

APPENDIX 10.2 - NICHOLAS KING HOMES APPLICATION TECHNICAL APPENDIX

Technical Appendix Report

**Nicholas King Homes, Pearce's Farm
Wokingham**

July 2024

Ecology | Green Space | Community | GIS

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Report Produced for **Nicholas King Homes**

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SUMMARY

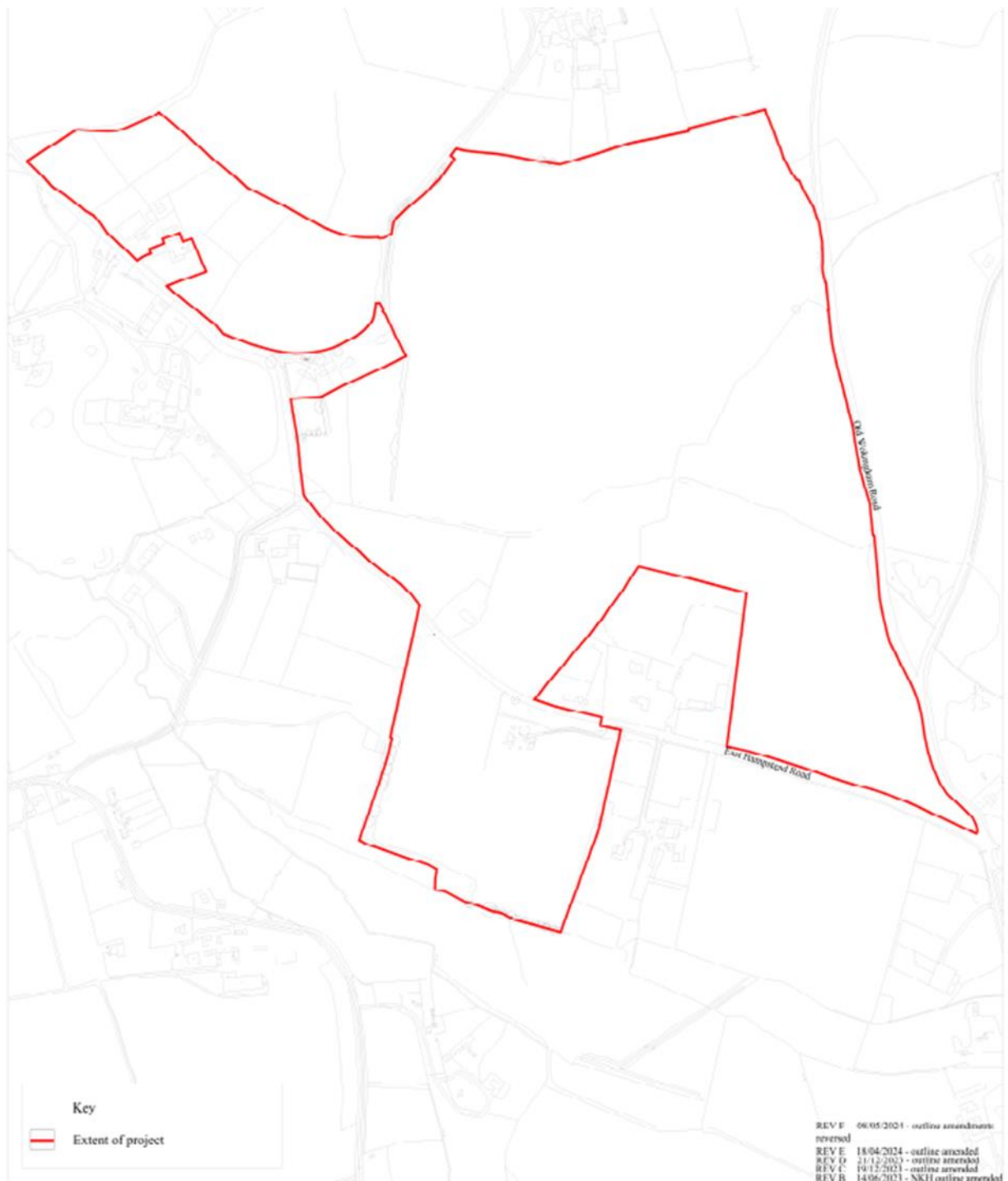
Purpose of the Report	This Report has been produced by Ethos Environmental Planning on behalf of Nicholas King Homes. It provides an assessment of the likely ecological effects associated with the outline planning application for 180 units with all matters reserved (except access to the site).
Description of the scheme	The development proposals for the site include plans for 180 residential units, attenuation and infrastructure.
Methodology	A desk study and UK Habitat Classification survey were undertaken for the site in May and April 2022. Detailed surveys for bats, amphibians and dormice were undertaken in 2022.
Baseline Ecological Conditions	The site comprised three fields of modified and other neutral grassland with boundary hedgerows, a small area of woodland, mixed scrub, two ponds, developed land; sealed surface, unsealed surface, vegetated garden and seven structures. The site is within the Zone of Influence (Zol) of the Thames Basin Heaths Special Protection Area (SPA). The bat surveys found the site to be of county importance for roosting brown long-eared bats and of local importance for commuting common pipistrelle bats. A maternity roost for brown long-eared bat was identified in the barn structure, B3. The eDNA survey for both ponds was returned as negative for great crested newt (GCN) DNA.

1 INTRODUCTION

- 1.1 This technical appendix report has been prepared by Ethos Environmental Planning (Ethos) on behalf of Nicholas King Homes and should be read in conjunction with Chapter 10 - Biodiversity. The report was written by Ellie Shearn BSc (Hons), Ecologist, and reviewed Matthew Attrill BSc (Hons), Senior Ecologist at Ethos. The final report has been approved by Jim Phillips, Managing Director at Ethos. The details and experience of the authors and field survey team are provided in Section 2.15.
- 1.2 The report provides the results of surveys undertaken in relation to the proposed development of Land at Pearces Farm, Wokingham, also known as the 'Nicholas King Homes Application Area' (Central Grid Reference SU 82826 67477), and hereafter referred to 'the site' and shown in Figure 1. The site forms part of the South Wokingham Strategic Development Location (SDL) Extension which is shown in Figure 2. The site is located in the south Wokingham, Berkshire.
- 1.3 The site comprises 7.03 hectares and included two fields of modified grassland, one of other neutral grassland, a section of other broadleaved woodland, various native hedgerow types, areas of mixed scrub, two ponds, an area of unvegetated, unsealed surface, two sections of vegetated garden and seven structures and associated hardstanding.



Figure 1 Site location



WKH2104
25/04/2023

PROJECT AREA PLAN
PHASE 4b, 4c, & 4c(i) OF THE SOUTH
WOKINGHAM SDL EXTENSION

JOHN SIMPSON ARCHITECTS, 15 LEE, 70 MILLAGE PARK, LONDON NW3 6BB
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Drawing No: SK014F
Scale: 1:2500@A1

Figure 2 Project Area Plan, Phase 4b, 4c, & 4c(i) of the South Wokingham SDL Extension (John Simpson Architects Ltd, 2023^a, Drawing No: SK014F, Rev F)



Figure 3 Site location

- 1.4 The site is proposed for 180 residential units with infrastructure and greenspace.
- 1.5 The aims of this report are to:
 - provide an assessment of the likely effects of the proposed development on ecological features on site;
 - provide an assessment of the likely effects of the proposed development on adjacent or nearby designated sites;
 - identify the measures required to mitigate impacts on site biodiversity;
 - identify opportunities to deliver ecological enhancements and measurable gains for biodiversity as part of the development proposals; and
 - to enable the Local Planning Authority to assess whether the proposals comply with relevant planning policy or legislation.
- 1.6 This report has been produced following the approach set out in CIEEM's 'Guidelines for Ecological Report Writing' (CIEEM, 2017).

2 METHODOLOGY

2.1 Scope of Assessment

2.1.1 This assessment has been undertaken following the approach set out in the '*Guidelines for Ecological Impact Assessment in the UK and Ireland*' (CIEEM, 2018). The assessment has considered 'Important Ecological Features' that are present within the 'Zone of Influence' of the project. Important Ecological Features for this project comprise¹:

- Designated nature conservation sites;
- Habitats and Species of Principal Importance for the Conservation of Biodiversity in England;
- Legally protected species; and
- Red Listed or rare species (based on Red Data Book lists, Birds of Conservation Concern and species considered to be nationally rare/scarce).

2.1.2 The Zone of Influence (Zoi) is the area over which the project could have an influence on ecological features. The Zoi is likely to vary for different features. However, in general terms the Zoi for this development proposal is considered to comprise the land within the red line boundary as well as immediate adjacent habitat features. It also includes designated nature conservation sites in the surrounding area.

2.1.3 The scope of the assessment was informed by an 'ecological walkover' undertaken in April 2022 with subsequent follow up surveys undertaken between 2021 - 2022. The purpose of this was to identify the habitats on site, their potential for protected species and to establish the scope of surveys that would be required to inform a future planning application at the site.

2.1.4 The overall assessment has been informed by guidelines provided in CIEEM (2017) Guidelines for Ecological Report Writing.

2.2 Background Data Search

2.2.1 A background data search was received from Thames Valley Environmental Record Centre in December 2023. The search area included records of non-statutory designated sites and protected and notable species within 1km of the proposed development site.

2.2.2 An additional search for statutory designated sites within 2km of the development site and granted European Protected Species (EPS) licences within 2km of the site boundary was undertaken using publicly available information (DEFRA Magic map).

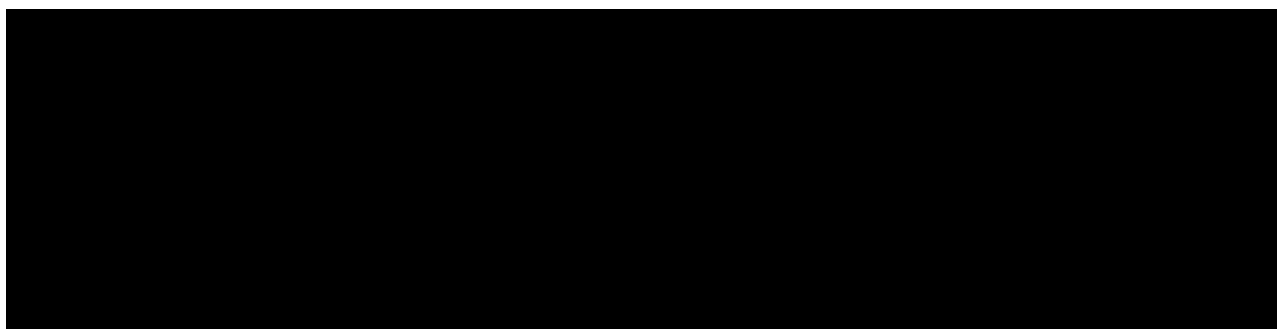
¹ Box 14 in CIEEM's ECiA Guidelines (2018)

2.3 UK Habitat Classification Survey

- 2.3.1 An initial UKHab survey was undertaken on 28th April 2022 and updated on 23rd June 2022, and subsequent UKHab surveys were undertaken of the various land parcels within the proposed development site throughout April 2022 and were re-assessed again in July 2023 for an updated view. The survey incorporated detailed assessment of the land within the development boundary, including a description and mapping of all key features and habitat types. The survey was carried out to identify the range of habitats within the site and the predominant and notable species of flora. This survey was informed by the 'Handbook for Phase 1 Habitat Survey – a technique for environmental audit' (JNCC, 2010).
- 2.3.2 Grasslands were surveyed using professional judgement and random sampling. A minimum of three 1x1m² quadrats were undertaken for each grassland parcel. Information collected within each quadrat included aspect, slope, average ground cover, sward variation, species and their percentage cover. Where the grassland differed to a certain extent, or was divided by a field boundary, it was considered that the grassland was a different habitat parcel and another assessment was undertaken.

2.4 NERC S. 41 Mammals

- 2.4.1 The survey included an assessment of the habitats on site for their potential to support NERC Section 41 species such as hedgehog (*Erinaceus europaeus*), polecat (*Mustela putorius*), harvest mouse (*Micromys minutus*) and brown hare (*Lepus europaeus*). This included a search for nests, runs, latrines, paw prints, and live specimens.



2.6 Hazel Dormouse

- 2.6.1 The survey included an assessment of the potential of the site for hazel dormouse (*Muscardinus avellanarius*), focusing on the connectivity and suitability of the habitat on site.
- 2.6.2 Fifty dormouse tubes were deployed in suitable habitat across the site in April 2022 at roughly 20 metre intervals. The tubes were checked once a month between June and November 2022. Table 1 below (taken from Table 5 of the *Dormouse Conservation Handbook*) shows the index of probability of finding evidence of dormouse in nest tubes. The score is based on 50 tubes deployed and a minimum score of 20 must be reached to determine presence/likely absence. As the tubes were deployed between

May and November, the total score achieved was 24 and the threshold was therefore met.

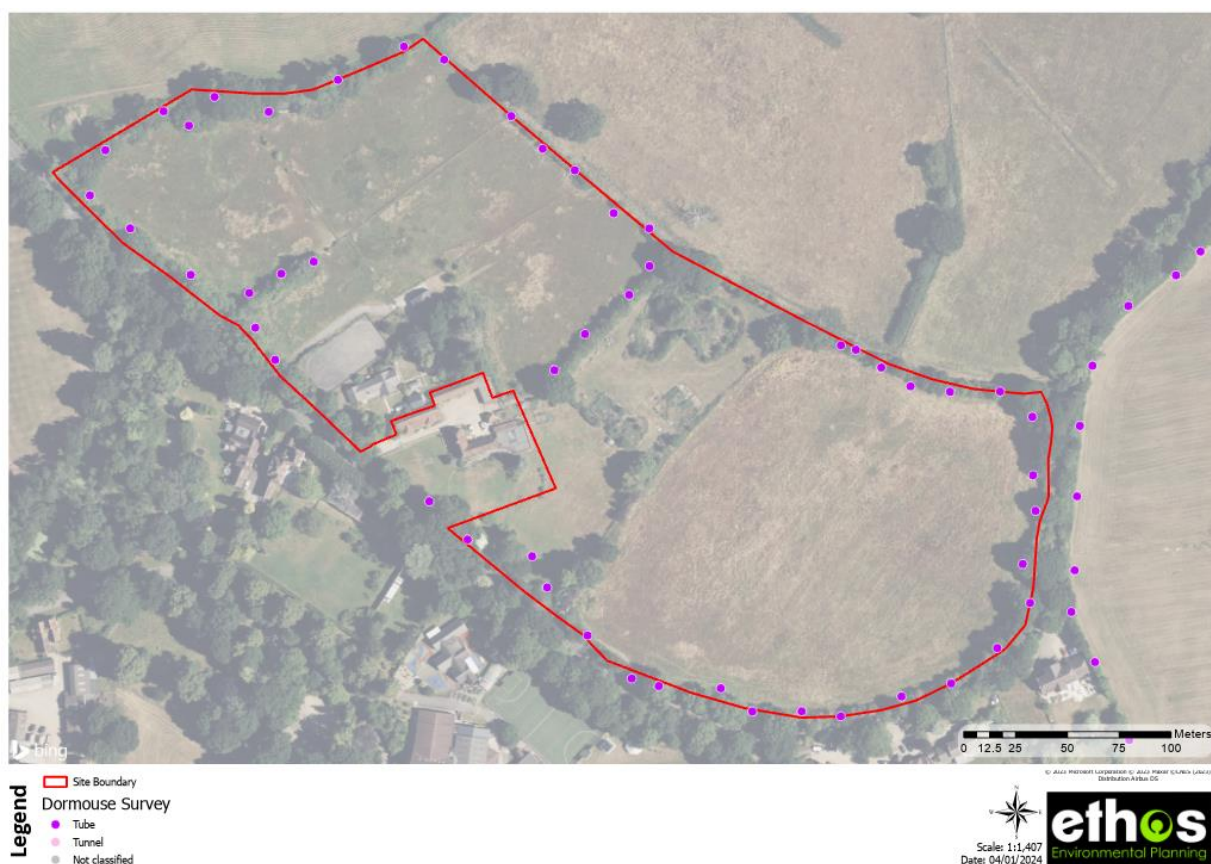


Figure 4 Location of dormouse tubes deployed across the site

Table 1 Index of probability of finding dormice present in nest tubes in any one month

Month	Score
April	1
May	4
June	2
July	2
August	5
September	7
October	2
November	2
Total	24

2.7 Riparian Mammals

2.7.1 The survey included an assessment of the site to support riparian mammals such as otter (*Lutra lutra*) and water vole (*Arvicola amphibius*). This included an assessment of the riparian habitats on site or within the wider environment to support these species.

2.8 Bats

- 2.8.1 The methodology for the bat survey has been informed by the 'Bat Surveys for Professional Ecologists Good Practice Guidelines 3rd Edition' (Collins, 2016).
- 2.8.2 The habitats on site were assessed for their suitability to support foraging and commuting bats. This assessment was also contextualized through examination of suitable habitat and features in the wider landscape and possible flight-lines across the proposed site following natural linear features such as hedgerows.
- 2.8.3 An assessment of the trees to support roosting bats was undertaken. Potential roosting features on trees were identified as any feature within a tree that could provide shelter for a roosting bat. These features result from the following three mechanisms: disease and decay, damage, and associations.

Preliminary roost assessment

- 2.8.4 Physical external and internal inspection of the buildings were undertaken on 1st June 2022 using the equipment described below to assist the inspection. Approximately 5 hours of search effort were expended.
- 2.8.5 The physical search includes a search for live animals and a search for other signs that give an indication of past or present occupancy as outlined below. In the case of bats, typical indicators include droppings (which are characteristic and can often be speciated or at least be indicative of species type), signs of staining, urine splashing, characteristic odours, and accumulations of discarded prey remains.
- 2.8.6 Where required, the search included an endoscope search of features with potential for bats. Equipment included a Rigid micro-CA-350 Inspection Camera with micro 6mm extension, camera, laser measure, and binoculars.

Emergence/re-entry surveys

- 2.8.7 The emergence surveys were informed by the results of the preliminary roost inspection. In line with the guidance in Table 7.3 of 'Bat Surveys Good Practice Guidelines' (Collins, 2016).
- 2.8.8 Two emergence surveys were undertaken on B3 on 23rd June and 28th July 2022.
- 2.8.9 The emergence surveys commenced 15 minutes before sunset and finished approximately an hour and a half after sunset. The dawn survey commenced two hours before sunrise and finished 15 minutes after.
- 2.8.10 One surveyor was positioned adjacent to potential roosting features, as shown in Figure 4 below.

- 2.8.11 One thermal imaging camera was used as a survey aid on all surveys. The thermal imaging surveys were led by Matt Attrill (see section 2.15), a licensed bat surveyor who has attended two training courses on the use of thermal imaging cameras for bat surveys (Wildlifetek, 2020, 2022) and considered to be 'suitably qualified' in the use of the cameras as both a survey aid and method. For these surveys, thermal imaging was used as a 'survey aid' in accordance with the Thermal Imaging Bat Survey Guidelines (Fawcett Williams, 2021).
- 2.8.12 The thermal imaging surveys used two Flir T540 thermal imaging cameras. Videos were recorded as non-radiometric files. This camera has a thermal resolution of 464×348 with a 42° lens which allows for the detection of bats up to a distance of 51m. The video files were transferred into standard video analysis software for later analysis.
- 2.8.13 Static bat detectors were deployed as a survey aid for the emergence surveys carried out in June and July on building B3 (see Photo 1 below). The observations and recordings made by the surveyors and thermal cameras were cross referenced with the calls recorded on the static bat detectors to confirm species identification and support the overall assessment.

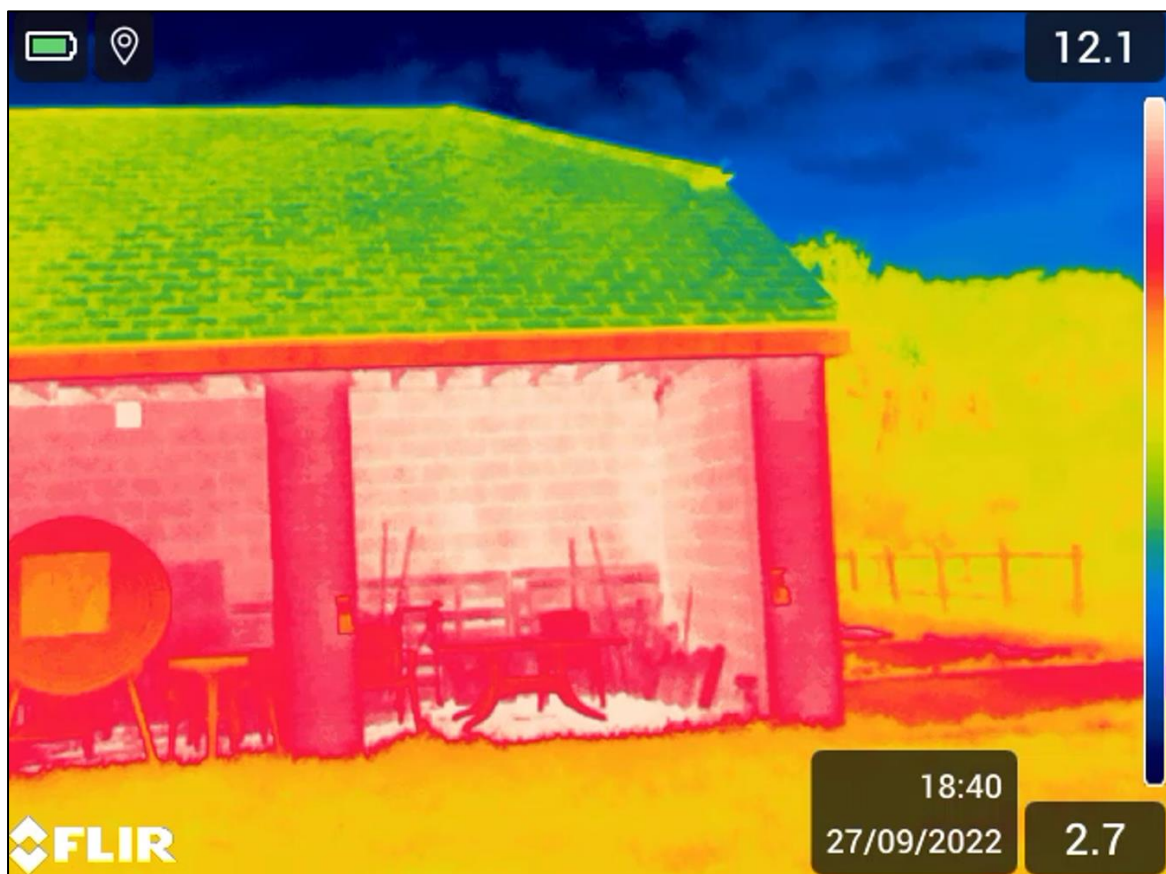


Photo 1 Eastern elevation (B3)

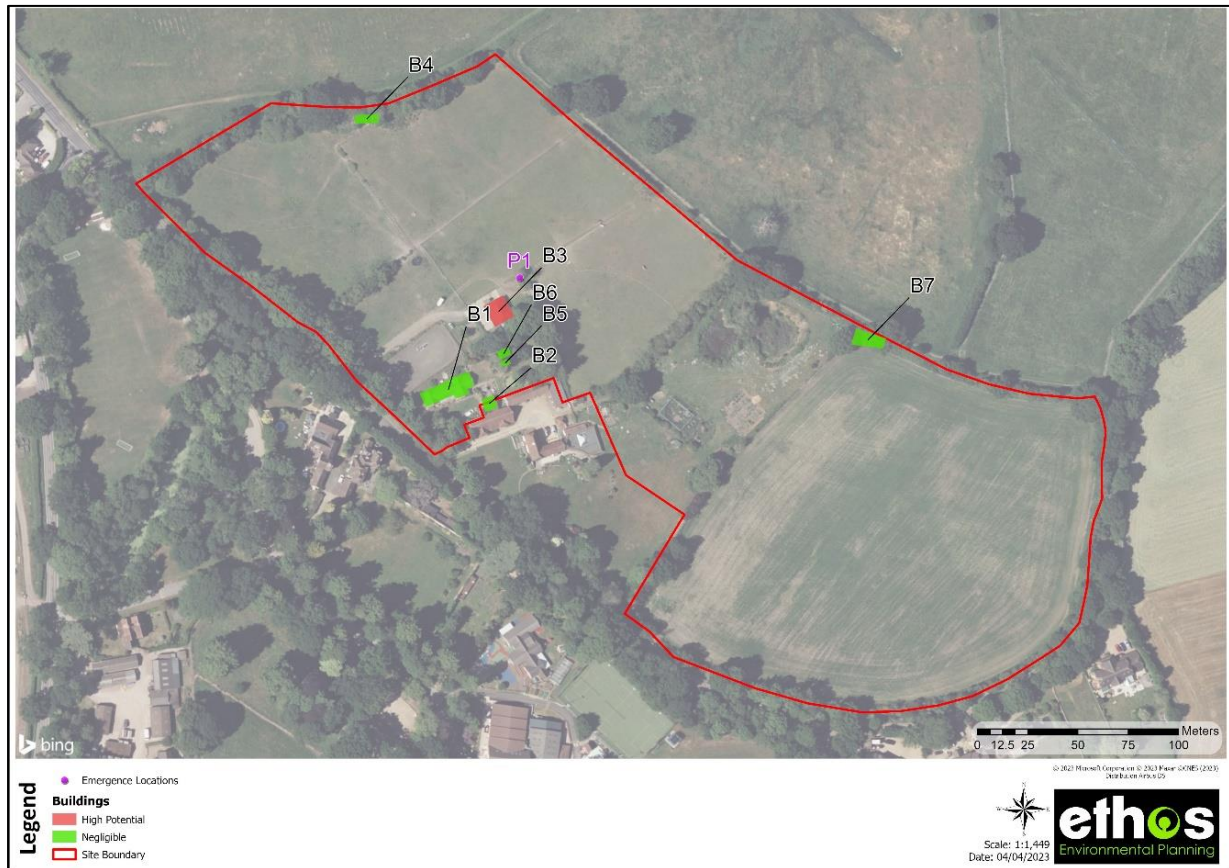


Figure 5 Building and emergence surveyor positions map

2.8.14 Echo Meter Touch (EMT) bat detectors were used for all the surveys. All calls recorded were analysed using the Echo Meter Touch app software. All calls recorded were cross referenced to a call reference collection library of known bat species to confirm species presence.

Activity surveys

2.8.15 Bat activity surveys were undertaken on site to highlight any important commuting or foraging features on site. This included two surveyors walking the planned transects of the site. The number of transects and number of surveys was informed by the habitats assessment which stated that the site provided moderate potential for bats.

2.8.16 Information recorded throughout the survey included the species present, their location, behaviour, and the identification of habitat features which were frequently used by the species. Surveyors were equipped with EMT bat detectors.

2.8.17 The transect is displayed within Figure 5 below and the dates of the surveys are provided below:

- Survey 1 – 28th April 2022
- Survey 2 – 16th May 2022
- Survey 3 – 23rd June 2022
- Survey 4 – 19th July 2022

- Survey 5 – 30th August 2022
- Survey 6 – 27th September 2022
- Survey 7 – 20th October 2022



Figure 6 Activity survey transects and listening points

Automated / static surveys

- 2.8.18 Bat static surveys were used to provide the composition of bat species present on site and were used to support the findings of the bat activity surveys. Bat surveys were undertaken between April – October 2022 with six statics deployed over a five-day period each month. The number and timings of the surveys were informed by the scoping assessment.



Figure 7 Static bat detector locations

2.8.19 The calls were processed and analysed using the British Trust for Ornithology (BTO) Pipeline. This software provides a confidence score for each species returned and highlights rare species which are unlikely to be detected in the survey area. Results with a low confidence <50% probability were excluded from the analysis.

2.9 Birds

2.9.1 The bird survey included an assessment of the habitats on site for their potential to support protected and notable species of bird as well as their potential to support breeding birds.

2.10 Reptiles

2.10.1 The potential presence of reptiles on site was assessed considering the habitats present (availability of refugia and basking areas) and suitability of surrounding environment. Where possible, attempts to confirm reptile presence on site were made following *Froglife Advice Sheet 10 – Surveying for Reptiles* through direct observation in reptile “hotspots” and checking of any existing refugia.

2.11 Amphibians

Habitat Assessment

- 2.11.1 The site was examined for suitable waterbodies and for breeding terrestrial habitat. Terrestrial habitats providing sufficiently structured vegetation in which amphibians may forage or hibernate over winter were also surveyed for.
- 2.11.2 In addition to the on-site assessment, *Great Crested Newt Mitigation Guidelines* (English Nature, 2001) recommend that a desktop analysis of ponds within 500m of the site be undertaken, to identify any potential breeding ponds which may require further survey. Ponds within 500m of the site were mapped on GIS with an OS OpenData base map at 1:10,000 resolution.

HSI scoring

- 2.11.3 Habitat suitability indices (HSI) were calculated for every pond within the 500m buffer. The HSI was developed by Oldham et al. (2000) as a means of evaluating habitat quality and quantity. Ten suitability indices are assessed visually for each pond resulting in a numerical index between 0 (unsuitable) and 1 (highly suitable). As stated in ARG UK Advice Note 5, "In general, ponds with high HSI scores are more likely to support great crested newts than those with low scores. However, the system is not sufficiently precise to conclude that any pond with a high score will support newts, or that any pond with a low score will not do so."

eDNA surveys

- 2.11.4 Ponds 1 and 2 were subject to eDNA surveys on 28th April 2022. The surveys comprised the collection of 40ml samples from 20 locations around the edge of each pond. Samples are mixed together in a bag and six 15ml samples are extracted and stored within preserving fluid. These samples were then sent to ADAS, who analyse the samples for GCN DNA. This technique has been tested by DEFRA and found to have a reliability of 99.3%. Sampling methodology followed best practice guidance within Analytical and Methodological Development for Improved Surveillance of the Great Crested Newt (Freshwater Habitats Trust, 2014).

2.12 Invertebrates

- 2.12.1 Due to the many invertebrate taxonomic groups that exist, the often-large differences in invertebrate diversity between habitats and the many survey techniques available, invertebrate surveys are highly specific to individual sites. Therefore, an assessment of the site's potential for invertebrates was undertaken, including the need for targeted surveys, as recommended in *Considering Invertebrates in Preliminary Ecological Appraisals* (Jukes, 2021).

2.13 Limitations

- 2.13.1 Two emergence surveys were undertaken on B3. These surveys were used to confirm that the building was a maternity roost for brown long-eared bats and confirm numbers of bats using the building. Although this is less than the usual three surveys required, with the use of thermal cameras and suitable building inspection beforehand, it is assessed that sufficient data has been collected to inform the compensation/mitigation required for this onsite roost.
- 2.13.2 The static bat detectors deployed during the September static deployment did not record a full 5 nights of data due to a technical failure. It was assessed that this was not a significant limitation due to the extensive monitoring throughout the remaining active season.
- 2.13.3 One of the structures on site, B4, could not be accessed internally during the structure inspection. However, there were no external features present for roosting bats and the interior was considered likely to be thermally insufficient for bats as it was open to the elements. It is therefore considered that this structure provides 'negligible' potential for roosting bats and this is not a significant limitation of the assessment.
- 2.13.4 Seven of the offsite ponds, identified in the desktop search were on private land and not accessible for surveying. The majority of the ponds were separated from the site by significant barriers to dispersal and it was considered that this did not constitute a significant limitation to the assessment.

2.14 Evaluation of Ecological Features

- 2.14.1 In line with CIEEMs guidelines on EcIA, this assessment has focused on relevant Important Ecological Features. The scale of importance of these features has been determined based on available contextual information, which for this project are considered only to include:
- **International** – of international importance and protected through international legislation;
 - **National** – of importance in England and protected through national legislation;
 - **County** – of importance to the county (Berkshire) but not sufficiently important to warrant 'National' scale of importance; and
 - **Local** – of importance to the local area (Wokingham), but not sufficiently important to warrant County scale of importance.
- 2.14.2 Potential impacts on Important Ecological Features are identified and assessed; likely significant effects are those likely to result in a change to the conservation status of a habitat or species population or undermine/support nature conservation policy. Mitigation measures have been devised following the mitigation hierarchy; appropriate mechanisms for securing mitigation measures have been identified.

2.15 Personnel

2.15.1 The surveyors on site have been detailed below in Table 2.

Table 2 Site surveyors

Ecologist	Position	Qualifications/ Licences	Experience	Role in assessment
Jim Philips	Managing Director	MSc BSc (Hons), MCIEEM Class 2 Bat Licence Class 1 GCN Licence	Jim's experience in ecology covers a wide range of projects and clients and his focus is on interpreting relevant policy and legislation to ensure projects are delivered efficiently and meet the needs of the client. He holds survey licenses for bats and great crested newts in England and Wales and is a registered consultant on Natural England's Bat Low Impact Class License (BLICL)	Report checker
Sarah Forsyth	Principal Ecologist	MSc DIC BSc (Hons), ACIEEM Class 1 GCN Licence Tree Climbing and Rescue, City and Guilds NPTC Level 2 Award (206 and 306)	Sarah has over 15 years' experience in ecological management and assessment, both in consultancy and the public sector. Sarah is responsible for leading on ecological assessments and overseeing projects through various stages of planning and implementation.	Bat surveyor
Steph Green	Principal Ecologist	MSc BSc (Hons), MCIEEM Class 1 GCN Licence Class 1 Hazel Dormouse Licence	Steph has over eight years' experience in ecological field survey and consultancy. Steph is responsible for leading and undertaking comprehensive habitat assessments, protected species surveys and is a licenced GCN and dormouse worker, as well as a Full Member of CIEEM.	Dormouse survey, Bat activity survey and bat static deployment.
Dan Carpenter	Principal Consultant (Biodiversity Net Gain)	BSc(Hons), PhD, CEnv, MIEnvSc, official position:	Dan is an ecologist and environmental data scientist with over twelve years of experience in ecological research and practice. His focus is on securing biodiversity and environmental net gains for Ethos' clients, both for individual projects and strategically. Dan has a broad range of ecological experience	Bat surveyor

Ecologist	Position	Qualifications/ Licences	Experience	Role in assessment
			and its application in development, land management and nature conservation.	
Martin Smith	Senior BNG Consultant	BSc (Hons) Class 2 Bat Licence (NE) Class 1 dormouse licence (NE) Class 1 GCN Licence	Martin is a qualified tree climber and holds licences for dormouse, bats, and GCN. Martin specialises in undertaking BNG assessments and works on offsetting projects for Ethos. Martin manages multiple projects with Ethos and is competent at a range of phase 1 and phase 2 ecological surveys.	Dormouse survey, Bat activity survey and bat static deployment.
Matt Attrill	Senior Ecologist	Tree Climbing and Rescue, City and Guilds NPTC Level 2 Award (206 and 306) BSc (Hons) Class 2 Bat Licence Class 1 GCN Licence	Matt is a highly experienced field surveyor with over 7 years ecological experience. Matt is competent in surveying for a wide variety of wildlife gained experience from both the commercial and voluntary sectors.	Dormouse survey, Bat activity survey, bat static deployment, structures inspection, UKHabs survey, GCN DNA sampling, and project management.
Kane Burchill	Senior Ecologist	Level 2 Certificate and Diploma in Work-based Environmental Conservation Tree Climbing and Rescue, City and Guilds NPTC Level 2 Award (206 and 306) ACIEEM Class 1 Bat Licence (NE) Class 1 Hazel Dormouse Licence (NE) Class 1 GCN Licence (NE)	Kane has over eight years' experience in ecological field survey and consultancy. As an Senior Ecologist with Ethos; Kane is responsible for leading and undertaking comprehensive habitat assessments protected species surveys and is a licenced bat, GCN and dormouse worker.	Dormouse survey, Bat activity survey and bat static deployment.
George Clutterbuck	Environmental Analyst	Level 2 Certificate and Diploma in Work-based Environmental Conservation Working towards a certificate of higher	George has over seven years' experience in ecological field survey and consultancy. George is responsible for undertaking comprehensive habitats and protected species assessments. Much of his time is spent digitising	Bat emergence survey.

Ecologist	Position	Qualifications/ Licences	Experience	Role in assessment
		learning: Field Ecology - currently Level 2 Certificate and Diploma in Work-based Environmental Conservation	using GIS software to achieve Biodiversity Net Gain.	
Joel Sellors-Moore	Ecologist	MSc, Qualifying CIEEM	Has over four years' experience in ecological field survey and consultancy. Joel is responsible for managing projects and undertaking comprehensive habitat and protected species assessments in addition to biodiversity net gain and nutrient neutrality assessments. At the time of writing this report, Joel no longer works for Ethos.	Dormouse survey, Bat activity survey, bat static deployment, structures inspection and GCN DNA sampling.
Becky Morris	Ecologist	PhD, DIC, MSc, BSc, MCIEEM Class 1 GCN Licence	Becky has 16 years' experience working as an Ecological Consultant, specialising in botanical surveys. She holds a great crested newt survey licence.	Bat activity survey and bat static deployment.
Joe Bamforth	Ecologist	MSc, BSc (Hons) Class 1 Bat Licence 2022-10148-CL17-BAT Tree Climbing and Rescue, City and Guilds NPTC Level 2 Award (206 and 306)	Joe has over three years' experience in ecological consultancy and assists with habitat assessments, protected species surveys and data analysis.	Bat activity survey.
Sarah Roberts	Assistant Ecologist	MSc, BA Class licence WML-CL29 To survey for barn owl (<i>Tyto alba</i>)	Sarah has over three years' of consultancy and biodiversity project management experience. Sarah assists with fieldwork and report-writing for habitats and protected species. She specialises in ornithology and ecological provisions for urban developments.	Bat activity survey and bat static deployment.
Ellie Shearn	Ecologist	BSc (Hons), Qualifying CIEEM	Ellie is an ecologist at Ethos with three years' experience in ecological field survey. Ellie undertakes protected species surveys including bat surveys and assessment.	Dormouse survey, Bat activity survey and bat static deployment.
Ben Smurthwaite	Ecologist	MSc, BSc (Hons) Qualifying CIEEM	Ben has over three years' experience in ecological field surveys and consultancy, and is responsible for managing	Dormouse survey, Bat activity survey

Ecologist	Position	Qualifications/ Licences	Experience	Role in assessment
		Class 1 GCN Licence (NE) Class 1 Bat Licence (NE)	projects, undertaking habitat and protected species surveys and biodiversity net gain assessments, and is a licenced bat and great crested newt worker.	and bat static deployment.
Kate Downes	Assistant Ecologist	MSc, BSc (Hons), DET, QTLS Qualifying CIEEM	Kate is an assistant ecologist at Ethos with a special interest and relevant field survey experience in ornithology. Kate assists with fieldwork and report-writing for habitats and protected species.	Dormouse survey, Bat activity survey, bat static deployment and report author.
Katie Munday	Ecologist	MSc, BSc (Hons), Qualifying CIEEM	Katie has two years' experience in ecological consultancy. She undertakes a variety of surveys, including protected species surveys and habitat assessments, and she assists with bat call data analysis.	Bat activity survey, bat static deployment and bat data analysis.
Holly Atkinson	GIS Officer	MSc, BSc (Hons)	Holly has worked for two ecological consultancies in the South West and currently supports the Ethos team by producing GIS maps for a wide range of projects. Her GIS skills have been enhanced through use of the software both during her Masters and while carrying out ecological research abroad. She also has experience in the field performing ecological surveys, primarily of bats.	Bat activity survey.

3 BASELINE ECOLOGICAL CONDITIONS

3.1 Designated Sites

Statutory Designated Sites

- 3.1.1 There are one statutory designated site present within 2km of the site and the site is within the Zone of Influence (Zoi) for one other statutory designated site due to recreational pressures and the mobility of the species for which the site is designated.

Thames Basin Heaths SPA

- 3.1.2 The site is 3km from The Thames Basin Special Protection Area (SPA), within the 400m to 5km Zoi, as shown in Figure 7.
- 3.1.3 The site comprises of lowland heath habitat. The site is designated as it supports breeding populations of Annex I species including nightjar (*Caprimulgus europaeus*), woodlark (*Lullula arborea*) and Dartford warbler (*Sylvia undata*).
- 3.1.4 The Thames Basin Heaths SPA is of **International importance** for nature conservation, in line with its designation. Potential impacts on the SPA as a result of the development will be mitigated through the provision of SANG and are part of the planning decision process.

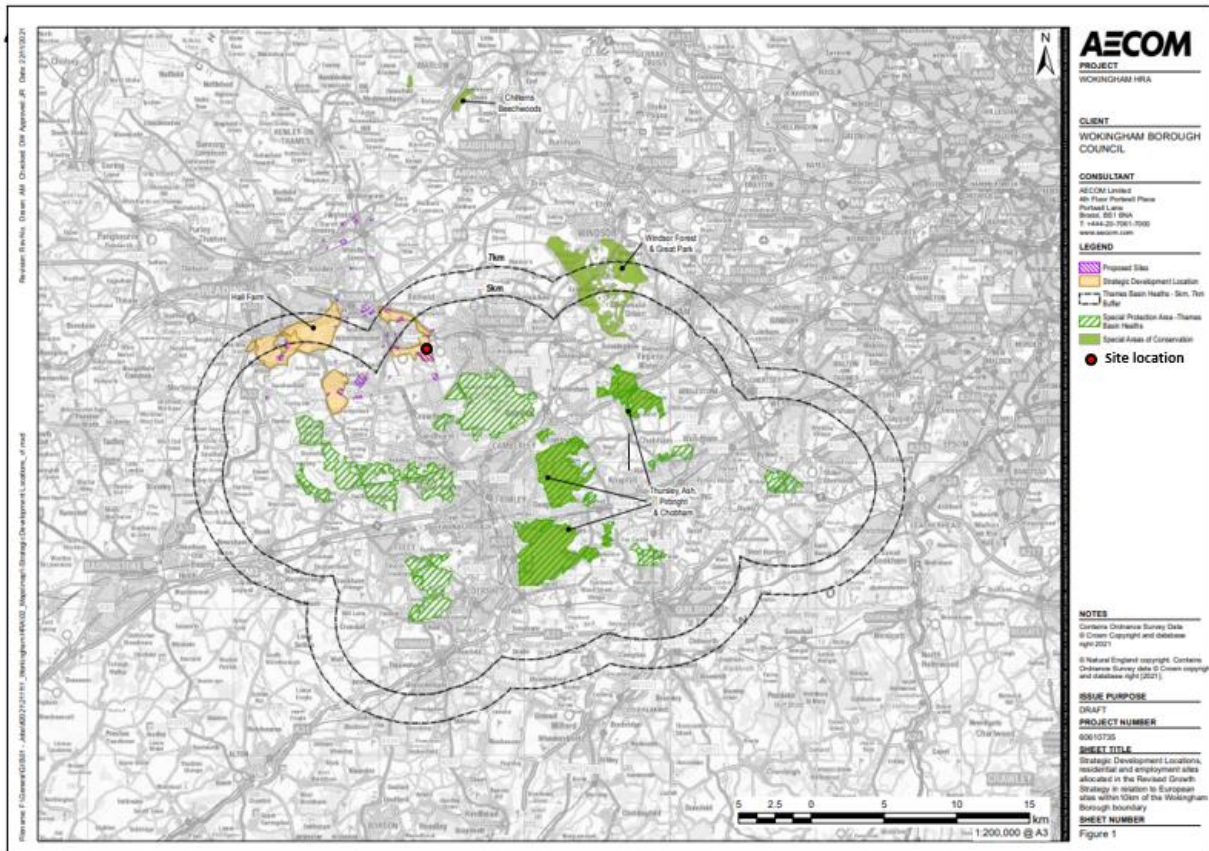


Figure 8 Wokingham Borough Council Thames Basin Heaths SPA Buffer Zones Map

Heathlake SSSI, LNR

- 3.1.5 Heathlake Site of Special Scientific Interest (SSSI) and Local Nature Reserve (LNR) is located 1.8km south of the development site, as shown in Figure 8.
- 3.1.6 Heathlake is an area of woodland and heathland with a seven acre lake, described as an acid lake and the only one of its kind found in Berkshire. The lake supports several rare plants, including water-milfoil (*Myriophyllum spicatum*) and six-stemmed water crowfoot (*Ranunculus fluitans*).
- 3.1.7 Heathlake SSSI/LNR is of **National Importance** for nature conservation, in line with its designation. Heathlake is a considerable distance from the site and impacts on it are considered highly unlikely.

Non-statutory Designated Sites

- 3.1.8 The data search returned records of eight Berkshire Local Wildlife Sites within the 2km search radius, as shown in Figure 8 below; the data search also returned two Berkshire Proposed Local Wildlife Sites and one Biodiversity Opportunity Area.

Table 3 Non-statutory designated sites

Site Name	Designation	Description	Distance from the Site
Adjacent Wokingham Road/Peacock Lane	Local Wildlife Site	A small area split into two by a footpath. It is partly acidic birch woodland with some wet areas and partly oak woodland with much sycamore and some old lime coppice. Species recorded here include wood anemone, bluebell, bugle, primrose, yellow archangel and Solomon's-seal.	750m SE
Rigg's Copse	Local Wildlife Site	A small ancient woodland with stands of oak and birch with hazel coppice, alder with birch and beech with holly. There are two good stands of wild service tree. There is a good varied ground flora including less common species such as common cow-wheat, polyploidy and great wood-rush. Other species present include bluebell, common spotted orchid, pignut, wood anemone, betony and wood sorrel.	1.7km NE
Tarman's Copse	Local Wildlife Site	Tarman's Copse, on the west edge of Bracknell, is bounded to the north and west by residential estates and industry to the east. To the south is an area of rough grassland, new properties and building site (as at May 2013). It is a mature, outgrown sweet chestnut coppice with ash and scattered oaks and localised alders. The ground flora includes locally abundant broad buckler fern	1.82km NE

		and abundant bluebell. There are indications of its ancient woodland status, notably old ash coppice stools and wood banks, both external and internal with old pollard marker trees. The woodland has a varied 3D-structure and includes deadwood habitats and there is also, at least locally frequent, regeneration of the canopy trees. The habitat has affinities to the calcareous (W8) end of the W10 community. It has high public use. SECTION 41 HABITAT(S) OF PRINCIPLE IMPORTANCE: Lowland Mixed Deciduous Woodland	
Big Wood	Local Wildlife Site	Big Wood consists of two areas of woodland and an open area along the line of power lines. The site is largely ancient woodland except for the south-western section. The western area is classed in the inventory as replanted and is continuous with similarly classified woodland to the west. The southern woodland is dominated by birch with oak with bracken dominating below. Bluebells and wood sorrel are frequent. In the east oak is dominant and there is a well-developed understorey of hazel coppice with hawthorn, crab apple and field maple. Here bluebells dominate the ground flora. Ash is present at the edge. On the northern edge there is an area with abundant alder. The south western area is a pine plantation with some birch. Here holly is present. The northern woodland and also a small strip between the power lines is birch dominated with some oak and occasional hazel. Bracken dominates the ground flora although there are patches with abundant dog's mercury. Barren strawberry is present here. At the edge of the small strip a wild service tree is present. The open area is mainly dominated by bracken. In the east there is an area of wet grassland with tufted hair-grass, Yorkshire fog and creeping bent and rush pasture with abundant soft rush. Species present indicate the acidic and wet nature of this area. These include locally frequent yellow loosestrife, foxglove, wood sage, marsh thistle, water mint, greater bird's-foot trefoil, tormentil, common century, the rare marsh stitchwort, betony and ragged robin. SECTION 41 HABITAT(S) OF PRINCIPAL	1.1km NE

		IMPORTANCE: Lowland mixed deciduous woodland	
Gorrick Plantation	Local Wildlife Site	This site is largely conifer plantation with some wet alder woodland. The site has remnants of heathland and bog habitat. Grass snake, woodlark, woodcock and nightjar have been recorded here. Plants recorded here include purple moor-grass, cross-leaved heath, bell heather and round leaved sundew.	1.5km SW
Trench's Bridge	Local Wildlife Site	An area of woodland and coppice with a stream running from north to south. Oak is the dominant tree in the canopy and there is much birch. In the wetter areas, in the west, alder is abundant. Species present include bluebell, remote sedge, dog's mercury and lady fern. In the wetter areas common marsh bedstraw and bugle can be seen.	1.4km SW
Woodland near Ludgrove School	Local Wildlife Site	An area of dense woodland that slopes down to a stream with ditches running north-south through the wood. The wood is hazel coppice with alder, birch, rowan and hawthorn. There are some wet areas and some willow carr. The ground flora has dense nettles and currant (probably redcurrant). The richest areas of ground flora are found along the paths. Species present include moschatel and yellow archangel.	800m W
Peacock Meadows	Local Wildlife Site	Peacock Meadows is a large area of public open space predominantly composed of recreated wildflower grassland. The grassland creation has been successful, and the site is quite species-rich in places, however as of the 2019 survey the habitat is not currently considered to quite meet the definition of Lowland Meadow priority habitat. The site also incorporates West Garden Copse (formerly an ancient woodland LWS in its own right) along with areas of newly planted native woodland, scrub and scattered trees.	1km NE
Woodland South of Allotment Gardens	Proposed Local Wildlife Site	A small patch of ancient woodland on the outskirts of Bracknell, supporting lowland mixed deciduous woodland and a variety of wildlife. Section 41 Habitats of Principal Importance: Lowland Mixed Deciduous Woodland Recorded Occurrences of Protected / Notable Species Stag Beetle, Common Pipistrelle, Soprano Pipistrelle, Brown Long-eared, Serotine, and Natterer's Bats, Grass Snake and Slow Worm.	1.96km SE

Beaufort Park	Proposed Local Wildlife Site	This site has been proposed as a Local Wildlife Site. It was considered by the selection panel in spring 2010 but while some areas appeared likely to qualify for such status, especially the heathland, the information on the grassland was not sufficient to decide on where it was worthy of being notified at that time. It was hoped that further information would be obtained in for future consideration by the Local Wildlife Sites Panel. The site consists of an area of heathland, in the south-west, acid grassland and woodland.	1.5km SE
Thames Basin Heath	SAC, BOA	There are extensive areas of heathland and bog at Sandhurst to Owlsmoor Bogs and Heaths SSSI, Wellington Bog SSSI and within the largely wooded Broadmoor to Bagshot Heaths and Woods. Remnants are found elsewhere including the golf course at Crowthorne. Bog is also found in association with ponds and small lakes at Englemere Pond and Rapley Lakes. In the west remnants of these habitats are found. The heathland is important for species such as nightjar, woodlark and Dartford warbler and also reptiles and butterflies such as silver studded blue and grayling.	1.2km S

Ancient Woodland

- 3.1.9 Parcels of ancient woodland are found within the search radius of the site, namely Easthampstead Park, Watley's Copse and Big Wood, as shown on Figure 9 below. None are located within proximity to the site.

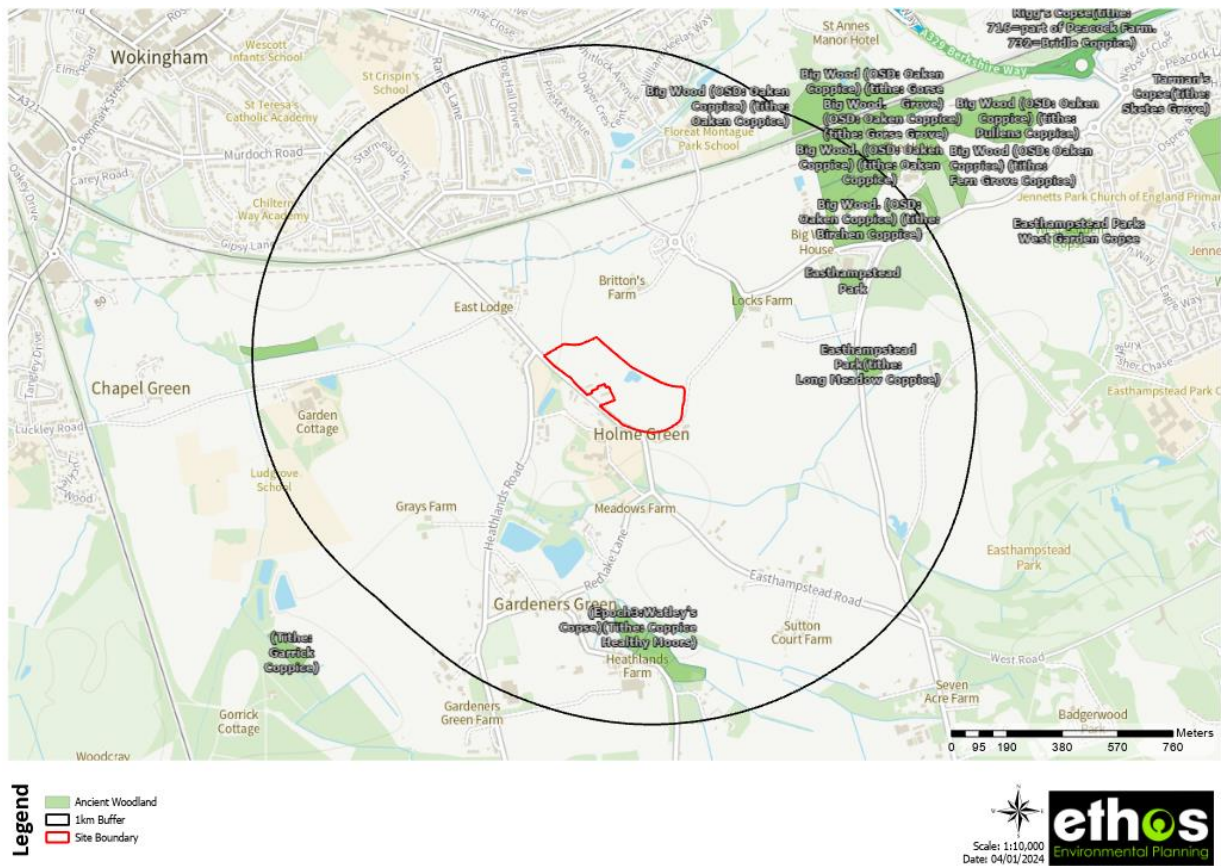


Figure 9 Ancient woodland parcels within 1km of the site

Priority Habitats

3.1.10 Many parcels of deciduous woodland and two parcels of traditional orchard are located immediately adjacent to and close to the site, as shown in Figure 10.

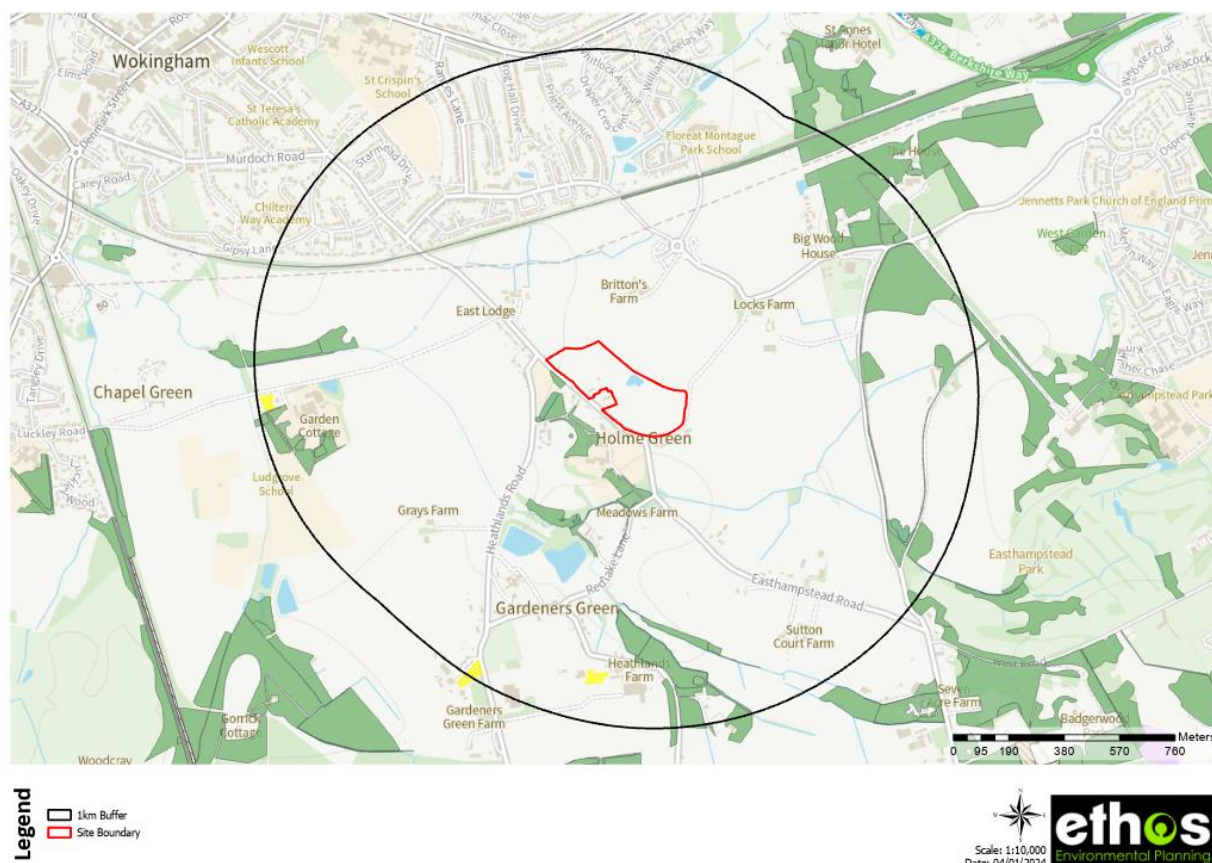


Figure 10 Priority habitats within 1km of the site. Green depicts deciduous woodland and yellow depicts traditional orchard.

3.2 Habitats

General Site Description

- 3.2.1 The site comprises of three fields, the eastern field and northern section of the central field being modified grassland and the western field and southern section of the central field being other neutral grassland.
- 3.2.2 The eastern field is bordered in the north and east by native species rich hedgerow with trees and a line of trees in the south-western corner. There is a structure in the north-eastern corner.
- 3.2.3 The central field has a section of other neutral grassland to the south with a larger parcel of modified grassland to the north. Within this modified grassland there are two parcels of vegetated garden and a pond which is surrounded by mixed scrub. The modified grassland parcel is bordered to the north by native hedgerow with trees.
- 3.2.4 The western field comprises of a large parcel of other neutral grassland, bordered in the south by a native species rich hedgerow with trees with a section extending into the grassland, native hedgerow with trees along the western and north-western boundary and a native hedgerow along the northern border. Along the western boundary of the grassland there is a section of other broadleaved woodland in the

south-west corner and a section of mixed scrub in the central area of the western boundary, encroaching into the grassland.

- 3.2.5 In the south-eastern corner of the western grassland there is an area of vegetated garden, an area of sealed surface, areas of artificial unvegetated surface, a section of modified grassland and a small pond.

UKHab Survey

- 3.2.6 Figure 11 displays the key habitats using the UK Habitat classifications. Descriptions of the habitats are provided in the following section.



Figure 11 UKHab

Modified grassland

- 3.2.7 The largest parcel of modified grassland is be found in the eastern field. This is a hay cut field sown with a tussocky grasses seed mix. The species recorded within the grassland comprise of ragwort (*Jacobaea vulgaris*), broadleaved dock (*Rumex obtusifolius*), curled dock (*Rumex crispus*), dandelion (*Taraxacum spp.*), field buttercup (*Ranunculus arvensis*), common bent (*Agrostis capillaris*), oat grass (*Arrhenatherum spp.*), cocks' foot (*Dactylis glomerata*) and rough meadow grass (*Poa trivialis*).

- 3.2.8 The central field has a parcel of modified grassland to the north and in the south-eastern corner of the western grassland there is a small, modified grassland section adjacent to the residential dwelling.
- 3.2.9 The modified grassland on site is species-poor, agriculturally seeded and appears to be regularly maintained at a short sward height. It is not considered to be a habitat of particular nature conservation importance.



Photo 2 Eastern field



Photo 3 Central field



Photo 4 Modified grassland

Other neutral grassland

- 3.2.10 The field to the west is previously horse-grazed, other neutral grassland and comprises of a set of small paddocks. Species present within this grassland were Red clover (*Trifolium pratense*), White clover (*Trifolium repens*), Bird's-foot trefoil (*Lotus corniculatus*), Meadow buttercup (*Ranunculus acris*), Perennial rye-grass (*Lolium perenne*), Ribwort plantain (*Plantago lanceolata*), Dandelion (*Taraxacum officinale*), Yorkshire fog (*Holcus lanatus*), Creeping bent (*Agrostis stolonifera*), Sweet vernal (*Anthoxanthum odoratum*), meadow foxtail (*Alopecurus pratensis*), bush vetch (*Vicia sepium*), common cats ear (*Hypochaeris radicata*), black knapweed (*Centaurea nigra*), cocks foot (*Dactylis glomerata*), black medick (*Medicago lupulina*).

- 3.2.11 Within the central field, there is a parcel of other neutral grassland to the south (see Photo 7). This section is managed to lawn but with indicator species of other neutral grassland recorded, including; field wood rush (*Luzula campestris*), bush vetch (*Vicia sepium*), Yorkshire fog (*Holcus lanatus*), perennial rye grass (*Lolium perenne*), lesser stitchwort (*Stellaria graminea*), meadow fox tail (*Alopecurus pratensis*), field buttercup, sweet vernal grass (*Anthoxanthum odoratum*), common sorrel (*Rumex acetosa*), oxeye daisy (*Leucanthemum vulgare*) and common daisy (*Bellis perennis*).
- 3.2.12 The other neutral grassland is not a Habitat of Principal Importance and is not considered to be of particular nature conservation importance.



Photo 5 Grassland western edge of the site



Photo 6 Grassland dated June 2022



Photo 7 Grassland

Other woodland; broadleaved

- 3.2.13 There is a small woodland copse in the south-west corner of the site which qualifies as a habitat of principle importance in England. Species recorded included mature and immature English oak, horse chestnut (*Aesculus hippocastanum*), young hazel (*Corylus avellana*) and holly (*Ilex aquifolium*). Ground flora recorded included lesser stitchwort, bluebell (*Hyacinthoides non-scripta*), ivy (*Hedera helix*) and bramble (*Rubus fruticosus*).
- 3.2.14 There are extensive areas of woodland in the local area (see site location in Figure 1), with the woodland on-site only forming a small percentage of the local resource. On this basis it is considered that the woodland is of **Local importance** for nature conservation.



Photo 8 Onsite woodland parcel



Photo 9 Woodland ground flora dated April 2022.

Ponds

- 3.2.15 There are two ponds onsite. One is located in the northern section of the central field and has mixed scrub around its edges. The other pond is a manmade, ornamental pond with associated formal planting, located in the associated garden area adjacent to the residential dwelling.
- 3.2.16 The pond in the central field is considered as a Habitat of Principal Importance and therefore is considered to have **Local importance** for nature conservation. The manmade pond is not a Habitat of Principal Importance.



Photo 10 Central Pond



Photo 11 Central Pond



Photo 12 Ornamental Pond

Mixed scrub

- 3.2.17 There are two areas of mixed scrub onsite; one area surrounds the larger pond in the northern section of the central field; and the other section is located along the western site boundary.
- 3.2.18 The mixed scrub along the western site boundary has species recorded as follows; goat willow (*Salix caprea*), common gorse (*Ulex europaeus*), hawthorn (*Crataegus monogyna*) and bramble with high concentrations of common nettle (*Urtica dioica*). The old stables adjacent to the scrub area is used for storing horse manure which may indicate why nettle concentration is so high.
- 3.2.19 There is a band of scrub around the larger pond onsite with species recorded as follows, goat willow, silver birch (*Betula pendula*), blackthorn (*Prunus spinosa*) and bramble.
- 3.2.20 Mixed scrub is not a Habitat of Principal Importance and is not considered to be of particular nature conservation importance.



Photo 13 Mixed Scrub



Photo 14 Mixed scrub



Photo 15 Mixed scrub surrounding pond



Photo 16 Mixed scrub surrounding pond

Linear habitats

- 3.2.21 There are several hedgerows and a line of trees located onsite which are shown in Figure 11 and described in Table 4 below.
- 3.2.22 All native hedgerows and the line of trees onsite qualify as Habitats of Principle Importance in England and are assessed to be of **Local importance** for nature conservation.



Figure 12 Linear habitats onsite

Table 4 Linear habitats

Hedgerow Number And type	Description	Photo
H1 Native Hedgerow	A native hedgerow with trees comprising of newly planted hawthorn, established but still young, with two mature oaks.	 Photo 17

H2 Native Hedgerow	A native hedgerow, newly planted with established hawthorn. Other species includes bramble, dog rose (<i>Rosa canina</i>) and a high concentration of nettles along the base.	 Photo 18
H3 Native Hedgerow	A native hedgerow, newly planted with two established hawthorn trees. All planted hawthorn have tree guards.	 Photo 19
H4 Native hedgerow	Hedge extends into the centre of the site from the northern boundary. Species present includes one mature oak, hawthorn dominated with minor elder, bramble and ivy. Ground flora of nettle and garlic mustard (<i>Alliaria petiolata</i>).	 Photo 20
H5 Native hedge with trees	Hedgerow largely unmanaged with trees to the northern area only and not along full length. Species present were oak, hawthorn, elm, holly, birch spp.,	 Photo 21

H6 native species rich hedgerow with trees	This hedge is a mature hedge with occasional mature trees. Species present includes mature oak, hawthorn, blackthorn, elder (<i>Sambucus nigra</i>), ash and English bluebell.	 Photo 22
H7 native hedgerow with trees and associated ditch	This hedge contained mature trees, was species rich and had an associated ditch for the majority of its length. Species present includes oak, field maple (<i>Acer campestre</i>), blackthorn, hawthorn, holly, elder, dog rose, elm, English bluebell, lesser stitchwort and honey suckle (<i>Lonicera periclymenus</i>).	 Photo 23
H8 Line of Trees	A line of trees in the south-western corner of the eastern field which extends into the site. The species present includes copper plum (<i>Prunus cerasifera</i>) which have bracket fungus (<i>Basidiomycete</i>), horse chestnut, hazel, hawthorn, elder and bramble.	 Photo 24
H9 A native species rich hedgerow with trees	This hedgerow is unmanaged with large growth of bramble at the base. Species present includes sycamore (<i>Acer pseudoplatanus</i>), ash (<i>Fraxinus excelsior</i>), holly, hawthorn, elm (<i>Ulmus procera</i>), dog rose and blackthorn.	 Photo 25

H10 Native Hedgerow with trees	A native hedgerow with trees, this hedgerow is unmanaged with large gaps evident. There are mature oak trees with hawthorn and ivy present.	 <i>Photo 26</i>
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Vegetated garden

- 3.2.23 There are three areas of vegetated garden, two in the central field and one in the western field, adjacent to the residential dwelling.
- 3.2.24 The vegetated gardens on site are species-poor with non-native species present in a highly managed space. It is not considered to be a habitat of particular nature conservation importance.



Photo 27 Vegetated Garden



Photo 28 H9 Vegetated Garden



Photo 29 Vegetated Garden

Artificial unvegetated, unsealed surface

- 3.2.25 In the western field, within the south-eastern corner there is an area of loose gravel, used as a horse training area. This habitat has no particular ecological importance for nature conservation.

Developed land; sealed surface

- 3.2.26 Adjacent to the horse training area there is a concrete, compressed path which runs from the barn structure to the north, down to the hedgerow boundary in the south. This habitat has no particular ecological importance for nature conservation.



Photo 30 Unsealed surface



Photo 31 Compressed concrete path

3.3 NERC S. 41 Mammals

- 3.3.1 A total of 59 records of hedgehog (*Erinaceus europaeus*) within 2km were returned by the data search dated between 2012 and 2022. Whilst no records were from within the site one record was from old Wokingham Road along the northern boundary. The other records were scattered throughout the local area, with the majority of records being located within residential areas approximately 1km to the northeast and northwest of the site, with several records within 1km of the southern boundary.
- 3.3.2 During an ecological walkover in April 2022, a single hedgehog dropping was found, adjacent to B1, as shown in Photo 33 below.

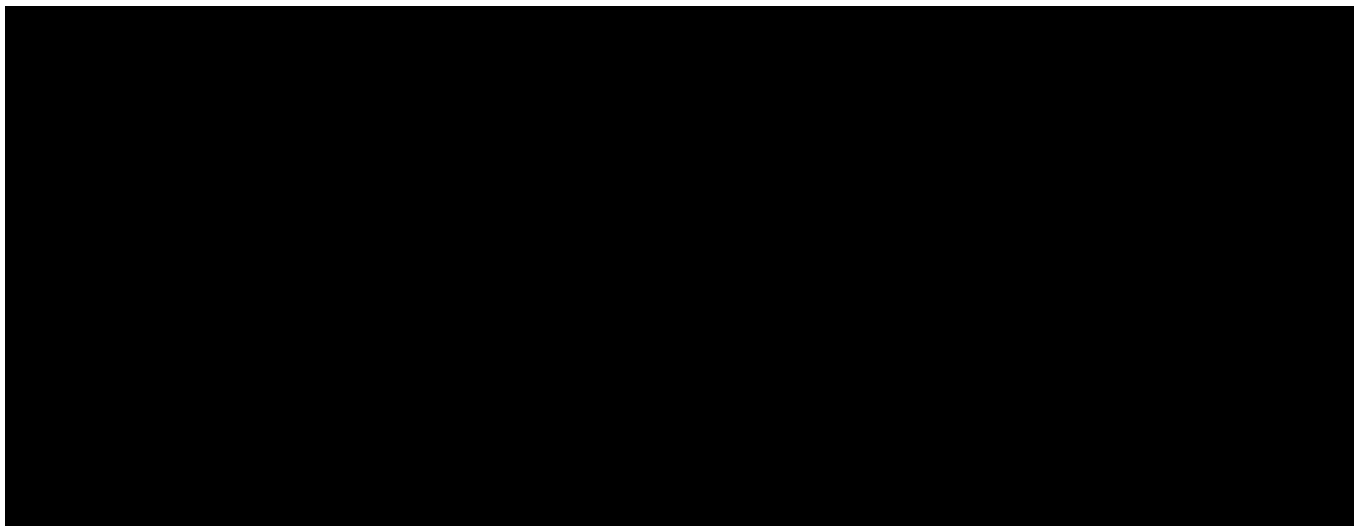


Photo 32 Hedgehog dropping

- 3.3.3 The on-site habitats offer refuge and foraging opportunities for hedgehog, with good connectivity to other suitable habitats in the wider environment. It is considered likely that hedgehog are present on site and utilise the hedgerows, scrub and tussocky grassland throughout the site for foraging and commuting.
- 3.3.4 Brown hare favour areas of open farmland with patches of long grass to 'lay-up' during the day. There are large areas of open grassland on site suitable for the species.

Therefore, there is the potential for brown hare to be present on site or within the vicinity of the site and to use the site to forage.

- 3.3.5 Polecat are found in many habitats including hedgerows and small areas of woodland, as well as riverine habitats. Although some of these habitats are found on site, distribution records from the Vincent Wildlife Trust (2016) suggest that polecat is sparsely distributed across the county, with only two records received as part of the 2016 study to the area immediately west of Reading. Due to a lack of records of the species it is considered unlikely that polecat are present on site.
- 3.3.6 The suitable tussocky, unmanaged grassland that is required for harvest mouse habitat is not present on site and therefore, the site is deemed unsuitable as it is well managed and kept to a short sward. Harvest mice are deemed to be absent from the site.
- 3.3.7 Hedgehog and brown hare are listed as Species of Principal Importance for the conservation of biodiversity in England. Any animals using the site are likely to form part of a wider population within the local area, which would be of **Local importance** to nature conservation.



3.5 Hazel Dormouse

- 3.5.1 Two records of hazel dormice (*Muscardinus avellanarius*) within 2km were returned by the data search, records included field signs as well as individuals and were located in Big Wood, Bracknell approximately 300m to the north of the site.
- 3.5.2 Fifty dormouse nest boxes were deployed in April 2022 across the site in appropriate hedgerows and vegetation and were checked:
- 5th May 2022;
 - 25th August 2022;
 - 27th September 2022;
 - 20th October 2022;
 - 2nd December 2022.

3.5.3 Throughout all of the surveys undertaken, no evidence of hazel dormouse was recorded. Several wood mouse (*Apodemus sylvaticus*) and previously used birds nests were recorded within the nest tubes.

3.5.4 It has been determined that hazel dormouse are absent from the site and will not be considered further.

3.6 Riparian Mammals

3.6.1 No records of otter (*Lutra lutra*) or water vole (*Arvicola amphibius*) were identified by the data search.

3.6.2 A tributary of the Emm brook is located 200m south-east of the site, a small stream which connects to the brook and a network of ditches in the area. There are no functional links from the brook to the development site therefore it is unlikely that otter or water vole would be resident onsite.

3.6.3 Overall, due to a lack of records, evidence and suitable habitat on or adjacent to the site, otter and water vole are assessed to be likely absent from the site and are not considered further in this assessment.

3.7 Bats

Background data search

3.7.1 There were a total of 482 records of bats within 2km returned by the data search. These included Annex II species Bechstein's bat (*Myotis bechstenii*), and barbastelle bat (*Barbastella barbastellus*) of which both were single records from beyond the site boundary. There was also 12 records of unidentified *Myotis* sp., also beyond the site boundary.

3.7.2 The remaining records related to brown long eared bat (*Plecotus auritus*), common pipistrelle (*Pipistrellus pipistrellus*), Daubenton's bat (*Myotis daubentonii*), Leisler's bat (*Nyctalus leisleri*), Nathusius's pipistrelle (*Pipistrellus nathusii*), Natterer's bat (*Myotis nattereri*), noctule (*Nyctalus noctule*), serotine (*Eptesicus serotinus*), and soprano pipistrelle (*Pipistrellus pygmaeus*), as well as unidentified *Plecotus* and *Pipistrellus* species.

3.7.3 No records were located within the site boundary however many records relating to roosts or evidence of potential roosts were considered confidential and only provided to 1km accuracy, and therefore the exact location is unknown.

3.7.4 There was one European Protected Species (EPS) licence recorded within 1km of the site relating to bats:

- (2018-34805-EPS-MIT) granted for brown long-eared bat and common pipistrelle (2018-2023), within 700m of the site.

Habitat context

- 3.7.5 The site is dominated by other neutral and modified grassland with hedgerows with mature trees, a section of woodland, and areas of scrub. The hedgerows on site connect to an extensive network of hedgerows, woodland and pasture in the wider environment. Overall, the site is assessed to have moderate potential for foraging and commuting bats.

Trees

- 3.7.6 Tree surveys have been undertaken by Quaife Woodland on the site. It has been determined that no trees will be removed on site for the proposed development.
- 3.7.7 The preliminary ground level assessment did not identify any potential roost features on any trees present on site. Therefore, all trees are assessed to contain 'negligible' potential for roosting bats and no additional surveys are required.
- 3.7.8 No direct impacts will be incurred from the proposed development, and indirect impacts will be incurred.

Preliminary roost assessment

- 3.7.9 There are seven structures onsite, which are shown in Figure 13. One of the structures is a residential dwelling which is in active use and the remaining six are outbuildings with a variety of uses. Descriptions of the buildings onsite are provided in Table 5 below along with their potential for roosting bats.

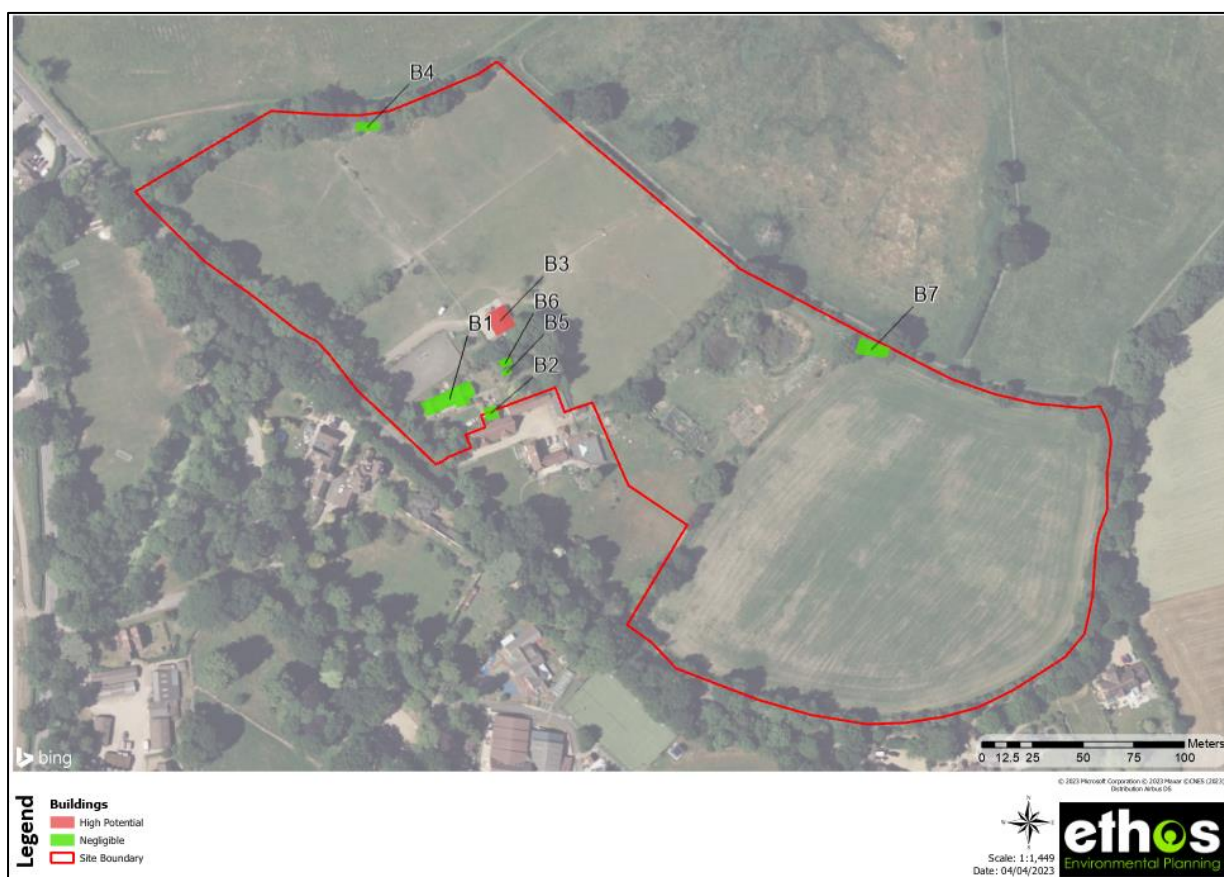


Figure 13 Structures location and assessment for bat roosting potential

Table 5 Results of the preliminary roost inspection

Structure	Description	Evidence	Potential
B1	A bungalow, residential, dwelling with an intersecting hip roof with stone and composite tiles, wooden barge boards, soffits and fascia. Tiles and roof structure is mostly in good condition, with few slipped tiles noted, but no gaps seen from within the roof void. The structure has one brick chimney, the walls are constructed of painted brick, all in good condition with no potential features seen. The internal loft void comprises an A-frame of timber beams with sarking. Holes were seen in the sarking but no light was observed coming through. Mouse droppings were found.	None	Negligible
B2	B2 is a single storey brick construction with a gable ended pitched roof of timber, constructed with slate and uPVC soffits. There are hanging wall tiles on the southern elevation, all in	None	Negligible

	good condition apart from one missing. The northern elevation is timber clad. The roof has recently been fitted with new sparking. Internal inspection revealed no obvious access from the missing hanging wall tile.		
B3	B3 is a brick open access barn with wooden beams and concrete floor. No obvious potential features seen externally on the structure for bats, however structure allows constant open access to the loft void inside. Internally there is a timber A-frame with an open loft void space. An open hatch leads directly from the loft void space into the barn below.	Two clustered piles of dropping under the ridge beam in the loft void and scattered throughout the void were seen along with eight live bats. One bat was identified as a brown long-eared bat (BLE). Droppings were sent off for DNA analysis with a positive result for BLE received (results shown in Appendix 1).	High (confirmed roost)
B4	B4 is a single storey shed of timber construction with corrugated asbestos cladding and a flat timber roof with felt cladding. No internal inspection was carried out for health and safety reasons, due to the presence of degraded asbestos.	None	Negligible
B5	B5 is a dilapidated timber shed with a once flat roof open with birds nest inside.	None	Negligible
B6	B6 is a one storey shed timber construction with a slightly pitched felt roof. Newly constructed and in active use. Looks clean and tight no evidence.	None	Negligible
B7	Timber clad, single skin, open fronted structure with tiled, pitched roof. The internal structure is a timber frame	None	Negligible

	with tiles directly attached, there is no sarking and no evidence of suitable crevices for bats.		
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Photo 33 Residential dwelling (B1)



Photo 34 Residential dwelling (B1)



Photo 35 Residential dwelling (B1)



Photo 36 Residential dwelling (B1)



Photo 37 Slipped tiles (B1)



Photo 38 Birds nest (B1)



Photo 39 Residential dwelling (B1)



Photo 40 Brick outbuilding (B2)



Photo 41 Brick outbuilding (B2)



Photo 42 Missing wall tile (B2)



Photo 43 Internals of outbuilding (B2)



Photo 44 Internals of outbuilding (B2)



Photo 45 Barn structure (B3)



Photo 46 Barn structure (B3)



Photo 47 Barn structure (B3)



Photo 48 Barn structure (B3)



Photo 49 Storage room (B3)



Photo 50 Bird nest inside barn (B3)



Photo 51 Loft hatch used as an entrance by BLE bats



Photo 52 Barn loft void (B3)



Photo 53 Cluster of bat droppings pile 1 (B3)



Photo 54 Cluster of bat droppings pile 2 (B3)



Photo 55 Stables (B4)



Photo 56 Stables (B4)



Photo 57 Dilapidated structure (B5)



Photo 58 Dilapidated structure (B5)



Photo 59 Internal storage (B5)



Photo 60 Timber shed (B6)



Photo 61 Timber shed (B6)



Photo 62 Timber shed internals (B6)



Photo 63 Timber outbuilding (B7)



Photo 64 Timber outbuilding internals (B7)

Emergence surveys

3.7.10 Emergence surveys were carried out on B3, the brick barn building, in line with guidance provided in 'Bat Surveys Good Practice Guidelines' (Collins, 2016). The detailed results of the emergence surveys are provided in Appendix 2 and a summary is provided below:

- On both emergence surveys in June and July 2022, BLE were identified emerging from the structure B3.
- On 23rd June 2022 a BLE was identified exiting the structure through the open front on the eastern elevation, re-entering the structure one minute later and continuing to exit and re-enter the building over a period of three minutes. Three other BLE were identified exiting and re-entering the structure via the same access point later, during the survey.
- On 28th July 2022, a BLE was identified emerging from the structure through the open front on the eastern elevation and re-entering the structure shortly after to forage in the open barn.
- During each survey, it was confirmed that the bats had exited the structure (B3) via the open hatch, found towards the back right corner of the barn structure, which opens into the loft void space. The bats scattered on exit with no regular commuting route away from the roost.

3.7.11 These observations were supported by both the thermal imagery and static detector recordings obtained during the emergence surveys to increase confidence.

Activity transect surveys

3.7.12 Seven activity transect surveys were undertaken between April and October 2022 with six species recorded, namely common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), noctule (*Nyctalus noctula*), serotine (*Eptesicus serotinus*), brown long-eared bat (*Plecotus auritus*) and Myotis spp. bat. Detailed results of the activity surveys are located in Appendix 2 and summarised below:

- The highest levels of activity were recorded along the northern hedgerow boundary, however activity was fairly consistent along all site boundaries.
- Common pipistrelle was the most frequently recorded species for each survey undertaken. Low numbers of noctule, soprano pipistrelle, brown long-eared bat and *Myotis* spp. were also seen.
- Activity levels were assessed to be low-moderate across the survey period, with the highest number of bats recorded during the May and June surveys.
- Common pipistrelles were frequently seen foraging above the mature oak trees along the boundary in the north-western corner.

Static detector surveys

3.7.13 Results from the static detector surveys are summarised below, with full results detailed in Appendix 2.

- A total of eight species of bat were recorded across the site, namely common pipistrelle, soprano pipistrelle, noctule, Leisler's bat (*Nyctalus leisleri*), serotine (*Eptesicus serotinus*), brown long-eared bat (*Plecotus auritus*), *Myotis* spp., barbastelle (*Barbastella barbastellus*).
- *Myotis* species bat calls were identified to the following possible species onsite with Brandts, whiskered, Bechstein's, Daubenton's and Natterer's. In total *Myotis* calls totalled less than 3% and did not warrant advance surveys to confirm species.
- The number of calls recorded at Location A1 were higher than at Location A2 (see Figure 17). Different assemblages of bat species were recorded at each location. Common pipistrelle and soprano pipistrelle were most frequently recorded at Location A1 (west of the site) whereas serotine, Natterer's and barbastelle bat were more frequently recorded at Location A2 (east of the site).
- Common pipistrelle was the most recorded bat on site across all detectors, comprising 68.7% of all bat calls. Soprano pipistrelle were the second most recorded species, comprising 25% followed by Natterer's (1.8%), Brown long-eared (1.7%), Noctule (1.1%), and Barndt's/Whiskered bat (0.8%) of all bat calls.
- The highest number of mean bat passes per hour related to common pipistrelle at Location 1 (see Figure 19)

Barbastelle

- Barbastelle calls comprised 0.25% of all bat calls with a total of 45 calls throughout the survey period.
- Barbastelle calls were also recorded at Location A1, with 12 calls recorded.
- There was a peak of barbastelle calls recorded in May and August. During August, activity was fairly consistent throughout the nights, with no particular peak in activity (which could suggest occasional commuting activity) by this species of bat.

Brown long-eared

- 3.7.14 During building inspections on B3, a maternity roost for brown long-eared bat was identified within the structure. The species was also confirmed exiting and re-entering the structure during emergence surveys. The key ecological features for this species onsite were assessed to be B3 and surrounding hedgerows.

Common pipistrelle

- 3.7.15 Static detector surveys identified a high number of common pipistrelle calls across the site, with the majority of calls recorded at Location A1. Common pipistrelle were frequently seen foraging and commuting on site during the activity transect surveys. Key ecological features were assessed to be the boundary hedgerows for this species.

3.8 Birds

- 3.8.1 A total of 1169 records of birds within 2km were returned by the data search. Records included Schedule 1 species; black redstart (*Phoenicurus ochruros*), brambling (*Fringilla montifringilla*), crossbill (*Loxia curvirostra*), fieldfare (*Turdus pilaris*), firecrest (*Regulus ignicapilla*), green sandpiper (*Tringa ochropus*), hobby (*Falco subbuteo*), kingfisher (*Alcedo atthis*), peregrine (*Falco peregrinus*), red kite (*Milvus milvus*), redwing (*Turdus iliacus*), and wood lark (*Lullula arborea*).
- 3.8.2 Returned records also included and Amber and Red List species; barnacle goose (*Branta leucopsis*), black-headed gull (*Chroicocephalus ridibundus*), bullfinch (*Pyrrhula pyrrhula*), common gull (*Larus canus*), common redpoll (*Acanthis flammea*), common sandpiper (*Actitis hypoleucos*), common tern (*Sterna hirundo*), cuckoo (*Cuculus canorus*), dunnoek (*Prunella modularis*), gadwall (*Mareca strepera*), greenfinch (*Chloris chloris*), grey wagtail (*Motacilla cinerea*), greylag goose (*Anser anser*), hawfinch (*Coccothraustes coccothraustes*), herring gull (*Larus argentatus*), house martin (*Delichon urbicum*), house martin (*Passer domesticus*), kestrel (*Falco tinnunculus*), lapwing (*Vanellus vanellus*), lesser black-backed gull (*Larus fuscus*), lesser spotted woodpecker (*Dryobates minor*), linnet (*Linaria cannabina*), mallard (*Anas platyrhynchos*), meadow pipit (*Anthus pratensis*), mistle thrush (*Turdus viscivorus*), moorhen (*Gallinula chloropus*), nightjar (*Caprimulgus europaeus*), pochard (*Aythya farina*), redstart (*Phoenicurus phoenicurus*), reed bunting (*Emberiza schoeniclus*), ring ouzel (*Turdus torquatus*), rook (*Corvus frugilegus*), sedge warbler (*Acrocephalus schoenobaenus*), shoveler (*Spatula clypeata*), skylark (*Alauda arvensis*), snipe (*Gallinago gallinago*), song thrush (*Turdus philomelos*), sparrowhawk (*Accipiter nisus*), spotted flycatcher (*Muscicapa striata*), starling (*Sturnus vulgaris*), stock dove (*Columba oenas*), swift (*Apus apus*), tawny owl (*Strix aluco*), teal (*Anas crecca*), tree pipit (*Anthus trivialis*), turtle dove (*Streptopelia turtur*), wheatear (*Oenanthe oenanthe*), whinchat (*Saxicola rubetra*), whitethroat (*Curruca communis*), widgeon (*Mareca penelope*), willow warbler (*Phylloscopus trochilus*), woodcock (*Scolopax rusticola*), woodpigeon (*Columba palumbus*), and wren (*Troglodytes troglodytes*).

- 3.8.3 No Schedule 1 or Red and Amber List species records were located within the site, however many of the records were given to 1km or 2km accuracy and therefore the exact location of these records is unknown.
- 3.8.4 During bat surveys in 2022, a single barn owl (*Tyto alba*) was seen foraging on the site, in the western field during July and August. There were no suitable roosting features onsite for breeding barn owls, however areas of the western field which were unmanaged could provide suitable foraging habitat for barn owls.
- 3.8.5 Tawny owl was heard during a July 2022 bat survey, located along the eastern boundary of the site. Tawny owl may utilise the mature hedgerows onsite to hunt and will likely be nesting in woodland within 1km of the site.
- 3.8.6 During the preliminary roost inspections for bats, a bird nest was recorded on the north-east gable end of building B1, one nest behind a missing tile within the loft space of building B2, ten house martin nests were recorded inside the building B3 and a blackbird nest was found within hedgerow H5, where the hedgerow bisects the western field.



Photo 65 Bird nest on B1



Photo 66 Bird nesting behind slipped tile



Photo 67 One of ten house martin nests within B3



Photo 68 Blackbird nest within onsite hedge

- 3.8.7 The habitats on site were dominated by modified and other neutral grassland which provides some, however restricted opportunity for ground nesting birds.
- 3.8.8 As the background data search has returned records of ground nesting birds i.e., skylark and lapwing, and there is some suitable habitat on site, it has been determined that the site provides some potential habitat for breeding ground nesting birds.
- 3.8.9 The woodland strip, scrub and hedgerows could provide potential breeding habitats for common and widespread species of birds.
- 3.8.10 Overall, the desk study identified several Red List and Amber List species found within a 2km radius of the site, with the closest record for Lapwing identified 136m south of the site. Nests for Red List species; house martin were found onsite, giving evidence of the sites importance for breeding. Due to the mix of favourable habitats onsite for breeding birds, it is considered that the likely assemblage of birds present within the hedgerows and woodland is of **Local importance** for nature conservation.

3.9 Reptiles

Background data search

- 3.9.1 A total of 117 records of reptiles within 2km of the site boundary were returned by the data search dated from between 1995 and 2023. Records included adder (*Vipera berus*), common lizard (*Zootoca vivipara*), grass snake (*Natrix natrix*), and slow worm (*Anguis fragilis*).
- 3.9.2 Slow worm accounted for 90 of the records, no records were from on site with the majority of records coming from areas either approximately 600m to the north or 600m to the southeast of the site. The closest record was located 520m to the southeast of the site.
- 3.9.3 There were 8 records of grass snake returned, the closest of which was located approximately 590m east of the site, other records were 1.25 – 1.45km from the site boundary.
- 3.9.4 There were 17 records of common lizard, the closest of which was approximately 620m north of the site. The most recent record from 2023 is from Gorick plantation, approximately 1.4km to the south west of the site.
- 3.9.5 Only two records of adder within 2km were returned by the data search, dated 1997 and 2018, the latter of which is the closest being located in Beaufort park 1km to the south east of the site.

Habitat assessment and survey results

- 3.9.6 The site is dominated by modified and other neutral grassland, which provides some habitat for reptiles. The key features on site are assessed as the hedgerows and patches of grassland/scrub in the west of the site.
- 3.9.7 The majority of the site was managed or agricultural land with habitats suitable for reptiles restricted to boundary and scrub areas only. Reptiles are likely absent from the site.

3.10 Amphibians

Background data search

- 3.10.1 The data search returned a total of 89 amphibian records within 2km of the site. Records related to great crested newt (*Triturus cristatus*), palmate newt (*Lissotriton helveticus*), smooth newt (*Lissotriton vulgaris*), common frog (*Rana temporaria*) and common toad (*Bufo bufo*) and were dated from between 1998 – 2023.
- 3.10.2 Of these records 24 were great crested newt, two of which were in close proximity to the site; 1 lies within a residential garden approximately 60m beyond the northern site boundary and the other lies within a residential garden approximately 90m beyond the most western edge of the boundary.
- 3.10.3 UK BAP species common toad accounted for 15 of the recorded dated from between 1998 and 2021. The closest of these records was approximately 375m west of the site within fishing ponds.
- 3.10.4 No EPS licences relating to GCN were identified by the data search.

Habitat assessment

On-site waterbodies

- 3.10.5 There are two ponds onsite, one found adjacent to the farm buildings in the western field and the other, a larger pond in the central field. There are no other waterbodies present on the site.
- 3.10.6 The terrestrial habitat in the west of the site is assessed as having potential for GCN, containing unmanaged grassland, scrub and woodland, which would provide foraging and hibernating habitat for amphibians. These habitats are also well-connected to offsite suitable terrestrial habitats to the north and west of the site, which would support amphibians migrating through the wider landscape.

Nearby waterbodies

- 3.10.7 The desk-based assessment identified a further fourteen ponds within 500m of the site, and six additional ponds outside of the 500m radius, as shown in Figure 13. Ponds 3-9 are located on private land and could not be accessed for the survey. Ponds 10-11 which are located to the east are within the site boundary of the Priors Farm development, whereby Ethos carried out surveys in 2022. Ponds 10-11 were both man-made fishponds and were both assessed as unsuitable for GCN due to the high concentration of fish within them. Environmental DNA analysis was carried out on both ponds with a negative and indetermined result. The latter result is believed to be due to sample degradation.
- 3.10.8 Ponds 3-9, which could not be assessed, were considered a significant distance from the site and separated by barriers to dispersal, including a main road. Therefore, GCN within these ponds would be unlikely to be impacted by the development.

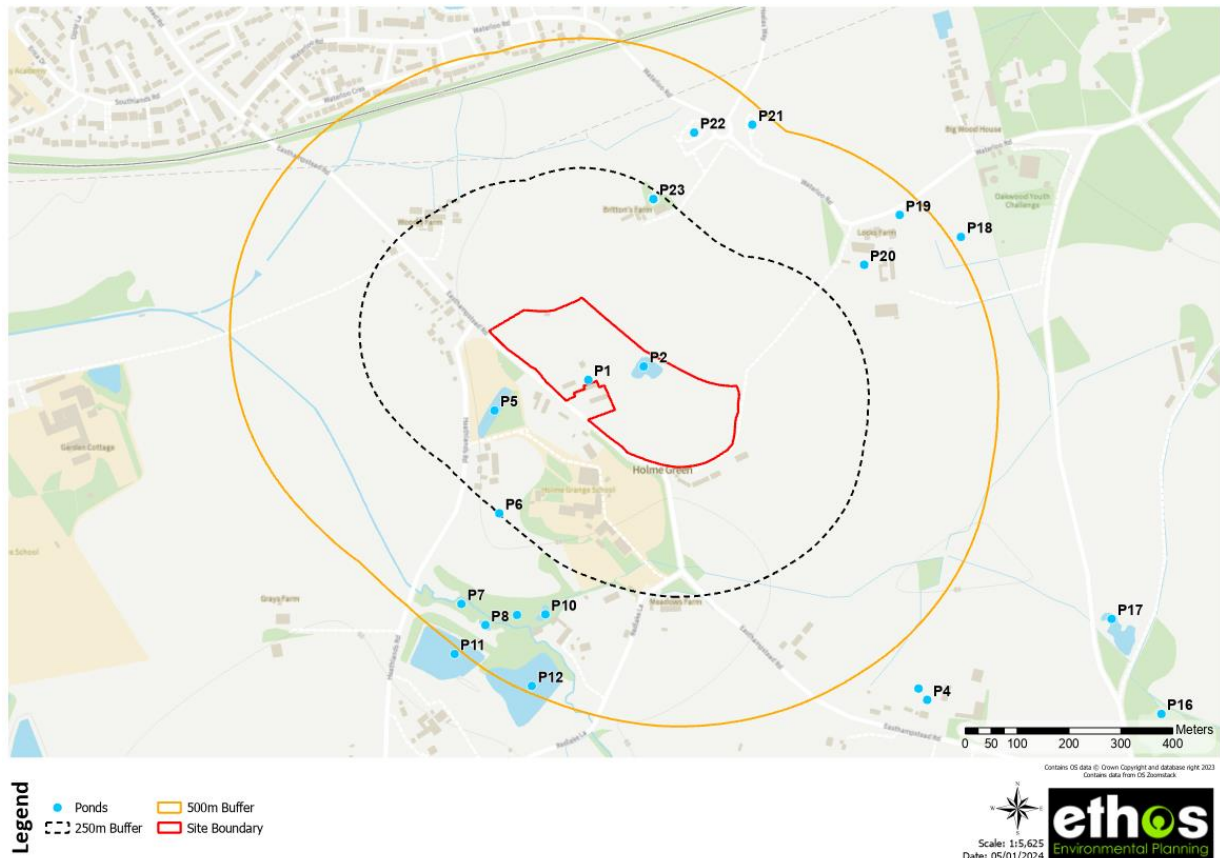


Figure 14 Ponds within 500m radius of the site

HSI

- 3.10.9 The HSI of both ponds on site was carried out and identified Pond 1 have a value of 0.90 and Pond 2 to have a value of 0.80, which gives a classification of 'Excellent' for both, regarding their suitability to support GCN, as shown in Table 6 below.

Table 6 Habitat suitability index calculations for ponds onsite

Indices				
	Value	Description	Value	Description
Geographic location	1	Optimal	1	Optimal
Pond area	1	50	1	800
Pond permanence	1	Drying rarely	1	Drying rarely
Water quality	0.67	Moderate	0.67	Moderate
Shade	1	40%	1	60%
Waterfowl effect	0.67	Minor	1	Major
Fish presence	0.67	Possible	0.67	Possible
Pond density	1	6 ponds	1	6 ponds
Terrestrial habitat	1	Good	1	Good
Macrophyte cover	0.35	10%	0.8	45%
Score	0.80		0.90	
Assessment of suitability	Excellent		Excellent	

eDNA

3.10.10 The eDNA survey of both ponds onsite identified GCN DNA to be absent from the pond.

Summary

3.10.11 GCN were assessed to be absent from the ponds on site given the results of the eDNA surveys and likely absent terrestrially due to significant distances from known populations and hard barriers to dispersal.

3.11 Invertebrates

3.11.1 A total of 144 records of invertebrates within 2km of the site were returned by the data search dated between 1993 and 2023, 98 of the records related to nationally scarce stag beetle (*Lucanus cervus*), all of which were beyond the site boundary the closest record was located within residential gardens at Holme Green just beyond the western edge of the site. The records were scattered around the local area with the majority coming from residential gardens approximately 1km to the north west. Other notable species records include Schedule 41 species small heath (*Coenonympha pamphilus pamphilus*), blood vein moth (*Timandra comae*), cinnabar moth (*Tyria jacobaeae*), dot moth (*Melanchra persicariae*), forester moth (*Adscita statice*), knot grass moth (*Acronicta rumicis*), olive crescent moth (*Trisateles emortualis*), rustic moth (*Hoplodrina blanda*), shaded broad-bar moth (*Scotopteryx chenopodiata*), and white ermine moth (*Spilosoma lubricipeda*) none of which were located within the site boundary.

- 3.11.2 The site comprised modified grassland, which provides low habitat for invertebrates. The key features were assessed to be the mature trees in the hedgerows which could provide potential habitat for invertebrates. Given the large number of stag beetles within the background data search and the site provides suitable habitat, it has been determined that they are likely present on site.

3.12 Invasive Species

- 3.12.1 Records of American skunk-cabbage (*Lysichiton americanus*), buddleia (*Buddleja davidii*), Himalayan balsam (*Impatiens glandulifera*), rhododendron (*Rhododendron ponticum*) and *Crangonyx pseudogracilis/floridanus* have been recorded within 2km of the site.
- 3.12.2 No invasive species were recorded on site.

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APPENDIX 1 – BAT GENOTYPING RESULTS



4 July 22

Re: Identification Results for Ellie Shearn, Ethos Environmental Planning

Job number 18234, received 20 June 2022

Sample labelled: Pearces Farm, near entrance, B3 larger tube

PCR amplification successful. DNA sequence:

ATGACCAACATTTCGAAAGTCCCACCCTCTCATAAAATTATCAATGACTCATTTCATTG
ACTTACCTGCTCCCTCAAATATTTTCATCATGATGAACTTTGGATC

Phylogenetic analysis identification: *Plecotus auritus*

Confirmed by maximum likelihood, maximum parsimony, bootstrap 100%.

Best regards,

Professor Robin Allaby

The results and conclusions in this report are based on an investigation of mtDNA sequence analysis. The results obtained have been reported with accuracy. The interpretation represents the most probable conclusion for the DNA sequence obtained rather than the sample provided given current levels of species data. It should be borne in mind that different circumstances might produce different results. Therefore, care must be taken with interpretation of the results especially if they are used as the basis for commercial recommendations.

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APPENDIX 2 – BAT SURVEY DATA

The following section details the results of the bat surveys at the site. Codes used in the description of bat species are as follows:

CP	Common pipistrelle (<i>Pipistrellus pipitrellus</i>)
SP	Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)
NOC	Noctule bat (<i>Nyctalus noctula</i>)
LEI	Leisler's bat (<i>Nyctalus leisleri</i>)
SER	Serotine bat (<i>Eptesicus serotinus</i>)
MYODAU	Daubenton's bat (<i>Myotis daubentonii</i>)
MYONATT	Natterer's bat (<i>Myotis nattereri</i>)
WHI/BRA	Whiskered/Brandt's bat (<i>Myotis mystacinus/ brandti</i>)
BLE	Brown long-eared bat (<i>Plecotus auritus</i>)
BARB	Barbastelle bat (<i>Barbastella barbastellus</i>)

A summary of the bat activity surveys is included below, and the environmental variables recorded during the surveys are shown in Table 7.

Table 7 Activity surveys environmental variables

Date	28/04/2022		16/05/2022		23/06/2022		19/07/2022		30/08/2022		27/09/2022		20/10/2022	
Sunset/Sunrise	20:21		21:22		21:24		21:10		19:54		18:50		18:15	
Start / End time	20:13	22:20	20:50	22:56	21:24	23:25	21:10	22:45	19:48	21:58	18:39	20:44	18:15	20:15
Temperature (°C)	11	10	15	14	19.2	19	26	23	20.7	21	14.5	12	11	8
Humidity (%)	69	74	80	85	77	81.9	58	77	65	64	71.7	70	90	91
Cloud cover (oktas)	7/8	6/8	2/8	4/8	8/8	0/8	7/8	1/8	1/8	0/8	0/8	0/8	8/8	8/8
Avg. Wind speed (m/s)	0.2	0.5	10	10	0.4	0.4	4.4	5.8	1.1	1.3	0	0	1.5	1.7
Rain	None		Earlier		Earlier		Earlier		None		During		None	

28th April 2022 Activity Survey (sunset: 20:21)

- 20:36 -SP heard not seen by residential dwelling.
- 21:00 - SP heard not seen at A8.
- 21:03 – SP heard not seen at A8.
- 21:12 – SP heard not seen by residential dwelling.
- 21:31 – SP commuting by A2. Very faint registration.

- 21:41 – CP heard not seen foraging by barn A9.
- 21:56 – CP and SPIP foraging along the byway north of A6.
- 22:00 – CP commuting east then south along hedgerow at A7.
- 22:01 – SP commuting north at A7.
- 22:04 – CP commuting heard not seen at A8.
- 22:17 – SP heard not seen. Faint registration.

Moderate bat activity of CP and SP. Most activity centred around A8 and A7 in the north-east corner of the site and around the buildings in the western field, south-eastern corner.

16th May 2022 Activity Survey (sunset: 21:22)

- 21:34 – CP heard not seen south of A7, a single pass commute.
- 21:46 - NOC commute high over site east along hedgerow towards A5.
- 21:52 - BLE at A9, foraging, 3 of them around the barn, 1 flew directly over field.
- 21:59 - CP 1 pass at A1.
- 22:10 - CP by barn with bat droppings A9, heard not seen, 1 pass.
- 22:12 – MYO spp. At A9, potential Natterer's bat. CP and SP passes.
- 22:15- CP over small pond by residential bungalow.
- 22:16 - CP near the front of residential bungalow.
- 22:17 - SP near the front of residential bungalow.
- 22:23 – BLE commuting at A5.
- 22:25 - CP foraging between A5 and 6.
- 22:29 - MYO at A6 commuting east along hedgerow, potential whiskered or Natterer's bat.
- 22:35 - SP at A7.
- 22:47 - MYO spp. at A 5.
- 22:51 - SP by driveway, central area of the site.
- 23:22 - Faint CP pass, heard but not seen.

Overall, early and busy start with CP and SP and BLE around the barn at A9. Most activity along the boundaries of the eastern field.

23rd June 2022 Activity Survey (sunset: 21:22)

- 21:42 - NOC foraging high over road and tree line above residential dwelling.
- 21:54 - NOC foraging over byway north of A6.
- 22:05 - CP foraging in residential garden.
- 22:10 - CP foraging over barn, A9, low.
- 22:20 - CP foraging at A1.
- 22:30 - CP foraging over barn at A9.
- 22:36 - SER commuting west over A9.
- 22:39 - CP foraging at over A9.
- 22:47 - CP foraging along hedge by A6.
- 22:56- SP foraging at A8.
- 23:01 – SER foraging around A9.

- 23:06 - CP foraging at A2.

Fairly quiet survey with individual bats foraging across most hedgerows onsite, main activity around stables and barn buildings.

19th July 2022 Activity Survey (sunset: 21:10)

- 21:29 - NOC foraging high over hedgerow over centre barns, A9.
- 21:56 - NOC foraging over A8.
- 22:03 - barn owl fly by at A5.
- 22:05 – CP foraging in residential garden area near A5.
- 22:06 – SER foraging in residential garden area near A3.
- 22:13 - SP commuting near A1.
- 22:19 - SP foraging at A1.
- 22:27 - CP foraging at A3.
- 22:34 – SER foraging at A3.
- 22:35 – BLE foraging at row stables A9.
- 22:36 - SP foraging at row stables A9.
- 22:39 – CP foraging at A2.
- 23:00 - CP foraging over front lawn of residential dwelling.
- 23:02 – CP and BLE foraging within barn by A9.

A quiet survey with scattered activity across the site. Individual bats foraging at hedgerows and some more open areas of the site. Recorded as the hottest day on record for the UK, so a very hot and dry evening. Some rain earlier but very short isolated and light showers only.

30th August 2022 Activity Survey (sunset: 19:54)

- 20:10 - NOC foraging above site circling, continuous for 5mins plus near A6.
- 20:19 - CP pass between A7-6 heading south west.
- 20:21 - SP commuting, heading south west A7 -6.
- 20:24 – SP foraging up and down hedgerow to A7.
- Tawny owl heard A7.
- 20:27 - NOC heard not seen at A7.
- 20:36 - CP foraging up and down hedgerow between A7-8.
- 20:37 - suspected barn owl at A8.
- 20:40 – SP foraging over central field, in southern section.
- 20:43 – BLE heard not seen between A8-5 BLE.
- 21:03 - CP foraging near residential dwelling with social calls.
- 21:14 - suggested whiskered MYOTIS pass along hedgerow. Then CP heading south-east at A2.
- 21:16 - MYO foraging up and down hedgerow, followed by CP between A3-4.
- 21:19 – SP and CP foraging around oak trees near A2 with social calls.
- 21:21 – CP foraging at A2. Faint registration.

- 21:23 - BLE foraging at A2 from oak trees to hedgerow west / north-west followed by MYOTIS.
- 21:23 – CP after A2 foraging above heads by oak trees in hedgerow between A2-1.
- 21:29 – CP foraging at A2.
- 21:33- CP foraging at A1 with social calls.
- 21:41 – CP heard not seen at A10.
- 21:52 – CP heard not seen at A5.
- 22:04 – CP in multiple foraging at A7 around oak trees

Overall, lots of CP and SP activity occurred around the mature trees and hedgerows on site. Minimal myotis activity was recorded.

27th September 2022 Activity Survey (sunset: 18:50)

One CP was recorded at 19:43 near A7. No other bats or activity was recorded during this survey.

20th October 2022 Activity Survey (sunset: 18:15)

- 18:15 - CP X3 foraging around house.
- 18:23 - SP at A8 Pass.
- 18:31 - CP foraging on eastern boundary.
- 18:47 - CP south of residential dwelling.
- 18:51 - CP at A10 foraging.
- 18:57 - CP foraging southwestern boundary.
- 18:59 - CP southwest foraging.
- 19:20 – Natterer's A7 pass east.

Mainly CP and SP with no focused activity but mostly on boundaries mature trees adjacent to house at the start of the survey. All pipistrelle bat species, except myotis NATT near the end of survey. Very foggy and poor conditions for bats.

A summary of the bat emergence surveys is included below, and the environmental variables recorded during the surveys are shown in Table 8.

Table 8 Emergence surveys environmental variables

Date	23/06/2022		28/07/2022	
Sunset/Sunrise	21:24		21:10	
Start / End time	21:24	23:25	21:10	22:45
Temperature (°C)	19.2	19	26	23
Humidity (%)	77	81.9	58	77
Cloud cover (oktas)	8/8	0/8	7/8	1/8
Avg. Wind speed (m/s)	0.4	0.4	4.4	5.8
Rain	Earlier		Earlier	

23rd June 2022 Emergence Survey (sunset: 21:24)

- 22:03 – BLE emerged from building.
- 22:03 – BLE re-entered building, exited, entered and exited again between 22:06.
- 22:06 – Bat foraging in front of building.
- 22:07 – Three BLE flying into the barn structure and foraging.
- 22:08 – Three BLE flying into the loft space of the barn, one exits structure, followed by second, then third, followed by one of the three re-entering the building.
- 22:55 – BLE foraging at the front of the building. Bat enters building and shortly after exits.
- 23:10 – BLE enters structure.

Four BLE confirmed emerging from the structure, through the open hatch in the loft void and out of the eastern elevation, open side of the barn (B3). No other species recorded as emergences.

28th July 2022 Emergence Survey (sunset: 21:10)

- 21:10 - CP pass, heard not seen.
- 21:20 - BLE commuting north to south across east elevation of barn.
- 21:22 - BLE commuting south to north across east elevation of barn.
- 21:28 - BLE foraging around barn.
- 21:34 - BLE emergence – through open front of eastern elevation.
- 21:37 - CP flew past barn roof from east.
- 21:42 - faint NOC pass heard not seen.
- 21:49 - BLE calls registered, heard not seen.
- 21:58 - CP pass heard not seen.
- 21:59 - BLE calls registered, heard not seen.
- 22:19 - CP foraging (over top of barn).
- 22:31 - BLE pass, heard not seen.

BLE confirmed emerging from the structure, through the open hatch in the loft void and out of the eastern elevation, open side of the barn (B3). No other species recorded as emergences.

**NB: The term 'Activity' has been used during the analysis of the static bat detectors. Whilst static bat detectors cannot give an accurate indication of the number of bats foraging/commuting on site, they provide valuable information relating to species composition and comparisons from the number of records across the site. In this instance, the term 'activity' is based off the mean average records per night in order to prevent a period of intensive foraging over a short period of time skewing the results. It also allows for true comparison when detectors are deployed for different periods of time.*

Table 9 Static detector survey results summary

Static Number	Location Deployed	Average calls/night (across all species)	Species Recorded	Comments
A1	Centre of the western boundary hedgerow	480	10 species: CP, SP, NOC, LEI, SER, WHI/BRA, MYODAU, MYONATT, BLE, BARB, BEC.	CP accounted for 70% of records
A2	Near the north-eastern corner of the site, on the northern hedgerow	148	11 species: CP, SP, NOC, LEI, SER, WHI/BRA, MYODAU, MYONATT, BLE, BARB.	CP accounted for 62% of records.

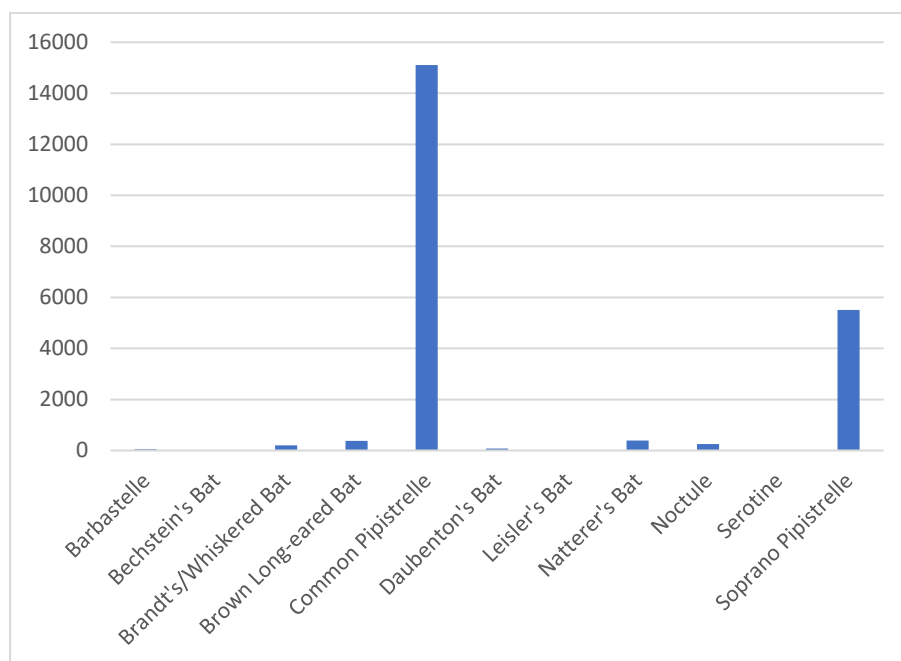


Figure 15 Total bat calls across the site

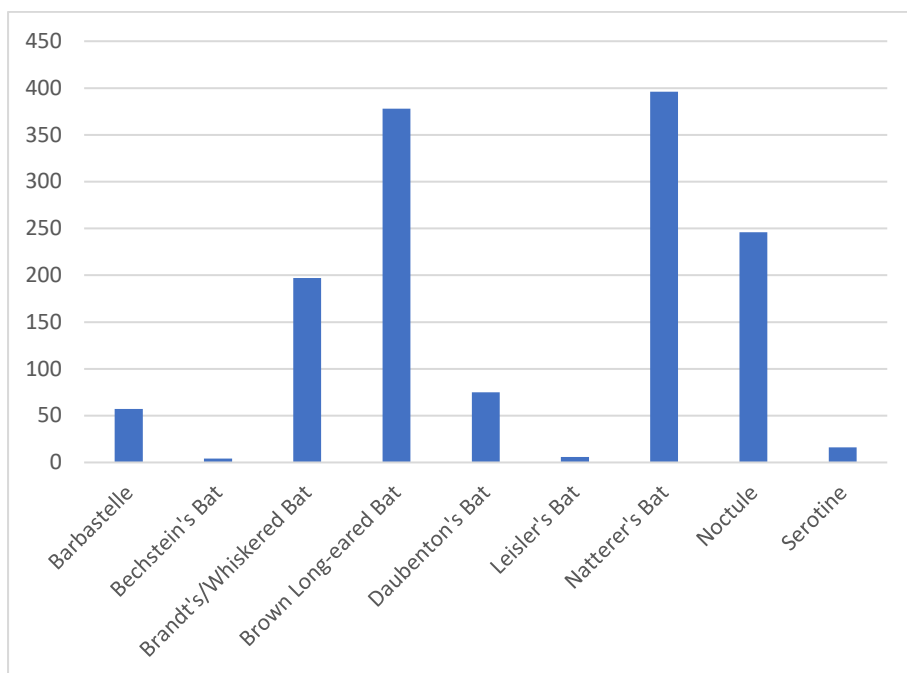


Figure 16 Total bat calls across the site excluding pipistrelle bats

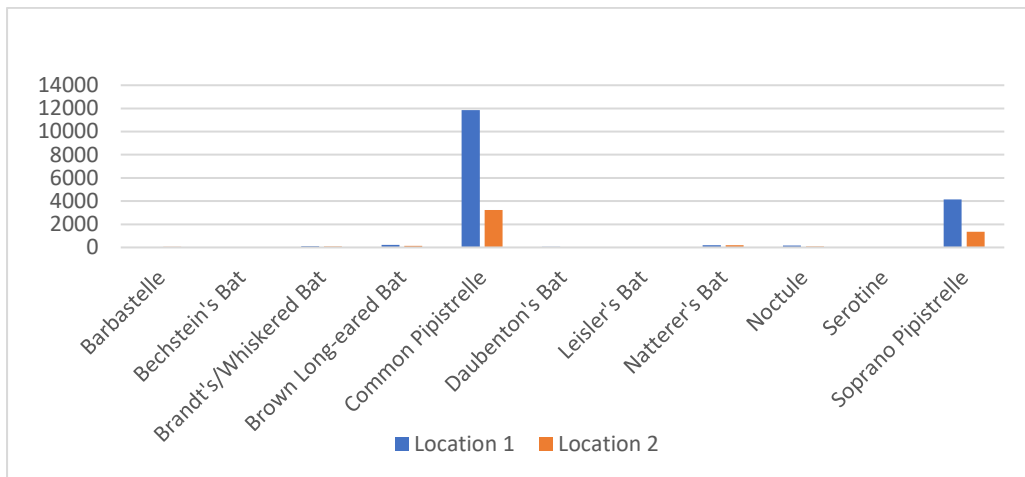


Figure 17 Total bat calls per location

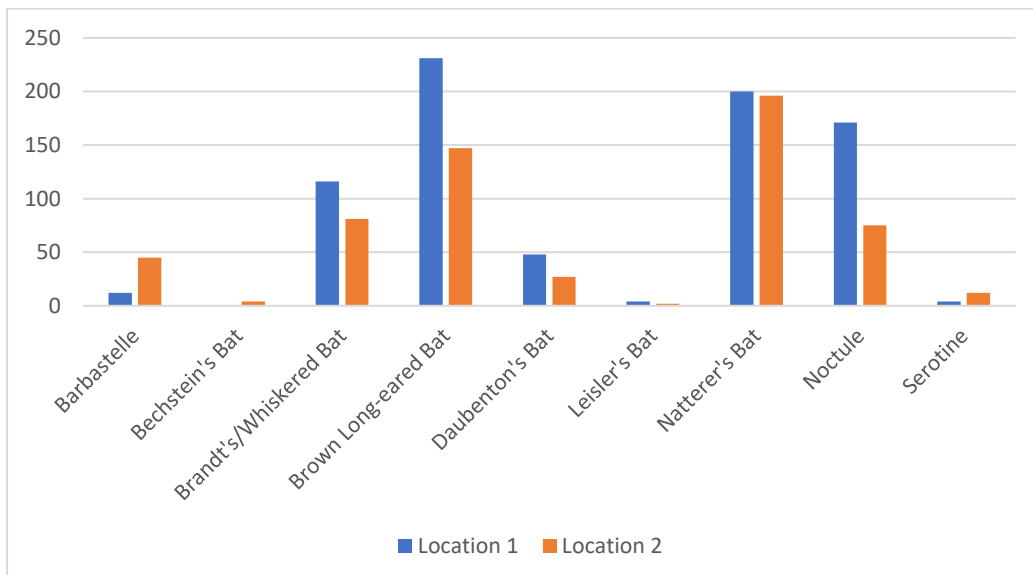


Figure 18 Total bat calls per location without pipistrelles

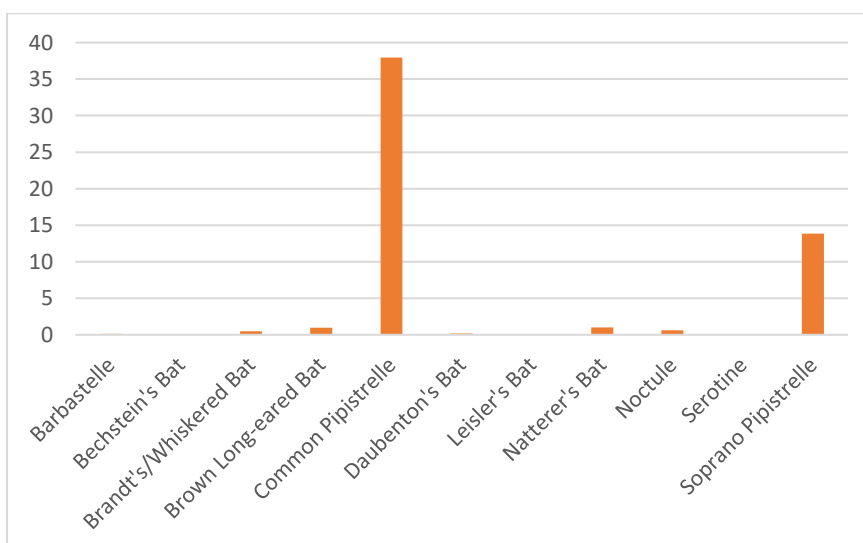


Figure 19 Total bat calls per hour

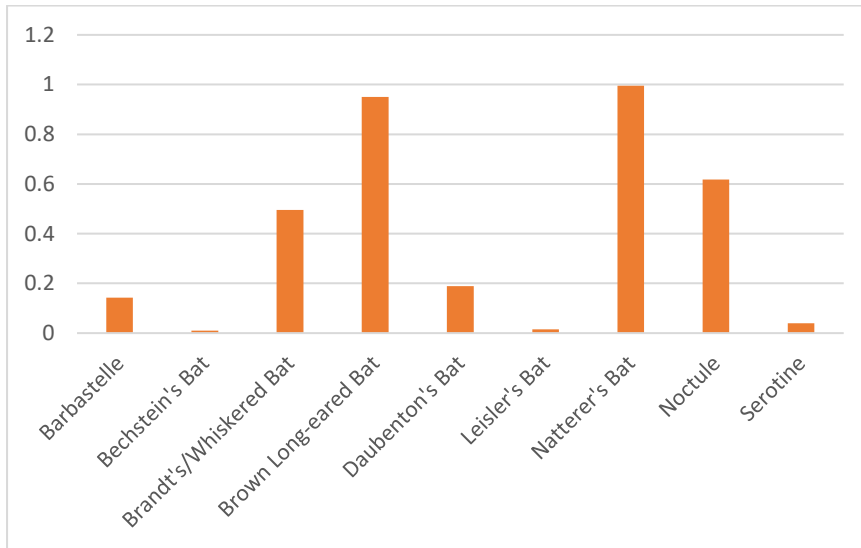


Figure 20 Total bat calls per hour without pipistrelles

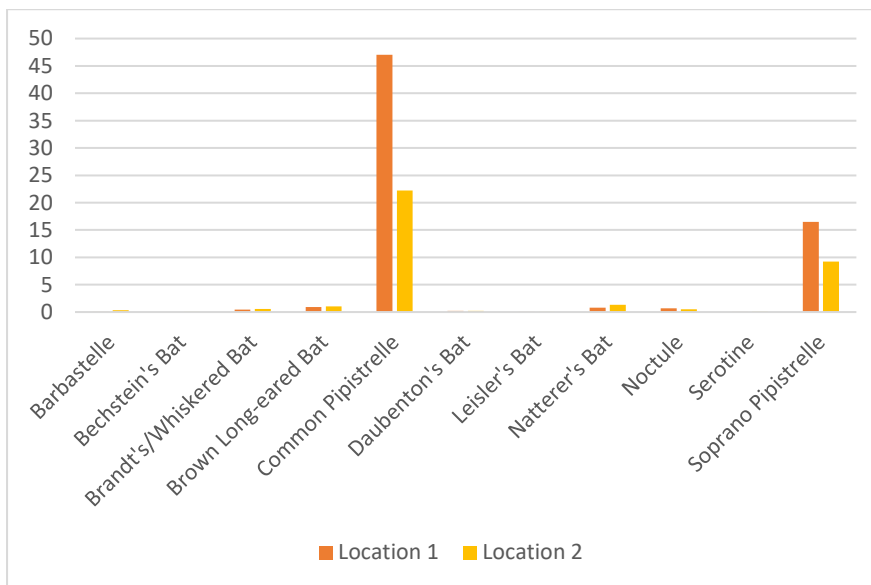


Figure 21 Calls per hour per location

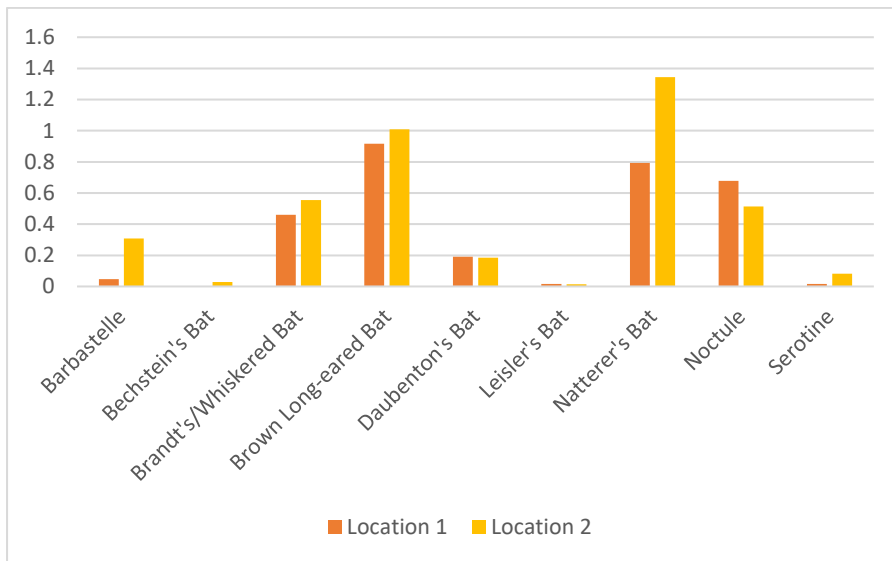


Figure 22 Calls per hour per location without pipistrelles

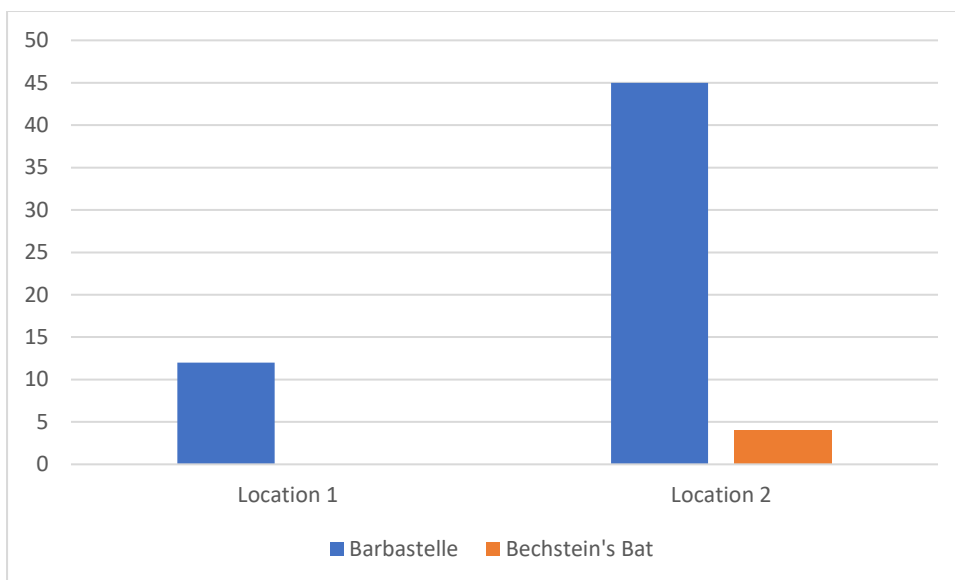


Figure 23 Total Barbastelle and Bechstein's Bat calls per location

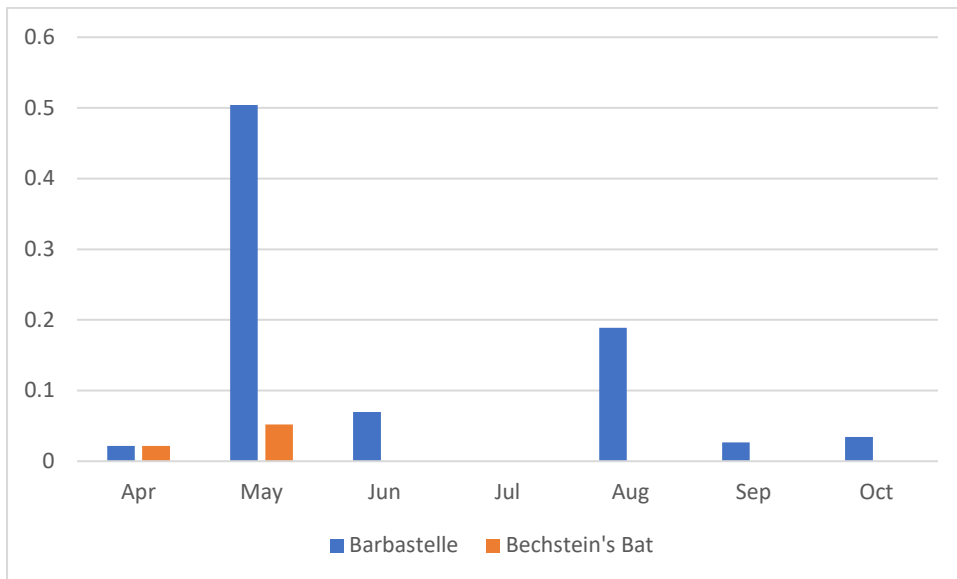


Figure 24 Total barbastelle and Bechstein's bat calls per hour per month

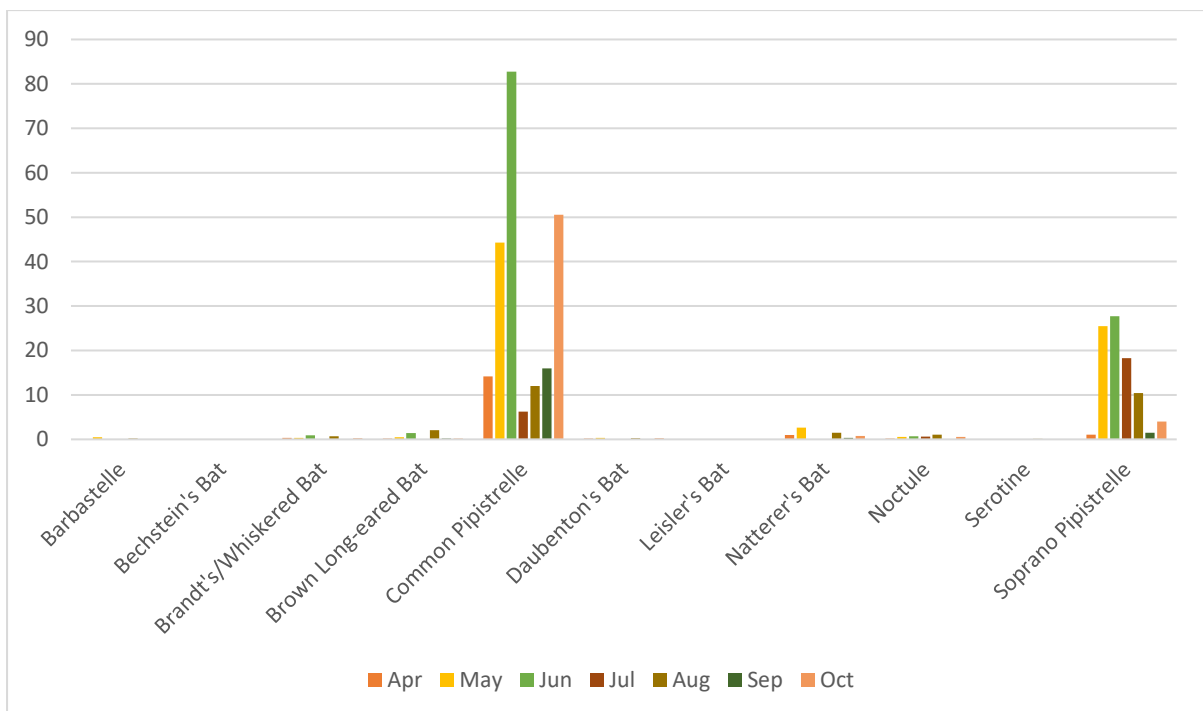


Figure 25 Calls per hour per month