

APPENDIX 10.3 - NICHOLAS KING HOMES AND LIGHTWOOD STRATEGIC APPLICATION TECHNICAL APPENDIX

Technical Appendix Report

**Byway 30 Works, Nicholas King Homes
& Lightwood, Wokingham**

July 2024

Ecology | Green Space | Community | GIS

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Report Produced for **Nicholas King Homes & Lightwood
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SUMMARY

Purpose of the Report	This Report has been produced by Ethos Environmental Planning on behalf of Nicholas King Homes & Lightwood Strategic Ltd. It provides an assessment of the likely ecological effects associated with the highway corridor crossing a byway and an active travel connection providing pedestrian/cycle access to the Byway in Wokingham.
Description of the scheme	The development proposals for the site include plans for a 30m highway corridor providing a crossing of Byway 30 to allow access between the Lightwood and Nicholas King Homes site and an active travel connection to the north providing pedestrian/cycle access to the Byway from the Lightwood site, approximately 10m long by 3m wide.
Methodology	A desk study and UK Habitat Classification survey were undertaken for the site in 2021, respectively. Detailed surveys for bats, reptiles, amphibians, dormice and badger were undertaken throughout 2021 - 2023.
Baseline Ecological Conditions	The site comprised an area of artificial land, sealed surface with native species-rich hedgerows associated with ditches bordering the site. The surveys identified bats commuting along the hedgerows on site. The surveys identified that hazel dormice are absent from the site. The hedgerows were assessed as suitable habitat for invertebrates and birds.

1 INTRODUCTION

- 1.1 This technical appendix report has been prepared by Ethos Environmental Planning (Ethos) on behalf of Nicholas King Homes and Lightwood Strategic Ltd and should be read in conjunction with Chapter 10 - Biodiversity. The report was written by Ellie Shearn BSc (Hons), Ecologist, and reviewed by 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 2.12.
- 1.2 The report provides the results of surveys undertaken in relation to the proposed works on Byway 30, also known as 'Lightwood Strategic Application Area' (Central Grid Reference SU 83070 67394), hereafter referred to as 'the site' and shown in Figure 1. The works will comprise a 30m highway corridor providing a crossing of Byway 30 to allow access between the Lightwood and Nicholas King Homes site and an active travel connection to the north providing pedestrian/cycle access to the Byway from the Lightwood site, approximately 10m long by 3m wide. This forms the byway application of the South Wokingham Strategic Development Location (SDL) Extension, shown in Figure 2. The site is located in the south Wokingham, Berkshire.
- 1.3 The site comprises a 30m length of byway and a 10m long length of hedgerow.



Figure 1 Site location





Figure 3 Site location

- 1.4 The site is proposed for a crossing of the Byway for site access and an active travel connection providing pedestrian/cycle access to the Byway from the site, as shown in the Project EIA Illustrative Masterplan (John Simpson Architects Ltd, 2023^b).
- 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 November 2021 with subsequent follow up surveys undertaken between 2021 - 2023. 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 1km of the development site and granted European Protected Species (EPS) licences within 1km 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 17th November 2021 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).

2.4 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.
- 2.6.2 150 dormouse tubes were deployed in suitable habitat across the surrounding sites 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 Bats

- 2.7.1 The methodology for the bat survey has been informed by the 'Bat Surveys for Professional Ecologists Good Practice Guidelines 3rd Edition' (Collins, 2016).
- 2.7.2 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.

- 2.7.3 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.

Activity surveys

- 2.7.4 Bat activity surveys were undertaken on the adjacent sites to highlight any important commuting or foraging features on this and the other sites throughout the wider application. This included six 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.
- 2.7.5 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.
- 2.7.6 The transect is displayed within Figure 4 below and the dates of the surveys are provided below.



Figure 5 Activity survey transects and listening points

Automated/static surveys

- 2.7.7 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 6 Static bat detector locations

- 2.7.8 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.

2.8 Birds

- 2.8.1 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.

2.9 Invertebrates

- 2.9.1 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).

2.10 Limitations

- 2.10.1 Over the course of the static detector surveys, several of the static detectors failed to record any data due to technical failures. It was assessed that this was not a significant limitation due to the extensive monitoring throughout the remaining active season.
- 2.10.2 Activity surveys were focused on the surrounding land outside of the redline application for this report. The significant survey data can provide an overview of bats within the area but assumptions have been made for how bats use the byway itself. This limitation could have significant implications to the assessment and conclusions of impacts of the proposals.

2.11 Evaluation of Ecological Features

- 2.11.1 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.
- 2.11.2 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.

2.12 Personnel

- 2.12.1 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.	Bat and dormouse surveyor
Dan Carpenter	Principal Consultant (Biodiversity Net Gain)	BSc(Hons), PhD, CEnv, MIEEnvSc, 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 and its application in development, land management and nature conservation.	Bat surveyor
Martin Smith	Senior BNG Consultant	BSc (Hons) Class 2 Bat Licence (NE)	Martin is a qualified tree climber and holds licences for dormouse, bats, and GCN.	Bat surveyor and UKHab surveyor

Ecologist	Position	Qualifications/ Licences	Experience	Role in assessment
		Class 1 dormouse licence (NE) Class 1 GCN Licence	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.	
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.	UKHab, bat, badger and dormouse surveyor
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.	Bat, dormouse and tree surveyor
George Clutterbuck	Environmental Analyst	Level 2 Certificate and Diploma in Work-based Environmental Conservation Working towards a certificate of higher learning: Field Ecology - currently Level 2 Certificate and Diploma in Work-based Environmental Conservation	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 using GIS software to achieve Biodiversity Net Gain.	UKHab, bat and drone surveyor
Joel Sellors-Moore	Ecologist	MSc, Qualifying CIEEM	Has over four years' experience in ecological field survey and consultancy. Joel	Bat, dormouse, UKHab and tree surveyor

Ecologist	Position	Qualifications/ Licences	Experience	Role in assessment
			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.	
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 surveyor
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, dormouse and UKHab surveyor
Sarah Roberts	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, dormouse and UKHab surveyor
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.	Bat and dormouse surveyor. Report author
Ben Smurthwaite	Ecologist	MSc, BSc (Hons) Qualifying CIEEM Class 1 GCN Licence (NE) Class 1 Bat Licence (NE)	Ben has over three years' experience in ecological field surveys and consultancy, and is responsible for managing projects, undertaking habitat and protected species surveys and biodiversity net gain assessments, and is a licenced bat and great crested newt worker.	Bat and dormouse surveyor
Kate Downes	Ecologist	MSc, BSc (Hons), DET, QTLS Qualifying CIEEM	Kate is an assistant ecologist at Ethos with a special interest and relevant field	Dormouse and bat surveyor

Ecologist	Position	Qualifications/ Licences	Experience	Role in assessment
			survey experience in ornithology. Kate assists with fieldwork and report-writing for habitats and protected species.	
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 surveyor
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 surveyor

3 BASELINE ECOLOGICAL CONDITIONS

3.1 Designated Sites

Statutory Designated Sites

- 3.1.1 The background data search identified one statutory designated site within 2km of the site.
- 3.1.2 Heath Lake is a LNR and a SSSI that consists of a small, shallow lake, surrounded by birch and pine woodland with areas of relict heathland. Heath Lake is a long-established open water habitat supporting specialist communities of native plants and animals. Of particular interest are populations of some uncommon and rare aquatic plant species.



Figure 7 Statutory designated sites within 2km

Non-statutory Designated Sites

- 3.1.3 The data search returned records of one Local Wildlife Sites within the 2km search radius, as detailed in Table 3.

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.	730m 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 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	1.86km NE
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	1.03km NE

		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 planation 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 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.	1.6km 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.	1.5km 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	1.26km W

		dense nettles and currant (probably redcurrant). The richest areas of ground flora are found along the paths. Species present include moschatel and yellow archangel.	
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.	1.95km 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.	1.6km 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	1.4km S

		reptiles and butterflies such as silver studded blue and grayling.	
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Ancient Woodland

- 3.1.4 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 7 below. None are located within proximity to the site.

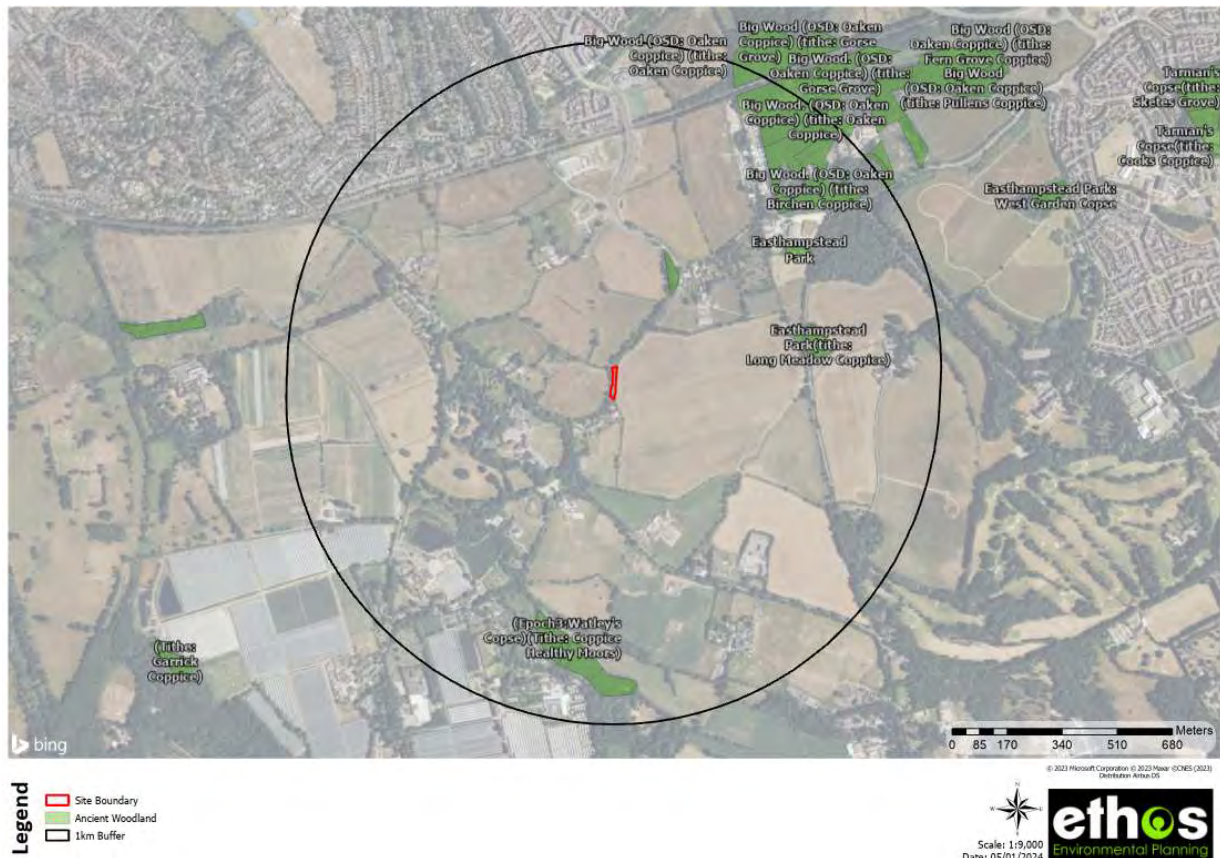


Figure 8 Ancient woodland parcels within 1km of the site

Priority Habitats

- 3.1.5 Many parcels of deciduous woodland and two parcels of traditional woodland are located immediately adjacent to and close to the site, as shown in Figure 8.

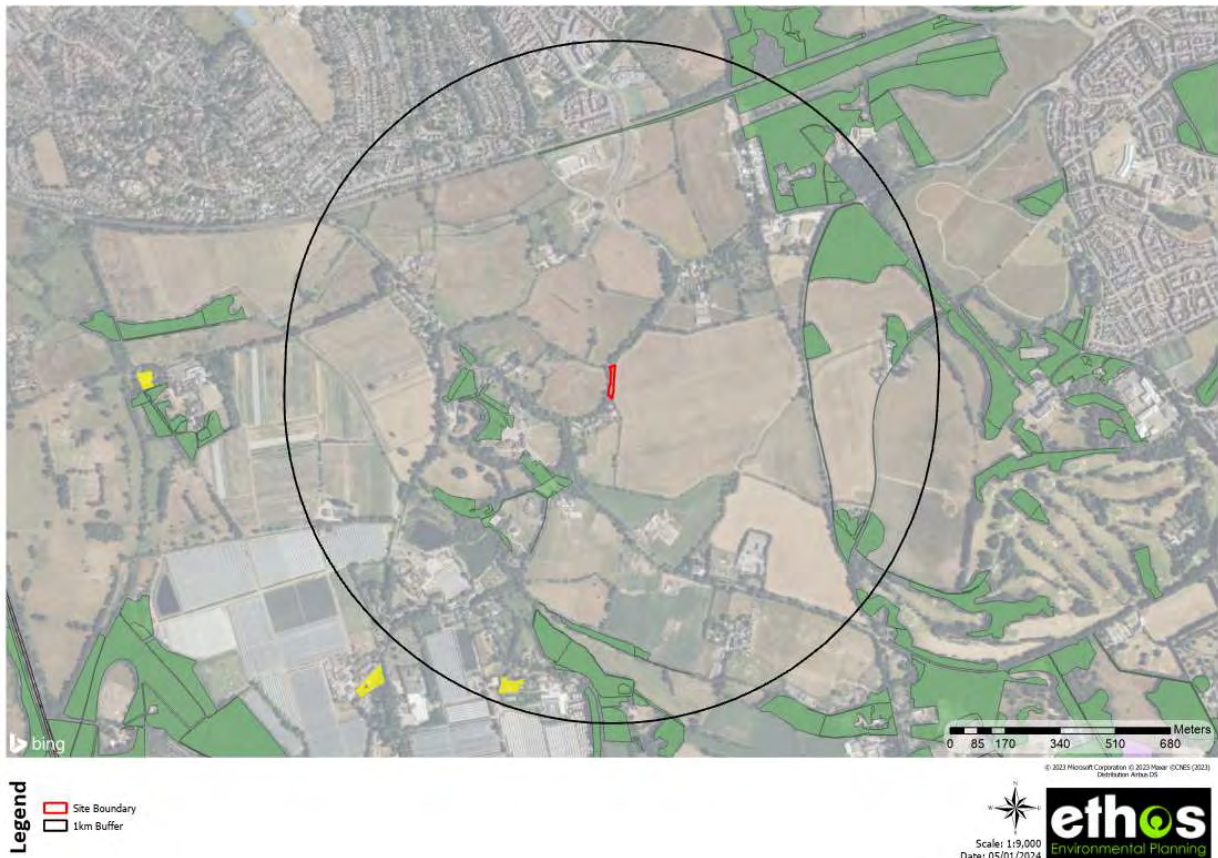


Figure 9 Priority habitats within 1km of the site. Green depicts deciduous woodland and yellow depicts traditional orchard.

3.2 Habitats

General Site Description

- 3.2.1 The site is comprised of a Byway of artificial unvegetated; unsealed surface lined with two hedgerows and areas of mixed scrub.

UKHab Survey

- 3.2.2 Figure 8 displays the key habitats using the UK Habitat classifications. Descriptions of the habitats are provided in the following section. The UKHab was first undertaken in 2022 and then updated in July 2023.



Figure 10 UKHab survey

Artificial unvegetated, unsealed surface

- 3.2.3 A parcel of artificial unvegetated, unsealed surface is present along the site comprising a gravel pathway along the Byway.
- 3.2.4 The parcel does not meet the criteria as a habitat of principal importance and is not considered to be of particular nature conservation importance.



Photo 1 Artificial unvegetated, unsealed surface (Google Maps)



Photo 2 Artificial unvegetated, unsealed surface (Google Maps)

Hedgerows

- 3.2.5 The hedgerows of the site are species-rich native hedgerow with trees associated with a ditch. The eastern hedgerow (H12) functions as a double hedgerow with that on the western boundary of the Prior's Farm site, as seen in Photo 6. The species included in this hedgerow are: pedunculate oak (*Quercus robur*), blackthorn, field maple (*Acer campestre*), ash (*Fraxinus excelsior*), elder (*Sambucus nigra*), hawthorn and dog rose.
- 3.2.6 The western hedgerow (H11) was similar in composition and is comprised of: oak, field maple, blackthorn, holly (*Ilex aquifolium*), hawthorn, elder, dog rose and elm (*Ulmus procera*). The western hedgerow is functionally linked to that of the eastern side of the Pearce's Farm site.



Photo 3 Hedgerow from Byway internal



Photo 4 Eastern hedgerow from Byway external

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 No NERC S.41 mammals were recorded on site.
- 3.3.3 The site was dominated by artificial unvegetated, unsealed surface with hedgerows, which provides good potential habitats for hedgehog and brown hare. The only features for hedgehog were assessed to be the hedgerows. Overall, it was considered that the site held potential for hedgehog and brown hare. It was determined that the site was not suitable for harvest mouse or polecat given the lack of suitable habitat and background data search records.
- 3.3.4 Hedgehog and brown hare are listed as a 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** for 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.
- 3.5.2 155 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 Bats

Background data search

- 3.6.1 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.

- 3.6.2 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.
- 3.6.3 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.
- 3.6.4 Six European Protected Species (EPS) licences were returned within a 2km background data search for bats:
- (2014-4527-EPS-MIT) returned for Brandt's bat, brown long-eared bat, common and soprano pipistrelle and whiskered bat from 2014 – 2025, located 300m south of the site.
 - (2014-4527-EPS-MIT-1) returned for Brandt's bat, brown long-eared bat, common and soprano pipistrelle and whiskered bat from 2015 – 2025, located 300m south of the site.
 - (EPSM2013-5937) returned for common and soprano pipistrelle from 2013 – 2014, located 1.9km south of the site.
 - (EPSM2009-993) returned for common pipistrelle from 2009 – 2011, located 2km northeast of the site.
 - (2018-34805-EPS-MIT) returned for brown long-eared bat and common pipistrelle returned from 2018 – 2023 located 1.3km west of the site.
 - (2018-37587-EPS-MIT-1) returned for brown long-eared bat, common and soprano pipistrelle bats from 2018 – 2023, located 2km north of the site.

Habitat context

- 3.6.5 The hedgerows on site were assessed to be the only valuable features for commuting and foraging bats. The site was connected to several small woodland copses and a larger, connected woodland section in the north of the site. The hedgerows provided good connectivity to the wider area. The habitats on site were therefore assessed to have moderate potential for commuting and foraging bats.
- 3.6.6 The wider area was comprised of a network of arable land, hedgerows and small sections of woodland that provides good connectivity from the site to the wider area. There are several small ponds nearby as well as the one onsite that were assessed to hold moderate potential to support foraging bats.

Trees

- 3.6.7 Tree surveys have been undertaken by Quaife Woodland and The Environmental Dimension Partnership (EDP) on the site. It has been determined that no trees will be removed on site for the proposed development.
- 3.6.8 No direct impacts will be incurred from the proposed development, and indirect impacts will be incurred.

Activity transect surveys

East of the site

- 3.6.9 Seven bat activity transect surveys were undertaken between April – October 2022 across the adjacent application site to the east of the site with eight species recorded, namely: common pipistrelle, soprano pipistrelle, noctule, serotine, brown long-eared bat, Natterer's bat, Daubenton's bat and unknown Brandt's/whiskered bat.
- 3.6.10 The highest levels of activity were recorded in the July surveys.
- 3.6.11 *Myotis spp* were only recorded in low levels on two surveys, once in May along the southwest of transect 2 and along three times along the northern boundary of transect 1 in August.
- 3.6.12 The detailed results of the activity surveys are detailed in Appendix 1 of the Lightwood Technical Appendix Report (Appendix 10.1).

West of the site

- 3.6.13 Seven activity transect surveys were undertaken between April and October 2022 across the adjacent application site to the west of the site 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*.
- 3.6.14 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.
- 3.6.15 The detailed results of the activity surveys are detailed in Appendix 2 of the Nicholas King Homes Technical Appendix Report (Appendix 10.2).

Static detector surveys

East of the site

- 3.6.16 Twelve species were recorded on the static detectors deployed on the adjacent application site to the east of the site, namely barbastelle, Bechstein's bat, Brandt's/whiskered bat, brown long-eared bat, common pipistrelle, Daubenton's bat, Leisler's bat, Nathusius's pipistrelle, Natterer's bat, noctule, serotine and soprano pipistrelle.
- 3.6.17 Common pipistrelle comprised 72% of total calls recorded, followed by soprano pipistrelle comprising 22.6% of total calls recorded. Low numbers of barbastelle (0.24%) and Bechstein's bat (0.01%) were recorded across the site.
- 3.6.18 The detailed results of the static detector surveys are detailed in Appendix 1 of the Lightwood Technical Appendix Report (Appendix 10.1).

West of the site

- 3.6.19 A total of eight species of bat were recorded across detectors deployed on the adjacent application site to the west of 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*).
- 3.6.20 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 Brandt's/Whiskered bat (0.8%) of all bat calls. *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% of all calls recorded.
- 3.6.21 Detailed results from the static detector surveys are located in Appendix 2 of the Nicholas King Homes Technical Appendix Report (Appendix 10.2).

3.7 Birds

- 3.7.1 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*).
- 3.7.2 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*).

- 3.7.3 No Schule 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.
- 3.7.4 The artificial land, sealed surface provides no opportunity for ground nesting birds, and therefore it is assessed that ground nesting birds are absent.
- 3.7.5 The hedgerows could provide potential breeding habitats for common and widespread species of birds.

3.8 Invertebrates

- 3.8.1 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.

- 3.8.2 The site comprised artificial land, sealed surface, which provides negligible 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.

3.9 Invasive Species

- 3.9.1 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; all records besides *Crangonyx pseudogracilis/floridanus* were located over 1km from the site.
- 3.9.2 No invasive species were recorded on site.

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APPENDIX 10.4 - BASELINE PHOTOS



Photo 1 Modified grassland



Photo 2 Modified grassland



Photo 3 Modified grassland



Photo 4 Modified grassland



Photo 5 Other neutral grassland



Photo 6 Other neutral grassland



Photo 7 Mixed scrub



Photo 8 Mixed scrub



Photo 9 Woodland



Photo 10 Woodland



Photo 11 Cropland



Photo 12 Artificial unsealed surface



Photo 13 Developed land; sealed surface



Photo 14 Developed land; sealed surface



Photo 15 Vegetated garden



Photo 16 Vegetated garden



Photo 17 Emm Brook tributary



Photo 18 Emm Brook



Photo 19 Ditch



Photo 20 Ditch



Photo 21 Pond



Photo 22 Pond



Photo 23 Hedgerow H1



Photo 24 Hedgerow H2



Photo 25 Hedgerow H3



Photo 26 Hedgerow H4



Photo 27 Hedgerow H5



Photo 28 Hedgerow H6



Photo 29 Hedgerow H7



Photo 30 Line of trees H8



Photo 31 Hedgerow H9



Photo 32 Hedgerow H10



Photo 33 Hedgerow H11



Photo 34 Hedgerows H12 and H13



Photo 35 Hedgerow H13



Photo 36 Hedgerow H14



Photo 37 Hedgerow H15



Photo 38 Hedgerow H16



Photo 39 Hedgerow H17



Photo 40 Hedgerow H18



Photo 41 Hedgerow H19



Photo 42 Hedgerow H20



Photo 43 Hedgerow H21



Photo 44 Hedgerow H22



Photo 45 Hedgerow H23



Photo 46 Hedgerow H24



Photo 47 Hedgerow H25



Photo 48 Hedgerow H26



Photo 49 Hedgerow H27



Photo 50 Hedgerow H28



Photo 51 Hedgerow H29



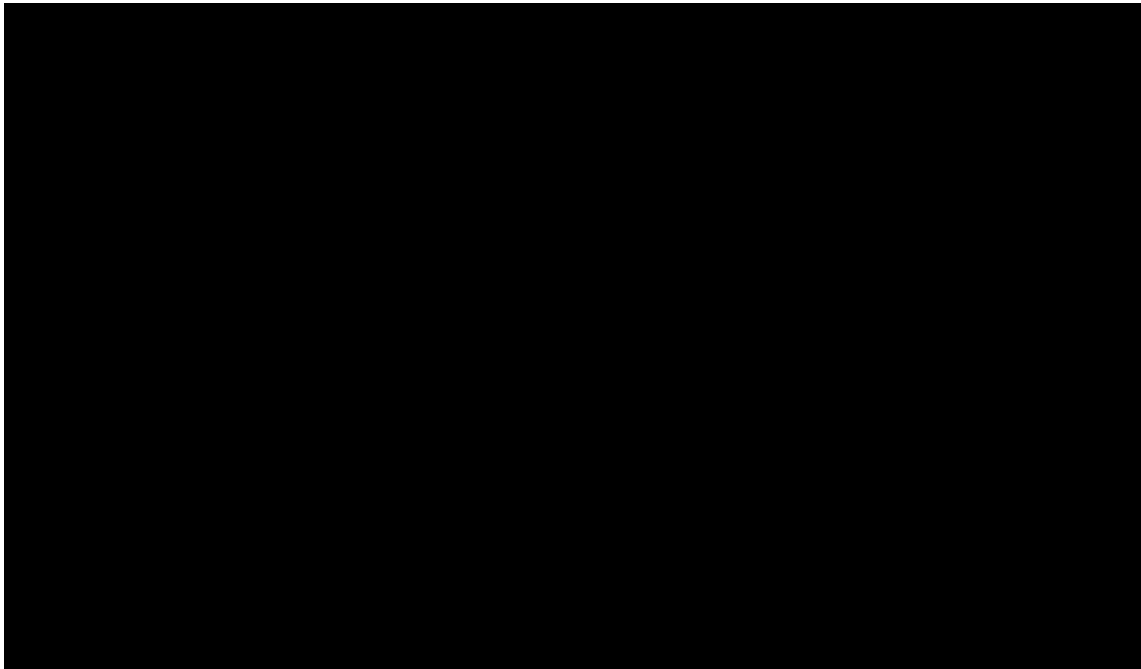
Photo 52 Hedgerow H30



Photo 53 Hedgerow H31



Photo 54 Hedgehog dropping



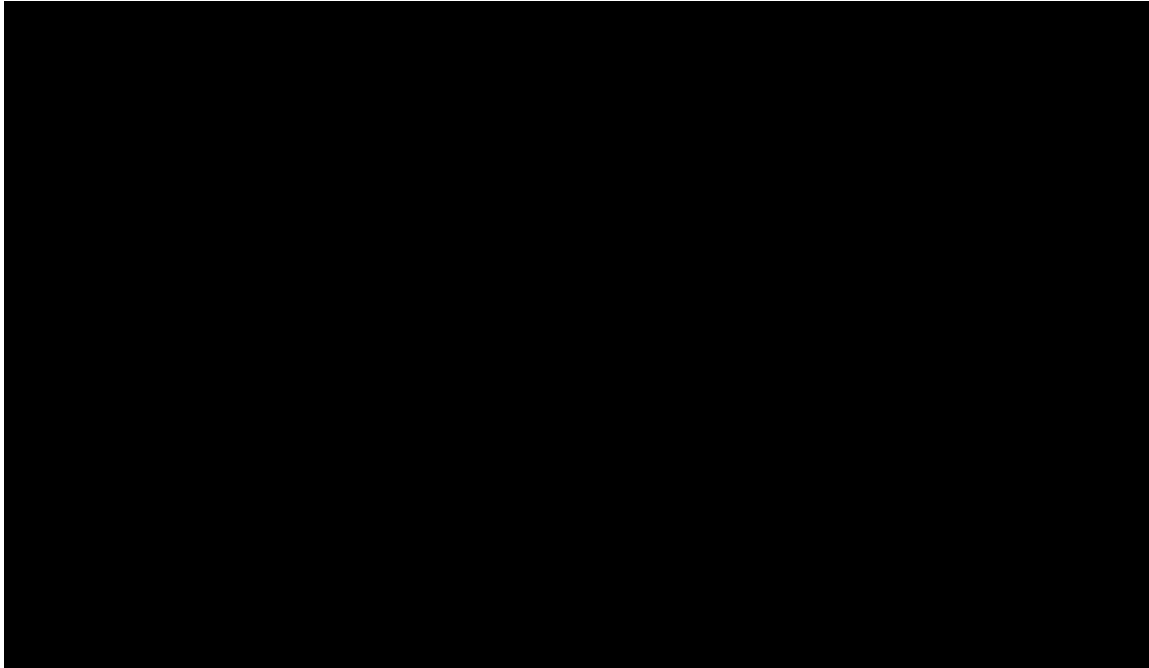


Photo 58 Wood mouse nest



Photo 59 Wood mouse nest



Photo 60 Bank vole droppings



Photo 61 Building B1



Photo 62 Building B1



Photo 63 Building B1



Photo 64 Building B1 – missing tiles



Photo 65 Building B2



Photo 66 Building B2 – missing tile



Photo 67 Building B2



Photo 68 Building B3



Photo 69 Building B3



Photo 70 Building B3



Photo 71 Building B3 – loft hatch used by BLE



Photo 72 Building B3 – clustered bat droppings



Photo 73 Building B4



Photo 74 Building B5



Photo 75 Building B5



Photo 76 Building B6



Photo 77 Building B6



Photo 78 Building B7



Photo 79 Building B7



Photo 80 Building B8



Photo 81 Building B8



Photo 82 Building B8



Photo 83 Building B8 – split in panelling



Photo 84 Building B9



Photo 85 Building B9



Photo 86 Building B10



Photo 87 Building B11



Photo 88 Building B12



Photo 89 Building B12



Photo 90 Building B12



Photo 91 Buildings B13 – B17



Photo 92 Buildings B13 – B17



Photo 93 Building B3 – BLE emergence point



Photo 94 Bird nest on B1



Photo 95 Bird nest behind missing tile on B2



Photo 96 One of ten house martin nests in B3



Photo 97 Blackbird nest in H7



Photo 98 Pond P2 dried out



Photo 99 Pond P3



Photo 100 Pond P4

APPENDIX 10.5 - BAT DNA 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:

ATGACCAACATTTCGAAAGTCCCACCCTCTCATAAAATTATCAATGACTCATTATTG
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.

Professor Robin Allaby

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APPENDIX 10.6 - BAT STATIC DETECTOR SURVEY RESULTS

Table 1 Total bat calls recorded

Species	Calls
Barbastelle	138
Bechstein's Bat	8
Brandt's/Whiskered Bat	426
Brown Long-eared Bat	694
Common Pipistrelle	39524
Daubenton's Bat	209
Leisler's Bat	17
Nathusius' Pipistrelle	84
Natterer's Bat	468
Noctule	1100
Serotine	72
Soprano Pipistrelle	13182
Total	55922

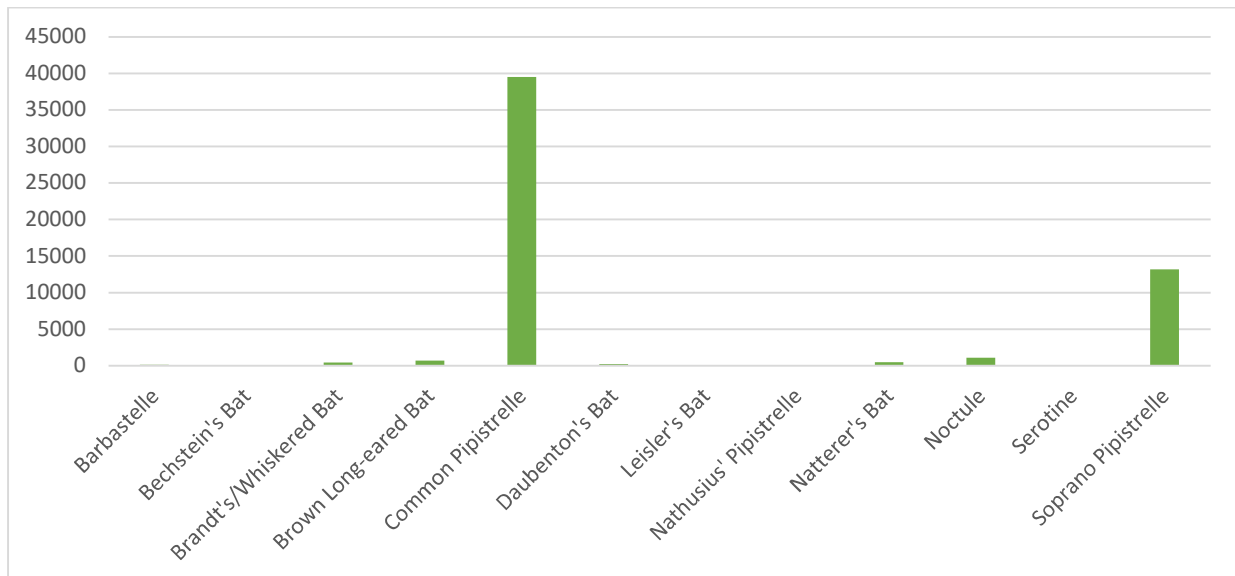


Figure 1 Total bat calls

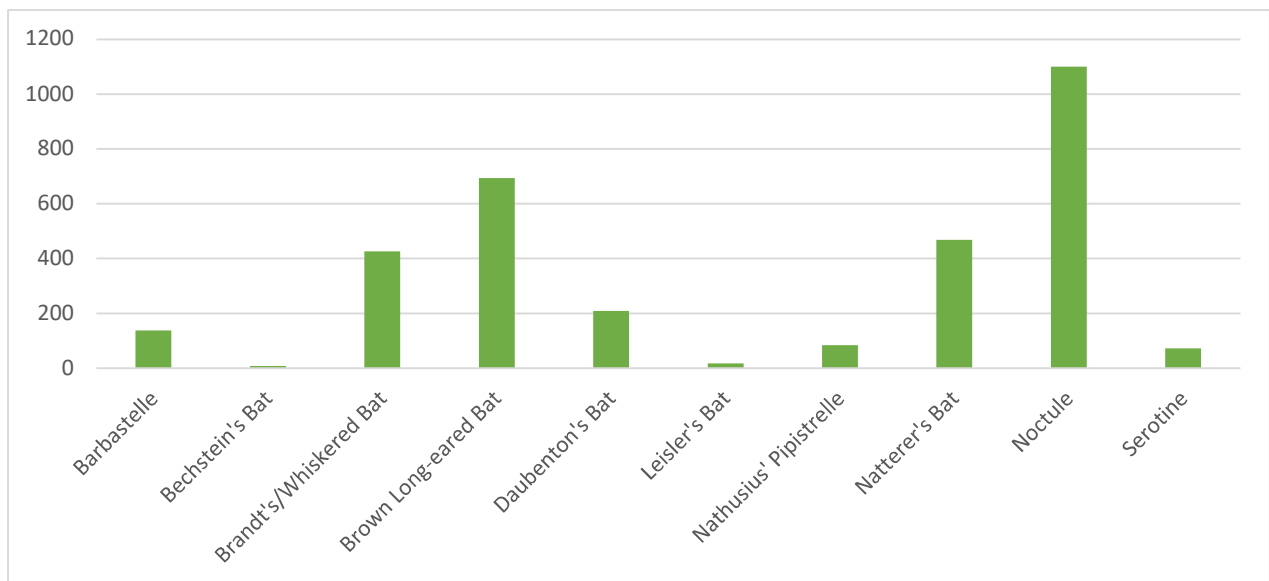


Figure 2 Total bat calls recorded without common or soprano pipistrelle bats

Table 2 Total bat calls per location

Species	A1	A2	B1	B2	B3	B4
Barbastelle	12	45	6	10	46	19
Bechstein's Bat	0	4	4	0	0	0
Brandt's/Whiskered Bat	116	81	3	163	39	24
Brown Long-eared Bat	231	147	75	66	125	50
Common Pipistrelle	11858	3244	2195	18802	1833	1592
Daubenton's Bat	48	27	28	59	10	37
Leisler's Bat	4	2	2	2	4	3
Nathusius' Pipistrelle	0	0	5	50	24	5
Natterer's Bat	200	196	32	7	3	30
Noctule	171	75	201	272	161	220
Serotine	4	12	22	16	6	12
Soprano Pipistrelle	4158	1347	761	3921	1480	1515
Total	16802	5180	3334	23368	3731	3507

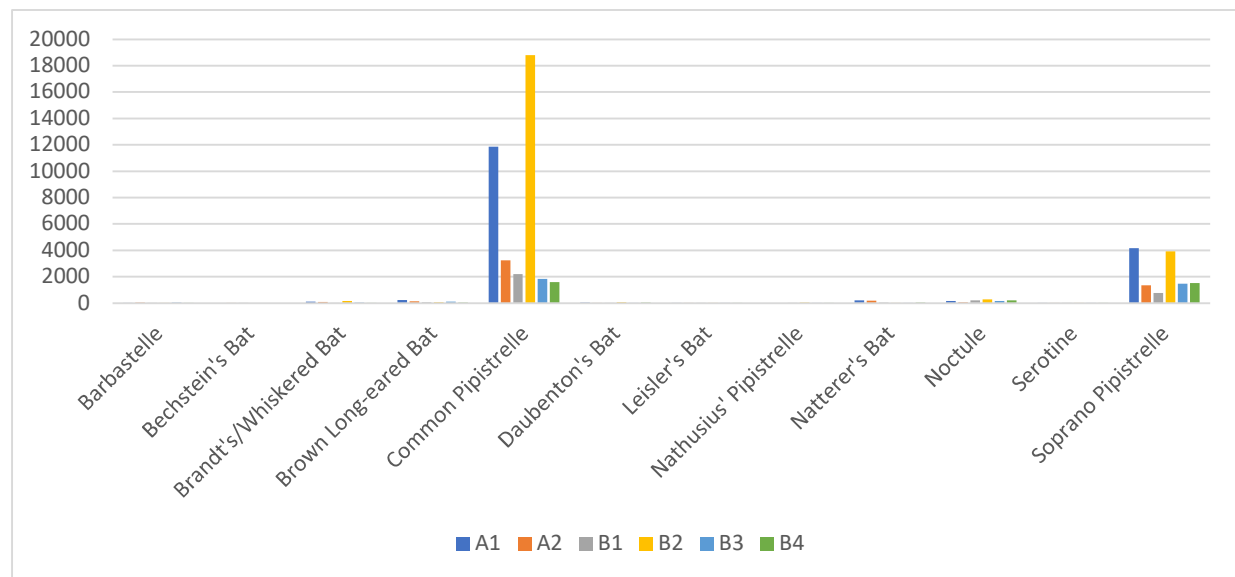


Figure 3 Total bat calls per location

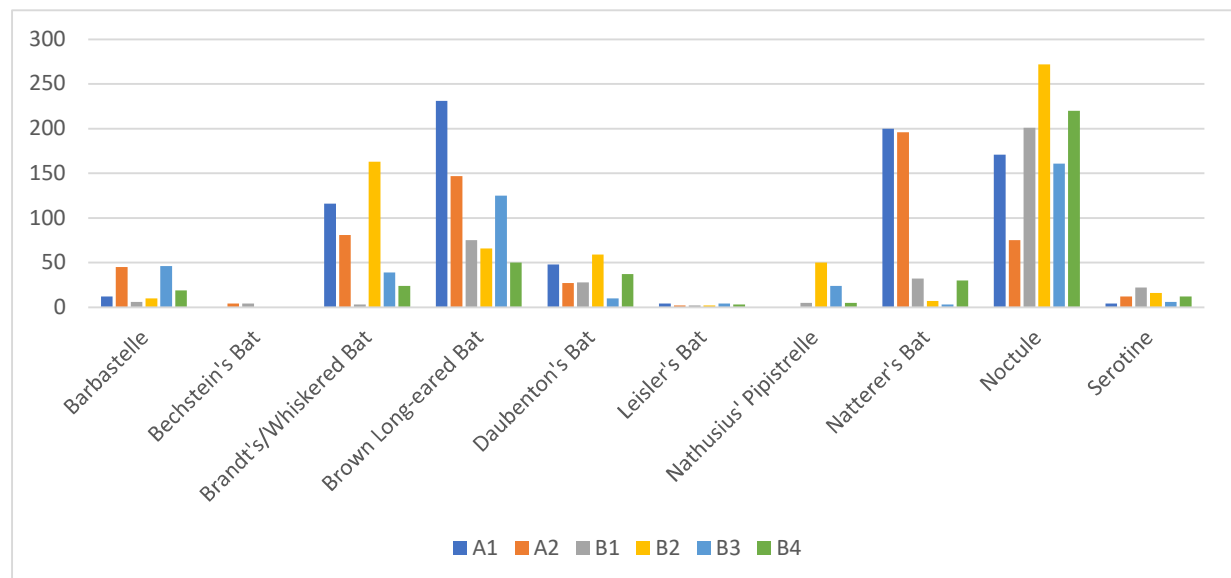


Figure 4 Total bat calls per location, without common or soprano pipistrelle bats

Table 3 Total bat calls per month

Species	Apr	May	Jun	Jul	Aug	Sep	Oct
Barbastelle	1	29	18	2	26	12	50
Bechstein's Bat	3	3	0	0	0	0	2
Brandt's/Whiskered Bat	44	19	125	92	96	1	49
Brown Long-eared Bat	17	27	177	60	279	65	69
Common Pipistrelle	3513	2549	15731	8787	3428	1138	4378
Daubenton's Bat	21	20	65	8	33	8	54
Leisler's Bat	0	0	4	4	5	2	2
Nathusius' Pipistrelle	1	0	81	0	0	1	3
Natterer's Bat	73	151	71	6	148	20	54
Noctule	52	31	219	232	211	58	241

Serotine	0	0	18	32	19	0	3
Soprano Pipistrelle	805	1466	10897	2982	2509	240	1666
Total	4530	4295	10261	12205	6754	1545	6571

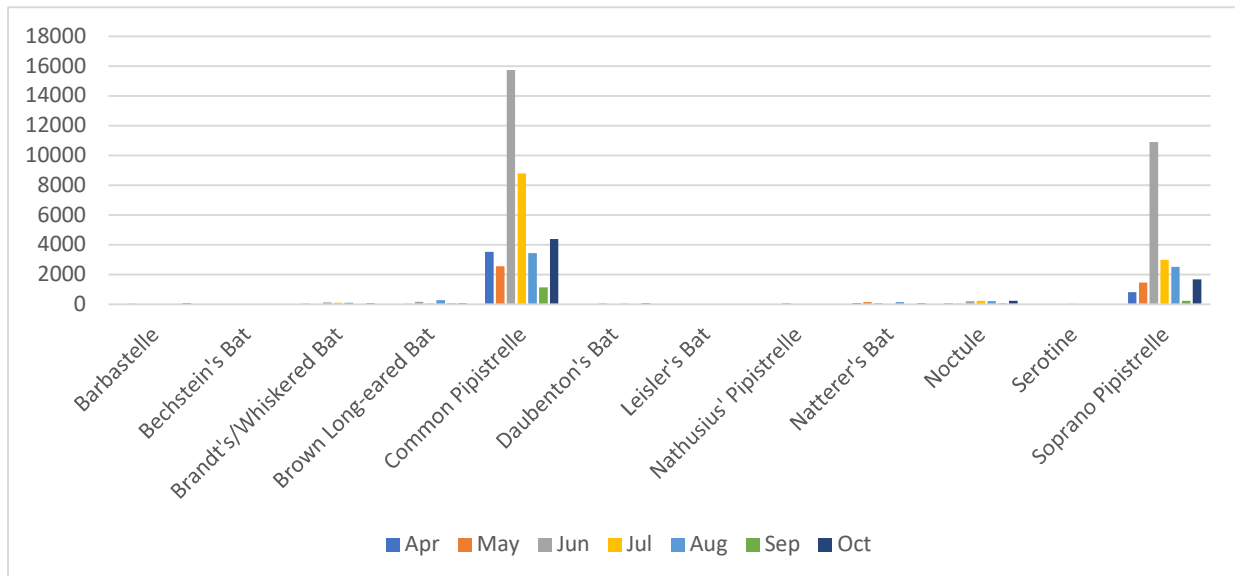


Figure 5 Total bat calls per month

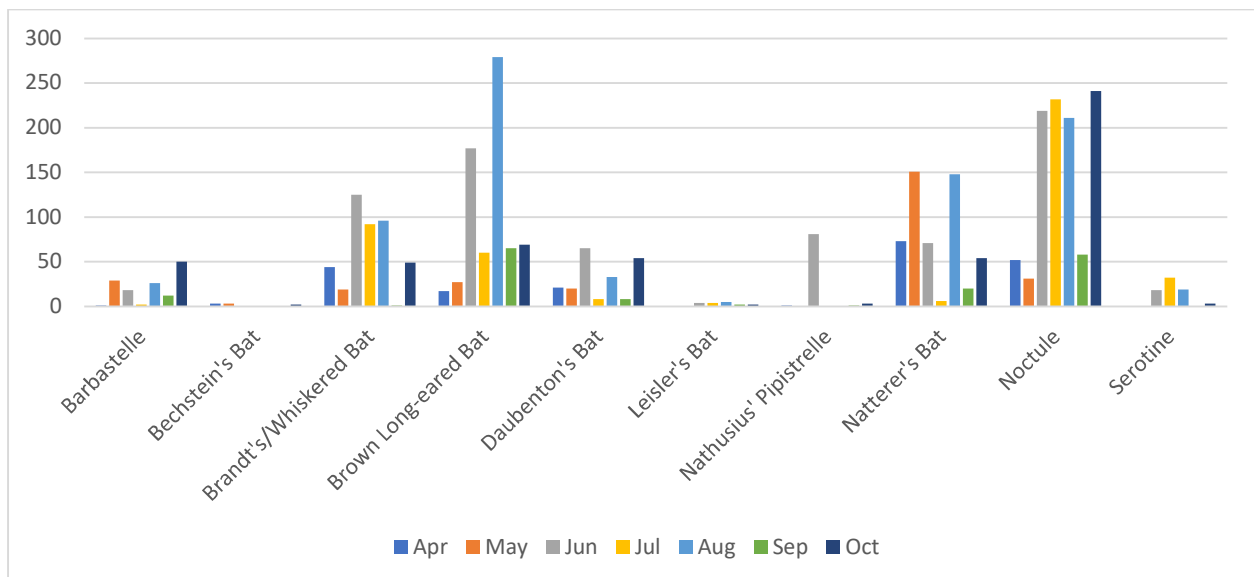


Figure 6 Total bat calls per month, without common or soprano pipistrelle bats

Species	Total
Barbastelle	0.228914
Bechstein's Bat	0.014282
Brandt's/Whiskered Bat	0.737255
Brown Long-eared Bat	1.284067
Common Pipistrelle	63.78333
Daubenton's Bat	0.330215
Leisler's Bat	0.026713

Nathusius' Pipistrelle	0.088876
Natterer's Bat	1.071129
Noctule	1.521645
Serotine	0.09945
Soprano Pipistrelle	21.95392

Table 4 Total bat calls per hour per night

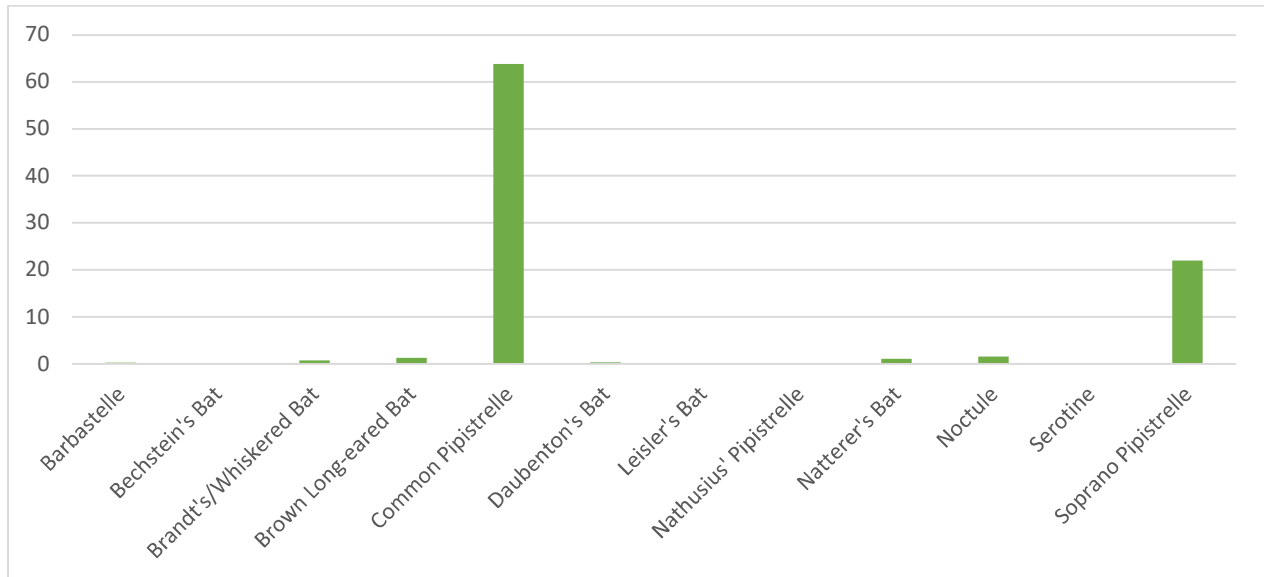


Figure 7 Total bat calls per hour per night

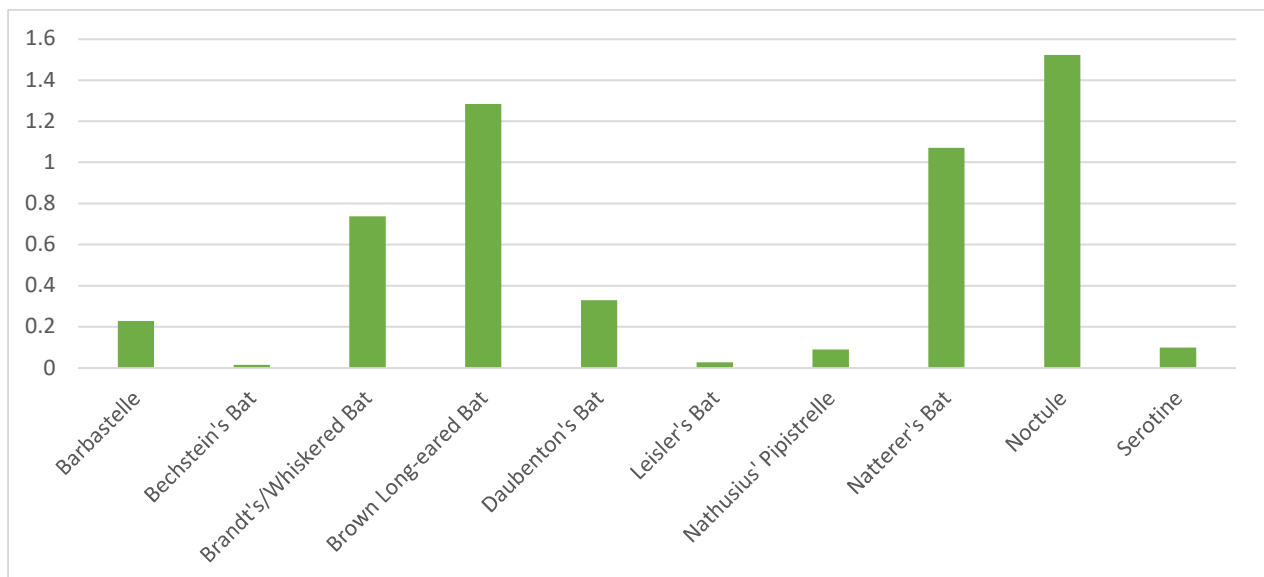


Figure 8 Total bat calls per hour per night, without common or soprano pipistrelle bats

Table 5 Total bat calls per hour per night, per location

Species	A1	A2	B1	B2	B3	B4
Barbastelle	0.047581	0.308621	0.020728	0.046937	0.244135	0.074741
Bechstein's Bat	0	0.027433	0.013819	0	0	0
Brandt's/Whiskered Bat	0.459952	0.555517	0.010364	0.765079	0.206984	0.09441

Brown Long-eared Bat	0.91594	1.008161	0.259103	0.309786	0.663412	0.196688
Common Pipistrelle	47.01824	22.24813	7.583086	88.25158	9.728267	6.262539
Daubenton's Bat	0.190325	0.185172	0.096732	0.27693	0.053073	0.145549
Leisler's Bat	0.01586	0.013716	0.006909	0.009387	0.021229	0.011801
Nathusius' Pipistrelle	0	0	0.017274	0.234687	0.127375	0.019669
Natterer's Bat	0.793021	1.344215	0.110551	0.032856	0.015922	0.118013
Noctule	0.678033	0.514368	0.694396	1.276696	0.854474	0.865426
Serotine	0.01586	0.082299	0.076004	0.0751	0.031844	0.047205
Soprano Pipistrelle	16.48692	9.23805	2.629033	18.40413	7.854792	5.95964

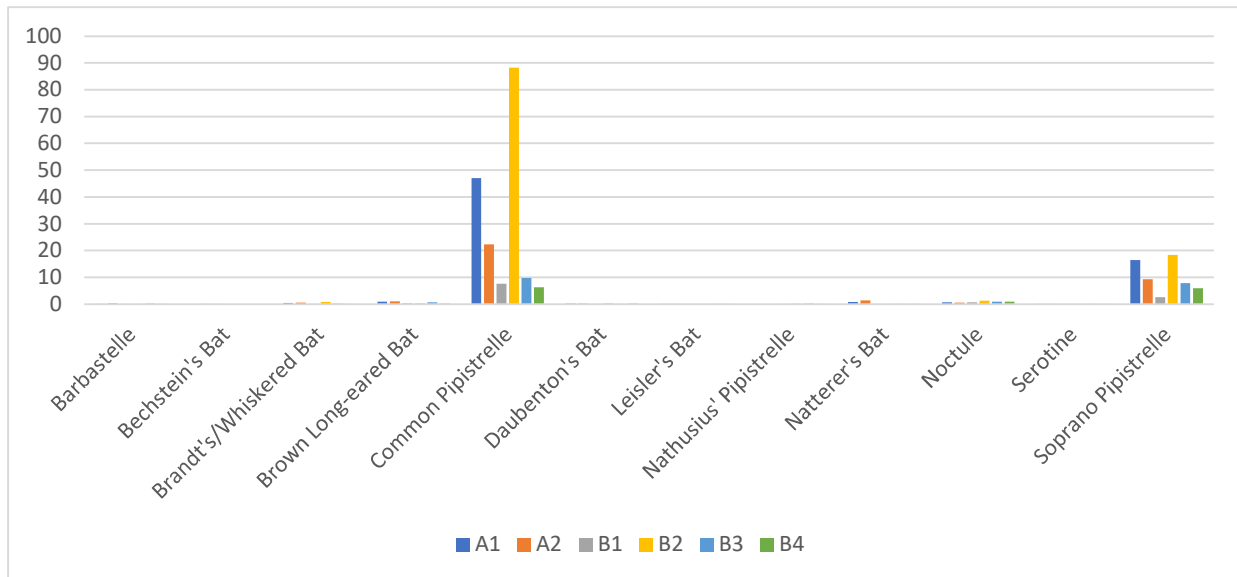


Figure 9 Total bat calls per hour per night, per location

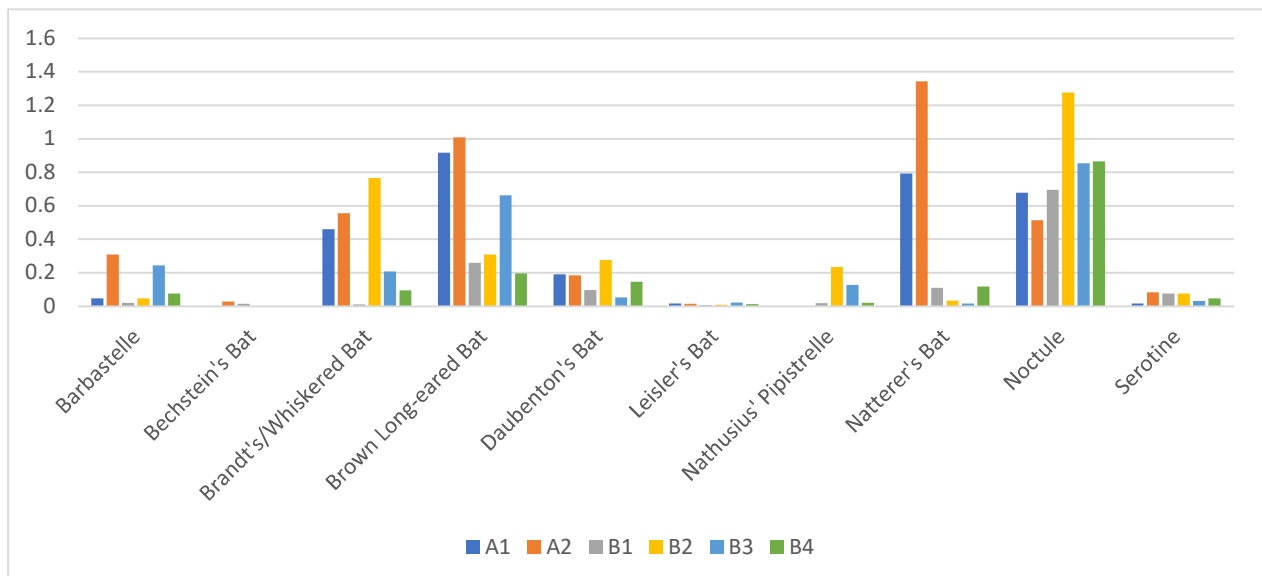


Figure 10 Total bat calls per hour per night, per location, without common or soprano pipistrelle bats

Table 6 Total bat calls per hour per night, per month

Species	Apr	May	Jun	Jul	Aug	Sep	Oct
Barbastelle	0.021853	0.503997	0.123578	0.016142	0.272794	0.12385	0.254646

Bechstein's Bat	0.033508	0.052138	0	0	0	0	0.009176
Brandt's/Whiskered Bat	0.528846	0.330205	1.139966	0.742534	1.00724	0.008846	0.414086
Brown Long-eared Bat	0.243298	0.469239	1.673681	0.484262	2.92729	0.716561	0.467997
Common Pipistrelle	30.87267	44.29962	121.3567	76.2954	35.96685	20.71833	57.17022
Daubenton's Bat	0.250583	0.347584	0.326856	0.064568	0.346239	0.088464	0.462262
Leisler's Bat	0	0	0.01791	0.032284	0.05246	0.035386	0.034412
Nathusius' Pipistrelle	0.005828	0	0.353721	0	0	0.008846	0.013765
Natterer's Bat	1.146562	2.624261	0.085968	0.096852	1.552828	0.406936	0.802936
Noctule	0.447261	0.538756	1.639653	2.405165	2.213829	0.548478	1.509521
Serotine	0	0	0.087759	0.306699	0.199349	0	0.039
Soprano Pipistrelle	5.492424	25.47793	32.76977	39.75787	26.32462	3.096249	10.60908

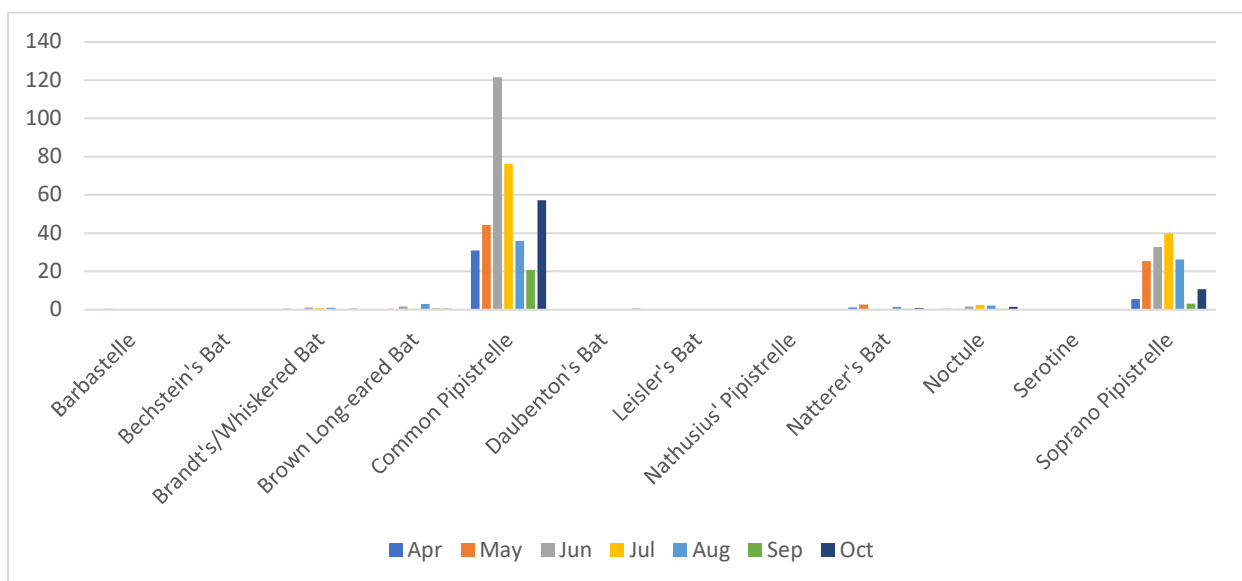


Figure 11 Total bat calls per hour per night, per month

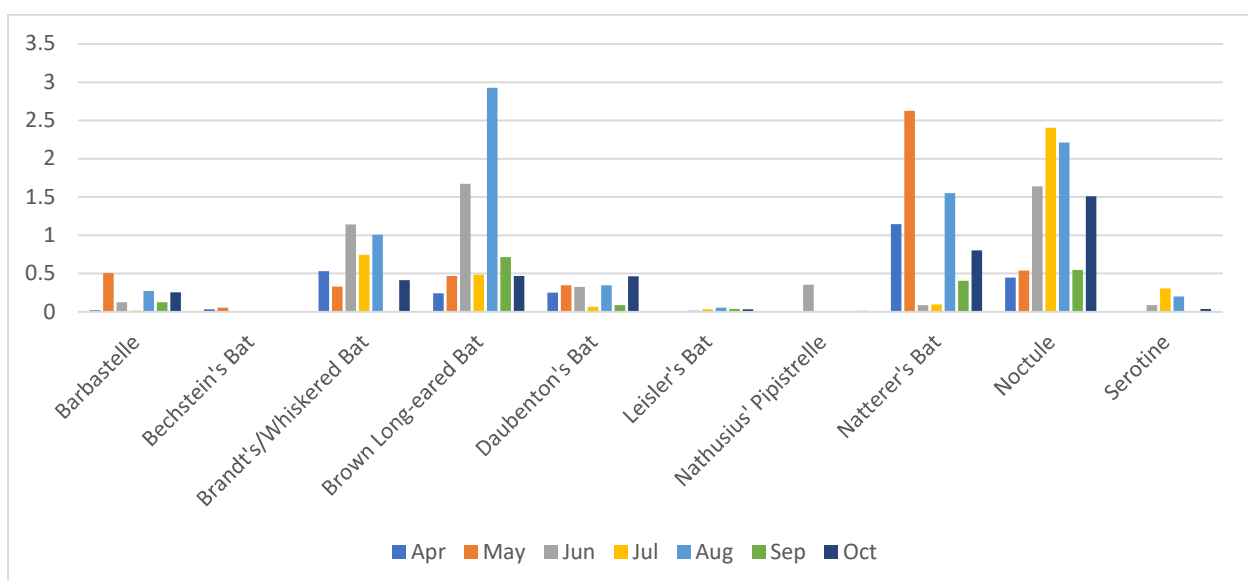


Figure 12 Total bat calls per hour per night, per month, without common or soprano pipistrelle bats

APPENDIX 10.7 - HSI CALCULATION FOR GCN

Parameter	Description	Pond 1		Pond 2	
		Score	Index	Score	Index
Location	England = optimal	Optimal	1.00	Optimal	1.00
Pond Area	Measure pond surface area (m ²) and round to nearest 50m ²	50.00	0.10	800.00	1.10
Pond Drying	Never, rarely, annually, sometimes	Rarely	1.00	Sometimes	0.50
Water Quality	Abundant/Moderate/Low invertebrate community/Few submerged plants/clearly polluted	Moderate	0.67	Moderate	0.67
Shade	Estimate percentage perimeter shaded to 1m from shore	40.00	1.00	60.00	1.00
Fowl	No evidence/present but little impact/severe impact	Minor	0.67	Major	0.01
Fish	No records/no evidence but local conditions suggest they may be present/small number of carp, goldfish or stickelback/ dense populations	Possible	0.67	Possible	0.67
Ponds	Count number of ponds within 1km of survey pond, not separated by major barriers	6.00	0.79	6.00	0.79
Terrestrial Habitat	Good terrestrial habitat offers cover and foraging opportunities and includes meadow, rough grassland, hedges scrub and woodland	Good	1.00	Good	1.00
Macrophytes	Estimate percentage of pond surface occupied	10.00	0.40	45.00	0.75
		TOTAL	0.627	TOTAL	0.520
		CATEGORY	Average	CATEGORY	Below Average

Parameter	Description	Pond 3		Pond 4	
		Score	Index	Score	Index
Location	England = optimal	Optimal	1.00	Optimal	1.00
Pond Area	Measure pond surface area (m ²) and round to nearest 50m ²	100.00	0.20	50.00	0.10
Pond Drying	Never, rarely, annually, sometimes	Never	0.90	Never	0.90
Water Quality	Abundant/Moderate/Low invertebrate community/Few submerged plants/clearly polluted	Moderate	0.67	Moderate	0.67
Shade	Estimate percentage perimeter shaded to 1m from shore	20.00	1.00	0.00	1.00
Fowl	No evidence/present but little impact/severe impact	Major	0.01	Major	0.01
Fish	No records/no evidence but local conditions suggest they may be present/small number of carp, goldfish or stickelback/ dense populations	Major	0.01	Major	0.01
Ponds	Count number of ponds within 1km of survey pond, not separated by major barriers	6.00	0.79	6.00	0.79
Terrestrial Habitat	Good terrestrial habitat offers cover and foraging opportunities and includes meadow, rough grassland, hedges scrub and woodland	Moderate	0.67	Moderate	0.67
Macrophytes	Estimate percentage of pond surface occupied	60.00	0.90	0.00	0.30
		TOTAL	0.299	TOTAL	0.250
		CATEGORY	Poor	CATEGORY	Poor

APPENDIX 10.8 - GCN DNA RESULTS

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Sample ID: ADAS-3587 Condition on Receipt: Good Volume: Passport
Client Identifier: Wilson's Pearce's Farm Description: pond water samples in preservative
Date of Receipt: 05/05/2022 Material Tested: eDNA from pond water samples

Determinant	Result	Method	Date of Analysis
Inhibition Control ¹	2 of 2	Real Time PCR	09/05/2022
Degradation Control ²	Within Limits	Real Time PCR	09/05/2022
Great Crested Newt ³	0 of 12 (GCN negative)	Real Time PCR	09/05/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10 ⁻⁴ ng/ μ L) ⁴	4 of 4	Real Time PCR	As above for GCN

Report Prepared by: Dr Helen Rees Report Issued by: Dr Ben Maddison

Signed:



Signed:



Position: Director: Biotechnology Position: MD: Biotechnology

Date of preparation: 10/05/2022 Date of issue: 10/05/2022

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

* If all PCR controls and extraction blanks give the expected results a sample is considered negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.

¹ Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

² No degradation is expected within time frame of kit preparation, sample collection and analysis.

⁴ Additional positive controls (10⁻², 10⁻³, 10⁻⁴ ng/ μ L) are also routinely run, results not shown here.

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Sample ID: ADAS-3608 Condition on Receipt: Medium Sediment Volume: Passed
Client Identifier: Pearce's Farm Description: pond water samples in preservative
Date of Receipt: 05/05/2022 Material Tested: eDNA from pond water samples

Determinant	Result	Method	Date of Analysis
Inhibition Control ¹	2 of 2	Real Time PCR	09/05/2022
Degradation Control ²	Within Limits	Real Time PCR	09/05/2022
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	09/05/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/ μ L) ³	4 of 4	Real Time PCR	As above for GCN

Report Prepared by: Dr Helen Rees Report Issued by: Dr Ben Maddison

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Position: MD, Biotechnology

Date of preparation: 10/05/2022

Date of issue: 10/05/2022

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

* If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.

¹ Recorded as the number of positive replicate reactions at expected C_i value. If the expected C_i value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

² No degradation is expected within time frame of kit preparation, sample collection and analysis.

³ Additional positive controls (10^{-5} , 10^{-2} , 10^{-3} ng/ μ L) are also routinely run, results not shown here.

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Sample ID: ADAS-3618 Condition on Receipt: Good Volume: Passed
Client Identifier: Prior's Farm Goldfish Description: pond water samples in preservative
Date of Receipt: 05/05/2022 Material Tested: eDNA from pond water samples

Determinant	Result	Method	Date of Analysis
Inhibition Control [†]	2 of 2	Real Time PCR	09/05/2022
Degradation Control [‡]	Within Limits	Real Time PCR	09/05/2022
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	09/05/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10 ⁻⁴ ng/μL)*	4 of 4	Real Time PCR	As above for GCN

Report Prepared by: Dr Helen Rees Report Issued by: Dr Ben Maddison

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Position: Director: Biotechnology Position: MD: Biotechnology

Date of preparation: 10/05/2022 Date of issue: 10/05/2022

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

* If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[‡] No degradation is expected within time frame of kit preparation, sample collection and analysis.

*Additional positive controls (10⁻¹, 10⁻², 10⁻³ ng/μL) are also routinely run, results not shown here.

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Sample ID: ADAS-3593 Condition on Receipt: Good Volume: Passed

Client Identifier: Priors Farm,
Corp Pond Description: pond water samples in preservative

Date of Receipt: 05/05/2022 Material Tested: eDNA from pond water samples

Determinant	Result	Method	Date of Analysis
Inhibition Control [†]	2 of 2	Real Time PCR	09/05/2022
Degradation Control [§]	Evidence of degradation	Real Time PCR	09/05/2022
Great Crested Newt [*]	Indeterminate	Real Time PCR	09/05/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10 ⁻⁴ ng/μL) [‡]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by: Dr Helen Rees Report Issued by: Dr Ben Maddison

Signed:



Signed:



Position: Director: Biotechnology Position: MD: Biotechnology

Date of preparation: 10/05/2022 Date of issue: 10/05/2022

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

^{*} If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[‡] Additional positive controls (10⁻¹, 10⁻², 10⁻³ ng/μL) are also routinely run, results not shown here.