ridge area. Externally, gaps are present to gable verge mortar and gaps are considered likely between the metal roof and wooden sarking.	Moderate
B5	An open fronted and sided timber framed shed with partial timber walls and a pitched metal clad roof with some missing sections. Internally the shed is open to the roof with no loft area.	Low
B6	A single story, single pitched lean-to canopy with open front and sides with a metal tin roof. The building is located behind the northern gable of building 2.	Low
B7	A large, prefabricated concrete framed open barn with concrete sheet cladding to two walls. The barn contains a corrugated concrete sheet roof with concrete ridge tiles.	Negligible

Bat emergence and re-entry surveys 28th and 29th June 2021

7.4.70 The initial dusk emergence and dawn re-entry surveys captured frequent commuting activity over the site and foraging activity around the buildings. All surveyors recorded multiple bat passes throughout the survey with common pipistrelle bats, noctule and brown long-eared bat most frequently recorded. Soprano pipistrelle bats were recorded rarely. Surveyor locations can be seen in **Figure 8-10** in **Appendix 7.1- PEA**.

7.4.71 Several brown long-eared bats were identified entering B3 during the dawn survey between 03:40 h and 04:18 h, with probable return to roost events by means of barn door and gap in gable end. Similarly, a singular brown long-eared bat was identified returning to roost at 03:53 h, through the barn door of B4. In addition, a singular common pipistrelle was identified entering via a gap under the lead capping, on the gable end of B4 at 04:21 h.

7.4.72 A brown long eared bat was seen to enter building 1 via the upper right-hand window during the dawn return survey but was observed existing the building some minutes later and is not considered to have gone to roost within the building.

Bat emergence and re-entry survey 19th and 20th July 2021

7.4.73 The second suite of dusk emergence and dawn re-entry surveys captured frequent commuting activity over the site and foraging activity around the buildings. Most frequent species recorded were common pipistrelle bats, noctule and brown long-eared bat as seen in the previous survey. Surveyor locations can be seen in **Figure 7.9** in **Appendix 7.1-PEA.**

7.4.74 A single common pipistrelle bat was seen emerging from the barn door of B3 at 21:58 h and continued to forage within the courtyard. In addition, a single brown long-eared bat emerged from B4 at 22:45 h. During the dawn re-entry survey, two common pipistrelle bats were seen re-entering B3 at 04:33 h and 04:37 h, via a gap in the brickwork on the top right area of the barn door. Furthermore, four

brown long-eared bats were seen entering B3 and flying around inside, with only one thought to have exited the building. It is considered that the remaining three bats could be roosting within B3, although the exact roost location could not be determined.

Bat emergence and re-entry survey 2nd and 3rd August 2021

7.4.75 Surveyor locations can be seen in **Figure 7.10** in **Appendix 7.1- PEA**. As with the previous survey visits, the dusk emergence and dawn re-entry surveys captured frequent commuting activity over the site and foraging activity around the buildings, with common pipistrelle and noctule being recorded most frequently. *Myotis* sp., and soprano pipistrelle bats were recorded rarely. A singular common pipistrelle was recorded emerging via the barn door of B3 at 21:13 h. In addition, a single common pipistrelle was recorded returning via the barn door the following morning at 04:48 h.

Summary

7.4.76 The surveys undertaken in 2021 confirm that B3 and B4 provide occasional day roosts for a low number of brown long-eared bat and common pipistrelle. Brown long-eared bats were also observed entering Building 1 on a number of occasions and whilst roosting was not confirmed, it is suspected that the building could be used by this species for roosting. Survey of the building was difficult due to the lack of opportunity to inspect the building internally due to health and safety reasons and viewing of the building during nocturnal surveys was compromised by tall and dense vegetation growing around the building. Roosting bats are considered to be a receptor in respect of the Proposed Development and based on the survey data collected the buildings on site are considered to be of Site to Local importance to common bat species.

Hibernation

7.4.77 The main barns around the courtyard (B2, B3 and B4) and the farmhouse (B1) were considered to have some suitability to support roosting bats, mostly associated with cracks and gaps within brickwork both internally and externally.

7.4.78 The open nature of the buildings which contain open doorways and windows mean the buildings are bright inside which limits their suitability for hibernating bats and as the corrugated roofs present on B2, B3 and B4 mean the temperature within the buildings is likely to fluctuate and these buildings are unlikely to provide the stable and consistent temperatures favoured by hibernating bats.

7.4.79 The lean-to shelters and smaller ancillary buildings located around the main barns (B5 & B6) and the open barn B7 were considered to be of negligible interest to hibernating bats being open to the elements and containing limited features to sheltering bats.

7.4.80 Hibernation surveys undertaken in January and February 2022 consisted of a visual inspection of the house (external only) and barn buildings (where accessible) for hibernating bats. The inspections were completed using high powered torches, a telescopic ladder and endoscope to provide a comprehensive search. B1 was not structurally sound and was, therefore, not subject to internal inspection during the survey visits on health and safety grounds. The remaining six buildings were checked, and all accessible features were fully inspected with torch and endoscope and no bats were found. Therefore, hibernating bats are not currently considered to be a receptor in respect of the Proposed Development.

Badger

7.4.81 Results relating to badger are provided in a separate confidential appendix (**Appendix 7.2- Confidential Badger Addendum**).

Other notable species

7.4.82 Hedgehogs have been recorded within 2 km of the site by NERC and TVERC. The habitats on site are suitable for supporting this species and hedgehogs could be a receptor with respect to Proposed Development of the site.

7.4.83 A single little owl *Athene noctua* was identified during the nocturnal bat surveys. It is thought to be nesting within B3 and was seen entering and exiting via a hole in the eastern gable end on multiple occasions.

7.4.84 The Site habitats are dominated by heavily grazed field with modified grassland, species-poor hedgerows and ponds which are adversely affected by eutrophication and as such largely are considered to provide low value for a range of important terrestrial and aquatic invertebrate species. The greatest likely value identified was associated with the areas of gorse scrub, and mature trees. Based on this assessment the Site is considered to be of Site to Local importance to a range of invetebrate species.

7.5 EVOLUTION OF THE BASELINE CONDITIONS WITHOUT DEVELOPMENT

7.5.1 As required by Schedule 4 of the 2017 EIA Regulations the ES must contain an outline of the likely evolution of the baseline conditions without implementation of the development and to be **"***as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge".*

7.5.2 Without development is it considered likely that the baseline habitats will remain largely the same, with dominant modified grassland with only minimal changes in condition. It is thought likely that the site would continue to the farmed and cattle grazed keeping the condition of the baseline habitats will remain fairly consistent in the near future.

7.6 ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS

Protected sites

Construction

7.6.1 There are no identified statutory designated sites within close proximity to the site. No internationally designated sites and nationally designated sites were identified within 10km and 2km of the site, respectively.

7.6.2 Given the separation and distance of the Site from the identified LNR's and non-statutorily designated sites within 2km, it is anticipated any pollution impacts arising from the proposed construction would be temporary, reversible and **negligible/not significant** at greater than a Site level without mitigation. However, ecological receptors determined as effected below district level are considered not significant under the EIA Regulations overall.

Operation

7.6.3 There are two non - statutory designated sites and a number of pLWS' within 2km of the Site which are assumed to be accessible to the public. The Proposed Development is for commercial use and the Proposed development has been designed to include areas for recreational use. Given the distance of these sites from the Proposed Development, and the provision of local recreational facilities within the scheme, it is considered that any additional recreational pressures arising from the operation of the Proposed Development would be infrequent and **negligible/not significant** at greater than a Site level. However, ecological receptors determined as effected below district level are considered not significant under the EIA Regulations overall.

Habitats

7.6.4 The Proposed Development has embedded mitigation which is based on the Illustrative Landscape Strategy (**Figure 3.4**) and includes:

- Native species-rich hedgerows.
- The area of grassland to be retained will be enhanced.
- Habitats will be able to attain the specified condition as set out in the DEFRA Metric (**Appendix 7.3**) at the reserved matters stage.
- New tree planting will be predominately native species.
- The proposed orchard will use native species/cultivars.
- The proposed woodland will include native tree species.
- At least two separate wildlife ponds will be created for the purpose of providing good quality pond habitat and separate to attenuation functions

7.6.5 Based on **Figure 3.4- Illustrative Landscape Strategy** the Proposed Development is anticipated to result in the following Biodiversity Net Gain based on DEFRAs Metric V 3 which accompanies the planning application documentation (**Appendix 7.3**):

- 20.64% BNG habitats
- 41.28% BNG hedgerows

Modified grassland (and tall rudneral habitats)

Construction

7.6.6 The construction of the Proposed Development will require permanent and irreversible land take of a proportion of the modified grassland. Due to the poor condition of modified grassland to be lost habitat and its abundance in a wider landscape setting, the loss of modified grassland is considered to be a **direct**, **negative, permanent** effect of significance at a **Site level** only. However, ecological receptors determined as effected below district level are considered not significant under the EIA Regulations overall.

Operation

7.6.7 The Proposed Development will enhance areas of retained grassland with a species-rich grassland mix and a wildlife conservation mix. The creation of lowland meadow habitat would be **long-term, direct, permanent and positive** and would be considered to be of significance at a **Site** to Local level. However, ecological receptors determined as effected below district level are considered not significant under the EIA Regulations overall.

Mixed scrub

Construction

7.6.8 The Proposed Development will require **direct, permanent** land take mixed scrub including scrub around Huscote Farm. This habitat is typically common and abundant in the wider landscape setting and nationally and loss of this habitat is considered to be of significance at a **Site** level only. However, ecological receptors determined as effected below district level are considered not significant under the EIA Regulations overall.

Operation

7.6.9 The Proposed Development includes planting woodland transition habitat (anticipated to be native scrub) and native woodland which would be **direct positive** and long-term **permanent** and as such it is anticipated that the Proposed Development would result in an enhancement of mixed scrub habitat which would be significant at a **Site** level. However, ecological receptors determined as effected below district level are considered not significant under the EIA Regulations overall.

Gorse scrub

Construction

7.6.10 The Proposed Development will currently retain gorse scrub on site and woodland transition habitat (anticipated to be native scrub). Without mitigation there is potential for accidental incursions into retained habitats which would be a **direct, negative**, **temporary or permanent** considered to be of significance at a **Site** level only. Ecological receptors determined as effected below district level are considered not significant under the EIA Regulations overall.

Operation

The Proposed Development includes woodland transition habitat (anticipated to be native scrub) which could include gorse to enhance this habitat on site which would be **direct positive, permanent** and significant at a **Site** level. However, ecological receptors determined as effected below district level are considered not significant under the EIA Regulations overall.

Species-poor Hedgerows

Construction

7.6.11 The Proposed Development will require land take of 12 out of 42 native hedgerows either fully or partially. The retained hedgerows will retain habitat corridors around the Site. Given the length of hedgerow being retained and planted, it is unlikely that the **direct permanent** loss of hedgerow will have a **negative** effect on habitat connectivity of significance at a **Site level**. However, ecological receptors determined as effected below district level are considered not significant under the EIA Regulations overall.

Operation

7.6.12 The Proposed Development includes planting species-rich native hedegrow to increase species diversity and it is anticipated that retained hedegrows would be enhanced through gap planting and improved management. Over time as the new and gap planted hedegrows mature the Proposed Development is anticipated to

result in a net enhancement of species-rich hedgerow habitat which would be a **direct positive, permament** and of significance at up to a **Local** level. However, ecological receptors determined as effected below district level are considered not significant under the EIA Regulations overall.

Coniferous Woodland, Mixed Woodland and Other broadleaved Woodland

Construction

7.6.13 The Proposed Development will retain all existing woodland on the site. Without mitigation there is a low risk of woodland being affected by the Proposed Development during construction through incidental incursions or pollution events which, given the distance of the construction works from these woodlands is considered to be **temporary**, **indirect**, **negligible**/ not significant at greater than a **Site** level. However, ecological receptors determined as effected below district level are considered not significant under the EIA Regulations overall.

Operation

7.6.14 The Proposed Development will introduce some level of recreational use albeit this is considered likely to be limited to the formal areas of recreation with no direct paths proposed. Any recreational use is likely to be infrequent, **temporary, indirect** and **negligible**/not significant at greater than a **Site** level. However, ecological receptors determined as effected below district level are considered not significant under the EIA Regulations overall.

Buildings

7.6.15 Impacts relating to loss of B1 and B7 at Huscote Farm are considered in relation to bats and birds below.

Ponds

Construction

7.6.16 The Proposed Development will require permanent land take P3 and P4 and remodeling (and assumed temporary landtake) of P7. These ponds are not considered to qualify as Priority Habitats and are considered to be of poor condition due to high levels of eutrophication and limited or lack of aquatic vegetation. The loss of ponds during construction, until newly cerated ponds have become established, is considered to be a direct, **negative**, and **temporary** and significant at a **Site** level. However, ecological receptors determined as effected below district level are considered not significant under the EIA Regulations overall.

Operation

7.6.17 The Proposed Development includes four attenuation ponds and two ponds created for wildlife purposes. Taking a precautionary approach, without detailed landscaping propospals for the remodelled pond or new ponds the Proposed Development could result in a **short term, negative impact** on to pond habitat until new ponds are naturally established after which it is anticipated that the additional pond habitat would be a **direct positive, permanent and significant** at a **Site** level. However, ecological receptors determined as effected below district level are considered not significant under the EIA Regulations overall.

Species

Common amphibians

Construction

7.6.18 Without additional mitigation the temporary loss of common amphibian breeding habitat and **permanent, direct negative** loss of terrestrial habitat during the construction phase could be of **significance** to populations of common amphibians at a **Site** level.

Operation

7.6.19 Following completion and establishment of proposed ponds and areas of enhanced grassland diversity would be **positive, direct, permanent** effect for local common amphibians and significant at a **Site to Local level**. However, ecological receptors determined as effected below district level are considered not significant under the EIA Regulations overall.

Birds

Construction

7.6.20 The Proposed Development will require loss of areas of hedgerows and scrub and grassland used by a range of bird species for foraging and breeding. B1 and B7 will be demolished which could support bird species Based on the survey data the highest value habitats for birds holding territories were the hedgerows and trees with the grassland providing limited value due to the effect of cattle grazing. Without additional mitigation nesting birds could be **negatively**, **directly** affected during the construction phase through **temporary to permanent** loss of habitat during breeding (vegetation removal and building demolition), which could be significant at a **Site to Local level**. However, ecological receptors determined as effected below district level are considered not significant under the EIA Regulations overall.

Operation

7.6.21 The Proposed Development once completed includes areas for enhancing shrub, hedgerow and trees and creation of additional ponds which would be positive for a range of bird species. Retained grassland areas within the eastern proportion of Site will provide suitable ground-nesting habitat for skylark which would be improved through a change in field management. Overall the Proposed Development upon completion is considered to be a **permanent, positive** impact for a range of urban and farmland birds species at a **Site to Local level**. However, ecological receptors determined as effected below district level are considered not significant under the EIA Regulations overall.

Bats

Construction

7.6.22 The Proposed Development requires demolition of B1 and B7. Buildings B2-6 will be retained. However the hedgerow and scrub to the south of these buildings will be lost and new lighting will be introduced during construction. Taking a precautionary approach it is assumed that the roosts identified within these buildings may not remain as a result of these changes.

7.6.23 Based on survey data B3 supports brown long-eared bat and common pipistrelle bat day roosts. A further brown long-eared bat roost was recorded from B4 with a

single bat seen to emerge and then return to this building. Brown long-eared bats were seen foraging within B1 on a number of survey visits but it was not clear if the building was being used for roosting and health and safety constraints restricted survey. Taking a precautionary approach it should be assumed that B1 could support occasional roost for brown long-eared bats. Without mitigation loss of these bat roosts would be a **direct negative permanent** effect at a **Local level**. However, ecological receptors determined as effected below district level are considered not significant under the EIA Regulations overall.

7.6.24 The Proposed development will require loss of sections of hedgerows and introduce artificial construction lighting in the vicinity of retained and new hedgerows which could affect foraging and commuting bats. H17/H18[13] was considered to have the highest bat activity which is largely being retained with a section to be lost to accommodate a road. Detailed lighting assessment has not been undertaken at this stage and taking a precautionary approach without an appropriate lighting scheme any introduced artificial lighting could disrupt bat commuting and foraging activities associated with this hedgerow which could be **indirect negative, permanent** effect significant at a Local level. However, ecological receptors determined as effected below district level are considered not significant under the EIA Regulations overall.

7.6.25 The Proposed Development may require felling of trees. At the outline application stage it is not confirmed which trees would require felling. Without mitigation felling of trees to accommodate the Proposed Development could adversely affect roosting bats which could be a **direct permanent, negative effect** at least at a **Local Level**. However, ecological receptors determined as effected below district level are considered not significant under the EIA Regulations overall. Confidence in this assessment is low.

Operation

7.6.26 The Proposed Development includes landscaping which would result in a net enhancement of species-rich hedgerows, pond habitats and species-rich grassland and new native trees all of which would be of **positive, direct, permanent** benefit for foraging bats up to a **Local level**. However, ecological receptors determined as effected below district level are considered not significant under the EIA Regulations overall.

Badgers

7.6.27 Information relating to badgers is provided in a seperate confidential **Appendix 7.2- Confidential Badger Addendum**.

Other notable species

Construction

7.6.28 The habitats on site could be used by hedgehogs. Without mitigation the construction phase could have a **negative, direct, permanent** impact on hedgehogs which could be significant at a **Site** level. However, ecological receptors determined as effected below district level are considered not significant under the EIA Regulations overall.

[13] Barton Hyett Associated 2022 Arboricultural Impact Assessment

7.6.29 The Proposed Development would enhance the botanical and structural diversity of habitats through an increase in species-diversity of grassland, new ponds which is considered to be a **positive, direct, permanent** effect to a range of terrestrial and aquatic invertebrate species at a Site level. However, ecological receptors determined as effected below district level are considered not significant under the EIA Regulations overall.

Operation

7.6.30 The Proposed Development includes landscaping which would result in a net enhancement of species-rich hedgerows, pond habitats and species-rich grassland and new native trees all of which would be of **positive, permanent** benefit for hedgehogs and a range of invertebrates up to a **Site** level. However, ecological receptors determined as effected below district level are considered not significant under the EIA Regulations overall.

7.7 MITIGATION AND ENHANCEMENTS

7.7.1 This section presents mitigation necessary to reduce any significant impacts identified. The mitigation is additional to the embedded mitigation but is considered necessary to prevent significant effects on the ecological features.

Mitigation by design

7.7.2 Section 7.6 included the following assumptions based on the layout which were considered to be 'Mitigation by design':

- Native species-rich hedgerows.
- The area of grassland to be retained will be enhanced.
- Habitats will be able to attain the specified condition as set out in the DEFRA Metric (**Appendix 7.3**) at the reserved matters stage.
- New tree planting will be predominately native species.
- The proposed orchard will use native species/cultivars.
- The proposed woodland will include native tree species.
- At least two separate wildlife ponds will be created for the purpose of providing good quality pond habitat and separate to attenuation functions.

7.7.3 Based on **Figure 3.4- Illustrative Landscape Strategy** the Proposed Development is anticipated to result in the following Biodiversity Net Gain based on DEFRAs Metric V 3 which accompanies the planning application documentation (Appendix 7.3):

- 20.64% BNG habitats
- 41.28% BNG hedgerows

7.7.4 This net gain is a long term, positive and significant effect. The percentage of Biological Net Gain (BNG) offers the Site a **residual positive significant effect** due to the presence and operation of the Proposed Development on this Site at a Local Level below district level and considered not significant under the EIA Regulations overall.

Additional Mitigation

7.7.5 The following additional mitigation measures are recommended that are not included within the design.

General

7.7.6 The following assessment and mitigation is based on data gathered in 2021. At the reserved matters stage it may be necessary to update surveys where 2 or more years have passed to inform the final layout and details of mitigation measures and the prevailing CIEEM guidelines in relation to the age of ecology data should be adopted.

Protected Sites

7.7.7 During construction potential minor negative indirect impacts have been identified due to sediment mobilisation/pollution events. Mitigation should include production of a Pollution Prevention Strategy to be included within the Construction and Environmental Management Plan (CEMP), prior to works commencing, agreed with the LPA and secured via planning condition.

Habitats

7.7.8 At the reserved matters stage the principles set out within the Illustrative Landscape Strategy and Parameters Plan and the DEFRA Biodiversity Metric submitted with the planning application to deliver measurable ecological enhancement should be implemented through a detailed landscape strategy and Landscape and Ecological Management Plan (LEMP). These principles are:

- Retained grassland to be enhanced through green hay/seeding to increase botanical diversity through long-term management within a LEMP to achieve lowland meadow of moderate condition.
- Creation of species-rich (five or more native species) hedgerows of greater length than being lost.
- Enhancement of retained hedgerows via gap planting and supplementary planting to increase biodiversity and an appropriate management regime.
- Creation of woodland and traditional orchard under an appropriate management regime to maintain its value over the long-term as set out in a detailed landscape strategy and LEMP.
- Planting native trees and shrubs and hedgerow to enhance habitat connectivity and diversity.
- Creation of SuDs features and two wildlife ponds designed to enhance the biodiversity value of the Site.
- Locations and nature of positive species-specific enhancements to include bat/bird boxes, amphibian and reptile refugia and insect boxes.

7.7.9 All trees and hedgerows to be retained should have adequate Root Protection Areas (RPAs) in line with BS 5837:2012 Trees in Relation to Design, Demolition and Construction.

7.7.10 These mitigation measures should be agreed with the LPA in a Landscape and Ecological Management Plan (LEMP) and secured via planning condition.

Species

Amphibians

7.7.11 Prior to any works affecting ponds and terrestrial habitat commencing, an Amphibian and Reptile Reasonable Avoidance Method Statement should be agreed with the LPA and secured via planning condition to minimise impacts to amphibians

and reptiles during the construction phase and should as a minimum include the following:

- A Tool-box talk to all relevant contractors by an appointed Ecologcial Clerk of Works including how to identify common amphibians, common reptiles and great crested newts and what to do in the event of any of these species being found.
- A method statement and timings for draw down of ponds to minimise impacts to common amphibians.

7.7.12 This information should be included within the CEMP.

7.7.13 The reserve matter application(s) landscaping scheme should identify in detail the number, profile and planting specification of all ponds and locations of hibernacula to demonstrate a benefit for amphibian species.

7.7.14 Should more than two years have passed since the assessment of ponds within 250 m of the Site for great-crested newts then an update assessment should be undertaken by a suitability experienced ecologist and if necessary surveys undertaken to confirm the current status of the Site with regard to great-crested newts.

7.7.15 Reptiles are highly mobile and whilst no reptiles were recorded during the survey, should more than two years have lapsed since the date of the survey a re-assessment should be undertaken by an experienced ecologist.

Birds

7.7.16 As a precautionary approach any vegetation clearance or building demolition should be undertaken outside the nesting bird season (nesting season runs March-August, inclusive) where practicable. Should these works be scheduled during the nesting bird season then the vegetation to be cleared or building to be demolished should be checked by a suitably experienced ecologist immediately beforehand. In order to prevent disturbance or harm to individuals, work should not be carried out within a minimum of 5m of any in-use nest, although this distance could be more depending on the sensitivity of the species.

7.7.17 Three Schedule 1 species and suitable breeding habitat for these species were present within and in the vicinity of the site. Prior to start of any construction works within the Site, species specific surveys should be undertaken to identify if breeding Schedule 1 species or their dependent young are present within the site or within an impact zone and appropriate mitigation put in place.

7.7.18 The LEMP at the reserved matter(s) stage should detail plant/tree and shrub species mixes, and pond planting, in accordance with the assumptions of the submitted Biodoiversity Metric and for the benefit on the local bird assemblages.

Bats

7.7.19 Prior to any works to the buildings or hedgerows commencing an appropriate Natural England bat licence should be obtained on recent bat survey data. Should 12 months or more have lapsed since the last bat survey data relating to these buildings surveys will be required to confirm the status of the bat roosts and an appropriate Natural England licence obtained. The following information should be included within the CEMP and secured via planning condition.

7.7.20 Based on data gathered to date, given the low conservation status of the roosts, works are currently considered eligible under a Bat Mitigation Class Licence (BMCL). Prior to any works adjacent to the building, demolition or renovation works with confirmed bat roosts it will be necessary to register the site with Natural England using a BMCL. If further surveys record a higher conservation status roost, or the number of roosts exceeds the accepted limit for the BMCL, then a European Protected Species Licence (EPSL) will be required.

7.7.21 No demolition works of B1 should be undertaken until an appropriate Natural England has been granted. Whilst full details of mitigation will be agreed with Natural England the following is likely to be required:

- Toolbox Talk
- Supervsion of works affecting buildings
- Installation of at least 2no. bat boxes on retained trees supervised by the licensed bat ecologist.

7.7.22 To minimise impacts to foraging bats, no development should commence until a detailed lighting scheme has been agreed with the LPA to minimise impacts on foraging and commuting bats.

7.7.23 Construction should be undertaken in daylight hours only and should be secured via a planning condition to minimise impacts on foraging and commuting bats.

7.7.24 Prior to felling any tree the tree(s) should be assessed by an experienced bat ecologist to determine suitability for roosting bats and appropriate surveys undertaken to determine presence/absence of roosting bats at an appropriate time of year.

7.7.25 No tree should be felled which supports roosting bats without an appropriate licence from Natural England as advised by the bat ecologist.

7.7.26 It should be appreciated that bats require only very small crevices for roosting and should a bat be found works in this area should immediately cease and a licensed bat ecologist contacted for further information.

Badger

7.7.27 Information relating to badgers is provided in a separate confidential **Appendix 7.2.**

Other notable species

7.7.28 Should a hedgehog be found, it should be moved using a gloved hand to a place of safety and shelter. A suitable gap (13 cm x 13 cm) should be included in new boundary treatments to allow passage of hedgehogs. These can be marked with signs so that they are not blocked off in the future (https://www.hedgehogstreet.org/help-hedgehogs/link-your-garden/). This information should be included in the CEMP and secured via planning condition.

7.7.29 The LEMP at the reserved matters stage should include erection of an owl or kestrel bird box on suitable retained trees. It should also include 2 no. log piles to create refuge for amphibians, small mammals, and invertebrates and istallation of 5no. hedgehog houses to benefit to local hedgehog populations. The LEMP should be secured via planning condition.

7.7.30 The LEMP at the reserved matters stage should specify the species mix for habitat create to demonstrate befefit for a range of aquatic and terrestrial invertebrate species. The LEMP should be secured via planning condition.

Table 7.18: Mitigation

Ref	Measure to avoid, reduce or manage any adverse effects and/or to deliver beneficial effects	How measure would be secured		
		By Design	By S.106	By Condition
1	At reserved matters stage update ecological surveys as needed to ensure RM is designed using data in accordance with age guidelienes set out by CIEEM			X
2	A Construction and Environmental Management Plan to set out how retained habitats will be safeguarded and risk of pollution and construction lighting affecting habitats/species will be minimised.			X
3	A Landscape and Ecological Management Plan at each RM stage to set out how habitats have been selected and will be managed to deliver an overall 10% Biodiversity Net Gain or greater in respect of habitats and hedgerows.	X		X
4	An Amphibian and Reptile Reasonable Avoidance Measures Method Statement to set out details on pond draw down methodologies during construction phase			X
5	Vegtation clearance or building demolition should be undertaken outside the nesting bird season (nesting season runs March-August, inclusive) where practicable unless supervised by a ECoW. Prior to works affecting the building a survey to confirm status of Schedule 1 bird species.			X
6	Prior to demolision of the buildings or removal of hedegrows connected to the building an appropriate Natural England licence for bats is obtained, informed if needed by up to date bat survey data, and any mitigfation agreed with NE put in place.			X
7	At the Reserved Matters stage a lighting scheme devised with an ecologist to minimise impacts to foraging bats			X
8	Prior to any trees being felled trees should be assessed by an experienced bat ecologist to determine presence/absence of bats and any mitigation put in place prior to felling the			X

	relevant tree.			
9	The CEMP and LEMP for each reserved matters to set out measures to safeguard hedgehogs during construction			X

Enhancements

7.7.31 The following measures are anticipated to be 'over and above mitigation':

- The LEMP at the reserved matter(s) stage should include details on installation of 10 no. bird nest box (Schwegler 1B bird nest box or similar) and 10 no. Vivara Pro Barcelona WoodStone Open Nest Box for a variety of bird species upon retained trees or new buildings that would be of benefit to the local bird populations.
- The LEMP at the reserved matter(s) stage should include details on installation of integrated bat boxes and/or installed on trees or buildings to the local bat populations.
- The LEMP to set out how each pond will be designed to enhance the habitat for amphibians, reptiles and invertebrate species.

7.8 RESIDUAL EFFECTS

7.8.1 The following residual effects are anticipated based on data gathered to date assuming the embedded mitigation and mitigation measures set out in Section 7.8 are implemented:

- A **positive**, **long-term permanent** effect on habitat biodiversity, hedgerow quality and biodiversity and enhancement of standing water habitat which should deliver over 10% measurable Biodiversity Net Gain and considered to be significant at a Site to Local level and not significant under the EIA Regulations.
- A **positive long-term permanent** impact on common amphibians through increased diversity of terrestrial habitats and through an increase in breeding habitat and significant at up to a Local level. Not significant under the EIA Regulations.
- A **positive**, **long-term permanent** impact on birds through increased provision of nesting and foraging habitat and increasing diversity of habitats through attenuation basins and significant at up to a Local level. Not significant under the EIA Regulations.
- A **short-term negative, temporary** impact on foraging and commuting bats during the construction phase and whilst habitats establish with a **positive, long-term permanent impact** on bat through increased provision of roosting habitat and increasing diversity of foraging habitats through attenuation basins and improved botanical diversity and significant at up to a Site level. Not considered significant under the EIA Regulations.
- A **postive, long-term** permanent impact to a range of terrestrial and aquatic invertebrate species and hedgehogs. Not considered significant under the EIA Regulations.

7.8.2 The predicted residual effects are not considered to be significant under the EIA Regulations.

7.9 CUMULATIVE EFFECTS

7.9.1 Cumulative impacts have been considered within the assessment of effects taking into consideration the potential cumulative impacts with schemes identified within **Chapter 2- Assessment Scope and Methodology.**

7.9.2 The Proposed Development has been designed to mitigate ecological impacts within the Site boundary and provide ecological enhancement including enhancing the habitat connectivity and quality with the adjacent landscape. All identified ecological impacts could be adequately mitigated and compensated within the Site and as such no significant effects arising in combination to other identified schemes have been identified at this stage.

7.10 MONITORING

7.10.1 The following monitoring measures are anticipated to be secured via planning condition:

- Each reserved matters application to demonstrate how the detailed layout and landscaping deliver the ecological enhancement and measurable biodiversity enhancement along the principles of this assessment within each reserved matters LEMP. The LEMP should set out monitoring measures to ensure the long term success of landscape planting.
- Should a European Protected Species Licence from Natural England be required in respect of bats then works should be undertaken in accordance with all monitoring requirements set out within the EPSL.
- The CEMP to include timing of works, appointment of an Ecological Clerk of Works and any measures to be included from an EPS licence.

7.11 SUMMARY

Introduction

7.11.1 An Ecological Impact Assessment has been undertaken in line with current best practice guidance (CIEEM, 2018). A desk-based assessment was undertaken to identify records of protected and/or notable habitats and species, and designated nature conservation sites in the vicinity of the site. Field survey data was collected in 2021 for the following species or species groups; amphibians, reptiles, birds, badgers, hazel dormice and bats. Information relating to badgers is provided under a separate Confidential Appendix due to the risk of persecution.

Baseline Conditions

7.11.2 The Site is dominated by heavily grazed grassland fields which have been modified through re-seeding and the effects of cattle grazing. The fields are typically bounded by species poor hedgerows with scattered mature trees. There are small field ponds within the site that have been poached by cattle and are of low ecological value. A former farmhouse and outbuildings are present on site. Pockets of woodland and gorse scrub are present along the eastern edge of the site.

7.11.3 Surveys to determine the presence/absence of hazel dormouse were undertaken and no hazel dormice were recorded. Pond sampled to determine the presence/absence of great crested newts were negative for this species and remaining ponds in the local landscape were considered to be poor habitat for this species although common amphibians such as frogs and toads could utilise these habitats. Reptile survey did not record the presence of any reptile species. A variety of farmland and urban birds use the site for foraging and nesting typically associated with the hedgerows and trees and low numbers of ground nesting birds

recorded, likely due to the high levels of cattle grazing. Brown long-eared bat and common pipistrelle bat roosts was recorded in two buildings within the farm complex and bats use the hedgerows for commuting and foraging into the local landscape.

Likely Significant Effects

7.11.4 Based on the data gathered the Proposed Development during the construction phase and without mitigation there is potential for negative effects significant at ar Site to Local level in relation to pollution events, loss of habitats and effects on species such amphibians, reptiles, birds, bats and small mamamls and invertebrates.

7.11.5 At the operation stage the Proposed Development will have established newly created habitats including enhanced grassland, species-rich hedgerows, native trees, new ponds, native woodland and an orchard all of which would be positive, permanent and of significance at up to a Lcoal level.

Mitigation and Enhancement

7.11.6 The Proposed Development includes retention of green corridors and enhancement of habitats to deliver a measurable biodiversity enhancement at the reserved matter(s) stage which would be secured via a Landscape and Ecological Management Plan (LEMP) via planning condition. The LEMP would provide species-specific enhancements including details on bat and bird box provision, amphibian and reptile refugia and appropriate pond design within the final layout. These measures will enhance the site for amphibians, reptiles, birds, badgers, and bats and invertebrate species at a site to local level.

7.11.7 Site management during construction would include pollution prevention, biosecurity and good environmental site measures to minimise ecological impacts to local wildlife sites and on site wildlife should be set out within a CEMP to be agreed with the LPA. The CEMP will include the requirement for pre-commencement surveys for nesting birds (if vegetation is removed during the breeding season) and amphibians and reptiles under a Reasonable Avoidance Method Statement, badgers and lighting which could affect bats. Appropriate mitigation should be put in place to comply with legal obligations including where necessary obtaining a European Protected Species Licence in respect of bats identified within buildings. It is not know which trees would require felling until final design at the reserved matters stage has been complete and a condition should be imposed to ensure all necessary bat surveys are undertaken of tree prior to felling to determine whether they support roosting bats and any necessary mitigation/licensing put in place. Impacts from construction and operational lighting on bats should be controlled via ecologically sensitive lighting plans secured via planning condition.

Cumulative and In-combination Effects

7.11.8 With the above mitigation put in place, together with proposed embedded enhancements the Proposed Development is anticipated to deliver new, good-quality habitat and no significant negative impacts to ecology are anticipated to occur from the proposed development alone or in-combination with other schemes.

Conclusion

7.11.9 Overall, the Proposed Development with embedded and additional mitigation will have very few residual effects and none anticipated to be significant under the EIA Regulations.

7.12 SUMMARY OF EFFECTS, MITIGATION AND RESIDUAL EFFECTS

Table 7.18: Summary of Effects, Mitigation and Residual Effects.

Receptor/ Receiving Environment	Description of Effect	Nature of Effect *	Sensitivity Value **	Magnitude of Effect **	Geographical Importance ***	Significance of Effects ****	Mitigation/ Enhancement Measures	Residual Effects ****
Construction								
Protected sites of nature conservation value	Construction activities within proximity to protected sites. Sediment Input/Pollution from construction activities.	Temporary / reversible, indirect	Not applicable	Not applicable	County - regional	Site level negative not significant	Stringent Pollution Controls. Production and Implementation of Construction Environmental Management Plan (CEMP).	Negligible not significant
Habitats	Loss of species-poor hedgerow, loss of non-priority ponds, loss of modified grassland	Permanent / negative, direct	Not applicable	Not applicable	Site	Site negative not significant	Embedded mitigation to include creation of 2 wildlife ponds, planting species rich hedegrow, enhancing retained hedgerows, creating lowland meadow habitat, planting new woodland, orchards, native trees, native shrubs to acehive	Site - Local level permanent positive not significant

Receptor/ Receiving Environment	Description of Effect	Nature of Effect *	Sensitivity Value **	Magnitude of Effect **	Geographical Importance ***	Significance of Effects ****	Mitigation/ Enhancement Measures	Residual Effects ****
							> 10% BNG	
Amphibians/ reptiles	Potential killing and injuring of individual amphibians and reptiles during construction if present. Negative permanent at up to a Local level predicted (low confidence).	Temporary to Permanent / Direct	Not applicable	Not applicable	Site	Site level, negative, not significant	The CEMP to include a Reptile Reasonable Avoidance Method Statement (RAMS).	Site level negative, not significant
Birds	Risk of killing or injuring nesting birds during demolition/vegetation clearance without mitigation.	Temporary to Permanent / negative, direct	Not applicable	Not applicable	Site	Site - Local level negative, not significant	Vegetation removal/building demolition will be undertaken outside of the bird breeding season (March - August inclusive) or under ecological supervision.	Site – Local level negative, not significant
Bats	Loss of bat roost(s) during demolition of building(s) and felling of trees.	Permanent / Direct, Negative	Not applicable	Not applicable	Site – Local	Site - Local level, not significant	Prior to demolition a Natural England licence should be obtained and mitigation put in place with installation of bat	Site level negative, not significant

Receptor/ Receiving Environment	Description of Effect	Nature of Effect *	Sensitivity Value **	Magnitude of Effect **	Geographical Importance ***	Significance of Effects ****	Mitigation/ Enhancement Measures	Residual Effects ****
							boxes on retained trees.	
	Possible construction lighting impacting foraging/commuting bats	Temporary / Direct, negative	Not applicable	Not applicable	Site – Local	Site – local level,not significant	CEMP to include a construction lighting scheme.	Site level negative, not significant
	Felling of trees potential to effect roosting bats	Permanent / direct, negative	Not applicable	Not applicable	Site – Local level (confidence low)	Site – Local not significance (confidence low)	Prior to felling bat assessment and if required bat surveys of trees and mitigation put in place prior to felling.	Site level negligible not significant

Receptor/ Receiving Environment	Description of Effect	Nature of Effect *	Sensitivity Value **	Magnitude of Effect **	Geographical Importance ***	Significance of Effects ****	Mitigation/ Enhancement Measures	Residual Effects ****
Badgers	See separate report							
Hedgehogs, and terrestrial invertebrates	Loss of hedgehog habitat. Low risk of encountering hedgehogs during construction	Permenent, negative, direct	Not applicable	Not applicable	Site	Site level not significant	CEMP to include measures to protect hedgehogs.	Site level, not significant
Operation								
Protected sites of nature conservation value	Recreational activities within proximity to protected sites	Temporary / indirect, negative	Not applicable	Not applicable	County - regional	Site – Local level not significant	Embedded mitigation recreational facilities within the site	Site level, negligible, not significant
Amphibians/ reptiles	Creation of attenuation ponds, species rich grassland, native shrub, tree planting and wetland grass areas for benefit of reptiles.	Permanent / positive, Direct	Not applicable	Not applicable	Site	Site level positive not significant	A LEMP to set out measures to enhance the Site for reptiles over the long term including locations of reptile hibernacula, log piles etc.	Site level positive not significant
Birds	Creation of new scrub and tree and standing water features for benefit range of urban and farmland bird	Permanent / postive direct	Not applicable	Not applicable	Local	Site level not significant	LEMP to detail planting to benefit birds	Site – Local positive, not significant

Receptor/ Receiving Environment	Description of Effect	Nature of Effect *	Sensitivity Value **	Magnitude of Effect **	Geographical Importance ***	Significance of Effects ****	Mitigation/ Enhancement Measures	Residual Effects ****
	species.							
Bats	Habitats to benefit foraging bats through habitat creation	Permanent, positive, direct	Not applicable	Not applicable	Site – Local	Site level, not significant	Implementation of a LEMP to ensure that bat foraging and commuting habitat is maintained and enhanced.	Site level. Not significant
	Operational lighting could effect foraging/communting bats	Permanent, neagtive, direct	Not applicable	Not applicable	Site - Local	Site – Local level, not significant	Detailed lighting design and specification, to be prepared at the detailed design stage should be bat friendly and developed with the input of a bat ecologist.	Site level - Local. Not significant
Hedgehogs, and terrestrial invertebrates	Enhancement of habitats for hedgehogs and invertebrates and connectivity through landscape planting and creation of attenuation ponds.	Positive. Permanent at Site level.	Not applicable	Not applicable	Site	Site level, not significant	LEMP to set out how barrier treatment to fences maintain habitat connectivity and planting benefit hedgehogs. Selection of planting for benefit of invertebrates and	Site level - Local. Not significant

Receptor/ Receiving Environment	Description of Effect	Nature of Effect *	Sensitivity Value **	Magnitude of Effect **	Geographical Importance ***	Significance of Effects ****	Mitigation/ Enhancement Measures	Residual Effects ****
							installation of bug boxes.	