



**Land to the West of Little Tew,
Chipping Norton, Oxfordshire OX7**

**Ecological Impact Assessment
& Biodiversity Net Gain Assessment**

April 2024

on behalf of Finchatton

Disclaimer

This report is issued to the client for their sole use and for the intended purpose as stated in the agreement between the client and Windrush Ecology Ltd. This report may not be relied upon by any other party without the express written consent of Windrush Ecology Ltd.

Windrush Ecology has exercised due care in preparing this report. It has not independently verified information provided by others, and no warranty is made in relation to the content of this report and Windrush Ecology Ltd assumes no liability for any loss resulting from errors, omissions or misinterpretation made by others.

Any recommendation, opinion or finding stated in this report is based on the circumstances and facts as they existed at the time that Windrush Ecology Ltd performed the work. The content of this report has been provided in accordance with the provisions of the CIEEM Code of Conduct.

Nothing in this report constitutes legal opinion.

Client	Finchatton
Job name	Land to the West of Little Tew, Chipping Norton, Oxfordshire OX7
Survey Dates	20 th July 2020, 20 th April 2021 & 16 th February 2024
Report date	17 th April 2024
Report title	Ecological Impact Assessment & Biodiversity Net Gain Assessment
Reference	W5847_rep_Land West of Little Tew_17-04-24

	Signed	Name	Position	Date
Prepared by		Edward Bodsworth MA (Cantab) PhD MCIEEM	Director	17/04/2024

Report Contents

1	Introduction	1
1.1	Site Description & Context.....	1
1.2	Proposal	1
1.3	Aims of Study	1
1.4	Biodiversity Statement	2
1.4.1	Pre-development Biodiversity Value of On-site Habitats	2
1.4.2	Date the On-site Pre-development Biodiversity Value was Calculated ..	2
1.4.3	Version of the Biodiversity Metric	2
1.4.4	Version of the Biodiversity Metric Publication Date	2
1.4.5	Supporting Documentation	2
1.4.6	Loss of On-site Habitats	3
1.4.7	Irreplaceable Habitats	3
2	Methodology.....	3
2.1	Desk Study.....	3
2.2	Extended Phase 1 Habitat Surveys 2020 & 2021	3
2.3	UKHab Habitat Survey 2024	3
2.4	Ground Level Tree Assessment (GLTA)	4
2.5	Biodiversity Net Gain Assessment	5
2.6	Evaluation Methodology	6
3	Results & Evaluation	7
3.1	Ecological Context	7
3.1.1	National Character Area Profile	7
3.1.2	Sites of Nature Conservation Importance	7
3.1.3	Protected & Notable Species Records	8
3.2	Habitats	9
3.2.1	Overview	10
3.2.2	Cropland; Cereal Crops (c1c & c1c 604).....	10
3.2.3	Grassland; Modified Grassland (g4).....	10
3.2.4	Hedgerows & Hedgerows with Trees (h2a & h2a 11).....	11
3.2.5	Other Features	11
3.2.6	Summary of Habitat Evaluation	11
3.3	Species	12
3.3.1	Plants	12
3.3.2	Birds	12
3.3.3	Bats	12
3.3.4	Reptiles	13
3.3.5	Amphibians	13
3.3.6	Invertebrates	14
3.3.7	Badgers.....	14
3.3.8	Hazel Dormouse	14
3.3.9	Other Mammals	15
3.3.10	Non-native Invasive Plant Species	15
4	Discussion	15
4.1	Relevant Legislation & Policy Guidance.....	15
4.1.1	Nesting Birds.....	15
4.1.2	Bats	15
4.1.3	The Natural Environment and Rural Communities Act 2006	16
4.1.4	Sites of Special Scientific Interest	17
4.1.5	National Planning Policy Framework (NPPF)	17
4.1.6	Environment Act 2021	19

4.2	Assessment of Potential Impacts	19
4.2.1	Sites of Nature Conservation Importance	19
4.2.2	Habitats	19
5	Biodiversity Net Gain Assessment.....	20
5.1	Overview	20
5.2	On-site Habitat Status Before Development	22
5.2.1	Habitat Condition Assessment	22
5.2.2	Habitat Strategic Significance	22
5.3	On-site Habitat Status After Development	23
5.3.1	Modified Grassland	23
5.3.2	Other Neutral Grassland	23
5.3.3	Other Woodland Mixed	24
5.3.4	Pond	24
5.3.5	Individual Trees	25
5.3.6	Species-rich Native Hedgerows	25
5.4	Results of Statutory Metric Calculation	27
5.4.1	Species	28
6	Recommendations.....	30
6.1	Habitats	30
6.2	Species	30
7	References.....	32
8	Appendix 1. Photographs 2021 & 2024	34
9	Appendix 2. Site Location Plans	37
10	Appendix 3. UKHab Habitat Plan	38
11	Appendix 4. Landscape Masterplan	39
12	Appendix 5. Detailed Layouts	40
13	Appendix 6. Statutory Biodiversity Metric	42
14	Appendix 7. Habitat Condition Assessment Sheets.....	43

1 Introduction

1.1 Site Description & Context

The land to the west of Little Tew, referred to as the 'site' for the purpose of this report, is located in the open countryside approximately 750m north-west of the village of Little Tew in Oxfordshire OX7. The approximate Ordnance Survey grid reference for the centre of the site is SP 374 290. Please refer to Appendix 2 for location plans.

The site comprises eight fields that are a mixture of arable farmland (cropland), agriculturally improved grassland (modified grassland) and fallow farmland (one field) separated by native hedgerows and native hedgerows with trees. There is one section of defunct hedgerow.

The site is located within the Cotswold Hills of Oxfordshire, within a mostly agricultural landscape. To the west, north and south are further fields of arable farmland and improved/semi-improved grassland within a network of hedgerows. To the north-east and east, beyond an adjacent road, are areas of plantation woodland and dwellings on the edge of the village of Little Tew.

Significant areas of woodland tend to be scarce within the immediate environs of the site, with the woodland habitats of Valley West of Great Tew Local Wildlife Site (LWS) located approximately 450m to the north.

Little Tew Meadows Site of Special Scientific Interest (SSSI) is located approximately 140m to the south of the site. This SSSI is designated for its unimproved grassland habitats including calcareous grassland and wetland flushes. The parkland habitats of Great Tew Park are located approximately 2km to the east.

1.2 Proposal

Construction of country house and gardens, stable courtyard, new highway accesses, solar array, drainage works and landscape proposals, including new pond/lake.

The proposals have been drawn up in consultation with the ecologist, and many compensation and enhancement measures are already integral to the scheme. This includes habitat creation within the landscaping of the landholding, including woodland, parkland, hedgerow, grassland and wetland habitats.

These are included partly as compensation for habitat loss (a section of hedgerow with trees), but largely to ensure the delivery of significant Biodiversity Net Gain (BNG), in excess of the statutory +10% increase that is required.

1.3 Aims of Study

The aims of this study are to describe and evaluate the habitats present within the site and to assess the potential for the site to support protected and notable species. The report discusses the likely impacts of the proposed development on the ecology of the site, on valued habitats and on protected and notable species. The study also makes recommendations for appropriate mitigation measures and habitat enhancement with regard to habitats and species, and the delivery of biodiversity net gain (BNG) within the proposals.

A further aim of this study is to assess and quantify the biodiversity value of the site and to assess and calculate the impacts of the proposed development on the site's biodiversity value, given as a net loss, no net change or gain in biodiversity units (i.e. delivery of BNG).

This report aims to:

Establish the total number of baseline biodiversity units for the site prior to the development taking place;
 Establish the total number of biodiversity units which will be created, retained and/or enhanced under landscape and ecological mitigation proposals for the site of; and
 Determine whether the proposed development scheme will result in a net loss, no net loss or a net gain in biodiversity

1.4 Biodiversity Statement

1.4.1 *Pre-development Biodiversity Value of On-site Habitats*

The pre-development biodiversity value of the on-site habitats is as follows:

84.57 Habitat Units
 58.95 Hedgerow Units

Watercourse Units are not applicable.

1.4.2 *Date the On-site Pre-development Biodiversity Value was Calculated*

17th April 2024.

1.4.3 *Version of the Biodiversity Metric*

Statutory Biodiversity Metric.

1.4.4 *Version of the Biodiversity Metric Publication Date*

29th November 2023

1.4.5 *Supporting Documentation*

- I. Biodiversity Metric calculation – provided in Excel format as Appendix 6 to this report. Results as follows:

The result of the calculation predicts a net gain in biodiversity.

Total net unit change in habitats: +63.39 habitat units

Total net % change in habitats: +74.98% habitat units

Total net unit change in habitats: +10.26 hedgerow units

Total net % change in habitats: +17.40% hedgerow units

Watercourse units are not applicable.

The Trading Rules are satisfied.

- II. Onsite irreplaceable habitats – not applicable (none present on site)
- III. Onsite habitats existing on the date of the application for planning permission are as follows:

Table 1. UKHab habitats existing on the date of the application for planning permission.

Primary Code	Secondary Code	Description
c1c	-	Cropland; Cereal Crops
c1c	604	Cropland; Cereal Crops (fallow)
g4	-	Grassland; Modified Grassland

Primary Code	Secondary Code	Description
h2a	-	Native Hedgerow
h2a	11	Native Hedgerow with Trees

1.4.6 Loss of On-site Habitats

There has been no loss of on-site habitats prior to the submission of the planning application.

Does the pre-development biodiversity value and date used above factor in the loss of any onsite habitat because of activities carried out before the submission of this application? – not applicable.

1.4.7 Irreplaceable Habitats

There are no irreplaceable habitats within the site.

2 Methodology

2.1 Desk Study

The Thames Valley Environmental Records Centre (TVERC) was contacted in March 2024 to gather records that it holds for protected and notable species, of nature conservation importance from within a 1km radius of the site.

The Multi-Agency Geographic Information for the Countryside (www.magic.gov.uk) website was searched for information regarding internationally protected sites (e.g. Special Areas of Conservation) within 5km of the site and statutory sites of nature conservation importance (e.g. Sites of Special Scientific Interest) within a 1km radius. Other Internet resources interrogated as part of the desk study include:

The Ordnance Survey - www.ordnancesurvey.co.uk
 Bing Maps - www.bing.com/maps
 Old Maps - www.old-maps.co.uk
 Google Earth - www.earth.google.co.uk

Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 was also consulted to gather information pertaining to priority habitats and species for conservation action at the national and local level.

Aerial photography interpretation was used to place the study sites into an ecological context and to provide information on the nature of the habitats beyond the site boundary. The information gathered is used to provide a baseline to the habitat assessment.

2.2 Extended Phase 1 Habitat Surveys 2020 & 2021

Phase 1 Habitat Surveys were undertaken on 20th July 2020 & 20th April 2021 by Edward Bodsworth MA (Cantab) PhD MCIEEM. A walkover of the site was conducted, and a description of the habitats present was prepared using standard Phase 1 Habitat Survey methodology (JNCC 2010).

Target notes were also prepared on features of particular ecological interest within the site and an assessment was made of the site's potential to support protected and notable species (such as species listed under Section 41 of the NERC Act 2006).

2.3 UKHab Habitat Survey 2024

A field survey, using the UK Habitat Classification (UKHab) system, was undertaken on 16th February 2024 by Edward Bodsworth MA (Cantab) PhD MCIEEM. The field survey technique used is detailed

in the UK Habitat Classification User Manual (Butcher, Carey, Edmonds, Norton, & Treweek, UK Habitat Classification Manual Version 1.1, 2020).

The MAGIC website and Google Earth Pro satellite imagery were also used to determine whether there are known or possible locations for rare and/or habitats of high nature conservation importance.

Field survey maps were prepared in QGIS and printed off for use in the field. Survey sheets were printed at a scale relevant to the scope and extent of the survey. They are between 1:10,000 and 1:200 scale.

The UKHab system comprises a five-level Primary Habitat Hierarchy and a list of Secondary Codes, the latter is divided into Essential codes and Additional Codes. It is mandatory that each recorded habitat parcel (which can be a point, line or polygon using geospatial vector data terminology) is allocated a single Primary Habitat Code and to record the presence of all Essential Secondary Code features associated with that habitat parcel. Additional Secondary Codes can also be associated with habitat parcels, where it is relevant to the whole parcel. The UKHab system recommends that up to six Secondary Codes can be allocated to a single habitat parcel.

The UKHab system includes all habitat types identified in the UK, irrespective of scale and geographic range, including all habitats listed under Section 41 of the NERC Act 2006 and all Habitats Directive Annex 1 habitats recorded in the UK. Where possible, synonyms for UKHAB habitats in other major habitat classifications are provided in the definitions.

The UK Habitat Classification Version 2.0 has been used (UKHab Ltd, 2023), with the use of Level 3 to 5 Primary Habitats and Secondary Codes. Primary Habitats and Secondary Codes follow the UKHab. Definitions listed in the aforementioned document. The Secondary Codes selected are appropriate to the site and habitats recorded.

Target notes were also prepared on features of particular ecological interest and an assessment was made of the site's potential to support protected and notable species (such as species listed under Section 41 of the NERC Act 2006) as well as invasive species (listed on Schedule 9 of the Wildlife & Countryside Act 1981).

2.4 Ground Level Tree Assessment (GLTA)

Hedgerow trees were assessed for their potential to shelter roosting bats following good practice guidelines published by the Bat Conservation Trust (Collins, 2023). The survey was undertaken from ground level (using binoculars and a 1 million candle-power torch where necessary) according to the criteria shown in Table 2.

The method involved a detailed inspection of the trees from ground level to compile information about the tree, Potential Roost Features (PRFs) or lack thereof and any evidence of bats or bats themselves that are observed.

The assessment was undertaken by Edward Bodsworth *MA (Cantab) PhD MCIEEM* 16th February 2024. Dr Bodsworth holds a licence from Natural England to survey for bats within all counties of England (Natural England Level 3 and Level 4 Licence nos. 2020-45379-CLS-CLS & 2020-45382-CLS-CLS).

The following criteria are used as guidelines for assessing the potential suitability of trees for bats (Collins, 2023):

Table 2. Guidelines for assessing the suitability of trees on proposed development sites for bats, to be applied using professional judgement (Collins, 2023).

Suitability	Description of Roosting Habitats
NONE	Either no PRFs in the tree or highly unlikely to be any.
FAR	Further assessment required to establish if PRFs are present in the tree.
PRF	A tree with at least one PRF present. The definition of PRF types is below: PRF-I: PRF is only suitable for individual bats or very small numbers of bats either due to size or lack of suitable surrounding habitats. PRF-M: PRF is suitable for multiple bats and may therefore be used by a maternity colony.

PRFs that can be exploited by bats are detailed in Table 3 (Collins, 2023):

Table 3. PRF types that can be exploited by bats and how they form (adapted from *Bat Roosts in Trees, Bat Tree Habitat Key*, 2018) (Collins, 2023).

PRFs Formed by Disease and Decay	PRFs Formed by Damage	PRFs Formed by Association
Woodpecker holes Squirrel holes Knot holes Pruning cuts Tear outs Wounds Cankers Compression forks Butt rots	Lightning strikes Hazard beams Subsidence cracks Shearing cracks Transverse snaps Welds Lifting bark Desiccation Fissures Frost cracks	Fluting Ivy

2.5 Biodiversity Net Gain Assessment

A Biodiversity Net Gain assessment was conducted using the Statutory Biodiversity Metric, published by Department for Environment, Food & Rural Affairs (February, 2024), to calculate the impact of the proposed development on the ecological value of the site. The calculation ascertains whether the proposals are likely to achieve a net gain in biodiversity, calculated as biodiversity (habitat) units and percentage biodiversity (habitat) units.

To effectively assess the impact of the proposals the habitats within the site were classified according to the habitat types given in the UKHab classification system (UKHab Ltd, 2023). Habitats were assessed for their condition and strategic significance according to the criteria given within the Statutory Biodiversity Metric User Guide and The Statutory Biodiversity Metric – Technical Annex 1 (Department for Environment, Food & Rural Affairs, 2024) through onsite visits and the interrogation of internet resources including MAGIC (www.magic.gov.uk) and Google Earth (www.earth.google.co.uk).

The areas of given habitats in both their current state and the proposed development were mapped using on site data, satellite imagery and QGIS software, with the resulting areas inputted into the Statutory Biodiversity Metric alongside strategic significance classifiers.

A site visit was undertaken by a suitably qualified ecologist to determine the habitats present on site, their location, size, condition and connectivity. This survey was conducted by Dr Bodsworth MCIEEM on the 16th February 2024.

The principles of biodiversity net gain as set out in the Biodiversity Net Gain Good Practice Guidelines (CIEEM, IEMA & CIRIA, 2019) have been considered throughout this process as listed below:

- Principle 1.** Apply the Mitigation Hierarchy
- Principle 2.** Avoid losing biodiversity that cannot be offset by gains elsewhere
- Principle 3.** Be inclusive and equitable
- Principle 4.** Address risks
- Principle 5.** Make a measurable Net Gain contribution
- Principle 6.** Achieve the best outcomes for biodiversity
- Principle 7.** Be additional
- Principle 8.** Create a Net Gain legacy
- Principle 9.** Optimise sustainability
- Principle 10.** Be transparent.

The completed Statutory Biodiversity Metric (excel spreadsheet) is contained within Appendix 6 (appended document).

2.6 Evaluation Methodology

The evaluation of habitats follows the geographic frame of reference presented within the *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal* (CIEEM, 2016).

The Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines recognise that ecological evaluation is a 'complex and subjective process' but provides key considerations to apply when 'applying professional judgement to assign values to ecological features and resources'. These include consideration of geographic frame of reference; site designations and features; biodiversity value; large populations or important assemblages of species; potential or supporting value; social value and economic value.

Focusing on assessments of biodiversity value, there are various characteristics that can be used to identify ecological resources or features that are likely to be important in terms of biodiversity. These include:

- Rare or uncommon species in the local, national or international context;
- Endemic or locally distinct sub-populations of a species;
- Species on the edge of their distribution;
- Notably large populations of animals or concentration of animals considered uncommon or threatened in a wider context;
- Species, rich assemblages of plants or animals;
- Ecosystems and their component parts, which provide the habitats required by the above species, populations and/or assemblages;
- Plant communities (and associated animals) considered typical of valued natural/semi-natural vegetation types; and
- Habitat diversity, connectivity and/or synergistic associations.

In this report, habitats are assigned to a value relating to their geographic frame of reference, using the following scale:

International

UK
National (England)
Regional (South East)
County (Oxfordshire)
District (West Oxfordshire)
Local or parish (Little Tew)
Immediate zone of influence of the site (Site)
Negligible

Regarding protected and notable species, an assessment of habitat suitability and potential presence of species has been undertaken, given the results of the desk study and field survey.

3 Results & Evaluation

3.1 Ecological Context

3.1.1 National Character Area Profile

The site is located within the Cotswold National Character Area. The Cotswold Hills form the best-known section of the predominantly oolitic Jurassic Limestone belt that stretches from the Dorset coast to Lincolnshire.

The dominant pattern of the Cotswold landscape is of a steep scarp crowned by a high, open wold; the beginning of a long and rolling dip slope cut by a series of increasingly wooded valleys.

The scarp provides a backdrop to the major settlements of Cheltenham, Gloucester, Stroud and Bath and provides expansive views across the Severn and Avon Vales to the west. Smaller towns and villages nestle at the scarp foot, in the valley bottoms and on the gentler valley sides at springlines.

3.1.2 Sites of Nature Conservation Importance

3.1.2.1 Statutory Sites

There are no sites of international importance to nature conservation, such as Special Areas of Conservation (SAC), within a 20km radius of the site.

The edge of Little Tew Meadows Site of Special Scientific Interest (SSSI) is located approximately 140m to the south of the site.

Little Tew Meadows SSSI

The Little Tew Meadows SSSI is one of the largest continuous areas of agriculturally unimproved grassland in Oxfordshire with several locally uncommon plants. The site has four adjoining fields of which one is managed as hay meadow while the others have a long history of management by low-intensity summer cattle grazing. Two of the fields have prominent ridge and furrow topography. The site is situated on Jurassic limestone which gives rise to a calcareous influence to the flora. It is located in the valley of the River Dorn, a tributary of the River Evenlode.

The grassland is generally moderately calcareous in character but some areas are strongly calcareous. A particularly notable feature of the site is the presence of extensive flushes. Limestone outcrops are present around the site of an old quarry in one of the fields.

3.1.2.2 Non-statutory Sites

There is only one non-statutory site of nature conservation importance within a 1km radius of the site, and this is the Valley West of Great Tew Local Wildlife Site (LWS) which is located approximately 450m to the north of the site boundary.

Valley West of Great Tew LWS

The valley has a wide range of habitats including fen, wet grassland, neutral grassland, wet woodland and mixed deciduous woodland. There are areas of wet woodland and neutral grassland including richer areas of lowland meadow. The wet woodland is species-rich with many wetland plants. The drier woodland is mostly planted but includes semi-natural woodland on the steeper banks and a small area is included on the Natural England ancient woodland inventory.

The site provides valuable habitat for invertebrates including large amounts of deadwood and also supports badger and otter.

Glyme & Dorn Valleys Conservation Target Area (CTA)

The site is located partly within the Glyme & Dorn Valleys CTA. Oxfordshire Biodiversity Action Plan targets for the CTA include:

- Lowland calcareous grassland – management and creation
- Lowland meadows – management and restoration
- Fen, reedbed and swamp – management and restoration
- Parkland – management, restoration and creation
- Lowland mixed deciduous woodland – management, restoration and creation
- Rivers – management and restoration

3.1.3 Protected & Notable Species Records

3.1.3.1 Plants

The Records Centre holds a number of different records for rare and uncommon plant species from the 1km search radius, the majority of which pertain to locations within the Valley West of Great Tew LWS and the Little Tew Meadows SSSI.

The records include plant species of grassland, wetland and woodland habitats including bluebell *Hyacinthoides non-scripta*, field scabious *Knautia arvensis*, harebell *Campanula rotundifolia*, ragged robin *Silene flos-cuculi* and quaking grass *Briza media*.

Bluebells were found at one location within the site, in a boundary hedgerow, but no other rare or uncommon plant species were noted within the site.

3.1.3.2 Birds

The majority of the species records pertain to birds, including species of grassland, woodland and hedgerow habitats, as well as some birds of wetlands.

Species associated with hedgerow habitats include yellowhammer *Emberiza citrinella*, bullfinch *Pyrrhula pyrrhula*, dunnoek *Prunella modularis*, linnet *Linaria cannabina* and song thrush *Turdus philomelos*. Species associated with grassland and farmland habitats include skylark *Alauda arvensis* and barn owl *Tyto alba*. Skylarks were seen and heard during the habitat survey.

There are records of red kite *Milvus milvus* and there are mature trees within some of the hedgerows which may provide suitable nesting sites for this species.

There are records of kingfisher *Alcedo atthis*, but there are no suitable habitats for this species within the site.

3.1.3.3 Bats

There are records of the following bat species, including records of droppings and roost locations for some species:

Common pipistrelle *Pipistrellus pipistrellus*
Soprano pipistrelle *Pipistrellus pygmaeus*
Whiskered bat *Myotis mystacinus*
Barbastelle *Barbastella barbastellus*
Noctule *Nyctalus noctula*
Leisler's bat *Nyctalus leisleri*
Brown long-eared bat *Plecotus auritus*
Lesser horseshoe bat *Rhinolophus hipposideros*

The hedgerows of the site form a habitat connection and network which may provide foraging and movement routes for bats. Some of the mature hedgerow trees have the potential to offer shelter to roosting bats.

3.1.3.4 Reptiles

The Records Centre holds one record of adder *Vipera berus* from 2010 and two records of grass snake *Natrix helvetica* from 2011.

3.1.3.5 Amphibians

There are no existing records of the great crested newt *Triturus cristatus* from the 1km search radius.

There are records of common frog *Rana temporaria* and common toad *Bufo bufo* from the area, dating from 2014.

3.1.3.6 Invertebrates

There are records of the blood vein moth *Timandra comae*, white clawed crayfish *Austropotamobius pallipes* and large black slug *Arion ater* from the search area.

The blood vein is a relatively common moth species, which can occur in hedgerow, grassland and woodland habitats. The large black slug is also a common and widespread species, that can occur in hedgerow habitats.

There are also three records of the small heath butterfly *Coenonympha pamphilus*, one of which is from the Little Tew Churchyard. The most recent record is from 1998 and this may not be a current representation of the species' occurrence in the locality. The improved grassland habitats of the site are also not suitable for small heath butterflies.

There are no suitable habitats within the site for white clawed crayfish.

3.1.3.7 Badger

There are two records of badger *Meles meles* from the search area, both dating from 2004.

3.1.3.8 Hazel Dormouse

There is one records for the hazel dormouse *Muscardinus avellanarius*, from a location on 'a footpath adjacent to the Great Tew Estate' and dating from 2011. The record is located approximately 900m to the north-east of the site boundary.

3.2 Habitats

Photographs of the site are presented in Appendix 1. Please refer to Appendix 3 for a UKHab Habitat Plan, showing the location and extent of the following habitats.

3.2.1 Overview

The site comprises eight agricultural fields, separated by hedgerows and hedgerows with trees. Five of the fields were under arable cultivation (cropland) at the time of the field surveys, with one fallow field and two fields of improved (modified) grassland. The hedgerows are largely similar in their species composition. Some of the hedgerows have mature standard trees.

Table 4. UKHab habitat types located within the site.

Primary Code	Secondary Code	Description
c1c	-	Cropland; Cereal Crops (cultivated)
c1c	604	Cropland; Cereal Crops (fallow)
g4	-	Grassland; Modified Grassland
h2a	-	Native Hedgerow
h2a	11	Native Hedgerow with Trees

3.2.2 Cropland; Cereal Crops (c1c & c1c 604)

There are six arable fields within the site, five of which are cultivated (ploughed in February 2024) and one of which is left fallow.

Whilst some arable field margins can support uncommon arable weeds, no rare arable weed species were noted during the habitat surveys (2020, 2021 & 2024) and the field margins support only common and widespread grass and ruderal species. The arable margins are similar in species composition to the margins of the fields of modified grassland (see below).

One field is not under cultivation and has been left fallow. This field supports sparse tall ruderal vegetation that is typical of fallow arable land including creeping thistle *Cirsium arvense*, stinging nettle *Urtica dioica*, creeping buttercup *Ranunculus repens*, bristly oxtongue *Picris echioides*, dandelion *Taraxacum officinale*, willowherb *Epilobium* sp., cock's-foot *Dactylis glomerata* and broad-leaved dock *Rumex obtusifolius*. There is abundant bare ground within this area of fallow cropland.

Modern methods of cultivation (possibly including the use of herbicide, insecticide and fertiliser) are likely to result in a habitat that is poor for several species. Given this, cultivated cereal cropland is considered to be of **negligible ecological value**.

Fallow cropland is considered to be of **ecological value at the site level**, as the ruderal species are likely to provide some foraging opportunities to invertebrates, birds and small mammals.

3.2.3 Grassland; Modified Grassland (g4)

Two of the fields (the southern fields) are modified (agriculturally improved grassland). Both fields appear to have been sown with a grass 'ley' and are of low botanical diversity, and have a poor, uniform structure. The sward is dominated by common grass species including perennial rye grass *Lolium perenne*, cock's-foot and false oat grass *Arrhenatherum elatius*. Herbs are present in very low abundance and include creeping buttercup, dandelion, bristly oxtongue and creeping thistle.

The field margins tend to be more diverse, with tufted hair grass *Deschampsia cespitosa*, cow parsley *Anthriscus sylvestris*, stinging nettle and garlic mustard *Alliaria petiolata* also noted.

The grassland habitats are species-poor, and of poor structure, and this is likely to be a result of agricultural improvement which appears to have involved sowing of a grass mix. The grassland does

not meet the criteria for any grassland habitats of 'principal importance' as listed under Section 41 of the NERC Act 2006, such as Lowland Meadows.

The grassland habitat is considered to be of **ecological value at the site level** only. The grassland does not exhibit any features or species that would indicate a calcareous influence, and the habitat has no similarity to valued grassland habitats of the nearby SSSI.

3.2.4 Hedgerows & Hedgerows with Trees (h2a & h2a 11)

Native hedgerows, and native hedgerows with trees, are considered to be the most valuable and most distinctive habitat features of the site.

The native hedgerows are largely similar in their species composition, with hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, ash *Fraxinus excelsior*, field maple *Acer campestre* and dog rose *Rosa canina* being common to all hedgerows. Standard mature trees, where present are oak *Quercus robur* and ash.

Other woody species that were noted occasionally and in low abundance within some hedgerows are apple *Malus sylvestris*, elder *Sambucus nigra*, hazel *Corylus avellana*, elm *Ulmus* species and snowberry *Symphoricarpos albus*.

The ground flora of the hedgerows is also relatively uniform, including cow parsley, stinging nettle, garlic mustard, cleavers *Galium aparine*, ground ivy *Glechoma hederacea*, ivy *Hedera helix*, white dead nettle *Lamium album*, bramble *Rubus fruticosus*, hogweed *Heracleum sphondylium* and lords-and-ladies *Arum maculatum*.

Bluebells were only noted at one location, within the hedgerow that forms the south-eastern boundary of the site along the adjacent bridleway.

The hedgerows are considered to meet the criteria for habitats of 'principal importance' as listed within Section 41 of the NERC Act 2006. It is considered that some of the hedgerows may also meet the ecological criteria for 'important' hedgerows under the Hedgerows Regulations 1997. Given the above, hedgerow habitats are considered to be of **ecological value within the local to district level**.

There is one section of hedgerow (which divides the two north-western fields) that is defunct. There are only two shrubs of hawthorn within this section of former hedgerow. Defunct hedgerows are considered to be of **ecological value at the site level** only.

3.2.5 Other Features

Ordnance Survey maps indicate a field drain between the two southern fields of improved grassland. This drain was not noted during any of the field surveys and is considered to be absent.

3.2.6 Summary of Habitat Evaluation

In summary, the habitats have been evaluated as follows.

Table 5. Summary of habitat evaluation.

Habitat	Value
Cropland; Cereal Crops (cultivated)	Negligible
Cropland; Cereal Crops (fallow)	Site
Grassland; Modified Grassland	Site
Native Hedgerow	Local to District

Habitat	Value
Native Hedgerow with Trees	Local to District

3.3 Species

3.3.1 Plants

No rare or uncommon plants were noted within the site and the majority of the site (cropland and modified grassland) is considered to be unsuitable for rare plant species. The habitats are not suitable for plant species that have been recorded from the nearby LWS and SSSI, such as field scabious, harebell and quaking grass. The grassland appears to have been sown with a grass 'ley' and has poor species-richness and poor structure, with an open, homogeneous sward.

Bluebells were noted at one location within a hedgerow which forms a boundary to the site, alongside an adjacent bridleway at approximate Ordnance Survey grid reference SP 3774 2885. No bluebells were seen in other hedgerows. No other rare or protected woodland species were noted within the hedgerows.

3.3.2 Birds

Hedgerows and trees offer potential nesting habitat for farmland birds and the local assemblage includes a number of species that may use such habitats including dunnock, song thrush, bullfinch and yellowhammer. Mature trees offer potential nesting sites to red kites and kestrels.

One singing skylark was seen and heard within the north-westernmost field in April 2021. This may indicate that skylarks nest, or attempt to nest, within the arable farmland of the site. However, only one skylark was observed on the day of the survey in April 2021. No skylarks were seen or heard during any of the other surveys in 2020 or 2024.

The modified grassland habitat is not considered to be suitable for skylarks, or other ground-nesting species since it is species-poor, has poor structure and appears to have been sown relatively recently.

There are no suitable habitats for wetland bird species, including the kingfisher.

3.3.3 Bats

There are no buildings within the site that could offer shelter to roosting bats.

Some of the mature hedgerow trees (all ashes) have been identified as having the potential to offer shelter to roosting bats. There are considered to be five PRF-I trees and one PFR-M tree.



Figure 1. Aerial photograph showing the location of trees with bat roost potential. Amber circles indicated PRF-I trees and the red circle indicates a PRF-M tree.

Cereal cropland and modified grassland are considered to be poor habitats for foraging bats, offering a low abundance and diversity of invertebrate prey. These habitats are unlikely to provide a key foraging resource to local bat populations.

The hedgerows, and mature trees of hedgerows, are considered to be suitable habitats for foraging bats, and bats are likely to use the network of hedgerows for movement/dispersal and for foraging within the shelter that the hedgerows may create. There are records of a number of different bat species, and it is likely that the surrounding area supports a mixture of common and rarer species. It is considered that the hedgerows are likely to be an important resource for local populations of bats.

There are no woodland or wetland habitats within the site that could offer a foraging resource to bats.

3.3.4 Reptiles

Habitats of the site are not considered to be suitable for common reptiles. Ploughed cereal cropland offers no obvious shelter or habitat, and the modified grassland is also considered to be unsuitable for reptiles. Although field margins and hedgerows can offer shelter, the field margins of the site are very narrow, and it is considered very unlikely that reptiles are present within these marginal areas.

The improved grassland is species-poor and appears to have been sown, possibly into land that was previously under arable cultivation. The wider landscape is largely agricultural, comprising arable land and improved pasture, and there are no habitats adjacent to the site that are considered to be suitable for reptiles, and so no source population for reptiles to move into the site.

3.3.5 Amphibians

There are no ponds or standing waterbodies within the site or adjacent to the site boundary.

Ordnance Survey maps show four ponds within a 500m radius of the site, and these include a small pond approximately 175m to the east, and ponds approximately 210m north-east, 260m east and 260m south-east. There are also a number of springs within the area, the nearest of which is approximately 310m to the south-west of the site.

The habitats of the site are considered to be largely unsuitable for amphibians whilst on land. Arable farmland, which is under cultivation, offers little or no cover to amphibians and is considered to be unsuitable. Similarly, (sown) modified grassland are unlikely to provide areas of suitable cover and shelter for amphibians that may be present in ponds over 175m away from the site.

The four nearby ponds appear to be surrounded by relatively suitable terrestrial habitats, and are separated from the site by plantation woodland, woodland and grassland. It seems unlikely that amphibians will be moving from these ponds in a westerly direction, through areas of suitable habitat, across a road and into cultivated arable land.

The site appears to be within a White Impact Risk Zone and Green Impact Risk Zone for great crested newts (as defined by Naturespace). These are the two zone of least concern with regard to the potential presence of great crested newts:

- Green – moderate habitat suitability – great crested newts may be present
- White – low habitat suitability – low probability of great crested newt presence

Given the above, amphibians (including great crested newts), are considered to be absent from the site.

3.3.6 *Invertebrates*

Cereal cropland and modified grassland are considered to be poor habitats for invertebrates. The cultivation of the arable farmland is likely to result in a poor habitat for invertebrates, and spraying with insecticide may further reduce the habitat suitability.

Areas of modified grassland are not suitable for uncommon grassland butterflies such as the small heath. This species tends to occur within unimproved or semi-improved grassland with higher plant species diversity, and more varied grassland structure, with areas of short grass, longer grass and bare ground.

Hedgerows, and associated features such as mature standard trees, offer potential habitat for common invertebrates, and this may include certain widespread species (such as moths) that are listed on Section 41 of the NERC Act 2006. The hedgerows are therefore considered to be of high ecological value for invertebrates.

There are no suitable habitats for white-clawed crayfish.

3.3.7 *Badgers*

No evidence of badgers, such as active/inactive setts, trackways, digging, footprints, dung, latrines, was recorded during the surveys in 2020, 2021 or 2024.

3.3.8 *Hazel Dormouse*

There are no woodland habitats within the site or adjacent to the site that could offer suitable habitat to hazel dormice. Whilst hedgerows can offer habitat to the species, suitable hedgerows are those that have abundant hazel (as a food source) and that have strong habitat connections to woodland habitats that are suitable for hazel dormice.

There is an area of plantation woodland to the north-east of the site, beyond the adjacent road, but this is a relatively young habitat, and it is not considered to be suitable for dormice. In addition,

although it is not a wide road, the road is likely to create a partial or complete barrier to dormouse dispersal from the north-east; there are no trees or vegetation that create connections or touching 'archways' of vegetation across the road that dormice could use for dispersal.

In the wider locality, the woodland habitats of Valley West of Great Tew LWS are located approximately 450m to the north of the site. However, these are also ecologically isolated from the hedgerows of the site, being located to the north of a road, and the hedgerows to the north of the road do not appear to be particularly suitable as dormouse habitat or for dormouse dispersal.

There is not considered to be sufficient, or strong enough, habitat connectivity into woodlands of the surrounding landscape for the hedgerows of the site to support a population of dormice.

It is considered that dormice are absent from the site.

3.3.9 Other Mammals

The hedgerows offer potentially suitable habitat to hedgehogs *Erinaceus europaeus*.

3.3.10 Non-native Invasive Plant Species

A relatively small patch of Japanese knotweed *Fallopia japonica* was noted within the hedgerow that forms the south-eastern boundary of the site, alongside the adjacent bridleway; at approximate Ordnance Survey grid reference SP 3772 2884.

No other non-native, invasive plant species were noted within the site.

4 Discussion

4.1 Relevant Legislation & Policy Guidance

4.1.1 Nesting Birds

Nesting birds are protected under the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to intentionally kill, injure or take any wild bird or take, damage or destroy its nest whilst in use or being built, or take or destroy its eggs. The nesting season for most species is between March and August, inclusive.

4.1.2 Bats

As with many animal species within the UK, declines in the abundance and distribution of many bat species have been documented through recent decades. The reasons for these declines are various and complex but it is considered that the major factors are changes in land use and agriculture, the loss of woodlands and hedgerows and the loss of suitable roosting sites.

Bats are particularly sensitive to human activity due to the fact that they roost within buildings, trees and underground structures such as mines, and the availability of suitable roost sites is considered to be a key factor in the conservation of bats within the UK. As a consequence, all species of bat and their roost sites are protected under the Wildlife and Countryside Act 1981 (as amended by the Countryside and Rights of Way Act 2000) and under The Conservation of Habitats and Species Regulations 2017. Taken together, these make it an offence to:

- (a) Deliberately capture or intentionally take a bat
- (b) Deliberately or intentionally kill or injure a bat
- (c) To be in possession or control of any live or dead wild bat or any part of, or anything derived from a wild bat
- (d) Damage or destroy a breeding site or resting place of such an animal or intentionally or recklessly damage, destroy or obstruct access to any place that a wild bat uses for shelter or protection

- (e) Intentionally or recklessly disturb any wild bat while it is occupying a structure or place that it uses for shelter or protection
- (f) Deliberately disturb any bat, in particular any disturbance which is likely
 - to impair their ability;
 - (i) to survive, breed, reproduce or to rear or nurture their young; or
 - (ii) in the case of hibernating or migratory species, to hibernate or migrate; or
 - to affect significantly the local distribution or abundance of the species to which they belong

A bat roost may be any structure a bat uses for breeding, resting, shelter or protection. It is important to note that since bats tend to re-use the same roost sites, current legal opinion is that a bat roost is protected whether or not the bats are present at the time.

Although the law provides strict protection to bats, it also allows this protection to be set aside (derogation) under The Conservation of Habitats and Species Regulations 2017 through the issuing of licences. Where a lawful operation is required to be carried out but which is likely to result in one of the above offences, a licence may be obtained from Natural England (the statutory body in England with responsibility for nature conservation) to allow the operation to proceed. However, in accordance with the requirements of The Conservation of Habitats and Species Regulations 2017, a licence can only be issued where the following requirements are satisfied:

The proposal is necessary 'to preserve public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment';

'There is no satisfactory alternative';

The proposals 'will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range'.

A licence application includes a Method Statement which details the ecological survey work that has been undertaken and assesses the impacts on bats and their roost sites as a result of the development proposals. It also presents a mitigation strategy for maintaining the 'favourable conservation status' of the bats. This strategy will often include careful timing of work to avoid disturbance to bats, sensitive work practices to avoid the killing and injury of bats and the provision of alternative and enhanced roosting sites and roosting opportunities such as bat lofts and bat boxes. These compensation features will be appropriate to the species of bat and the type of roost site, such as maternity, hibernation or transient. The Method Statement is prepared by a suitably qualified and experienced ecologist on behalf of the applicant. The licence application also includes a Reasoned Statement which is completed by the applicant (not the ecologist) to address the first two requirements of the Regulations which consider the 'need' of the development and any satisfactory alternatives.

Natural England aim to determine licence applications within 30 working days of receipt. However, there is no guarantee that this time scale will be met and it is occasionally exceeded, sometimes by a considerable margin. There is no fast track to obtaining a licence and an application can only be made once planning permission has been granted by the Local Authority (where appropriate).

4.1.3 *The Natural Environment and Rural Communities Act 2006*

Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 places a duty on the Secretary of State to publish, review and revise lists of living organisms and types of habitat in England that are of principal importance for the purpose of conserving English biodiversity.

It also requires the Secretary of State to take, and promote the taking of, steps to further the conservation of the listed organisms and habitats. This is important in the context of planning decisions as the National Planning Policy Framework affords planning policy protection to the habitats of species listed by virtue of Section 41.

Habitats listed within Section 41 of the NERC Act 2006 that are considered to be relevant to the site include:

Hedgerows (native hedgerows and native hedgerows with trees)

Species listed within Section 41 of the NERC Act 2006 that are considered to be relevant, or potentially relevant, to the site include:

A number of common bird species, such as dunnoek, bullfinch, linnet and song thrush (hedgerows and hedgerow trees offer potential habitat)

Bat species (potential for roosting within certain mature trees and hedgerows/trees offer potential foraging and dispersal habitat; mature trees may provide roosting opportunities)

Hedgehog (hedgerows offer potential habitat)

Common moth species (hedgerows offer potential habitat)

4.1.4 *Sites of Special Scientific Interest*

Under the Wildlife and Countryside Act 1981 the government has a duty to notify as a Site of Special Scientific Interest (SSSI) any land which in its opinion is of special interest by reason of any of its flora, fauna, geological or physiographical features. In England, SSSIs are designated by Natural England. This body is known as the designating body.

A SSSI is not necessarily owned by a conservation organisation or by the Government. The designation is primarily to identify those areas worthy of preservation. An SSSI is given certain protection against damaging operations, and any such operations must in theory be authorised by the designating body. The status also affords a certain amount of planning protection, depending on the reasons for designation.

The Countryside and Rights of Way Act 2000 has made some significant changes to SSSI legislation in England and Wales. The Countryside and Rights of Way Act 2000 strengthened the law giving greater power to the designating body to enter into management agreements, to refuse consent for damaging operations, and to take action where damage is being caused through neglect or inappropriate management.

Local Authorities and other public institutions now also have a statutory duty to further the conservation and enhancement of SSSIs both in carrying out their operations, and in exercising their decision-making functions, which includes planning decisions. SSSIs form the basic unit of UK protected area legislation; most higher designations (SPAs & SACs) are superimposed onto existing SSSIs.

4.1.5 *National Planning Policy Framework (NPPF)*

The National Planning Policy Framework was updated on 19th December 2023 and sets out the government's planning policies for England and how these are expected to be applied. This revised Framework replaces the previous National Planning Policy Framework published in March 2012, revised in July 2018, updated in February 2019, revised in July 2021 and updated in September 2023.

The NPPF states that planning policies and decisions should contribute to and enhance the natural and local environment by:

protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);

recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;
maintaining the character of the undeveloped coast, while improving public access to it where appropriate;
minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;
preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and
remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.

Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries.

To protect and enhance biodiversity and geodiversity, plans should:

Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and
Promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.

When determining planning applications, local planning authorities should apply the following principles:

If significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
Development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;
Development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons, and a suitable compensation strategy exists; and
Development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate.

The following should be given the same protection as habitats sites:

Potential Special Protection Areas and possible Special Areas of Conservation;
Listed or proposed Ramsar sites; and
Sites identified, or required, as compensatory measures for adverse effects on habitats
sites, Potential Special Protection Areas, Possible Special Protection Areas of
Conservation, and listed or proposed Ramsar sites.

The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site.

4.1.6 *Environment Act 2021*

The Environment Act 2021 has been introduced to ensure that England maintains and improves its environmental protection. The Act details a legal requirement for all developments (with some exemptions) to deliver a minimum of 10% measurable net gain in biodiversity.

4.2 **Assessment of Potential Impacts**

4.2.1 *Sites of Nature Conservation Importance*

There are no foreseeable impacts on statutory or non-statutory sites of nature conservation importance. This is due to the distance of sites of nature conservation importance from the site boundary, resulting in no foreseeable direct or indirect impacts.

The improved grassland habitats of the site have no similarity to valued grassland habitats of the nearby Little Tew Meadows SSSI. The boundary of the SSSI is considered to be far enough away from the proposed area of development to avoid any potential direct or indirect impacts. The proposals do not fall within the criteria for operations requiring Natural England's consent (ORNEC).

The site is located partly within the Glyme & Dorn Valleys CTA, and the proposed landscaping has been designed to meet several of the targets of the CTA including grassland creation and management, lowland mixed deciduous woodland creation, parkland creation and management, and the creation of reedbed/swamp (within the proposed lake).

4.2.2 *Habitats*

The proposals are for a dwelling, with the creation of parkland, woodland, grassland and wetland habitats. The habitat creation will be significant, and through the whole of the landholding, resulting in a significant enhancement of the existing green infrastructure. The proposals include the following elements:

- Strengthening of hedgerows (to create species-rich native hedgerows)
- Creation of hedgerows (species-rich native hedgerows)
- Creation of lowland mixed woodland
- Creation of parkland (modified grassland with individual rural trees)
- Creation of wetland (pond/lake, with reedbed and swamp margins)
- Creation of species-rich meadow grassland (other neutral grassland)
- Creation of pasture (modified grassland)
- Creation of gardens (vegetated garden)

There will be some loss of native hedgerow with trees. It is estimated that an approximate length of 180m of hedgerow with trees will be lost, and this will include a number of mature ash trees.

Hedgerows are considered to be of ecological value within a wider, local context, and are considered to meet the criteria for a habitat of 'principal importance' under Section 41 of the NERC Act 2006.

Hedgerows have been evaluated at the local to district level, with hedgerows with trees offering greater ecological value. Mature ash trees are a distinctive feature of the hedgerows, and are also considered to add to the ecological value of the hedgerows.

Loss of hedgerow and hedgerow trees will require compensation, and this has been included within the proposals which include approximately 0.684km of new native hedgerow and 208 individual standard native parkland trees. This includes a new hedgerow (of approximately 100m in length) alongside a ha-ha to the south side of the proposed house). This will provide compensation for the loss of hedgerow habitats, but also provide a habitat link/wildlife corridor in a west-east direction, to compensate for any habitat severance through the removal of the existing hedgerow. A new hedgerow will also be created to the south side of the proposed PV panel arrays and tree nursery to the north side of the site.

In addition to the creation of these new hedgerows, existing hedgerows to the western fields (including the defunct hedgerow) will be strengthened through further planting, providing increased botanical diversity and enhanced habitat connectivity in the north-south direction.

Whilst the new trees will be young, and not mature ashes, the proposed number of new trees is considered to provide adequate compensation for the loss of mature trees within hedgerows. The recommended retention of felled mature trees as fallen dead wood will ensure that some of the ecological value of the mature specimens is retained on site.

The proposals will result in the loss of arable farmland, as the farmland will be converted into grassland, parkland, gardens and woodland. The proposals will also result in the creation of species-rich grassland within areas of existing agriculturally improved grassland. The field of tall ruderal vegetation will also be lost to the proposed landscaping. Such habitat loss will not result in a significant adverse ecological impact. Indeed, the proposals to create habitats, including species-rich grassland, woodland and wetland are likely to result in a significant ecological enhancement.

Arable land, improved grassland and tall ruderal are of low ecological value, whilst the proposed habitats will be of high ecological value, such as woodland, wetland and parkland.

Lowland mixed woodland, hedgerows, ponds and parkland are all habitats of 'principal importance' as listed within Section 41 of the NERC Act 2006, and so it is considered that the proposals will contribute to the enhancement of ecological value within a wider context, at a local and district level.

5 Biodiversity Net Gain Assessment

5.1 Overview

It is considered that there is significant scope for delivering biodiversity net gain within the proposals, through habitat creation and enhancement. The landscape proposals include habitats that do not currently occur within the site, such as a lake, woodland and parkland, and creation of such habitats (on which is currently arable land or improved grassland) is likely to result in significant ecological enhancement. Existing hedgerows will be strengthened, through native planting, to improve habitat connectivity and the value of hedgerow habitats overall. The defunct hedgerow will be restored.

In terms of quantifying the extent of habitat creation, the following will be delivered through the proposed landscaping of the landholding:

- New native woodland (other woodland, mixed) – 7.46ha
- Individual trees; rural trees – 208 individuals
- New native species-rich hedgerows – 0.684km
- Lake/pond – 0.5ha
- Modified grassland – 16.35ha

Wildflower grassland (other neutral grassland) – 0.8ha
New gardens (vegetated garden), with 72 garden trees – 1.14ha
Enhanced hedgerows – 0.711km
Native tree nursery (horticulture) – 0.36ha

A lake/pond will be created within the southern area of the site, providing aquatic habitats that do not currently occur within the site, including fringing reedbed and swamp. In addition to this standing water habitats, a series of swales and pools will be created to the north of the lake, to direct water down the slope. These swales and pools will also provide significant habitat enhancement, as they will create seasonal waterbodies and wet ground that will be of value to wetland plants and animal species such as aquatic invertebrates. The proposed swimming pool to the east of the house will be a natural pool; not heated and naturally filtered.

With the exception of the retained grassland, all of the habitat creation will be undertaken within areas that are currently arable land, or fallow arable land (tall ruderal vegetation). Given this, the resulting biodiversity net gain is likely to be significant.

Not only do the proposals offer the opportunity of significant biodiversity net gain, but the proposed habitats also contribute to a number of target habitats within the adjacent Glyme & Dorn Valleys CTA, including:

- Lowland meadows – creation and management
- Reedbed and swamp – creation
- Parkland – creation and management
- Lowland mixed deciduous woodland – creation and management

The site is partly within the CTA and it is considered that the proposals will result in habitat creation and management that will be in line with the targets of the CTA, and will contribute to the aims and objectives of the CTA.

A biodiversity net gain assessment has been undertaken using Statutory Biodiversity Metric. The full calculation can be found in Appendix 7 (appended Excel Spreadsheet).

The calculation is based on the habitats present on site before development (please see Appendix 3 for a UKHab Baseline Habitat Map) and the habitats after development has taken place (please see the Appendix 4 for a landscape masterplan showing the habitats after development).

5.2 On-site Habitat Status Before Development

The total site area is 36.77ha.

Each of the habitats discussed within this Ecological Impact Assessment were inputted into the Statutory Biodiversity Metric using the UK Habitat Classification (UKHab) system.

Table 6. UKHab baseline on-site area habitats.

On-site Area Habitat Baseline	
UKHab Habitat Type	Area (ha)
Cropland; Cereal Crops	26.67ha
Grassland; Modified Grassland	10.10ha

Table 7. UKHab baseline linear (hedgerow) habitats.

On-site Linear Habitat Baseline	
UKHab Habitat Type	Length (km)
Native Hedgerow (h2a) – intact & defunct	1.41km
Native Hedgerow with Trees (h2a 11)	3.63km

5.2.1 Habitat Condition Assessment

Habitat condition was assessed according to the criteria given within the Statutory Biodiversity Metric User Guide. The summary condition assessments for the habitats within the baseline can be found in Table 6. The details of the habitat condition assessment can be found within the Habitat Condition Assessment Sheets in Appendix 7 of this report (separate Excel spreadsheet).

Table 7. Habitat condition assessment baseline.

UKHab	Condition	Rationale
Cropland; Cereal Crops	Condition Assessment N/A	Not applicable.
Grassland; Modified Grassland	Poor	Passes 4 criteria, but fails to pass essential criterion A.
Native Hedgerow (h2a) - intact	Good	Fails only 2 attributes.
Native Hedgerow (h2a) - defunct	Poor	Fails 5 attributes (defunct hedgerow).
Native Hedgerow with Trees (h2a 11)	Good	Fails only 2 attributes.

5.2.2 Habitat Strategic Significance

The site is partly located within an area of habitat strategic significance, namely a Conservation Target Area. For this reason, all of the habitats are allocated as being of strategic significance.

5.3 On-site Habitat Status After Development

The proposals are for a single dwelling with associated gardens to include lawns, 72 garden trees (mostly native), a natural swimming pool, formal gardens and a vegetable garden. Within the Metric, the condition assessment of 'vegetated gardens' is not applicable. There is no condition assessment required for the proposed buildings and areas of hard-standing (developed land; sealed surface).

Existing modified grassland will be retained, and will be taken under appropriate management through grazing and occasional cutting to enhance its ecological value, raising its condition from poor to moderate. All of the existing arable farmland will be converted into grassland, with one area of wildflower meadow (other neutral grassland, good condition) and the other areas of pasture (modified grassland, moderate condition) with parkland trees, grazed by livestock.

An ornamental lake/pond (pond, non-priority habitat) will be created to the southern area of the site, and the aim will be to achieve 'good' condition for this habitat through good design to create deeps and shallows, so that marginal aquatic vegetation, including reedbed, can become established.

Mixed woodland planting (other woodland, mixed) will create a woodland habitat. The habitat condition for this woodland has been taken as 'poor' which is being conservative due to the difficulty of creating 'good' condition woodland within 30 years.

An existing defunct hedgerow (native hedgerow, poor condition) will be enhanced through native tree and shrub planting to create a species-rich native hedgerow (good condition). Approximately 711m of native hedgerow (good condition) will also be enhanced through further native planting to widen and strengthen the hedgerows (thus resulting in species-rich native hedgerows of good condition). 0.684km of new species-rich native hedgerows with trees will also be planted.

5.3.1 Modified Grassland

Modified grassland will be retained (and enhanced) as well as created. New areas of modified grassland will be created through the sowing of an appropriate seed mix, such as Emorsgate EM3 Special General-Purpose Meadow Mixture, or similar. Existing areas of modified grassland will be enhanced by 'over-sowing' with the same mix. In enhanced, and created areas of modified grassland, the following will be achieved (as a minimum) to create grassland of moderate condition (enhanced from poor).

There are 6-8 vascular plant species per m² present, including at least 2 forbs.

Any scrub present accounts for less than 20% of the total grassland area.

Cover of bracken *Pteridium aquilinum* is less than 20%.

There is an absence of invasive non-native plant species (as listed on Schedule 9 of WCA).

5.3.2 Other Neutral Grassland

Wildflower meadow will be created through the sowing of a species-rich mix such as Emorsgate EM6 Meadow Mixture for Limestone Soils, or similar.

This will ensure a grassland that is a good representation of the habitat type it has been identified as, based on its UKHab description. The following elements will be achieved within the other neutral grassland habitat, to target 'good' habitat condition.

The grassland is a good representation of the habitat type it has been identified as, based on its UKHab description (as above) - the appearance and composition of the vegetation closely matches the characteristics of the specific grassland habitat type. Indicator species listed by UKHab for the specific grassland habitat type are consistently present.

Sward height is varied (at least 20% of the sward is less than 7cm and at least 20% is more than 7cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.

Cover of bracken *Pteridium aquilinum* is less than 20% and cover of scrub (including bramble *Rubus fruticosus* agg.) is less than 5%.

Combined cover of species indicative of sub-optimal condition and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities) accounts for less than 5% of total area.

There are 10 or more vascular plant species per m² present, including forbs that are characteristic of the habitat type.

5.3.3 Other Woodland Mixed

The proposed mixed, native woodland will be planted with the following mix of trees and shrubs:

Carpinus betulus - Hornbeam
Crataegus monogyna - Hawthorn
Quercus robur - Pedunculate Oak
Prunus spinosa - Blackthorn
Tilia cordata - Small leaved lime
Corylus avellana - Hazel
Alnus glutinosa - Alder
Acer campestre - Field maple
Sorbus torminalis - Wild service tree
Prunus padus - Bird cherry
Sorbus aucuparia - Rowan
Cornus sanguinea - Dogwood
Salix caprea - Goat willow
Euonymus europaeus - Spindle
Prunus avium - Wild cherry
Ilex aquifolium - Holly
Betula pendula - Silver birch
Malus sylvestris - Crab apple
Salix fragilis - Crack willow
Rosa canina - Dog rose
Pinus sylvestris - Scots' pine
Viburnum lantana - Wayfaring tree
Populus tremula - Aspen
Pinus nigra - Corsican pine
Salix cinerea - Common willow
Salix viminalis - Osier
Sambucus nigra - Elder
Ligustrum vulgare - Wild privet
Taxus baccata - Yew

There is a target habitat condition of 'poor', as it is considered that a score of <26 is likely.

5.3.4 Pond

The pond will be created to target 'good' condition, by achieving the following:

The pond is of good water quality, with clear water (low turbidity) indicating no obvious signs of pollution. Turbidity is acceptable if the pond is grazed by livestock.

There is semi-natural habitat (moderate distinctiveness or above) completely surrounding the pond, for at least 10 m from the pond edge for its entire perimeter.

Less than 10% of the water surface is covered with duckweed *Lemna* spp. or filamentous algae.

The pond is not artificially connected to other waterbodies, e.g. agricultural ditches or artificial pipework.

Pond water levels can fluctuate naturally throughout the year. No obvious artificial dams, pumps or pipework.

There is an absence of listed non-native plant and animal species.

The pond is not artificially stocked with fish. If the pond naturally contains fish, it is a native fish assemblage at low densities.

Emergent, submerged or floating plants (excluding duckweed) cover at least 50% of the pond area which is less than 3 m deep.

The pond surface is no more than 50% shaded by adjacent trees and scrub.

5.3.5 Individual Trees

Individual native trees will be planted within areas of modified grassland to form parkland habitats. Moderate condition can be easily achieved through the following:

The tree is a native species (or at least 70% within the block are native species).

The tree canopy is predominantly continuous, with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide (individual trees automatically pass this criterion).

There is little or no evidence of an adverse impact on tree health by human activities (such as vandalism, herbicide or detrimental agricultural activity). And there is no current regular pruning regime, so the trees retain >75% of expected canopy for their age range and height. More than 20% of the tree canopy area is oversailing vegetation beneath.

5.3.6 Species-rich Native Hedgerows

Existing native hedgerows will be enhanced to species-rich native hedgerows, and species-rich native hedgerows will also be created. The target habitat condition for the enhanced and created hedgerows will be 'good' and achieved through the following:

>1.5 m average along length

>1.5 m average along length

Gap between ground and base of canopy <0.5 m for >90% of length

Gaps make up <10% of total length; and no canopy gaps >5 m

>1 m width of undisturbed ground with perennial herbaceous vegetation for >90% of length:

- o Measured from outer edge of hedgerow; and
- o Is present on one side of the hedgerow (at least).

Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground.

>90% of the hedgerow and undisturbed ground is free of invasive non-native plant species (including those listed on Schedule 9 of WCA) and recently introduced species.

>90% of the hedgerow or undisturbed ground is free of damage caused by human activities.

Table 8. Target habitat condition after development.

UKHab Habitat Type	Target Condition	Area (hectares)
Urban - Developed land: sealed surface	N/A	0.66ha (created)
Urban - Vegetated garden	N/A	1.14ha (created) – 72 garden trees
Grassland - modified grassland	Moderate	9.0ha (enhanced from modified grassland poor condition)
	Moderate	16.35ha (created)

UKHab Habitat Type	Target Condition	Area (hectares)
Grassland – other neutral grassland	Good	0.80ha (created)
Woodland & Forest – other woodland mixed	Poor	7.46ha (created)
Lakes – pond (non-priority habitat)	Good	0.50ha (created)
Cropland – horticulture (tree nursery)	N/A	0.36ha (created)
Individual trees – rural tree	Moderate	0.8469 (created) – 208 parkland trees
Native hedgerows with trees	Good	3.45km (retained)
Species-rich native hedgerows	Good	0.19km (enhanced from native hedgerows poor condition)
Species-rich native hedgerows	Good	0.711km (enhanced from native hedgerows good condition)
Species-rich native hedgerows	Good	0.684km (created)

Table 9. UKHab area habitats and target condition assessment after development.

On-site Area Habitat Retention, Enhancement & Creation				
Habitat	Area Retained (ha)	Area Enhanced (ha)	Area Created (ha)	Target Condition
Developed land: sealed surface	-	-	0.66	N/A
Vegetated garden	-	-	1.14	N/A
Modified grassland	-	9.0	16.35	Moderate
Other neutral grassland	-	-	0.8	Good
Other woodland mixed	-	-	7.46	Poor
Pond (non-priority habitat)	-	-	0.5	Good
Horticulture (tree nursery)	-	-	0.36	N/A
Rural trees	-	-	0.8469	Moderate

Table 10. UKHab linear habitats and target condition assessment after development.

On-site Linear Habitat Retention, Enhancement & Creation				
Habitat	Length Retained (km)	Length Enhanced (km)	Length Created (km)	Target Condition
Native hedgerows with trees	3.45	-	-	Good
Species-rich native hedgerows	-	0.19	-	Good
Species-rich native hedgerows	-	0.711	-	Good
Species-rich native hedgerows	-	-	0.684	Good

Table 11. Summary of habitat condition assessment after development.

UKHab	Condition	Rationale
Developed land: sealed surface	N/A	Not applicable.
Vegetated garden	N/A	Not applicable.
Modified grassland	Moderate	Essential criterion A is achievable. Passes 3 other criteria (4 in total).
Other neutral grassland	Good	Essential criteria A and F both achieved. Passes 3 other criteria.
Other woodland mixed	Poor	Score of <26 is considered likely.
Pond (non-priority habitat)	Good	All criteria passes are achievable.
Horticulture (tree nursery)	N/A	Not applicable.
Rural trees	Moderate	4 criteria passes are achievable.
Native hedgerows with trees	Good	Retained hedgerow with trees retain their good condition.
Species-rich native hedgerows	Good	All criteria passes are achievable.

5.4 Results of Statutory Metric Calculation

The Statutory Biodiversity Metric predicts a significant Biodiversity Net Gain with regard to both habitats and hedgerows. The results are as follows:

Total net unit change in habitats: +63.39 habitat units

Total net % change in habitats: +74.98% habitat units

Total net unit change in habitats: +10.26 hedgerow units

Total net % change in habitats: +17.40% hedgerow units

Watercourse units are not applicable.

The Trading Rules are satisfied.

5.4.1 *Species*

5.4.1.1 *Plants*

There are no foreseeable impacts on rare or uncommon plant species.

The arable land and improved grassland habitats do not support rare plant species of unimproved or semi-improved habitats. There are no grassland habitats within the site that are similar or comparable to the habitats of Little Tew SSSI.

No bluebells are present within the sections of hedgerow that are proposed for removal. The patch of bluebells along the south-eastern boundary of the site will be retained.

5.4.1.2 *Birds*

It is considered that the proposals will have no significant impacts on skylarks, or other ground nesting species. One singing skylark was noted within the westernmost field in April 2021 (no other skylarks have ever been noted within the site), and small numbers of skylarks may use the site for nesting. The proposed grassland habitats will still offer potential habitat to nesting skylarks, if managed appropriately; conversion of arable land to grassland is unlikely to have a significant impact on the local population and breeding success of skylarks.

Removal of trees and hedgerows may result in the loss of nesting opportunities for breeding birds. If undertaken during the breeding period, clearance of hedgerows, trees and woody vegetation may result in the damage or destruction of active birds' nests. The breeding bird assemblage is likely to include certain common and widespread species that are listed as priorities for nature conservation under Section 41 of the NERC Act 2006, such a dunnoek and song thrush.

However, loss of hedgerows and hedgerow trees is unlikely to result in a significant impact on the breeding bird assemblage as a whole. The scale of habitat loss is relatively small, compared to the scale of retained (hedgerow) habitat, and the proposals include significant compensation and enhancement measures for breeding birds including new hedgerows, woodland and parkland. It is considered that any loss of habitat for breeding birds will be adequately compensated, and that in the medium to long term there will be significant habitat enhancement for breeding birds.

5.4.1.3 *Bats*

Bats can use mature trees as roost sites and trees that are scheduled for removal will need to be surveyed and assessed for their potential to offer shelter to bats, and for bat roosts as appropriate. This will be required to comply with the legal protection that is afforded to all bat species.

External lighting can affect bats by altering their activity and behaviour. Certain species have been shown to be attracted to mercury vapour lamps, which emit light over a very broad-spectrum including UV light to which insects are particularly sensitive. Insects can be attracted in large numbers to mercury lamps and so can certain bat species (Rydell and Racey 1993).

Lighting has shown to have an opposite effect on certain other species, which have been shown to avoid areas of artificial light (Stone *et al.* 2009). Therefore, any external lighting associated with the proposed development could affect the behaviour of foraging and dispersing bats.

At a wider scale, the proposals are likely to result in habitat enhancement for bats, through the creation of new habitats that will be of value to foraging bats, as well as the creation and strengthening of green infrastructure and habitat connectivity. Arable land is considered to be poor for foraging bats, whilst the creation of woodland, grassland, parkland and a lake is likely to deliver significant ecological

enhancement for foraging bats. There is also the potential to provide species-specific enhancement for bats, such as the erection of bat boxes.

5.4.1.4 Reptiles

There are no foreseeable impacts on reptile species; this is due to the unsuitability of the existing habitats for reptiles.

As discussed with regard to amphibians, the proposed creation of habitats has the potential to provide ecological enhancement for reptiles. In particular, the proposed lake and shallow reedbed/swamp habitat may offer habitat to grass snakes, and the proposed new grassland habitats may also be suitable for this species, and for slow worms.

5.4.1.5 Amphibians

There are no foreseeable impacts on amphibians, or habitats that may be of value to breeding amphibians, including great crested newts. This is due to the distance of ponds from the site and the unsuitability of arable land and improved grassland for amphibians whilst on land.

The creation of a lake/pond will provide a potential habitat for amphibians. The lake will be designed to provide shallow water habitats where reedbed and swamp can develop, features that may offer suitable habitat to amphibian species. There are currently no wetland habitats within the site and so the creation of a lake has the potential to deliver significant ecological enhancement with regard to amphibians.

The proposals also include the creation of grassland, parkland and woodland habitats, which will provide potential habitat for amphibians whilst on land. In particular, habitat creation within areas of existing arable land is considered to have the potential to provide significant habitat enhancement for amphibians.

5.4.1.6 Invertebrates

The relatively small scale of hedgerow removal is unlikely to have a foreseeable impact on the overall invertebrate assemblage of the site, and the loss of arable land is unlikely to have any significant impact on rare or uncommon invertebrate species.

The loss of hedgerow habitat will be compensated for, and the proposed habitat creation and enhancement is likely to result in a significant enhancement for invertebrate species. Woodland, grassland, parkland and wetland creation (within areas that are currently arable land) are all likely to result in a significant ecological enhancement for invertebrates.

In particular, it is considered that the proposed reedbed and swamp habitats of the lake may deliver significant enhancement by providing habitats for aquatic invertebrates; habitats that do not currently exist within the site.

5.4.1.7 Badgers

There are no foreseeable impacts on badgers or badger setts. No evidence of badger activity was noted within the site during any of the surveys.

5.4.1.8 Hazel Dormouse

There are no foreseeable impacts on hazel dormice, as this species is considered to be absent from the site. The proposals are likely to provide significant ecological enhancement for dormice in the longer term (if the species is able to colonise the site). The proposals include significant planting of woodland habitat, which will connect strongly with existing hedgerow habitats. In the longer term, this may provide woodland habitat, and habitat connectivity, that is suitable for hazel dormice.

5.4.1.9 Hedgehogs

Loss of hedgerow may result in the loss of habitat that is suitable for hedgehogs. However, the overall scale of habitat loss is considered to be relatively small, and the vast majority of hedgerows will be retained. Given this, the loss of some hedgerow habitat is unlikely to have a significant impact on the local population of hedgehogs.

Loss of hedgerows will be compensated for through the planting of new native hedgerows, and the strengthening of existing hedgerows. In addition to this, the proposed planting of woodland, as well as the creation of grassland and parkland habitats, has the potential to provide significant habitat enhancement in the medium to long term.

5.4.1.10 Invasive Species

The proposals are unlikely to result in the spread of invasive species. One, relatively small, patch of Japanese knotweed is present on the site boundary, but this area will remain unaffected by the proposals.

6 Recommendations

6.1 Habitats

Significant habitat creation and enhancement are already integral to the proposals.

Recommendations for the detailed design are:

Native tree and shrub species within all woodland, hedgerow and parkland planting. This should include a species mix that is characteristic of the site, such as hawthorn, oak, blackthorn, field maple, dog rose and hazel, but should also include native species that are not currently present (but are characteristic of the wider locality) such as spindle, crab apple, wayfaring tree, dogwood, guelder rose, hornbeam, wild cherry, silver birch, buckthorn, wild service tree and small-leaved lime.

Design of the pond/lake to create a convoluted edge, with shallows and reedbed, and a wide 'draw-down zone'. The pond/lake should not be stocked with fish, so as to maximise its value to wildlife.

Retention of felled trees as fallen dead wood. This could be within new parkland or woodland habitats.

Sowing the wildflower meadow (other neutral grassland) with an appropriate seed mix, and management of the meadow for its botanical and ecological value.

Management of parkland (modified grassland) habitats through an appropriate grazing regime.

6.2 Species

The following sections discuss species-specific measures, beyond the overall habitat creation that has already been discussed, to provide additional opportunities to certain species.

6.2.1.1 Birds

Any removal of woody vegetation should be undertaken outside of the breeding bird period, to avoid damage or destruction of active birds' nests.

On buildings, the integration of bird boxes is recommended as species such as house sparrow and swift will readily adopt such features as nest sites. The following bird nesting features are considered to be suitable:

- Schwegler House Sparrow Brick Box Type 24
- Schwegler Sparrow Terrace 1SP
- Ibstock Swift Box
- Swift Box Type 25

Consideration should be given to the erection of barn owl nest boxes on retained mature trees.

6.2.1.2 Bats

External lighting should be designed in such a way as to avoid and minimise potential impacts on bats that may be active within the locality. External lighting should only be used where it is essential for safety and security.

Where needed, lighting should be kept at low level and at low intensity, with hoods and baffles used to direct the light to where it is required. To minimise the impact on bats, the use of low pressured sodium lamps is recommended in preference to mercury or metal halide lamps which have a UV element that can affect the distribution of insects and attract bats to the area, affecting their natural behaviour. All lighting should be at low level and be directed to where it is required along paths and access routes.

The key principles for choosing a suitable type of lamp are:

- Avoid blue-white short wavelength lights: these have a significant negative impact on the insect prey of bats. Use alternatives such as warm-white (long wavelength) lights as this will reduce the impact on insects and therefore bats.

- Avoid lights with high UV content (e.g. metal halide or mercury light sources) or reduce/completely remove the UV content of the light. Use UV filters or glass housings on lamps which filter out a lot of the UV content.

Selecting an appropriate lamp unit that is designed to be environmentally friendly will minimise light spill, but further controls can be imposed by installing directional accessories such as baffles, hoods and louvres on lamps to direct light away from ecologically sensitive areas, such as hedgerows.

LED (Light Emitting Diode) units are an effective way to direct the light into small target areas and are recommended for lighting. Composite LEDs can be switched off to reduce/direct the light beam to specific areas.

Roosting opportunities for bats could be incorporated in a number of ways. This could be achieved through integrated features or externally mounted bat boxes on new buildings.

Options include:

- Vivara Pro Build-in WoodStone Bat Box, integrated into buildings
- Schwegler 1FR Bat Tube, integrated into buildings
- Schwegler 1FF or 1FQ Bat Boxes for external mounting on buildings
- Traditional wooden (oak) bat boxes for buildings and/or trees
- Beaumaris Woodstone Bat Box

The proposals include outbuildings for stables, garaging and maintenance and this provides an opportunity to create roof spaces for bats. This could include roof spaces that are suitable for

horseshoe bats, which are rarer species and species that are found within this part of the Cotswold Hills.

6.2.1.3 *Amphibians*

It is recommended that log piles are created close to the proposed new pond/lake, to provide shelter for amphibians whilst on land. Log piles could also be created elsewhere within the site, such as areas of newly planted woodland.

6.2.1.4 *Invertebrates*

It is recommended that any mature trees that are to be felled are retained as fallen dead wood habitat features, within areas of proposed woodland and parkland. This will provide habitat for saproxylic, and other, invertebrates.

It is recommended that bee bricks are integrated into the external fabric of the proposed outbuildings, to provide opportunities for mason bees and other solitary bee species.

6.2.1.5 *Hedgehogs*

Hedgehog houses could be installed within areas of woodland creation, to provide shelter for hedgehogs as the habitat matures.

6.2.1.6 *Invasive Species*

It is recommended that Japanese knotweed is eradicated from the hedgerow to the south-eastern site boundary. It is recommended that a specialist contractor is employed for such work.

7 **References**

Bat Conservation Trust, 2014. *The State of the UK's Bats 2014*. National Bat Monitoring Programme.

Bat Conservation Trust, 2023. *Bats and artificial lighting at night*. The Bat Conservation Trust, London.

CIEEM. 2018. *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1*. Chartered Institute of Ecology and Environmental Management, Winchester.

CIEEM, IEMA & CIRIA (2019). *Biodiversity Net Gain. Good Practice Principles for Development. A Practical Guide*.

Collins, J. 2023. *Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition)*. The Bat Conservation Trust, London.

Cresswell W. and Whitworth R., 2004. *An assessment of the efficiency of capture techniques and the value of different habitats for the great crested newt Triturus cristatus*. English Nature Research Report 576. English Nature, Peterborough.

Defra, 2024. *The Biodiversity Metric 4.0 – Technical Annex 1: Condition Assessment Sheets and Methodology*. Defra.

Defra, 2024. *The Statutory Biodiversity Metric User Guide*. Defra.

Emery, M., 2008. *Effect of Street Lighting on Bats*. Urbis Lighting Ltd., Anglia.

JNCC, 2010. *Handbook for Phase 1 Habitat Survey - a technique for environmental audit*. JNCC First published 1990; reprinted in 1993; reprinted in 2003 with limited revisions & additions; reprinted in 2004; reprinted in 2007 with minor additions; reprinted in 2010.

Joint Nature Conservation Committee, 2012. *Bat Worker's Manual*. Joint Nature Conservation Committee, Peterborough, UK.

Oldham R. S., Keeble J., Swan M. J. S. & Jeffcote M. 2000. *Evaluating the suitability of habitat for the great crested newt (Triturus cristatus)*. Herpetological Journal 10: 143-155.

Mitchell-Jones, A., 2004. *Bat Mitigation Guidelines*. English Nature.

Reason, P.F. and Wray, S. (2023). *UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation and compensation for developments affecting bats*. Chartered Institute of Ecology and Environmental Management, Ampfield.

Rydell J. & Racey, P. A. 1995. *Streetlamps and the feeding ecology of insectivorous bats*. Recent Advances in Bat Biology Zool Soc Lond Symposium abstracts.

Stone, E.L., Jones, G., & Harris, S. 2009. *Street lighting disturbs commuting bats*. Current Biology 19:1-5.

UKHab Ltd., 2023. *UK Habitat Classification User Manual Version 2.0* at <http://www.ukhab.org/>.

8 Appendix 1. Photographs 2021 & 2024



Photograph 1. Cropland, cereal crops April 2021.



Photograph 2. Fallow cropland April 2021.



Photograph 3. Modified grassland April 2021



Photograph 4. Detail of modified grassland April 2021.



Photograph 5. Hedgerow with trees February 2024.



Photograph 6. Modified grassland, hedgerow with trees February 2024.



Photograph 7. Modified grassland February 2024.



Photograph 8. Modified grassland February 2024.



Photograph 9. Cropland, cereal crops February 2024.



Photograph 10. Cropland, cereal crops February 2024.



Photograph 11. Native hedgerow February 2024.



Photograph 12. Hedgerow with trees February 2024.



Photograph 13. Ash tree with PRF-M potential.
February 2024.



Photograph 14. Ash tree with PRF-I potential.
February 2024.



Photograph 15. Ash tree with PRF-I potential.
February 2024.



Photograph 16. Ash tree with PRF-I potential.
February 2024.

9 Appendix 2. Site Location Plans



Aerial photograph showing the location of the land west of Little Tew (outlined in red) Source: www.bing.com/mapspreview/



Ordnance Survey map showing the location of the site (indicated by the red outline) within the local area. Source: www.bing.com/mapspreview/

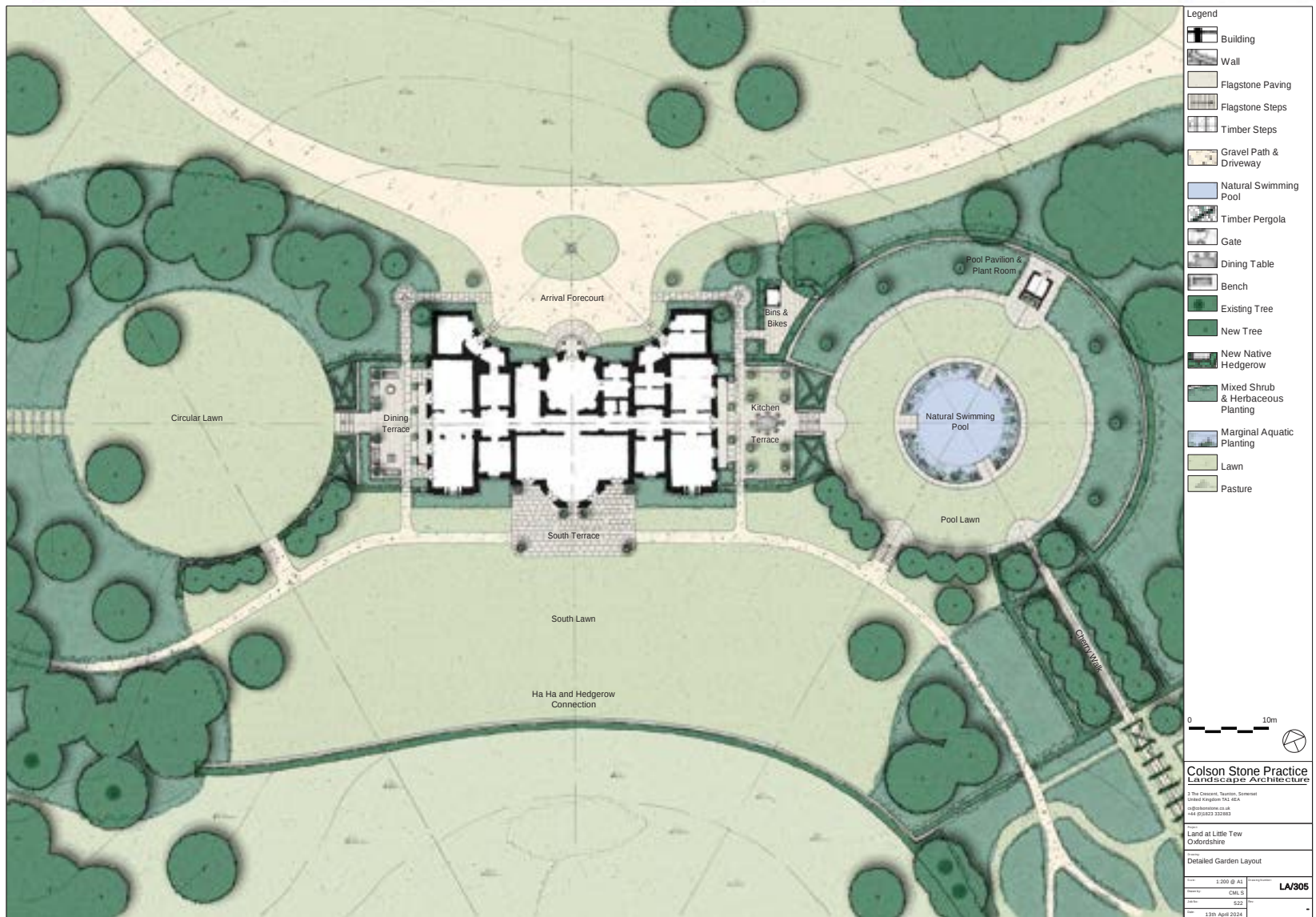
10 Appendix 3. UKHab Habitat Plan



11 Appendix 4. Landscape Masterplan



12 Appendix 5. Detailed Layouts





13 Appendix 6. Statutory Biodiversity Metric

Please refer to separate Excel spreadsheet for the full details of the Biodiversity Net Gain calculation using the Statutory Biodiversity Metric.

14 Appendix 7. Habitat Condition Assessment Sheets

Please refer to separate Excel spreadsheet.