



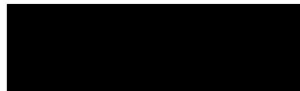
MKA
ECOLOGY

**Preliminary Ecological Appraisal
and Preliminary Roost Assessment**

912 Pratts Green Farmhouse, Kirtling

Site	912 Pratts Green Farmhouse, Kirtling
Project number	123322
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Declaration of compliance

This Preliminary Ecological Appraisal has been undertaken in accordance with British Standard 42020:2013 "Biodiversity, Code of practice for planning and development". The information which we have provided is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's (CIEEM) Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions.



MKA Ecology Ltd is a CIEEM Registered Practice. This means that MKA Ecology Ltd are formally recognised for high professional standards, working at the forefront of our profession.

Validity of data

Unless stated otherwise the information provided within this report is valid for a maximum period of 24 months from the date of survey. If works at the site have not progressed by this time an updated site visit may be required in order to determine any changes in site composition and ecological constraints.

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1. EXECUTIVE SUMMARY

In January 2022 MKA Ecology Limited was commissioned to undertake a Preliminary Ecological Appraisal and Preliminary Roost Assessment of 912 Pratts Green Farmhouse. The Preliminary Ecological Appraisal included a habitat survey, protected species scoping survey and desktop study of protected and notable sites and species in the area. The Preliminary Roost Assessment involved a detailed inspection of the buildings at the site. The aim of the Preliminary Roost Assessment was to identify any potential roost constraints that may be associated with the development of the Site. A site visit was undertaken on 7 February 2022.

The site consisted of a residential garden, with amenity grassland, scattered trees, mixed shrubs, hedgerows and a pond. A residential dwelling was situated centrally next to a garage with a gravel driveway.

The following ecological constraints were identified at the Site with recommendations made as follows;

Habitats: The native hedgerow, scattered mature trees, and pond present are all valuable habitats for local wildlife and should be retained and protected from damage during the works. Particular care should be taken with the native hedgerow and pond as these are both UK Habitats of Principal Importance.

Amphibians: The pond present was found to have good suitability for supporting great crested newts, and there is a known population existing at a site approximately 300m away. Habitats suitable for supporting hibernating great crested newts are readily available at the Site, and it is understood that some of this, (the mixed shrub adjacent to the house), will be removed in order to construct the new extension. Further survey work is recommended to establish the presence or absence of this species at the site, or a Natural England District Level Licence should be obtained if further survey work is not undertaken.

Birds: The hedgerows, scattered mature trees and mixed shrub all provide suitable habitat for breeding birds. Any vegetation and/or building clearance works must be carried out between the months of September and February inclusive to avoid impacts on breeding birds. Where this timing is not feasible works should be preceded by a nesting bird check.

Bats: The two buildings were found to possess suitable access points and potential roosting features for bats. Two nocturnal bat surveys should be undertaken on the residential dwelling, and one nocturnal bat survey should be undertaken on the garage. These can be carried out from May to August inclusive. Furthermore, a sensitive lighting scheme should be developed to prevent the disturbance of bats.

Opportunities exist to enhance biodiversity on the Site post-development. Options to create species-rich bee lawns and dead wood features for invertebrates should be explored, as should the provision

of a hedgehog hibernaculum and the inclusion of native planting in the landscaping plans. Bird and bat boxes should also be provided, including house martin boxes and integrated swift bricks in the exterior walls of the new buildings, and a barn owl box facing out towards the open fields surrounding the Site. These recommendations are in line with local and national planning policy and will ensure that the proposed development produces positive effects for local biodiversity.

2. INTRODUCTION

2.1. Aims and scope of Preliminary Ecological Appraisal and Preliminary Roost Assessment

In January 2022 MKA Ecology Limited was commissioned to undertake a Preliminary Ecological Appraisal and Preliminary Roost Assessment at 912 Pratts Green farmhouse, Kirtling by Snell David Ltd in order to support a planning application for the demolition of a modern extension and of the garage and lean-to, and for the construction of new extensions and alterations to the house.

The aims of the Preliminary Ecological Appraisal were to:

- Undertake a desktop study to identify the extent of protected and notable species and habitats within close proximity of the Site;
- Prepare a habitat map for the Site;
- Identify evidence of protected species/species of conservation concern at the Site;
- Assess the potential impacts of the proposed development, using existing plans;
- Detail recommendations for further survey effort where required; and
- Detail recommendations for biodiversity enhancements.

The aims of the Preliminary Roost Assessment were to:

- Undertake a Preliminary Roost Assessment to establish the suitability of the buildings at the site for roosting bats, and record any evidence of bat presence;
- Identify likely ecological impacts relating to the proposed development
- Assess the need for further survey effort, a European Protected Species Licence or mitigation, if required; and
- Propose any suitable habitat enhancements for bat species, if required.

2.2. Site description and context

The survey area is shown on the map in Figure 1. Within this report this area is referred to as the Site or 912 Pratts Green Farmhouse, Kirtling. The Site, (grid reference TL 69067 55735), is located just south of the village of Kirtling, Cambridgeshire, and falls under the jurisdiction of East Cambridgeshire District Council. The area within the red line boundary is approximately 0.4 hectares in size, and consists of a residential dwelling and garden, the latter of which appears to be managed by frequent mowing.

2.3. Proposed development


The proposed development includes the demolition of a modern extension and the existing garage and lean-to; along with new extensions and alterations to the existing grade 2 listed house.

The proposed development footprint necessitates the removal of some small areas of mixed shrubs.

2.4. Legislation and planning policy

This Preliminary Ecological Appraisal has been undertaken with reference to relevant wildlife legislation and planning policy.

Relevant legislation considered within the scope of this document includes the following:

- The Wildlife and Countryside Act 1981 (as amended);
- The Conservation of Habitats and Species Regulations 2017 (as amended);
- Natural Environment and Rural Communities (NERC) Act 2006;
- The Countryside and Rights of Way (CRoW) Act 2000;
-  Wild Mammals (Protection) Act 1996.

Further information is provided in Appendix 1, including levels of protection granted to the species considered in Section 3.3.

In addition to obligations under wildlife legislation, the revised National Planning Policy Framework (NPPF) updated on 20th July 2021 requires planning decisions to contribute to conserving and enhancing the local environment. Further details are provided in Appendix 1.

East Cambridgeshire District Council has produced an adopted Local Plan which covers a number of policies relating to biodiversity and habitat conservation, including:

Policy ENV 7 – Biodiversity and Geology

All development proposals will be required to:

- Protect the biodiversity value of land and buildings and minimise harm to or loss of environmental features, such as trees, hedgerows, woodland, wetland and ponds.
- Provide appropriate mitigation measures, reinstatement or replacement of features and/or compensatory work on or off site where harm to environmental features and habitat is unavoidable;

Maximise opportunities for creation, restoration, enhancement and connection of natural habitats as an integral part of development proposals;

In addition to this:

Development proposals where the main aim is to conserve biodiversity will be permitted. All applications for development that may affect biodiversity interests must be accompanied by sufficient information to be determined by the Local Planning Authority to allow potential impacts and possible mitigation measures to be assessed fully.

Where Protected Species, trees and woodland are present, proposals must be sensitive to, and make provision for, their needs, in accordance with the relevant protecting legislation. Where appropriate, there will be a requirement for the effective management of designated sites and other features, controlled through the imposition of conditions or Section 106 agreements.

Proposals which have an adverse impact on a site of international importance will not normally be permitted unless there are exceptional overriding reasons of public interest. Proposals which have an adverse impact on a site of national importance will not normally be permitted unless the benefits of development at the site significantly outweigh the impacts. Proposals which would cause harm to County Wildlife Sites, Ancient Woodland, veteran trees, Local Nature Reserves, Protected Roadside Verges, any other irreplaceable habitats, and green corridors or important species will not be permitted unless the need for, and benefits of development in that location outweigh the potential harm to nature conservation interests.

In September 2020, East Cambridgeshire District Council produced a Natural Environment Supplementary Planning Document (SPD) which provides further advice on policy requirements relating to areas including:

Policy SPD.NE5: Reviewing planning applications for Protected Species

When a proposal is likely to affect a protected species, the Council will only grant planning permission if:

an appropriate survey was carried out by a qualified ecologist at the time of year specified in Natural England's standing advice;
a wildlife licence is likely to be granted by Natural England if one is needed;
mitigation plans are considered acceptable;
compensation plans are acceptable when mitigation isn't possible; and
review and monitoring plans are in place, where appropriate.

Achieving the above may require an applicant to enter into a suitable form of developer contributions agreement.

Where a proposal is not likely to affect a protected species, but the proposal provides measures (such as an appropriate habitat in an appropriate location) which are likely to be beneficial to protected species, then weight in favour of such a proposal will apply.

Policy SPD.NE6 Biodiversity Net Gain

In addition to the provisions set out in the Local Plan, all development proposals should contribute to and enhance the natural and local environment by firstly avoiding impacts where possible, where avoidance isn't possible minimising impacts on biodiversity and providing measurable net gains for biodiversity.

If and when a nationally mandated mechanism to secure 'net gains' is introduced, then the following policy will not be implemented. In the absence of any nationally mandated mechanism to secure such 'net gains', the following policy applies:

All development proposals (except householder applications – see below) must provide clear and robust evidence setting out:

- (a) information about the steps taken, or to be taken, to avoid and minimise the adverse effect of the development on the biodiversity of the onsite habitat and any other habitat,
- (b) the pre-development biodiversity value of the onsite habitat based on an up to date survey and ideally using the Defra metric,
- (c) the post-development biodiversity value of the onsite habitat ideally using the Defra metric; and
- (d) the ongoing management strategy for any proposals.

Proposals which do not demonstrate that the post-development biodiversity value of the onsite habitat will not significantly* exceed the pre-development biodiversity value of the onsite habitat will be refused.

Demonstrating the value of the habitat (pre and post development) will be the responsibility of the applicant, and the information to be supplied will depend on the type and degree of proposals being submitted. The Council strongly recommends the use of available toolkits or biodiversity calculators (see section 14 of this SPD) and/or ecology surveys.

Where insufficient, incomplete or inaccurate information is submitted, meaning the Council is not able to determine whether a proposal is likely to lead to a net gain in biodiversity, a proposal will be deemed to fail the policy requirements (as set out in the Local Plan, the NPPF and this SPD) to take biodiversity opportunities and providing a biodiversity net gain.

Only in exceptional circumstance, the Council may (but is not obliged to) accept off-site biodiversity gains in exchange for on-site biodiversity net gain, but only in instances whereby:

- (i) it is not possible to provide significant net gains on site;
- (ii) the overall net outcome is a significant net gain in biodiversity; and
- (iii) a robust agreement is in place to deliver and maintain such off-site gains.

For householder applications, the detailed provisions of this policy do not apply, but there is still an expectation in most instances that an element of biodiversity gain should be incorporated into the proposal, such as bird boxes, insect ‘hotels’, bee blocks, bat boxes and/or hibernation holes. More detailed biodiversity gain would be welcomed.

** whilst ‘significantly’ is not defined precisely in this SPD, it should be taken to read that very minor net gains (such as a new bird box) would not constitute a significant gain. The gain should be more considerable, preferably creating habitat gains which support a larger variety of biodiversity. Where space is tight, integrating a variety of measures within the development may be appropriate, such as targeted bird boxes, insect ‘hotels’, bee blocks, bat boxes, hibernation holes and ‘green’ roofs.*

Policy SPD.NE9: Landscaping and Biodiversity

New planting must be an integral part of the design of a development rather than as an afterthought. It should be used in appropriate locations and must consider its function, context, scale, texture along with colour and seasonal qualities. At the same time, new planting should be chosen (in terms of species and location) to maximise biodiversity gains.

When preparing the detailed design of layouts, the implications of the future function will need to be taken into account, ensuring that the design does not cause problems for future maintenance and management.

In order to ensure the successful establishment of landscaping for biodiversity gain, the following provisions apply:

Landscape schemes should aim to be in the form of corridors, linking up areas of greenery, rather than isolated pockets of landscaping;

Remedial treatment should take place where the soils in planting areas are unsatisfactory, such as incorporation of soil amendments or decompaction. These should be applied to the whole planting area, not just to planting holes;

Native new planting should be provided that reflects the local character, except where landscape character considerations suggest otherwise (for example, planting that is in keeping with areas of historic character, or within ‘on-plot’ residential planting in urban areas);

Sufficient space should be provided to allow retained and new planting to continue growing healthily and for future management to be carried out;

A suitable species mix should be provided that helps to promote a wide range of biodiversity and contribute to enhancing green infrastructure;

Incorporate within the landscape scheme features that will support the establishment of biodiversity, such as wetland areas, 'insect hotels' and log piles (if trees are lost elsewhere on site);

Apply the guidance as set out in the Cambridgeshire Flood and Water SPD which relates to good SUDS design and biodiversity;

Try to avoid conflict between areas attractive for biodiversity and (i) non-native predators (such as domestic cats) and (ii) anti-social behaviour; and

Sufficient space for soft landscaping within the layout. The space needs to be sufficient for suitable species and numbers of trees to be provided and reach maturity without creating conflicts with buildings and infrastructure.

Where relevant these are discussed in further detail in Section 5.

3. METHODOLOGIES

This Preliminary Ecological Appraisal has been undertaken in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Preliminary Ecological Appraisal, 2nd edition (CIEEM, 2017). The Preliminary Roost Assessment has been undertaken in accordance with the best-practice guidelines developed by the Bat Conservation Trust (Collins, 2016).

3.1. Desktop study

A data search was conducted for the Site and the surrounding area within 2km. Data was retrieved from the sources listed in Table 1.

Table 1: Sources of data for desktop study

Organisation	Data collected	Date collected
Multi-agency Geographic Information for the Countryside (MAGIC) www.magic.gov.uk	Information on local, national and international statutory protected areas.	11/02/2022
Cambridgeshire and Peterborough Environmental Records Centre	Information on protected and notable sites and species within 2km of the Site (TL 69067 55735).	11/02/2022
Ordnance Survey maps and aerial photography	Information on habitats and connectivity between the Site and the surrounding landscape	11/02/2022
Plantlife Important Plant Areas Buglife Important Invertebrate Areas	Information on important invertebrate areas within 2km of the Site (TL 69067 55735).	11/02/2022

East Cambridgeshire District Council planning portal was also referred to in order to understand the scope of further development surrounding the Site.

3.2. UK Habitat Classification

Habitats were surveyed using the standardised UK Habitat classification and mapping methodology (UK Habs) (Butcher et al, 2020). Data were recorded onto field maps and then transferred onto a Geographic Information System (GIS) following the UK Habs Colour Mapping Pallet for ArcGIS. Dominant plant species were observed and recorded within each habitat type. The plant species nomenclature follows that of Stace (2019).

The DAFOR scale is used to describe the relative abundance of species. The scale is shown in Table 2. It is important to note that where a species is described as rare this description refers to its relative abundance within the Site and is not a description of its abundance within the wider landscape. Therefore, a species with a rare relative abundance within the Site may be common within the wider landscape.

Table 2: DAFOR scale

DAFOR code	Relative abundance
D	Dominant
A	Abundant
F	Frequent
O	Occasional
R	Rare

3.3. Protected and notable species scoping survey

As part of the Preliminary Ecological Appraisal, an assessment of the potential for the habitats on site to support protected or notable species was made. This assessment was based on the quality, extent and interconnectivity of suitable habitats, along with the results of the desktop study detailed in Section 3.1. This includes Species of Principal Importance as listed on Section 41 of the Natural Environment and Rural Communities (NERC) Act (2006), and Red and Amber listed Birds of Conservation Concern (BoCC) as per Stanbury *et al.*, 2021 (see Appendix 1).

Protected and notable species considered within the protected species scoping survey for 912 Pratts Green Farmhouse, Kirtling include the following:

Plants and fungi: Including species listed under Section 41 of the NERC Act (2006) such as Shepherd's-needle *Scandix pecten-veneris* and nationally scarce species such as oxlip *Primula elatior* and Welsh poppy *Meconopsis cambrica*.

Invertebrates: Including species listed on Section 41 of the NERC Act (2006) such as small heath *Coenonympha pamphilus*, grey dagger *Acrionicta psi* and buff ermine *Spilosoma lutea*. European eel *Anguilla anguilla*, river lamprey *Lampetra fluviatilis*, brown trout *Salmo trutta subsp. fario*.

Amphibians: Natterjack toad *Epidalea calamita*, great crested newt *Triturus cristatus* and common toad *Bufo bufo*.

Reptiles: Adder *Vipera berus*, common lizard *Zootoca vivipara*, slow-worm *Anguis fragilis*, grass snake *Natrix helvetica helvetica*.

- Birds: With special reference to species listed under Schedule 1 of The Wildlife and Countryside Act 1981 (as amended) and Species of Principal Importance.
- Mammals: [REDACTED] bats (all species), water vole *Arvicola amphibius*, otter *Lutra lutra*, hazel dormouse *Muscardinus avellanarius*, hedgehog *Erinaceus europaeus*, brown hare *Lepus europaeus*, harvest mouse *Micromys minutus* and polecat *Mustela putorius*.

In each case the likelihood of presence of these protected species at the Site was classified as being either confirmed, high, moderate, low or negligible.

Confirmed: The species is confirmed on the site during the Preliminary Ecological Appraisal, previous survey effort or recent records.

High: Habitats are available onsite which are highly suitable for this species and there are records within the desktop study. The surrounding areas also provide widespread opportunities for the species which are well connected to the Site.

Moderate: Some suitable habitat available on site for the species although not of optimum quality. Species is present with the desktop study.

Low: Some suitable habitat available on site for the species but this is low value and possibly of small scale or with poor connectivity. No, or very few, records returned in the desktop study.

Negligible: No suitable habitat available for the species, or very little poor-quality habitat.

This protected species scoping survey is designed to assess the *potential* for presence or absence of a particular species or species group, and does not constitute a full survey for these species.

3.4. Habitat Suitability Index (HSI) assessment

During the Preliminary Ecological Appraisal, the pond on site was assessed for its suitability to support great crested newt using the Habitat Suitability Index (HSI) (Oldham *et al.*, 2000).

This methodology requires the surveyor to record specific habitat factors for the pond which are then combined to assess whether the pond would be likely to support great crested newt based upon their habitat preferences. The Habitat Suitability Indices (SI) recorded are as follows:

- SI₁ Geographic location;
- SI₂ Pond area;
- SI₃ Pond permanence;
- SI₄ Water quality;

- SI₅ Pond shading;
- SI₆ Presence of water fowl;
- SI₇ Presence of fish;
- SI₈ Pond density within 1km;
- SI₉ Terrestrial habitat quality; and
- SI₁₀ Macrophyte cover.

The HSI score is obtained by combining the scores of the above parameters, and produces a numerical index between 0 and 1 (where 0 indicates poor habitat and 1 represents optimal habitat for great crested newt; see Table 3 below).

Table 3: HSI score and corresponding pond suitability for great crested newt (Oldham *et al*, 2010)

HSI Score	Pond Suitability
< 0.5	Poor
0.5 – 0.59	Below average
0.6 – 0.69	Average
0.7 – 0.79	Good
> 0.8	Excellent

It should be noted that this index is only a guide to the likely presence or absence of great crested newt and should be interpreted with in conjunction with background information on known populations in the area and knowledge of great crested newt ecology.

3.5. Preliminary Roost Assessment

The site contained two buildings and several trees. The buildings and trees were inspected and the locations of these features are shown in Figure 1. Internal and external inspection of the buildings at the site were undertaken following guidance set out in *Bat Surveys for Professional Ecologists – Good Practice Guidelines (3rd edition)* (Collins, 2016).

The following features were recorded for buildings:

- Location;
- Type;
- Age;
- Construction materials; and
- Current use.

Descriptions of potential and actual access points and roosting places were recorded (including height above ground level and aspect), as well as descriptions of evidence of bats found. The following types of evidence of use by bats were recorded:

- Location and number of any live bats;
- Location and number of any bat corpses or skeletons;
- Locations and number of bat droppings;
- Notes on relative freshness, shape and size of bat droppings;
- Location and quantity of any bat feeding remains;
- Location of clean, cobweb-free timbers, crevices and holes;
- Location of characteristic staining from urine and/or grease marks;
- Location and quantity of bat-fly (Nycteribiidae) pupal cases;
- Location of known and potential access points to the roost; and
- Location of the characteristic smell of bats.

The following features were recorded for trees:

Species

Descriptions of suitable and actual roost features were recorded (including height above ground level and aspect), as well as descriptions of evidence of bats found.

Potential roost features recorded were:

- Woodpecker holes;
- Rot holes;
- Hazard beams;
- Other vertical or horizontal cracks and splits (such as frost-cracks) in stems or branches;
- Partially detached plately bark;
- Knot holes arising from naturally shed branches, or branches previously pruned back to the branch collar;
- Man-made holes (e.g. cavities that have development from flush cuts) or cavities created by branches tearing out from parent stems;
- Cankers (caused by localised bark death) in which cavities have developed;
- Other hollows or cavities, including butt-rots;
- Double-leaders forming compression forks with included bark and potential cavities;
- Gaps between overlapping stems or branches;
- Partially detached ivy with stem diameters in excess of 50mm; and

Bat, bird or dormouse boxes.

The following types of evidence of use by bats were recorded for trees:

- Presence of bats;
- Bat droppings in, around or below a potential roost feature;
- Odour emanating from a potential roost feature;
- Audible squeaking at dusk or in warm weather; and
- Staining below the potential roost feature.]

Buildings and trees were assessed for their bat roost suitability according to the scheme presented in Collins (2016). These categories are shown in Table 4.

Table 4: Categories to assess roost suitability in buildings and trees (adapted from Collins, 2016)

Roost suitability	Description
Negligible	Negligible habitat features on site likely to be used by roosting bats.
Low	<p>A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions* and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).</p> <p>A tree of sufficient size and age to contain potential roost features but with none seen from the ground or features seen with only very limited roosting potential.</p>
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potential for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

*For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.

The guidelines for categorisation of bats in England by distribution and rarity (adapted from Wray *et al.*, 2010) are shown in the tables below.

Table 5: Rarity of bat species within England

Rarity within range (England)	Species
Rarest (population under 10,000)	Greater horseshoe bat <i>Rhinolophus ferrumequinum</i> Bechstein's bat <i>Myotis bechsteinii</i> Alcathoe's bat <i>Myotis alcathoe</i> Greater mouse-eared bat <i>Myotis alcohol</i> Barbastelle <i>Barbastella barbastellus</i> Grey long-eared bat <i>Plecotus austriacus</i>
Rarer (population 10,000 to 100,000)	Lesser horseshoe bat <i>Rhinolophus hipposideros</i> Whiskered bat <i>Myotis mystacinus</i> Brandt's bat <i>Myotis brandtii</i> Daubenton's bat <i>Myotis daubentonii</i> Natterer's bat <i>Myotis nattereri</i> Leisler's bat <i>Nyctalus leisleri</i> Noctule <i>Nyctalus noctula</i> Serotine <i>Eptesicus serotinus</i>
Common (population over 100,000)	Common pipistrelle <i>Pipistrellus noctule</i> Soprano pipistrelle <i>Pipistrellus pygmaeus</i> Brown long-eared bat <i>Plecotus auritus</i>

Table 6: Level of importance of roost type

Geographic frame of reference	Roost type
District, Local or Parish	Feeding perches (common species) Individual bats (common species) Small numbers of non-breeding bats (common species) Mating sites (common species)
County	Maternity sites (common species) Small numbers of hibernating bats (common and rarer species) Feeding perches (rarer/rarest species) Individual bats (rarer/rarest species) Small numbers of non-breeding bats (rarer/rarest species)
Regional	Mating sites (rarer/rarest species) including well-used swarming sites Maternity sites (rarer species) Hibernation sites (rarest species) Significant hibernation sites for rarer/rarest species or all species assemblages

Geographic frame of reference	Roost type
National/UK	Maternity sites (rarest species) Sites meeting SSSI guidelines*
International	SAC sites

*Sites meeting SSSI (Sites of Special Scientific Interest) selection guidelines include Barbastelle maternity roosts and mixed species hibernacula assemblages

3.6. Equipment

The Preliminary Roost Assessment was conducted using a variety of equipment including a digital video endoscope, binoculars, high-powered torch and a digital camera.

3.7. Surveyor, author and reviewer

The survey was undertaken by Will O'Connor CEcol MCIEEM, Director and Principal Ecologist at MKA Ecology Ltd, and Max Ellis, Graduate Ecologist, at MKA Ecology Limited. The report was written by Max Ellis, and reviewed by Will O'Connor. Will has 15 years' experience as a consultant ecologist.

3.8. Date, time and weather conditions

See Table 7 below for details of the date, time and prevailing weather conditions recorded during the site visit for the Preliminary Ecological Appraisal.

Table 7: Date, time and weather conditions of survey visit

Date	Time of survey	Weather conditions*
07/02/2022	14:15	Wind: 3 Cloud: 7 Temp: 8°C Rain: None

*Wind as per Beaufort Scale / Cloud cover given in Oktas.

3.9. Constraints

A single visit cannot always ascertain the presence or absence of a protected species. However, an assessment is made of the likelihood for protected species to occur based on habitat characteristics and the ecology of each species. Where there is potential for protected species, additional survey work may be required to ascertain their presence or absence.

Data on species records obtained from local biological records centres are sometimes only available at low spatial resolutions and are constrained by the voluntary nature of the contributions and what has been chosen to be submitted as records. While these records provide a useful indication of species

recorded in the local area, in particular protected or notable species, the data is not necessarily an accurate reflection of species assemblages or abundance in the vicinity.

The assessment was undertaken outside the optimum period of April to the end of September. However, within the scope of the study it was possible to identify key habitats present and assess their likelihood of supporting a greater range of species.

Some areas of the attic of Building 1 were not surveyed for bats due to access restrictions. Whilst it was possible to access the attic the chimney stacks prevented access to the entire area.

4. RESULTS

4.1. Desktop study

An ecological desktop study was completed for the Site and the surrounding 2km. Data provided by Cambridgeshire and Peterborough Environmental Records Centre identified a number of UK and European protected species, Species and Habitats of Principal Importance (as listed under Section 41 of the NERC Act 2006), and species of conservation concern within 2km of the Site. It should be noted that this is not a comprehensive list of the distribution or extent of the local flora and fauna of conservation importance. These species records are discussed in greater detail in the protected species scoping survey section (Section 4.3 below).

There are no statutorily designated sites existing within 2km of the survey area. Details of non-statutorily designated sites identified as part of the desktop study are displayed in Table 8 below. These consist of eight County Wildlife Sites (CWS) and one Protected Road Verge (PRV).

Table 8: Non-statutorily designated sites within 2km of 912 Pratts Green Farmhouse, Kirtling

Site name	Area (ha)	Distance and direction	Reasons for selection
Great Widgham Wood CWS	36.16	2000m W	Supports a population of a Nationally Scarce vascular plant species (oxlip).
Great Wood CWS	8.28	1,500m SE	A woodland listed in the Cambridgeshire Inventory of Ancient Woodland which retains more than 25% semi-natural cover and because it supports a population of a Nationally Scarce vascular plant species (oxlip).
Kirtling RSV CWS	0.3	1,600m W	Supports populations of Nationally Scarce vascular plant species (sulphur clover <i>Trifolium ochroleucon</i> , oxlip).
Lucy Wood and adjacent features CWS	22.57	1,100m W	A woodland listed in Cambridge Inventory of Ancient Woodland which retains >25% semi-natural cover; supports a Nationally Scarce vascular plant and a plant rare in the county; has >500m of hedgerow >2m wide, with at least five woody species which are allowed to flower and fruit.
Parish Boundary Hedgerow CWS	1.37	1,930m W	Supports at least 500m of hedgerow more than 2m in width, with at least five woody species and which are allowed to flower and fruit.

Site name	Area (ha)	Distance and direction	Reasons for selection
Bradley Park Wood CWS	5.83	1,900m SW	Listed in the Ancient Woodlands Inventory, with ancient woodland indicator species such as oxlip, Midland hawthorn <i>Crataegus laevigata</i> , and hairy St. John's-wort <i>Hypericum hirsutum</i> .
College Grove CWS	2.65	1,500m SW	Ancient woodland with a medieval wood bank.
Bases Wood CWS	4.53	1,200m S	An ancient woodland which is an important habitat for breeding birds, small mammals and invertebrates.
Kirtling E5 PRV		1,600m W	Neutral/calcareous grassland, presence of a nationally scarce species.

The survey area is immediately adjacent to agricultural fields to the south and west, farm buildings to the east, and Malting End Road to the north. The wider surrounding landscape is largely rural, consisting of open arable fields. The Site sits outside of Kirtling Green village and Kirtling village, which lie west and north respectively. A number of important ancient woodlands exist within a 2km radius of the site, including Lucy Wood, Great Wood, Bradley Park Wood, College Grove, and Bases Wood. All of these areas are of value for their flora, with nationally scarce species such as oxlip and other ancient woodland indicator species such as Midland hawthorn and hairy St. John's-wort having a presence within these woodlands. However, these woodlands are isolated within this landscape, and there is very little connectivity between them aside from hedgerows which separate the arable fields. Furthermore, due to the isolation of the Site and its almost total encirclement by arable fields, its connectivity to these important habitats is considered to be low.

The Site falls within several SSSI Impact Risk Zones (Natural England, 2019). Only large infrastructure such as aviation sites, quarries, or industrial/agricultural development that could cause air pollution require LPA consultation with Natural England. No consultation is therefore necessary for the present development.

The Site does not fall within any Important Plant Areas (IPAs) or Important Invertebrate Areas (IIAs).

The East Cambridge District Council planning portal a few planning applications in and around the village of Kirtling, most of which relate to residential developments.

4.2. UK Habitat Classification

The Site was found to comprise of a residential garden, with amenity grassland, scattered trees, mixed shrubs, hedgerows and a pond, along with residential dwelling which was situated centrally next to a garage with a gravel driveway.

More detailed species lists, along with their relative abundance, can be found in Appendix 2. The UK habitat classification survey map is provided in Figure 1, at the end of this section. Descriptions of the habitat types present along with dominant species compositions are provided below.

Native species rich hedgerow with trees (h2a11)

A native hedgerow consisting of native species such as blackthorn *Prunus spinosa*, hawthorn *Crataegus monogyna*, and ivy *Hedera helix* bordered the majority of the garden. The section of hedgerow to the south and east was also found to include mature trees such as ash *Fraxinus excelsior* and pedunculate oak *Quercus robur*, as indicated by Figure 1 (Photographs 1 and 2, Appendix 3). Hedgerows are a Habitat of Principal Importance listed in the NERC Act (2006).

Native species rich hedgerow associated with bank or ditch (h2a10)

The northern and western sections of the garden's hedgerow were found to have been established atop ditches (Photograph 3, Appendix 3). The hedge consisted of similar species along its entire length.

Modified grassland (g4)

A large majority of the survey area was found to consist of amenity grassland, which was regularly mown (Photographs 4 and 5, Appendix 3). This lawn was made up of a variety of species, but creeping bent *Agrostis stolonifera* and red fescue *Festuca rubra agg.* were found to be most abundant. Bee orchids *Ophrys apifera* also occurred occasionally across the lawn.

Eutrophic standing waters (r1a) - Pond (Priority Habitat) (19)

A linear pond (measuring approximately 140m² in area) lies along the southern border of the garden (Photographs 6 and 7, Appendix 3). This shallow waterbody was found to have a high density of macrophyte coverage. Ponds are a UK Biodiversity Action Plan Priority habitat.

Secondary codes relevant to this habitat type:

Introduced shrub (1160)

There were small areas of mixed shrub situated within the lawn, consisting largely of ornamental species (Photographs 8 and 17 – 19, Appendix 3, Target Notes 7-9).

Tall herb (16)

A small area of tall herbal species, dominated by common nettle *Urtica dioica*, is situated adjacent to the pond (Photograph 9, Appendix 3).

Scattered trees (11)

The grassland was interspersed with numerous scattered trees, including mature ash, mature pedunculate oak, and a mature willow *Salix sp.* (Photograph 10, Appendix 3).

Buildings (u1b5)

A large residential dwelling and a shed with a lean-to are situated centrally within the site (Photographs 20, 30 and 31, Appendix 3). These structures are discussed in more detail in the results of the Preliminary Roost Assessment.

Artificial unvegetated, unsealed surface (u1c)

A gravel driveway connects the site to Malting End Road.

Figure 1: UK Habitat Classifications and PRA Results Map of 912 Pratts Green Farmhouse, Kirtling



Target notes:

1: A mature tree with potential roosting features and access points suitable for bats (Photograph 11, Appendix 3).

2: A mature tree with potential roosting features and access points suitable for bats (Photograph 12, Appendix 3).

3: A mature tree with potential roosting features and access points suitable for bats (Photograph 13, Appendix 3).

4: A mature tree with potential roosting features and access points suitable for bats (Photograph 14, Appendix 3).

5: A mature tree with potential roosting features and access points suitable for bats (Photograph 15, Appendix 3).

6: A mature tree with potential roosting features and access points suitable for bats (Photograph 16, Appendix 3).

7: An area of mixed shrub with potential to support hibernating great crested newts (Photograph 17, Appendix 3).

8: An area of mixed shrub with potential to support hibernating great crested newts (Photograph 18, Appendix 3).

9: An area of mixed shrub with potential to support hibernating great crested newts (Photograph 19, Appendix 3).

4.3. Protected species scoping survey

Plants and fungi

The data search returned a number of protected or notable plant species within the search area. These included species listed under Section 41 of the NERC Act (2006), including Shepherd's-needle and oxlip.

A number of bee orchids were found scattered across the lawn. Although these are not listed as a species of interest in Cambridgeshire, they are certainly a species of value within the garden habitat which exists at the Site, and efforts should be made to retain and protect them where feasible. No specially protected or notable plant species aside from the bee orchids were recorded during the survey

and the species present were all common in the wider landscape. The amenity grassland is frequently mown and does not provide suitable habitat for rare and/or notable plant species. The type of habitat present suggests that the likelihood of the Site supporting protected or notable plant species is **negligible**. This species group is therefore not considered further in this report.

Invertebrates

The data search returned a number of protected or notable invertebrates within the search area. These included Species of Principal Importance listed under Section 41 of the NERC Act (2006), such as small heath, grey dagger and buff ermine.

The habitats within the survey area are unlikely to support protected and/or notable invertebrate species due to a lack of diversity. The frequently mown modified grassland is unlikely to support a diverse range of invertebrates. Whilst the marginal aquatic vegetation present at the pond was relatively limited, it is still likely to hold value for common and widespread invertebrates, such as members of the order *Odonata*. However, no impacts are anticipated on the pond and the risk of impacts on protected and/or notable invertebrates is therefore negligible. In the context of the wider area, the Site is not deemed to be important for protected invertebrate species and is unlikely to support a notable invertebrate assemblage of significance. Overall, the development is considered to have a **negligible** impact on protected and/or notable invertebrates. This species group will not be addressed further in this report.

Fish

No records of fish were returned by the data search. The likelihood of the Site supporting protected or notable fish species is **negligible**. This species group is not considered further within this report.

Amphibians

The Site is located within Natural England's Green Risk Zone for great crested newt, however the data search returned six records for great crested newt from a Site approximately 300m away, where pond surveys conducted in 2020 found 93 individuals from April to May. The HSI assessment of the pond found that it was of 'good' suitability for great crested newt. Details of the HSI assessment can be found in Appendix 5 and a summary is shown in Table 9 below. Furthermore, 19 waterbodies of varying sizes were found to exist within a 1km radius of the Site. With very few obstructions (such as major roads) between these ponds and the pond located in the survey area, connectivity between these habitats is high, and it is very possible that a great crested newt population originating from one of these ponds has established at the habitats available at the site. As such the possibility of great crested newts being present in the pond on Site has been assessed as **high**. The native hedgerow, shrubbery, and thicker vegetation surrounding the pond provide suitable terrestrial habitat for great crested newts.

A search of Defra's MAGIC website returned no European Protected Species Licences granted for great crested newt within 2km of the Site (licence period June 2015-May 2020).

Table 9: HSI Assessment results for the pond present on Site

Grid reference	HSI Score	Pond Suitability
TL690557	0.73	Good

Reptiles

The data search returned no records of reptiles within a 2km radius of the Site. Whilst there are suitable habitats for reptiles in the surrounding area, such as rough grassland and woodland edge, the habitats which are present within the survey area are unsuitable, comprising mainly of mown grassland and shrubbery. As such, the area included within the redline boundary is deemed to have **negligible** potential for supporting reptiles. This species is not considered further in this report.

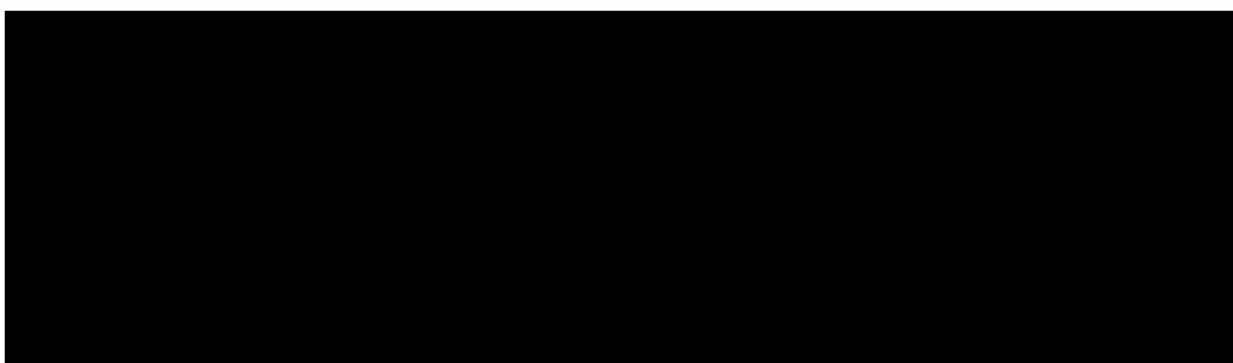
Birds

Seven species were recorded during the site visit. These are listed in Appendix 2 together with conservation statuses. It is important to note that this is not a full inventory of species for the Site.

The data search returned records of several protected and notable bird species from within 2km of the Site. These included a number of species listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) such as barn owl *Tyto alba*, hobby *Falco Subbuteo* and fieldfare *Turdus pilaris*, along with a number of other species for which there is a negligible risk of presence, including marsh harrier *Circus aeruginosus* and little egret *Egretta garzetta*.

Despite the large number of specially protected bird species returned in the data search, the Site is not expected to hold significant populations of any protected or notable species because the habitats are not overly valuable compared to habitats in the wider landscape. Specially protected species may occasionally visit to forage or shelter, however the likelihood of significant populations of specially protected or notable birds breeding on Site is **low**.

The scattered trees and shrubbery, as well as the hedgerows and buildings provide suitable habitat for breeding birds, particularly small passerines such as blackbird *Turdus merula*, blue tit *Cyanistes caeruleus*, and robin *Erithacus rubecula*, which were all recorded. The likelihood of breeding birds being present on site is therefore **high**.



Hedgehogs

The data search returned one record of hedgehog. The modified grassland, shrubs and hedgerows present at the Site hold value for foraging and hibernation. As such, there is a **high** potential that hedgehogs are present on the Site, however this species is not expected to face negative impacts due to the insignificant impacts on suitable habitats.

Other mammals

The data search returned no records of hazel dormouse, seven records of brown hare, one record of water vole, and one record of otter. No evidence of any of these species was recorded during the visit, and due to a lack of suitable habitats the Site has been assessed as holding **negligible** potential to support any of these species, and as such these species groups are not considered further in this report.

4.1. Preliminary Roost Assessment

The data search returned records for four species of bat: brown long-eared bat *Plecotus auritus*, common pipistrelle *Pipistrellus pipistrellus*, Daubenton's bat *Myotis daubentonii*, and Natterer's bat *Myotis nattereri*.

MAGIC map was consulted for any existing European Protected Species Licences for bats. No licences were retrieved within 2km of the Site boundary.

The grassland, pond, hedgerows and mixed shrubbery are all likely to support populations of invertebrates, and as such offer good foraging opportunities for bats. Furthermore, the hedgerows which surround the property on nearly all sides are potential linear passages for bats commuting through or into the site. In the context of the surrounding environment, which consists predominantly of open fields, the habitats present within the survey area are likely to be of some significance for bats, and as such there is a **moderate** risk that foraging and commuting bats are frequently visiting the Site.

The two buildings were assessed for potential roosts during the Site visit. Building 1 was found to be of **moderate** roost suitability, and Building 2 was found to be of **low** roost suitability. The results of the Preliminary Roost Assessment are shown in Figure 1. Multiple potential roosting features and access points were found on both structures. Building 1 has been assessed as being of **moderate** suitability for roosting bats due to its larger size and the potential presence of more cavities and spaces which may be utilised by roosting bats.

The tables below outline the results of the Preliminary Roost Assessment in further detail.

Table 10: Building inspection results

Building	Roost suitability	Description	Bat roost evidence and potential
Building 1	Moderate	A two-storey, brick-built L-shaped cottage, with timber-framed thatching (Photograph 20, Appendix 3).	<p>No direct evidence of bats was recorded (although access into the entire attic was not possible due to access restrictions). Whilst the spaces between the eaves of the thatched roof and the walls of the house were found to be largely blocked by chicken wire (Photograph 21, Appendix 3), there were still a number of potential access points, particularly towards the apices of the gables (Photographs 22 and 23, Appendix 3).</p> <p>In some places, the wooden frames around the exterior structure have become disjointed from the walls, and the resulting gaps are also potential access points for bats (Photographs 24 and 25, Appendix 3). The wooden framing of the dormer windows at the front of the structure appeared to have become detached from the walls, resulting in some large gaps and potential cavities suitably accessible for bats (Photographs 26 and 27, Appendix 3).</p> <p>It should be noted that these features occurred too far up the building to be inspected closer with a digital endoscope, however there is no reason to discount the possibility that these access points lead to cavities which are capable of supporting roosting bats.</p> <p>No evidence of bats was found in the attic (Photographs 28 and 29, Appendix 3), although full access was restricted.</p>
Building 2	Low	A garage and attached lean-to, both constructed of wooden panels and beams (Photographs 30 and 31, Appendix 3). The	<p>No direct evidence of bats was recorded.</p> <p>Garage</p> <p>Multiple suitable access points were found on the exterior of the garage structure. These occurred predominantly around the</p>

Building	Roost suitability	Description	Bat roost evidence and potential
		garage has a gabled roof and the lean-to has a single pitch roof.	<p>edges of the wooden panelling (Photographs 23 – 34, Appendix 3). Although some of these were found not to lead to suitable cavity space for roosting bats, a search with the digital endoscope found that there were gaps between the exterior and interior wood-panelled walls (Photograph 36, Appendix 3). These cavity spaces are considered to be optimal for roosting bats, both because of the availability of access points and the space available for large roosts to establish.</p> <p>The wooden panelling on the eastern aspect of the structure appeared to have been installed more recently, and was better sealed than the panelling encasing the rest of the building. As such, they were lacking in suitable access points.</p> <p>Whilst bats do not generally roost in metal structures due to its ability to conduct heat, there were gaps along the corrugated metal roof which might allow bats to access roosts elsewhere in the structure (Photograph 35, Appendix 3).</p> <p>No direct evidence of bats was found in the interior of the garage, although there were several access points leading to the aforementioned cavities between the wood panelling (Photographs 36-38, Appendix 3). There were also gaps in the wood panelling of the ceiling (Photograph 39, Appendix 3), however these appeared to lead to the outer metal corrugated roof, and as such this cavity is not considered to be optimal for roosting bats. However, the potential for bat presence here cannot be totally discounted.</p> <p>Lean-to</p>

Building	Roost suitability	Description	Bat roost evidence and potential
			No suitable access points or potential roosting features were found in the lean-to structure adjoined to the larger garage.

Table 11: Tree inspection results

Tree	Species	Roost suitability	Descriptions of potential/actual roost features
1	Ash	Low	Mature tree with knot hole Target note 1 Photograph 11, Appendix 3
2	Ash	Low	Mature tree with knot hole and peeling bark Target note 2 Photograph 12, Appendix 3
3	Pedunculate oak	Low	Mature tree with dead wood Target note 3 Photograph 13, Appendix 3
4	Ash	Low	Mature tree with knot hole Target note 4 Photograph 14, Appendix 3
5	Ash	Low	Mature tree with multiple rot holes, Target note 5 Photograph 15, Appendix 3
6	Willow sp.	Low	Mature tree with dead wood Target note 6 Photograph 16, Appendix 3

5. ECOLOGICAL CONSTRAINTS, OPPORTUNITIES AND RECOMMENDATIONS

This section outlines key ecological issues for consideration, recommendations for further work and ecological enhancements where appropriate.

On-site habitats

The native hedgerow, scattered trees, and pond within the site boundary are important features for biodiversity at the Site and should be retained where feasible, protected from damage during the works and enhanced during after the works with additional native planting. Special care should be taken with the pond and native hedgerow as these are Habitats of Principal Importance. It is understood that small areas of shrub will be removed in order to create space for the new extensions and paths. Shrubs should only be removed when required and should be appropriately replaced elsewhere within the site.

Recommendation 1

Habitats of value to biodiversity should be retained where feasible, protected from damage during the works and enhanced with additional planting post construction.

Amphibians

A pond suitable for great crested newts is present within the red line boundary, approximately 20m from the footprint of the proposed development. An HSI assessment of the pond found it to be of 'good' suitability for great crested newt, and there is a known population of great crested newts existing roughly 300m east of the Site. A total of 19 ponds of varying sizes exist within 1km of the survey area. Connectivity between these ponds is considered to be high; the area consists mostly of open fields separated by hedgerows, and there are very few significant obstacles which might prevent passage.

The shrubs, hedgerows, tall herb vegetation, and thicker foliage which exists on the banks of the pond are all of high value to this species during their terrestrial phase. Areas of shrub, which are suitable features for great crested newts during their terrestrial phase, fall within the footprint of the proposed development, and as such the risk posed to this species is considered to be **high**.

Great crested newt is protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended). It is an offence to deliberately disturb, injure or kill this species, and it is also an offence to damage or destroy a great crested newt breeding site or resting place, whether it is terrestrial or aquatic. Whilst no impacts on the aquatic habitat are expected provided that appropriate protective measures are in place, there is still a risk to this species whilst in their terrestrial phase. For example, disturbance might occur if individual become trapped in trenches during construction, and there also exists a threat of injury of death during the works.

Further survey work is recommended to establish the presence or absence of this species both at the Site and at other ponds within 250m, where access permits. An eDNA survey of the pond should be carried out between 15 April and 30 June.

Recommendation 2

Carry out an eDNA survey of the pond to establish the presence or absence of great crested newt at the site.

An alternative option to further survey work is to sign up to obtain a District Level Licence for Great Crested Newt by signing up to the Natural England District Level Licencing Scheme.

Recommendation 3

If further survey work is not carried out, a District Level Licence should be obtained by signing up for the Natural England District Level Licencing Scheme.

Birds

The hedgerows, shrub and trees all provide suitable habitat for breeding birds. There is a **high** possibility that breeding birds are present within the Site. A bird nest was found behind the wooden panelling of the garage (Photograph 40, Appendix 3).

All wild birds, their active nests and eggs are protected under The Wildlife and Countryside Act 1981 (as amended), which makes it an offence deliberately, or recklessly, to kill or injure any wild bird or damage or destroy any active birds' nest or eggs.

Scheduling vegetation removal works between the months of September and February inclusive (i.e. outside of the bird season) would avoid impacts on breeding birds.

Where vegetation and/or building clearance works are required during the breeding bird season (between the months of March and August inclusive), such works can only proceed following the completion of a nesting bird check undertaken by an experienced ornithologist. Any active birds' nest identified during this check must be protected from harm until the nesting attempt is complete. This will require a buffer to be left around the nest, the size of which will depend upon the species involved (as a general rule, this will be 10m in all directions around the nest). Any buffers established as a result of the initial nesting bird check must be subjected to a second check after the original nesting attempt is completed, before such areas can be removed during the breeding bird season.

Recommendation 4

Schedule vegetation clearance works between the months of September and February inclusive to avoid impacts on breeding birds. Where this timing is not feasible works should be preceded by a nesting bird check.

It is strongly recommended that any potential nesting bird habitat is cleared outside the breeding bird season in order to avoid potentially lengthy delays if nests are found during nesting bird checks.

Bats – impact of development on bats and trees

Both buildings, along with six trees located within the red line boundary (Target Notes 1-6), contained potential access points and roosting features suitable for bats. The data search contained numerous records of bats within 2km of the site.

Building 1 was assessed as possessing **moderate** roost suitability, and Building 2 was assessed as possessing **low** roost suitability.

All bat species are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of Conservation of Habitats and Species Regulations 2017 (as amended). Bats are also Species of Principal Importance listed on Section 41 of the NERC Act (2006). It is an offence to deliberately disturb a bat, damage or destroy a bat roost, intentionally or recklessly disturb a bat at a roost, or obstruct access to a roost.

The proposed development will involve the destruction of Building 2, the destruction of a modern extension on the house, and other modifications to the house. There is therefore a risk that individual bats may be killed, injured or disturbed while in their roost during the works and that any bat roosts will be damaged or destroyed without any mitigation measures. Whilst it was not possible to survey the entirety of the attic in Building 1 due to access restrictions, enough potential access points and roosting features were found on the exterior of this structure to trigger the necessity for further surveys to be undertaken.

Further surveys will gather the data required to inform the impact assessment, mitigation strategy and licence application process (if required).

It is recommended that best practice guidelines are followed with a total of one nocturnal survey for low-risk buildings and two nocturnal surveys for moderate risk buildings. Nocturnal bat surveys must be conducted during May to September inclusive (with at least two of the surveys conducted during May to August inclusive). It is recommended that surveys are spaced at least two weeks apart.

Whilst the aforementioned trees are located in close proximity to the proposed extension, there is not expected to be any impacts on any roosts which may exist. Provided that these trees are not damaged or disturbed for the duration of the construction works, there will be no need for further surveys to assess the likelihood of bats roosting in these trees.

Recommendation 5

Undertake two nocturnal bat surveys on Building 1 and one nocturnal bat survey on Building 2 to determine the presence or likely absence of bat species and if present the species, population size and type of roost present and establish how bats may be using the structures.

Bat roosting behaviour, commuting and foraging activity can additionally be dramatically affected by artificial lighting (BCT, 2018). It is strongly recommended that any proposed exterior lighting on the new garage and extension is designed and managed appropriately to ensure that the area remains suitable for foraging bats. A sensitive lighting scheme should be developed to allow suitable roosting and foraging areas for bats. Features which are of particularly high value for foraging and commuting bats, such as the hedgerows and pond, along with the trees with potential roost sites, should remain unlit so as to reduce any disturbance to any individuals. These measures should be secured through a planning condition.

Recommendation 6

Light pollution from any lighting should be minimised both during and after the construction phase. A sensitive lighting scheme should be developed and secured through a planning condition to allow for suitable roosting and foraging areas for bats within the site with maximum use of appropriate luminaires and directed lighting. Direct lighting on any mature trees, the pond, and the hedgerows, must be avoided.

Hedgehogs

The garden habitats available are suitable for hedgehog. Hedgehogs are Species of Principal Importance, and as such provisions should be made for this species post-development. It is recommended that a hibernaculum designed to support hibernating hedgehogs is installed in the garden post-development.

Recommendation 7

Install a hedgehog 'hibernaculum' within the new development.

Opportunities for biodiversity enhancement

Following the issue of the National Planning Policy Framework (NPPF; see Appendix 1), all planning decisions should aim to maintain and enhance, restore or add to biodiversity and geological conservation interests. Ecological enhancements should aim to deliver biodiversity gains for the proposed development site.

Planting of native species or those with a known attraction or benefit to local wildlife is recommended in landscape proposals. This will help to increase native plant species diversity, provide more ecologically valuable habitats, and result in a greater diversity of other dependent taxonomic groups. It is recommended that the areas where the hedgerow is thinner, namely along the southern border of the garden, are planted in with additional native species, such as hawthorn, hazel *Corylus avellana*, field maple *Acer campestre*, guelder rose *Viburnum opulus* and dogwood *Cornus sanguinea*. The areas of mixed shrub which are to be removed should be suitably replaced elsewhere in the garden.

A building-mounted trellis planted with a native climber such as wild honeysuckle *Lonicera periclymenum* can be installed onto the new structures and will provide additional cover for breeding birds, and enhanced feeding opportunities for birds and bats whilst utilising vertical space at the site.

Recommendation 8

It is recommended that native British species are incorporated within the planting scheme for the final landscaping design in order to enhance the overall value of the site for biodiversity, in line with the requirements of the NPPF. There should be a focus on planting UK native tree species, species-rich native hedgerow and native climbers on the new building.

A number of simple measures to improve biodiversity at the Site can be implemented. The amenity grassland habitat onsite provides an opportunity to create a bee lawn that can act as an important resource for bumblebees and other insect pollinators, which in turn provides benefits for other species within the ecosystem, including reptiles and bats. A bee lawn can be created by over-seeding the lawn with suitable plants such as selfheal *Prunella vulgaris* or bird's-foot-trefoil *Lotus corniculatus* and by reducing the mowing height and frequency. The bee orchids which can already be found in the garden can be integrated into this bee lawn. For more detailed information about the creation of a bee lawn please refer to Appendix 6.

Additionally, the creation of deadwood features at the site will be particularly valuable for invertebrates as a foraging resource, which in turn benefits a range of other species such as hedgehogs and reptiles. This could include rotting roots or tree stumps spread around various locations. The drilling of holes or cutting of notches can add even more value for invertebrates.

Recommendation 9

Incorporate simple biodiversity enhancement measures at the site, including the creation of a bee lawn and provision of deadwood features.

Enhanced opportunities for breeding birds should be incorporated into the design scheme. Bird boxes should be mounted on trees, fences and built structures at the site. It is recommended that there is focus on swifts *Apus apus* and house martin *Delichon urbicum*, together with the provision of generalist

bird boxes. In particular, there is an excellent opportunity to install integrated swift bricks into the external walls of the proposed structures. It should be ensured that these are installed as high as possible within the new extension. The extensive fields which surround the site on all sides provide good hunting opportunities for barn owls, and as such the provision of a barn owl box, which may be mounted on one of the mature trees overlooking these fields, will provide an ideal nesting site.

Examples of suitable boxes are shown in Appendix 4 together with information concerning the correct siting of these enhancement features.

Recommendation 10

A minimum of two integrated swift bricks, two house martin boxes, one generalist bird box, and one barn owl box should be installed at the site.

The wider landscape has the potential for use by foraging bats. With this in mind, enhanced opportunities for roosting bats should also be provided at the site through installation of bat boxes. The type and number of boxes which should be installed at the Site should be decided following the nocturnal bat surveys.

Summary of recommendations

Table 12 below summarises the recommendations made within this report, and specifies the stage of the development at which action is required. Colour coding of cells within the table is as follows:

Key:

	No action required for this species group at this stage
	Action required (see notes for details)
	Level of action required will be determined following the further survey work

Table 12: Summary of recommendations at 912 Pratts Green Farmhouse, Kirtling

Species	Pre-planning action required?	Pre-construction action required?	Construction phase mitigation required?	Enhancements proposed?
Habitats	Native planting Retain trees, hedgerows, shrub, and pond	No	Protect trees, hedgerows, shrub, and pond	Native planting Bee lawn Deadwood features
Bats	Carry out nocturnal bat surveys	TBC	TBC	TBC
Amphibians	Carry out eDNA survey OR acquire a District Level Licence	TBC	TBC	TBC
Birds	Bird boxes and native planting	No	Timing of works for vegetation removal	Bird boxes and native planting

Species	Pre-planning action required?	Pre-construction action required?	Construction phase mitigation required?	Enhancements proposed?
Hedgehogs			Incorporate integrated bird boxes into new buildings	Install hedgehog hibernaculum
	No	No	No	

Table 13: Summary of further surveys recommended at 912 Pratts Green Farmhouse, Kirtling

Species/species group	Purpose of survey	Survey period (inclusive unless otherwise stated)
Bats – nocturnal surveys	Confirm presence/absence	May – August (Optimal), September (Suboptimal)
Great crested newt - eDNA	Confirm presence/absence	Mid-April – June

6. CONCLUSIONS

A Preliminary Ecological Appraisal was undertaken at 912 Pratts Green Farmhouse, Kirtling in February 2021 by MKA Ecology Ltd. The proposed development involves the demolition of a modern extension and of the garage and lean-to, and for the construction of new extensions and alterations to the house.

The major constraints which were identified for this Site relate to bats and great crested newts. Due to the suitability of the habitats at the site for these species, and due to the negative impacts that would be caused by the proposed development should these species be present, further surveys must be carried out in order to determine their presence or absence. In brief, these surveys include:

An eDNA survey should be carried out to determine whether great crested newts are present at the Site. These can be carried out from **mid-April to June**. Alternatively, by obtaining a district level licence, works would be able to proceed without the need for further surveys.

Nocturnal surveys should be carried out in order to determine the presence or absence of bats in the buildings which were surveyed. These can be carried out from **May to August inclusive**.

The important habitats, including the pond and native hedgerow, should be retained and protected for the duration of the works, and works should be timed sensitively to avoid negatively impacting breeding birds. A sensitive lighting scheme should be developed in order to prevent the disturbance of bats.

Opportunities exist to enhance the biodiversity post-development and include native planting and the creation of a bee lawn in the landscaping plans. Deadwood features, hedgehog hibernacula and bird and bat boxes should all be provided to enhance the habitats for wildlife. These enhancement recommendations are in line with East Cambridgeshire District Council's adopted Local Plan and the National Planning Policy framework, and will ensure that the proposed development produces positive effects for local biodiversity.

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8. APPENDICES

8.1. Appendix 1: Relevant wildlife legislation and planning policy

Please note that the following is not an exhaustive list, and is solely intended to cover the most relevant legislation pertaining to species commonly associated with development sites.

Subject	Legislation (England)	Relevant prohibited actions
<i>Amphibians</i>		
Great crested newt <i>Triturus cristatus</i> Natterjack toad <i>Epidalea calamita</i>	Schedule 2 of Conservation of Habitats and Species Regulations (2017) Schedule 5 of The Wildlife and Countryside Act 1981 (as amended)	Deliberately capture or kill, or intentionally injure; Deliberately disturb or recklessly disturb them in a place used for shelter or protection; Damage or destroy a breeding site or resting place; Intentionally or recklessly damage, destroy or obstruct access to a place used for shelter or protection; and Possess an individual, or any part of it, unless acquired lawfully.
<i>Reptiles</i>		
Common lizard <i>Zootoca vivipara</i> Adder <i>Vipera berus</i> Slow-worm <i>Anguis fragilis</i> Grass snake <i>Natrix helvetica helvetica</i>	Part of Sub-section 9(1) of Schedule 5 of The Wildlife and Countryside Act 1981 (as amended)	Intentionally kill or injure individuals of these species (Section 9(1)).

Subject	Legislation (England)	Relevant prohibited actions
<p>Sand lizard <i>Lacerta agilis</i></p> <p>Smooth snake <i>Coronella austriaca</i></p>	<p>Full protection under Section 9 of Schedule 5 of The Wildlife and Countryside Act 1981 (as amended)</p>	<p>Deliberately or intentionally kill, capture (take) or intentionally injure;</p> <p>Deliberately disturb;</p> <p>Deliberately take or destroy eggs;</p> <p>Damage or destroy a breeding site or resting place or intentionally damage a place used for shelter; or</p> <p>Intentionally obstruct access to a place used for shelter.</p>
<i>Birds</i>		
<p>All wild birds</p>	<p>Wildlife and Countryside Act 1981 (as amended)</p>	<p>Intentionally kill, injure, or take any wild bird or their eggs or nests.</p>
<p>'Schedule 1' birds</p>	<p>Schedule 1 of the Wildlife and Countryside Act 1981 (as amended)</p>	<p>Disturb any wild bird listed on Schedule 1 whilst it is building a nest or is in, on, or near a nest containing eggs or young; or</p> <p>Disturb the dependent young of any wild bird listed on Schedule 1.</p>
<i>Mammals</i>		
<p>Bats (all UK species)</p>	<p>Schedule 2 of Conservation of Habitats and Species Regulations (2017)</p>	<p>Deliberately capture, injure or kill a bat;</p> <p>Deliberately disturb a bat (disturbance is defined as an action which is likely to: (i) Impair their ability to survive, to breed or reproduce, or to rear or nurture their young; (ii) Impair their ability to hibernate or migrate; or (iii) Affect significantly the local</p>

Subject	Legislation (England)	Relevant prohibited actions
	Schedule 5 of Wildlife and Countryside Act 1981 (as amended)	<p>distribution or abundance of the species);</p> <ul style="list-style-type: none"> • Damage or destroy a bat roost; • Intentionally or recklessly disturb a bat at a roost; or • Intentionally or recklessly obstruct access to a roost. <p>In this interpretation, a bat roost is "<i>any structure or place which any wild [bat]...uses for shelter or protection</i>". Legal opinion is that the roost is protected whether or not the bats are present at the time.</p>
Hazel dormouse <i>Corylus avellana</i>	Schedule 2 of Conservation of Habitats and Species Regulations (2017)	<ul style="list-style-type: none"> • Intentionally or deliberately capture or kill, or intentionally injure;

Subject	Legislation (England)	Relevant prohibited actions
	Schedule 5 of Wildlife and Countryside Act 1981 (as amended)	<p>Deliberately disturb or intentionally or recklessly disturb them in a place used for shelter or protection;</p> <p>Damage or destroy a breeding site or resting place;</p> <p>Intentionally or recklessly damage, destroy or obstruct access to a place used for shelter or protection; and</p> <p>Possess an individual, or any part of it, unless acquired lawfully.</p>
Otter <i>Lutra lutra</i>	<p>Schedule 2 of Conservation of Habitats and Species Regulations (2017)</p> <p>Section 9(4)(b) and (c) of Schedule 5 of Wildlife and Countryside Act 1981 (as amended)</p>	<p>Deliberately capture, injure or kill an otter;</p> <p>Deliberately disturb an otter in such a way as to be likely to significantly affect the local distribution or abundance of otters or the ability of any significant group of otters to survive, breed, rear or nurture their young;</p> <p>Intentionally or recklessly disturb any otter whilst it is occupying a holt;</p> <p>Damage or destroy or intentionally or recklessly obstruct access to an otter holt.</p>
Water vole <i>Arvicola amphibius</i>	Section 9 of Schedule 5 of Wildlife and Countryside Act 1981 (as amended)	<p>Intentionally kill, injure or take water voles;</p> <p>Possess or control live or dead water voles or derivatives;</p> <p>Intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection; or</p> <p>Intentionally or recklessly disturb water voles whilst occupying a structure or place used for that purpose.</p>

Subject	Legislation (England)	Relevant prohibited actions
<i>Crustaceans</i>		
White-clawed crayfish <i>Austropotamobius pallipes</i>	Section 9(1) of Schedule 5 of Wildlife and Countryside Act 1981 (as amended)	<ul style="list-style-type: none"> Intentionally kill, injure or take white-clawed crayfish by any method.

The Conservation of Habitats and Species (Amendment) Regulations 2017

Full legislation text available at: [The Conservation of Habitats and Species \(Amendment\) Regulations 2017\(legislation.gov.uk\)](https://www.legislation.gov.uk/ukpga/2017/102/contents)

The Wildlife and Countryside Act 1981 (as amended)

Full legislation text available at: <http://www.legislation.gov.uk/ukpga/1981/69/contents>.

Countryside and Rights of Way Act 2000

Full legislation text available at: <http://www.legislation.gov.uk/ukpga/2000/37/contents>

Section 41 of Natural Environments and Rural Communities (NERC) Act 2006

Full legislation text available at: <http://www.legislation.gov.uk/ukpga/2006/16/section/41>

Many of the species above, along with a host of others not afforded additional protection, are listed on Section 41 of the NERC Act 2006.

Section 41 (S41) of the Natural Environment and Rural Communities (NERC Act 2006) requires the Secretary of State to publish a list of habitats and species that are of principal importance for the conservation of biodiversity in England. The list (including 56 habitats and 943 species) has been drawn up in consultation with Natural England and draws upon the UK Biodiversity Action Plan (BAP) List of Priority Species and Habitats.

The S41 list should be used to guide decision-makers such as local and regional authorities to have regard to the conservation of biodiversity in the exercise of their normal functions – as required under Section 40 of the NERC Act 2006. The duty applies to all local authorities and extends beyond just conserving what is already there, to carrying out, supporting and requiring actions that may also restore or enhance biodiversity.

Schedule 9 of Wildlife and Countryside Act 1981 (as amended)

In addition to affording protection to some species, The Wildlife and Countryside Act 1981 (as amended) also names species which are considered invasive and require control. Section 14 of the Act prohibits the introduction into the wild of any animal of a kind which is not ordinarily resident in, and is not a regular visitor to, Great Britain in a wild state, or any species of animal or plant listed in Schedule 9 to the Act. In the main, Schedule 9 lists non-native species that are already established in the wild, but which continue to pose a conservation threat to native biodiversity and habitats, such that further releases should be regulated.

Wild Mammals (Protection) Act 1996

Full legislation text is available at: <http://www.legislation.gov.uk/ukpga/1996/3/contents>

Under this legislation it is an offence to cause unnecessary suffering to wild mammals, including by crushing and asphyxiation. It largely deals with issues of animal welfare, and covers all non-domestic mammals including commonly encountered mammals on development sites such as rabbits, foxes and field voles.

Birds of Conservation Concern (BoCC)

This is a quantitative assessment of the status of populations of bird species which regularly occur in the UK, undertaken by the UK's leading bird conservation organisations. It assesses a total of 245 species against a set of objective criteria to place each on one of three lists – Green, Amber and Red – indicating an increasing level of conservation concern. There are currently 70 species on the Red list, 103 on the Amber list and 72 on the Green list. The classifications described have no statutory implications, and are used merely as a tool for assessing scarcity and conservation value of a given species.

National Planning Policy Framework (NPPF)

Full text is available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

The revised NPPF was updated on 20 July 2021 setting out the Government's planning policies for England and the process by which these should be applied. The policies within the NPPF are a material consideration in the planning process. The key principle of the NPPF is a presumption in favour of sustainable development, with sustainable development defined as a balance between economic, social and environmental needs.

Policies 174 to 188 of the NPPF address conserving and enhancing the natural environment, stating that the planning system should:

Contribute to and enhance the natural and local environment by protecting and enhancing valued landscapes;

Recognise the wider benefits of ecosystem services; and

Minimise impacts on biodiversity and provide net gains in biodiversity where possible, contributing to the Government’s commitment to halt the overall decline in biodiversity.

Furthermore, there is a focus on re-use of existing brownfield sites or sites of low environmental value as a priority, and discouraging development in National Parks, Sites of Specific Scientific Interest, the Broads or Areas of Outstanding Natural Beauty other than in exceptional circumstances.

Where possible, planning policies should also

“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”.

8.2. Appendix 2: UK Habitat Classification species list

Please note that these lists are intended to be incidental records and do not constitute a full botanical survey of the site. Relative abundance is given using the DAFOR scale. Please see Table 2 for details.

Hedgerow (priority habitat) (h2a)

Common Name	Systematic Name	Relative abundance
Blackthorn	<i>Prunus spinosa</i>	A
Bramble	<i>Rubus sp.</i>	A
Hawthorn	<i>Crataegus monogyna</i>	A
Ivy	<i>Hedera helix</i>	F
Ash	<i>Fraxinus excelsior</i>	O
Field maple	<i>Acer campestre</i>	O

Modified grassland (g4)

Common Name	Systematic Name	Relative abundance
Creeping bent	<i>Agrostis stolonifera</i>	A
Red fescue	<i>Festuca rubra agg.</i>	A
Creeping buttercup	<i>Ranunculus repens</i>	F
Ground-ivy	<i>Glechoma hederacea</i>	F
Yorkshire-fog	<i>Holcus lanatus</i>	F
Bee orchid	<i>Ophrys apifera</i>	O
Cock's-foot	<i>Dactylis glomerata</i>	O

Tall herb (16)

Common Name	Systematic Name	Relative abundance
Common nettle	<i>Urtica dioica</i>	D
Winter aconite	<i>Eranthis hyemalis</i>	F

Scattered trees (11)

Common Name	Systematic Name	Relative abundance
Ash	<i>Fraxinus excelsior</i>	F

Common Name	Systematic Name	Relative abundance
Pedunculate oak	<i>Quercus robur</i>	O
Willow	<i>Salix sp.</i>	O

Bird species recorded at Pratts Green Farmhouse, Kirtling

Common name	Systematic name	S1 W&CA ¹	BoCC ² Status	S41 SPI ³	Local PrSp ⁴
Pheasant	<i>Phasianus colchicus</i>	-	Green	-	-
Woodpigeon	<i>Columba palumbus</i>	-	Amber	-	-
Red kite	<i>Milvus milvus</i>	-	Green	-	-
Kestrel	<i>Falco tinnunculus</i>	-	Amber	-	-
Blue tit	<i>Cyanistes caeruleus</i>	-	Green	-	-
Blackbird	<i>Turdus merula</i>	-	Green	-	-
Robin	<i>Erithacus rubecula</i>	-	Green	-	-

¹ Schedule 1 of The Wildlife and Countryside Act 1981

² Birds of Conservation Concern

³ Section 41 (NERC Act 2006) 'Species of Principal Importance'

⁴ Local Priority Species

8.3. Appendix 3: Site photographs

Photograph 1: Hedgerow



Photograph 2: Hedgerow with trees



Photograph 3: Hedgerow with ditch



Photograph 4: Amenity grassland



Photograph 5: Amenity grassland with scattered trees



Photograph 6: Pond



Photograph 7: Pond



Photograph 8: Mixed shrub



Photograph 9: Tall herb



Photograph 10: Scattered mature trees



Photograph 11: Tree 1, Mature Ash, Target Note 1



Photograph 12: Tree 2, Mature Ash, Target Note 2



Photograph 33: Tree 3, Mature Oak, Target Note 3



Photograph 14: Tree 4, Mature Ash, Target Note 4



Photograph 15: Tree 5, Mature Ash, Target Note 5



Photograph 16: Tree 6, Mature Willow, Target Note 6



Photograph 47: Area of mixed shrub, Target Note 7



Photograph 18: Area of mixed shrub, Target Note 8



Photograph 59: Area of mixed shrub, Target Note 9



Photograph 20: Building 1



Photograph 21: An area under the eaves of Building 1 which has been sealed with chicken wire



Photograph 22: Potential access point at the apex of the gabled roof, Building 1



Photograph 23: Potential access point at the apex of the gabled roof, Building 1



Photograph 24: Potential access point between the wooden beams of Building 1



Photograph 65: Potential access point under the wooden beams of Building 1



Photograph 26: Cracks under the roof of the dormer windows on Building 1



Photograph 27: Potential access points on the dormer windows on Building 1



Photograph 28: Interior of attic of Building 1



Photograph 79: Interior of attic of Building 1 (Andrew Firebrace Partnership, 2021)



Photograph 30: Building 2



Photograph 31: Lean-to adjoining Building 2



Photograph 32: Potential access points between the wooden panels of Building 2



Photograph 33: Potential access points between the wooden panels of Building 2



Photograph 34: Potential access points under the wooden panels of Building 2



Photograph 35: Metal gaps beneath corrugated metal roof of Building 2



Photograph 36: A view of the cavity, and potential roosting feature, which exists between the interior and exterior wooden panelling of Building 2



Photograph 37: Gap leading to cavity in interior of Building 2



Photograph 38: Gap leading to cavity in interior of Building 2



Photograph 39: Gap between the wooden ceiling panels of Building 2



Photograph 40: Bird nest found in the wall cavity of Building 2



8.4. Appendix 4: Bird and bat box recommendations

Bird box recommendations


A large number of bird boxes are available, designed for the specific needs of individual species. These are normally either designed to be mounted onto trees, external walls or integrated into a building. In general, bird boxes should be mounted out of direct sunlight and prevailing winds, out of reach of predators, with suitable foraging habitat for the subject species close by. Bird boxes should also be left up over winter as they can provide useful roosting sites for birds in bad weather.


Nest boxes should be cleaned at the end of each bird breeding season. All nesting material and other debris should be removed from the box. It should then be scrubbed clean with boiling water to kill any parasites (avoid using any chemicals). Once the box is clean, it should be left to dry out thoroughly. Under the Wildlife and Countryside Act 1981 it is an offence to disturb breeding birds and therefore annual cleaning is best undertaken from October to January when there is no risk of disturbing breeding birds.

Generalist boxes

Boxes to attract garden birds and woodland breeding species such as tits, nuthatch, redstart and pied flycatcher can be placed in gardens, orchards, woodlands and a wide variety of other habitats. The species of birds attracted to the box will depend upon the size of the entrance hole (see table below).

Boxes should be fixed two to five metres up a tree or wall, out of the reach of predators such as domestic cats. Unless there are trees or buildings, which give permanent shelter, it is best facing between north and east.

General		
Example	Description	Picture
Bird Brick Houses Integrated bird box	http://www.birdbrickhouses.co.uk/brick-nesting-boxes/integrated-bird-box/ Integrated into outside skin of 75mm and most 3" brickwork courses. Comes with a variety of hole sizes to suit particular bird species.	
Entrance Hole	Species	

28mm	Blue-, Marsh-, Coal- and Crested Tit, Wren.	
34mm	Great-, Blue-, Marsh-, Coal- and Crested Tit, Nuthatch, Pied Flycatcher, House Sparrow	
40mm	Redstart and Black Redstart	
50m	Starling	
60m	Spotted Flycatcher	
Schwegler No. 1B General Purpose Nest box	<p>www.schwegler-nature.com</p> <p>Suitable for various garden and woodland birds, created with different sized entrance holes to avoid competition between species. Other variations (e.g. 2M) can be free hanging, to deter predators.</p>	
Entrance Hole	Species	
26 mm	Blue-, Marsh-, Coal- and Crested Tit, possibly Wren. All other species are prevented from using the nest box due to this smaller entrance hole	
32 mm	Great-, Blue-, Marsh-, Coal- and Crested Tit, Redstart, Nuthatch, Pied Flycatcher, Tree and House Sparrows. This size is generally recommended as it supports the greatest number of species.	
Oval	Redstart; also used by species that nest in the diameter 32 mm boxes. However, because more light enters the brood chamber, it is preferred by Redstarts.	



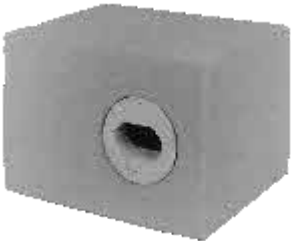
Swift boxes

Swifts are colonial nesters and it is important to have several nest sites in one area. It is recommended that most buildings should have between 4 and 10 nest provisions. Swifts also feed almost exclusively on the aerial plankton of flying insects and airborne spiders of small to moderate size, so therefore require habitats which support these invertebrates.

Nest boxes designed for swifts should be installed at least 5m high, around the eaves of the building or under deeply overhanging eaves to allow swifts to drop into the air to forage. The boxes should be positioned away from climbing plants to avoid access for predators such as rodents.

Swifts typically nest in flat spaces within buildings or within a crevice or cavity. The ideal nest box should have an oval or rectangular hole around 30mm (h) x 65mm (w). The internal dimensions of the box should be approximately 400mm (w) x 200mm (d) x 150mm (h).

Swifts can be attracted to areas that they have not previously colonised using 'swift response calls'. Audio CDs are available for this purpose and are available on the Schwegler website (www.schwegler-nature.com).

Swift		
Example	Description	Picture
lbstock Swift Box	<p>www.lbstock.com</p> <p>This swift brick can be built into a wall on new buildings.</p>	
Woodstone Build-in Swift Box	<p>https://gardenature.co.uk</p> <p>This nest box is made from a concrete and wood fibre mix. It can be mounted on a wall, or it can be built into the fascia of a wall. The front of the Woodstone swift box can be removed for cleaning.</p> <p>It should be fitted at least 5 metres above the ground ensuring there is an unobstructed flight path for birds entering and leaving the box.</p>	
Schwegler Brick Box Type 25	<p>www.schwegler-nature.com</p> <p>This brick design can be built into the wall of the new development and the external surface, excluding the hole, can be rendered to match the surrounding wall.</p>	


Swift		
Example	Description	Picture
Triple Genesis Swift Nest Box	<p>https://www.wildcare.co.uk/</p> <p>It can be mounted on an external wall to provide three swift nesting sites.</p>	
Schwegler Swift Box Number 18	<p>www.schwegler-nature.com</p> <p>This Swift Box No. 18 is ideally suited for creating Swift colonies under overhanging eaves.</p>	
Swift box model 30	<p>http://actionforswifts.blogspot.com/p/diy-swift-box-designs.html</p> <p>This box is suitable for any location as it has a double thickness, waterproof roof (made of uPVC). The 30° sloping roof should deter predators.</p>	
Schwegler Swift and Bat Box 1MF	<p>www.schwegler-nature.com</p> <p>This box contains two nesting chambers for Swifts, each with its own entrance, allowing two pairs to breed. In addition, a recess in the rear panel creates a space between the wall of the building and box, making it ideal for bats that inhabit buildings, such as the Pipistrelle.</p>	


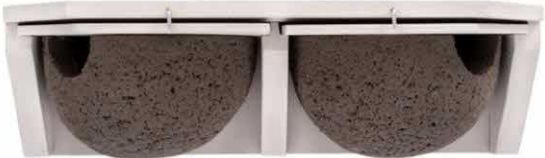
House martin

House martin are colonial nesters that feed on flying insects and prefer to hunt in the immediate vicinity of their nesting sites.

House martins arrive in the UK from their wintering grounds in sub-Saharan Africa during April and the first priority is finding a suitable nesting site where they form their nest bowls from mud and saliva under the eaves of houses and outbuildings. House martins readily make use of artificial nest boxes when suitably sited, tucked under the eaves of a house out of prevailing winds.

It is increasingly difficult for house martins to find suitable nest-building material in our modern world. Permanent puddles with soft muddy edges are in short supply and the ones they do find, are often of poor quality. Additional problems include the use of UPVC on buildings which is very smooth and as a result, nests tend to fall down, sometimes with the nestlings inside. An appropriate artificial house martin nest box avoids these problems.




House Martin		
Example	Description	Picture
Vivara Pro WoodStone House Martin Nest	<p>http://www.vivarapro.co.uk/</p> <p>These WoodStone House Martin Nests have been specially designed to appeal to house martins and are constructed from WoodStone, a mixture of wood fibres and concrete that is durable and provides great thermal properties for the growing nestlings.</p> <p>Dimensions: (H) 12cm x (W) 20cm x (D) 15cm, weight: 1.5kg</p>	

House Martin		
Example	Description	Picture
No. 13 Schwegler Modular House Martin Nest	<p>www.schwegler-nature.com</p> <p>The nest bowl is made in air-permeable, weatherproof Woodcrete. Mounted on a durable backing plate, it slides accurately into position using two supplied stainless steel mounting rails that dramatically simplify installation. If desired, the nest then slides out for easy cleaning at the end of every season.</p> <p>Dimensions: (H) 14 cm, x (W) 25cm x (D) 14cm weight: 900g</p>	
Slide-out Double House Martin Nest	<p>https://www.birdfood.co.uk/</p> <p>Each of the nest sections slide out of the plywood mounting board to allow for easy cleaning, or inspection of the nest contents by licensed surveyors. When in situ the nests are held securely in position with metal hooks.</p> <p>Dimensions: (H) 11cm x (W) 39cm x (D) 16cm.</p>	

Barn owl boxes

Barn owls hunt over open fields, mainly lowland farmland, with the best foraging habitats being rough tussocky grassland, with a high population of field voles.

Barn owl boxes are available for attachment to houses or trees. The access point of the nest box should face the open countryside. Installing two boxes a few hundred yards apart from each other will accommodate the male during the breeding season.

Barn owl		
Example	Description	Picture
Barn owl nest box	<p>www.barnowltrust.org.uk</p> <p>The best place for an owl box is within a large building at 3 metres or higher. Otherwise, erecting an owl box on a tree is suitable.</p>	
Barn owl nest box	<p>https://www.birdfood.co.uk/barn-owl-nest-box.html</p> <p>This box should be installed on a tree in open farmland, an isolated hedgerow or woodland edge ensuring that the entrance hole is clearly visible.</p>	
Barn owl nest box	<p>https://www.nhbs.com/barn-owl-nest-box</p> <p>This box is constructed from exterior grade plywood making it suitable for use both inside buildings, such as barns, or outside.</p>	

8.5. Appendix 5: Habitat Suitability Index (HSI) scores for the pond on Site

SI No	SI Description	SI Value
1	Geographic location	1
2	Pond area	0.2
3	Pond permanence	0.5
4	Water quality	0.67
5	Shade	1
6	Water fowl effect	1
7	Fish presence	1
8	Pond Density	1
9	Terrestrial habitat	0.8
10	Macrophyte cover	0.85
HSI score		0.73 - Good

8.6. Appendix 6: Bee Lawn

Garden spaces are important habitats and resources for many pollinators including bees, butterflies, hoverflies and beetles, which in turn provide resources for other species such as reptiles and bats. A bee lawn would be specifically cultivated to attract insect pollinators to your garden.




A bee lawn can be created by planting a seed mix containing flowering plants that are low-growing, attractive to pollinators and are also resistant to relatively frequent mowing. This would create a shorter, neater alternative to a wildflower meadow, but still contain a wide variety of pollinator friendly plants. The flowers to be planted should be a variety of shapes, colours and sizes to increase the diversity of pollinators which will be attracted including, but not limited to, bumblebees, solitary bees, flies and butterflies.




Mowing this area approximately once every three weeks and raising the mower blades to their highest level (around 3 inches is optimal) will allow these flowering plants to grow and thrive for the entire summer period.




Pre-made seed mixes for bee lawns are already available from a limited number of online sellers. Most wildflower mixes sold online are made up of taller meadow species that would not be suitable for a short garden lawn. One available lawn seed mix is the 'Wild Flower lawn seed mix' provided by Wild Flower Lawns and Meadows (<https://www.wildflowerlawnsandmeadows.com/>). This includes many suitable flowering plants but also includes species such as common spotted orchid (*Dactylorhiza fuchsia*) which


does not respond well to frequent mowing and can take 3-4 years to germinate and flower. Another provider selling a wildflower mix designed for lawns is John Chambers Wildflower Seed (<https://www.johnchamberswildflowers.co.uk/>). This mix contains many optimal flower species, and is sold both as a 100% wildflower mix and a mix including grass seeds (80% grass, 20% wildflower). However, if you were to buy the mix that includes grasses, the species of grasses contained in the mix are not specified, and with 80% of the seed being grass, there is a risk of the wildflowers being lost within the lawn.

Finally, if you have a pre-existing list of flowering plants that you would want in a bee lawn, there are websites which allow you to create your own bespoke seed mix to suit the particular area you are planting, one such website is <https://www.phoenixamenity.co.uk/>. Links to specific web pages for all three suppliers cited above are provided at the end of this document. The following table outlines some of the key flowering plants you may like to include if you were putting together your own seed mix:

Species Name	Description	Picture
<p>Birds-foot Trefoil (<i>Lotus corniculatus</i>)</p>	<p>Low, creeping perennial with bright yellow flowers tinged with orange, and is nitrogen fixing. Heavily used by bumblebees and solitary bees as a source of nectar and pollen; also used by some butterfly species. It is used by a variety of lepidoptera as a larval food plant e.g. common blue butterfly (<i>Polyommatus icarus</i>) and Six-belted clearwing moth (<i>Bembecia ichneumoniformis</i>).</p>	 <p>© RHS/Helen Bostock</p>
<p>Clover spp. (<i>Trifolium spp.</i>)</p>	<p>Clover species are much favoured by many bumblebees (in particular the long-tongued species) and are also nitrogen fixers. White clover is the most common species but Red clover and Alsike clover can also be planted. This low-growing flower has an ability to survive even close mowing.</p>	 <p>©Jouko Lehmuskallio</p>
<p>Wild Thyme (<i>Thymus polytrichus</i>)</p>	<p>Wild thyme often grows in dense patches, its small pink/purple flowers are attractive to many different types of pollinators such as butterflies and smaller bees.</p>	

Species Name	Description	Picture
<p>Creeping Buttercup (<i>Ranunculus repens</i>)</p>	<p>Forms a network of shoots and runners across the ground and spreads quickly. Buttercup flowers are a bright shiny yellow and as an open flower it is a source of nectar for a wide variety of pollinators. Flowering may not take place in the first year and flowering can be late with plants sometimes flowering in October.</p>	
<p>Common Knapweed (<i>Centaurea nigra</i>)</p>	<p>Very hardy thistle-like plant with bright purple flowers; very popular plant with pollinators (bees, butterflies, beetles, flies etc.) as it produces large volumes of nectar over the summer period.</p>	
<p>Cowslip (<i>Primula veris</i>)</p>	<p>Flowering in spring, cowslips are easily recognisable with their long tubular yellow flowers that grow in clusters on ~25cm tall stalks. Cowslips usually flower in April-March, before grasses tend to get long. These flowers would be more suited to later and less frequent mowing.</p>	 <p data-bbox="1257 1205 1362 1272">©Laurie Campbell</p>

Species Name	Description	Picture
<p>Eyebright (<i>Euphrasia</i> sp.)</p>	<p>Small plant producing very small (5-10mm) white flowers. Semi-parasitic, they take nutrients from the roots of nearby plants, so do well in a meadow setting. This flower is almost exclusively pollinated by bees, with the yellow spot on the petals used to guide them in.</p>	 <p>© Trevor Dines</p>
<p>Germander Speedwell (<i>Veronica chamaedrys</i>)</p>	<p>Another low growing, creeping species; Germander Speedwell tends to grow in patches or mats among grasses and the small blue/purple flowers are particularly attractive to smaller pollinators such as small flies and solitary bees.</p>	
<p>Chammomile (<i>Chamaemelum nobile</i>)</p>	<p>Small plant with daisy-like flowers, historically used for lawns and therefore very suited to a frequently mown area. This flower is chiefly pollinated by small flies, so a useful addition to a lawn to attract alternate insect pollinators to bees and butterflies.</p>	

Species Name	Description	Picture
Selfheal (<i>Prunella vulgaris</i>)	A violet blue flower atop a hairy stem, with the rest of the plant forming a mat among the grasses. This plant is often found among turf and is therefore resistant to mowing. These flowers are particularly attractive to <i>Lycaenidae</i> butterflies, small moths and solitary bees.	© First Nature 

Other flowering plants to consider including would be:

- Kidney Vetch (*Anthyllis vulgaris*)
- Daisy (*Bellis perennis*)
- Oxeye Daisy (*Leucanthemum vulgare*)
- Ragged Robin (*Lychnis flos-cuculi*)
- Yarrow (*Achillea millefolium*)
- Ribwort Plantain (*Plantago lanceolata*)
- Salad Burnet (*Sanguisorba minor*)
- Wild Marjoram (*Origanum vulgare*)
- Toadflax (*Linaria vulgaris*)
- Yellow Rattle (*Rhinanthus minor*) – This plant is particularly useful if the lawn is being created on previously well fertilised, grass heavy soils, as it is very good at drawing away nutrients and suppressing grass growth. (Sourced seeds must be as fresh as possible for best chance of growth).

Links to wildflower lawn seed mixes:

- <https://www.wildflowerlawnsandmeadows.com/shop/flowering-lawn-wild-flower-seed-mix/>
- <https://www.johnchamberswildflowers.co.uk/wildflower-seeds-mixes/80-grass-seed-mixes/heritage-flowering-lawn-80-grass-seed-wildflower-mix>
- <https://www.phoenixamenity.co.uk/store/products/create-your-own-wildflower-and-wildflower-and-grass-mix/>
- **“Note: All generic wild flower seed mixes have high grass content. Some of the above plants will only grow under certain soil characteristics, and further investigation of soil properties is strongly recommended for all sites before deciding upon the appropriate seed mix/ plant species. Should you wish to develop a more dramatic wild flower meadow, MKA Ecology would be happy to produce a bespoke mix for your site in order to create an outstanding meadow feature”**



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