AEWC Ltd

Animal Ecology & Wildlife Consultants

Bat Activity Survey Report

Land to the East of Tilletts Lane

Warnham
Horsham
West Sussex

Natalie Arscott

23-246
April 2025

AEWC Ltd Birch Walk, Lower Street, Fittleworth, West Sussex, RH20 1JE
Tel:08452 505585, info@aewc.co.uk , www.aewc.co.uk

Registered in England and Wales No. 06527840

Contents

Author	Natalie Arscott
Authorised by	Brigitte de Coriolis
Report and version number	23-246-BAS-V1
Survey Dates	May – October 2024

Summary

- AEWC Ltd were commissioned by Batcheller Monkhouse on behalf of their client to undertake a bat activity survey at Land to the east of Tilletts Lane, Warnham, Horsham, West Sussex at central grid reference TQ 15533 34010 to help inform the proposed development of the site.
- This report details the results of the survey, which was carried out between May and October 2024.
- One static bat detector was installed on the central hedge and tree line that separates the two fields making up the site for five nights a month and set to record from 30 minutes prior to sunset until 30 minutes after sunrise with trigger parameters set to record all bat passes during this time.
- The survey has found a moderate level of bat activity on the hedge and tree line, with 5,851 call files recorded in total, and six different species in addition to two genera (not classified to species level) identified.
- Over 70% of the call files recorded were identified as common pipistrelle (*Pipistrellus pipistrellus*), with all other species recorded significantly less frequently. Rare and light-averse species, including Western barbastelle (*Barbastella barbastellus*), were recorded during the survey but at low numbers only, indicating occasional use as opposed to the site being a valuable foraging and/or commuting feature.
- The survey has found no evidence that the hedge and tree line is a key commuting route between maternity roosts and foraging grounds for any bat species, given the absence of consistent, significant spikes in activity shortly after sunset or before sunrise. As such, the introduction of a road through this hedge and tree line is unlikely to be of significant detriment to any bat colonies within the local area.
- Recommendations have been made within Section 5 of this report to minimise impacts on foraging and commuting bats. **These include the production of a Bat-Sensitive Lighting Strategy, the retention of habitat buffers between development and hedgerows and tree lines, minimising hedgerow removal, and including areas of semi-natural habitat to provide suitable foraging opportunities**.

1 Introduction

1.1 AEWC Ltd were commissioned by Batcheller Monkhouse on behalf of their client to undertake a bat activity survey at Land to the east of Tilletts Lane, Warnham, Horsham, West Sussex at central grid reference TQ 15533 34010 to help inform the proposed development of the site.

1.2 The bat surveys and report writing were carried out in accordance with Bat Surveys: Good Practice Guidelines (Bat Conservation Trust, 2023).

1.3 This report details the results of the bat activity survey and outlines recommendations in relation to bats.

Aims and Objectives

1.4 The objectives of the survey were to:

- Identify bat activity levels during the survey period within the site.
- Identify whether rare or significant bat species are present within the site.
- Identify whether the hedge and tree line, part of which will be removed for a new road, is used as an important commuting route for bats moving between maternity roosts and foraging grounds.

Site Location

1.5 The site is located in the village of Warnham, northwest of Horsham and west of the A24. The surrounding landscape includes a diverse mix of habitats, such as ancient and semi-natural woodlands, traditional meadows, grasslands, native hedgerows, and arable and pastoral agricultural lands. Wetlands, ponds, and other water bodies, particularly within Warnham Local Nature Reserve, are also present. To the south is residential development. See Figure 1.

1.6 One static detector was installed on the central hedge and tree line that separates the two fields making up the site for five nights a month between May and October 2024, to record bat passes on a nightly basis to identify the bat species and activity levels present within acoustic range of the detector positions. See Figure 2.

FIGURE 1: SHOWING THE LOCATION OF THE SURVEY SITE

FIGURE 2: SHOWING THE SITE BOUNDARY AND LOCATION OF THE STATIC BAT DETECTOR

Legislation

1.7 All species of bats are listed on *Schedule 5* of the *Wildlife and Countryside Act 1981 (as amended)* which affords them protection under *Section 9*, as amended. They are also protected under the *Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019*. In combination, this makes it an offence to:

- intentionally kill, injure or take (capture etc.);
- possess;
- intentionally or recklessly damage, destroy, obstruct access to any structure or place used by a scheduled animal for shelter or protection, or disturb any animal occupying such a structure or place; and
- sell, offer for sale, possess or transport for the purpose of sale (live or dead animal, part or derivative) or advertise for buying or selling such things.

1.8 A roost is defined as 'any structure or place which a bat uses for shelter or protection'. As bats tend to reuse the same roosts, legal opinion is that a roost is protected whether or not bats are present.

1.9 Any disturbance of a bat occupying a roost can lead to prosecution. Disturbance can be caused by noise, vibration and artificial lighting. Penalties for breaking the law can include fines of £5,000 per bat, imprisonment and the seizure of equipment.

1.10 Furthermore, seven bat species (barbastelle, Bechstein's, noctule, soprano pipistrelle, brown long-eared, lesser horseshoe and greater horseshoe) are also Species of Principal Importance in England under *Section 41* of the *Natural Environment and Rural Communities Act 2006*.

2 Methods

2.1 The static bat detector surveys were conducted between May and October 2024, covering the peak active period for bats. The static detector was deployed for five continuous nights of good weather (dry and warm), when any bats present were likely to be active. The nights of static detector recording were as follows:

- 22/05/2024 – 26/05/2024
- 21/06/2024 – 25/06/2024
- 22/07/2024 – 26/07/2024
- 20/08/2024 – 24/08/2024
- 19/09/2024 – 23/09/2024
- 10/10/2024 – 14/10/2024

2.2 An Elekon Batlogger A+ Bat Detector with microphone on a 2m cable was used for taking full spectrum recordings of any bats within acoustic range. The microphone was positioned extended out from the tree to which the detector was affixed in order to minimise echo as far as practicable. The detector was left for a minimum of five nights, set to record from 30 minutes before sunset until 30 minutes after sunrise, with trigger parameters set to record all bat passes during this time.

2.3 The data was run through the BTO Acoustic Pipeline tool to be automatically identified. All low confidence calls and any identified recordings of Annex II species were then manually analysed using Elekon Bat Explorer software which is designed to work with the Batlogger detectors.

3 Constraints/Limitations

3.1 Many species have very similar echolocation calls making accurate species identification from acoustic surveys difficult, especially for cryptic groups like *Myotis* and *Plecotus* bats. For this survey, *Myotis* and *Plecotus* calls have been identified to genus level only.

3.2 Different amplitude of species' calls dramatically under or over identify the presence of some species, resulting in a very biased survey technique and commonly misidentifying absence of some species, notably long-eared bats. Louder species may also have been recorded from other areas beyond the hedgerow that was the focal point of the survey.

3.3 The survey period for static bat detector surveys is recognised as April to October inclusive. Due to project timings, the survey began in May, therefore excluding April. This is not considered to represent a significant constraint to the survey given April is a sub-optimal month for bat activity and the survey otherwise covered the entire main active period including periods of peak activity. April 2024 was also unusually wet in the southeast of England, with 55% more rainfall than average, and bat activity would likely have been lower than usual for this time of year due to the poor weather conditions. It is therefore considered highly unlikely that having data from April would significantly alter the conclusions or recommendations made from this survey.

4 Results

Total Recordings

4.1 A total of 5851 call files were recorded between May and October 2024 of six different species plus two genera, where cryptic species calls could not confidently be classified to species level. See Table 1. The bat species/genera recorded on-site were:

- Common pipistrelle – *Pipistrellus pipistrellus*
- Soprano pipistrelle – *Pipistrellus pygmaeus*
- Noctule bat – *Nyctalus noctula*
- Myotis bat species – *Myotis* spp.
- Serotine bat – *Eptesicus serotinus*
- Long-eared bat species – *Plecotus* spp.
- Leisler's bat – *Nyctalus leisleri*
- Western barbastelle – *Barbastella barbastellus*

TABLE 1: NUMBER OF CALL FILES RECORDED FOR EACH SPECIES SEPARATED BY MONTH

Species	May	Jun	Jul	Aug	Sep	Oct	Total:
Pipistrellus pipistrellus	1041	435	417	461	620	1180	**4154**
Pipistrellus pygmaeus	39	29	10	377	820	46	**1321**
Nyctalus noctula	1	29	36	0	13	0	**79**
Nyctalus leisleri	1	8	0	0	2	0	**11**
Eptesicus serotinus	3	3	24	3	2	0	**35**
Myotis spp.	3	5	4	0	30	38	**80**
Plecotus spp.	0	0	13	1	6	0	**20**
Barbastella barbastellus	0	1	1	4	140	5	**151**
Total:	**1088**	**510**	**505**	**846**	**1633**	**1269**	**5851**

Common Pipistrelle

4.2 Common pipistrelle was by far the most frequently recorded species during the survey period, making up 71% of the total call files. This species was frequent during all months.

Soprano Pipistrelle

4.3 Soprano pipistrelles were the second most frequently recorded species during the survey period, making up over 23% of the total call files. This species was present during all months.

Noctule Bat

4.4 Noctule bats made up 1.35% of the total call files. This species was present during all months except for August and October, but the number of call files for each month was typically low.

Leisler's Bat

4.5 Leisler's bat was the least recorded species, making up 0.19% of the total call files. This species was present during May, June, and September, with only a very low number of passes recorded.

Serotine Bat

4.6 Serotine bats made up 0.6% of the total call files. This species was present during all months except for October, but the number of call files for each month was typically very low.

Myotis Species

4.7 *Myotis* species bat calls, which may be from multiple species, made up just over 1.36% of the total call files. This species was present during all months except for August, but the number of call files for each month was typically low.

Long-Eared Bats

4.8 Long-eared bat calls made up 0.34% of the total call files. No long-eared bats were recorded in May, June or October, with low numbers recorded in July, August and September.

Western Barbastelle

4.9 Western barbastelle made up 2.58% of the total call files. A very low number of passes were recorded for this species during June, July, August, and October, with a peak in activity recorded in September.

Times of Passes

4.10 The volume of passes recorded for each species / genus has been analysed in relation to the time period after sunset that these passes were recorded, with the aim of identifying consistent, significant peaks in activity shortly after sunset or shortly before sunrise. Peaks close to sunset or sunrise, relative to what is considered the accepted emergence window for that species, within the peak breeding season could be considered a good indication for a maternity roost in close proximity, with the hedge and tree line being used to commute between the roost and foraging grounds. Bat species that are found in closed or edge habitats will typically utilise sheltered features, such as tree lines, for commuting early in the night when light levels are higher, and they are most vulnerable to predation.

4.11 Noctule bats, Leisler's bats, and serotine bats have been excluded from this analysis, since they are open habitat specialists with no preference for commuting close to hedge and tree lines.

4.12 The percentages of the total passes that were recorded for each species (excluding the three 'big bats' discussed above) during each 1-hour time period for each month are shown in Table 2. The percentages have been rounded to the nearest whole value and the hour(s) of peak activity for each species is shown in red and bold.

TABLE *2*: PERCENTAGE OF CALL FILES FOR EACH SPECIES RECORDED DURING EACH TIME PERIOD AFTER SUNSET

Hours after sunset:	1	2	3	4	5	6	7	8	9	10	11	12
May												
Common pipistrelle	20%	**29%**	22%	14%	4%	3%	5%	2%	N/A	N/A	N/A	N/A
Soprano pipistrelle	8%	10%	**31%**	10%	0%	15%	23%	4%	N/A	N/A	N/A	N/A
Myotis spp.	7%	30%	**33%**	7%	0%	7%	4%	11%	N/A	N/A	N/A	N/A
Western barbastelle	0%	0%	0%	**75%**	25%	0%	0%	0%	N/A	N/A	N/A	N/A
June												
Common pipistrelle	1%	5%	2%	2%	2%	8%	**79%**	2%	N/A	N/A	N/A	N/A
Soprano pipistrelle	**34%**	13%	13%	0%	3%	13%	13%	11%	N/A	N/A	N/A	N/A
Myotis spp.	0%	0%	**50%**	0%	25%	0%	25%	0%	N/A	N/A	N/A	N/A

Western barbastelle	0%	0%	0%	0%	0%	**100%**	0%	0%	N/A	N/A	N/A	N/A
Long-eared spp.	0%	0%	**80%**	0%	20%	0%	0%	0%	N/A	N/A	N/A	N/A
July												
Common pipistrelle	18%	6%	9%	**25%**	9%	5%	13%	15%	N/A	N/A	N/A	N/A
Soprano pipistrelle	10%	**40%**	0%	0%	0%	**40%**	10%	0%	N/A	N/A	N/A	N/A
Myotis spp.	0%	20%	**40%**	0%	0%	20%	20%	0%	N/A	N/A	N/A	N/A
Western barbastelle	0%	0%	0%	**100%**	0%	0%	0%	0%	N/A	N/A	N/A	N/A
Long-eared spp.	0%	0%	0%	**80%**	0%	20%	0%	0%	N/A	N/A	N/A	N/A
August												
Common pipistrelle	13%	13%	6%	8%	6%	**23%**	14%	2%	4%	11%	N/A	N/A
Soprano pipistrelle	**80%**	7%	2%	1%	1%	2%	0%	0%	1%	6%	N/A	N/A
Myotis spp.	**100%**	0%	0%	0%	0%	0%	0%	0%	0%	0%	N/A	N/A
Western barbastelle	0%	0%	17%	0%	0%	**33%**	17%	**33%**	0%	0%	N/A	N/A
Long-eared spp.	0%	0%	0%	**50%**	0%	0%	0%	**50%**	0%	0%	N/A	N/A
September												
Common pipistrelle	12%	14%	4%	17%	4%	**32%**	2%	1%	6%	5%	2%	2%
Soprano pipistrelle	27%	4%	2%	3%	14%	2%	**37%**	1%	1%	2%	3%	5%
Myotis spp.	10%	12%	12%	2%	7%	**26%**	22%	0%	2%	0%	1%	4%
Western barbastelle	0%	22%	**30%**	7%	13%	22%	4%	1%	0%	0%	1%	0%
Long-eared spp.	0%	0%	33%	0%	**67%**	0%	0%	0%	0%	0%	0%	0%
October												
Common pipistrelle	**47%**	43%	2%	1%	2%	1%	0%	3%	0%	0%	0%	0%
Soprano pipistrelle	36%	**51%**	4%	4%	0%	0%	0%	0%	0%	0%	0%	4%
Myotis spp.	21%	19%	2%	10%	**33%**	15%	0%	0%	0%	0%	0%	0%
Western barbastelle	0%	20%	0%	0%	0%	0%	0%	0%	**40%**	**40%**	0%	0%

Common Pipistrelle

4.13 There is no clear trend in the times relative to sunset or sunrise that common pipistrelles were most frequently recorded. The time period of highest activity varied between each month, and it fell within the first 2 hours after sunset for only two of the months (May and October) and fell within 2 hours of sunrise for only one month (June).

Soprano Pipistrelle

4.14 The highest level of soprano pipistrelle activity was recorded during the first 2 hours after sunset for four of the six survey months. However, this was only a significantly high peak relative to the rest of the night's activity for October and August. Therefore,

there was no overall trend of a consistent, significant activity peak shortly after sunset seen across most of the survey months. No activity peaks close to sunrise were recorded.

***Myotis* Species**

4.15 There is no clear trend in the times relative to sunset or sunrise that *Myotis* species were most frequently recorded. The time period of highest activity varied between each month, and it fell within the first 2 hours after sunset for only one of the months (August) and never within 2 hours of sunrise.

Western Barbastelle

4.16 There is no clear trend in the times relative to sunset or sunrise that barbastelles were most frequently recorded. The time period of highest activity varied between each month, and it never fell within the first 2 hours after sunset or 2 hours before sunrise. It should be noted that, apart from in September, only low numbers of barbastelle passes were recorded, and therefore high percentages may not be representative of a high number of passes.

Long-Eared Bats

4.17 There is no clear trend in the times relative to sunset or sunrise that long-eared bats were most frequently recorded. The time period of highest activity varied between the four months that these species were recorded in, and it never fell within the first 2 hours after sunset or 2 hours before sunrise. It should be noted that only low numbers of long-eared bat passes were recorded, and therefore high percentages may not be representative of a high number of passes.

5 Discussion

5.1 An overall moderate level of bat activity was recorded at the site. Activity levels peaked during September and October and were lowest during June and July.

5.2 The majority of the activity recorded was from common pipistrelles, which were frequent during all months. Soprano pipistrelle activity varied considerably, with fairly low numbers of this species recorded during most months, with the exceptions of August and September where significantly higher numbers of passes from this species were recorded. All other species were recorded at low numbers, with a small peak in Western barbastelle activity in September.

Species Discussion

Common Pipistrelle

5.3 This is a common and widespread species across the UK which is associated with a wide range of habitats as a generalist species, with maternity roosts largely found within buildings, but smaller roosts found in both buildings and trees. They are considered to be light-tolerant and are often found within urban areas. They usually emerge from roosts within 30 minutes of sunset.

5.4 This species was recorded much more frequently than any other species on-site, making up 71% of the total calls. This is not unexpected given how common this species is compared to other bat species. Whilst the presence of a maternity roost in close proximity to the site cannot be ruled out, there is no evidence that would suggest this is likely. The lowest numbers of passes of these species were recorded during the maternity period – June and July – which is the opposite to the trend that would be expected were a maternity roost present in close proximity. A high volume of common pipistrelle activity is a typical outcome across many sites due to the common and widespread nature of this species.

5.5 Common pipistrelles were always recorded within the first hour after sunset, however no consistent activity peaks shortly after sunset or shortly before sunrise were seen across the survey months. Instead, there was significant variation in the times of highest activity between each month. October was the only month where the level of common pipistrelle activity was significantly higher in the first 2 hours after sunset compared to the rest of the night. However, this is a typical trend seen at this time of year, with colder nights resulting in a flurry of activity shortly after emergence time, with prey availability then quickly dropping off with the falling temperatures. As such, the survey has provided no evidence that the hedge and tree line surveyed is being used as a key commuting route for common pipistrelles between a maternity roost and foraging grounds.

Soprano Pipistrelle

5.6 This is a common and widespread species across the UK, which is found using a wide range of habitats, however it is mostly associated with water, especially larger open waterbodies and larger rivers. Whilst soprano pipistrelle bats are known to travel a reasonable distance to foraging sites, maternity roosts in particular are often found within close proximity to water bodies. This is also an early emerging species, typically leaving the roost very close to sunset.

5.7 There are significant waterbodies present in the wider landscape, the closest being within Warnham Local Nature Reserve located 1.8km to the southeast, but there are no large waterbodies within close proximity to the survey site. Soprano pipistrelle activity varied throughout the survey period and was low between May and July, which covers the maternity period. As such, the survey has provided no evidence that a maternity roost for this species within close proximity to the site is likely.

5.8 The highest level of soprano pipistrelle activity was often recorded within the first two hours after sunset; however, this was only seen to be a significantly high peak compared to the rest of the night during August and October. This is after the maternity period, with pipistrelles being early-breeding species and hence maternity colonies would have likely disbanded by August. A high level of activity shortly after sunset is also typical in October, with colder nights resulting in a flurry of activity shortly after emergence time, with prey availability then quickly dropping off with the falling temperatures and this is consistent with the activity also seen from common pipistrelles. As such, based on the lack of a consistent, significant activity peak shortly after sunset or prior to sunrise, the survey has provided no evidence that the hedge

and tree line surveyed is being used as a key commuting route for soprano pipistrelles between a maternity roost and foraging grounds.

***Nyctalus* Bats**

5.9 Noctule bats are common and widespread in the UK. This is a high-flying species that forages over a wide area and, as a loud echolocating species, they are easily picked up on bat detectors. There is overlap between the calls of the noctule and Leisler's bats which can result in misidentification and potential under- or over-recording, however both species forage over a wide area, are recorded to emerge within 30 minutes of sunset and are generally considered to be light-tolerant. Whilst noctule bats are recorded to roost within buildings, they are most frequently recorded roosting in trees, particularly for maternity roosts. Leisler's bats are more commonly associated with building roosts.

5.10 Noctules and Leisler's bats were typically only recorded in low numbers and were not present during all survey months, and as such these are thought to be resulting from occasional passing or foraging individuals, with no evidence that a maternity roost is present nearby. Activity peaked in June and July which correlates with the emergence of preferred prey such as cockchafers from habitats such as the fields on-site and therefore this is not an unexpected result.

Serotine Bat

5.11 Serotine bats are a relatively common species in the UK mainly found roosting within buildings and rock crevices and are rarely found in trees. They usually forage within 2km of their roost site at tree top height in order to capture their preferred moth and beetle prey. Very little is known about the hibernation habits of serotine bats, but it is believed that they largely hibernate within buildings. As a loud echolocating species, they are easily picked up on bat detectors and so can be recorded at some distance from the detector.

5.12 Serotine bats were recorded in very low numbers only. As such, it is considered most likely that these were from occasional passing or foraging individuals, with no evidence that a maternity roost for serotine bats is present in close proximity to the site. Activity peaked in July which correlates with the emergence of preferred prey such as cockchafers from habitats such as the fields on-site and therefore this is not an unexpected result.

***Myotis* Bats**

5.13 All *Myotis* calls were classified to genus level only, due to the overlaps in call parameters making these cryptic species difficult to confidently differentiate through acoustic analysis, particularly for small myotis species.

5.14 Daubenton's bats are a common and widespread species which are predominately associated with large water bodies over which they forage and are most commonly found roosting within trees. Maternity roosts are most frequently found within close proximity to large water bodies.

5.15 Natterer's bats are a common and widespread species which are best adapted for foraging in cluttered environments, favouring woodland, woodland edges, hedgerows, and over waterbodies. They are known to roost in both buildings and trees.

5.16 Bechstein's bats are one of the UK's rarest bat species with a limited and patchy distribution, primarily found in southern England and south Wales. It is an Annex II species under the EU Habitats Directive. They are woodland specialists that favour ancient woodlands and typically forage within 1-2km of their roost, avoiding open habitats. This species predominantly roosts within tree cavities. There is a small block of secondary woodland adjacent to the south of the site, but no other woodland areas in close proximity to the site, as such the site is likely sub-optimal for this species.

5.17 There are three species of small *Myotis* bats present within the UK: whiskered, Brandt's, and Alcathoe. Whiskered bats are a common and widespread species largely associated with woodlands and scrub habitat and are known to utilise buildings and trees for roosting. Brandt's bat is found throughout the UK but is less common and widespread than whiskered, with the majority of large colonies found within the more northern areas of the UK, but with some colonies known to be present within SE England. Alcathoe was first identified in 2010 and is still classified as data-deficient although it is understood to be a woodland specialist, the majority of known roost sites are within West Sussex and all but one of the known roosts in the UK are within trees.

5.18 Given *Myotis* species were only recorded in low numbers, with very low numbers between May and August, which covers the maternity period, it is considered unlikely that any maternity roosts for *Myotis* species are present in close proximity to the site. The times of peak *Myotis* activity varied between each survey month and only fell within the first 2 hours after sunset during August and never within 2 hours of sunrise. As such, the survey has provided no evidence that the hedge and tree line surveyed is being used as a key commuting route for myotis species between a maternity roost and foraging grounds.

Long-Eared Bats

5.19 Due to the quiet nature of these species, they are commonly under-recorded on acoustic surveys. They are not known to travel particularly far from their maternity roost sites for foraging, with the majority of foraging activity within 500m of the roost site (Entwistle et.al 1996) and therefore the presence of suitable foraging habitat near to potential roost sites is an important factor in roost selection.

5.20 Brown long-eared bats are common and widespread throughout the UK and are often associated with woodland for foraging and are frequently found roosting within trees in addition to being commonly found roosting within the roof voids of buildings. Grey long-eared bats are very rare and restricted to southern England. As slow-flying species, long-eared bats are at greater risk of predation and therefore are light-averse, emerging when it is almost fully dark and generally sticking to dark corridors and tree lines for foraging and commuting in order to reduce likelihood of predation.

5.21 Long-eared bats were only recorded during three of the six survey months, and during these three months (July, August, and September) there were only a very low number

of passes. There is therefore no evidence that there is a maternity roost within close proximity to the site, however the quiet nature of this species can mean they often go undetected.

5.22 During the months when long-eared bats were recorded, the time period of highest activity never fell within the first 2 hours after sunset. As such, the survey has provided no evidence that the hedge and tree line surveyed is being used as a key commuting route for long-eared bat species between their roosts and foraging grounds.

Western Barbastelle

5.23 Western barbastelles are a rare species in the UK, with a patchy distribution primarily across southern and western England, parts of Wales, and East Anglia. It is an Annex II species under the EU Habitats Directive. They forage in a variety of habitats but are light-averse. Barbastelles typically roost in tree crevices and under loose bark, or occasionally in buildings. This species is very sensitive to habitat loss, fragmentation, and light pollution.

5.24 Western barbastelles were recorded on-site, during all survey months except for May, however these were very low numbers of passes for each month except for September. A peak in barbastelle activity was recorded in September. Calls were also typically recorded well after sunset. It is noted that barbastelles are known to travel significant distances from maternity roosts to forage. It is considered that barbastelles commute through and/or forage on-site periodically, but there is no evidence that the hedge and tree line is frequently used by barbastelles or that a maternity roost is present within close proximity to the site.

5.25 The time period of highest activity never fell within the first 2 hours after sunset. As such, the survey has provided no evidence that the hedge and tree line surveyed is being used as a key commuting route for Western barbastelle between their roosts and foraging grounds.

5.26 A peak in barbastelle activity was recorded in September, with the activity being spread throughout the nights during this period. September is a transient period when maternity colonies have disbanded, nights become cooler, and foraging behaviour can alter. This activity peak is not considered to be notably important since activity was very low during the peak summer season, indicating it's unlikely that the site is within a Core Sustenance Zone for barbastelles and there is unlikely to be a nearby maternity roost. The barbastelle calls recorded during September were recorded at random times throughout the night rather than following a consistent pattern, indicating that this is foraging behaviour as opposed to bats as roosts. The difference in activity in September compared to all other survey months may therefore be due to seasonal changes.

Conclusions and Recommendations

5.27 The overall activity recorded shows that the site is used by a range of bat species, including common pipistrelle, soprano pipistrelle, noctule bat, *Myotis* species, serotine bat, long-eared bat species, Leisler's bat, and Western barbastelle. However, common pipistrelle was the only species that was consistently frequent across all

survey months, with all other species showing variability in the frequency of passes recorded and predominantly being recorded with low numbers of passes only.

5.28 Given the frequency of common pipistrelle passes throughout the survey period, it cannot be ruled out that a maternity roost for this species could be present in close proximity, although the months of peak activity did not correlate with what would be expected were this the case. This cannot be confirmed without more advanced survey techniques, and given the large population size of the species, it is not unusual to record a high level of common pipistrelle activity. This species is common and widespread and a habitat generalist, typically tolerant of lighting and urban environments. Given the relatively low number of call files for all other species combined with the habitat features on and surrounding the site, it is considered unlikely that significant maternity roosts for any other bat species are present in very close proximity to the site. Rare and light-averse species, including Western barbastelle, were recorded during the survey but at low numbers only, indicating occasional use as opposed to the site being a valuable foraging and/or commuting feature. Species that favour woodland for foraging would be considered less likely to utilise an open site like this to a great degree, except for low levels of commuting and potentially for short-term spikes in the availability of preferred prey.

5.29 It is proposed that a new road will cut through the hedge and tree line that was the focal point of the survey. Analysis of the times at which bats were recorded showed no consistent, significant activity peak shortly after sunset or before sunrise for any closed or edge habitat bat species. This indicates that the hedge and tree line is not a key commuting route between maternity roosts and foraging grounds for these species, as consistent spikes in activity would be expected were the hedge and tree line being used for this purpose. As such, there is no evidence to suggest that intersecting this linear habitat feature with a road will be of significant detriment to any bat colonies within the local area. It is noted that the road has been designed to utilise an existing gap between mature trees, and the retention of these mature trees will help to preserve the benefits that the hedge and tree line can provide to commuting bats, with the tree canopies reducing the gap.

5.30 It is noted that a road will also cut through the tree line along the site's western boundary, providing access from Tilletts Lane. However, there are mature tree lines along both sides of Tilletts Lane, and the western tree line will remain untouched, providing a continued, unimpacted commuting route for bats. Therefore, no impacts to bats are expected from the new site access off Tilletts Lane, and it was considered that surveying this tree line was unnecessary.

5.31 The central site areas currently comprise open agricultural land which is of low value for foraging bats. The proposed development, which will include areas of Public Open Space and new landscaping, provides an opportunity to enhance the site's foraging potential and provide a better mosaic of habitats. Areas of semi-natural habitat should be incorporated into the design. The existing boundary features, which are of good quality for bats, should be retained and protected from impacts, including lighting.

5.32 **It is recommended that a Bat-Sensitive Lighting Strategy is devised for the site, to be submitted to and agreed with the Local Planning Authority. Lighting should be designed in accordance with the Institute of Lighting Professionals Guidance note 8: '*Bats and Artificial lighting in the UK'* which can be downloaded for free from the ILP website.**

5.33 **Boundary hedgerows should be retained wherever possible and not subject to aggressive pruning to significantly reduce their height and width. Buffers of semi-natural habitat should be retained between the hedgerows and the development, providing habitat corridors and lighting buffer zones. Trees along the hedgerows should be retained where possible. The hedgerows must not be illuminated.**

6 References

Bat Conservation Trust (2023) *Bats and Artificial lighting in the UK*. Guidance note 8: Bats and the Built Environment. BCT and ILP, London. https://theilp.org.uk/publication/guidance-note-8-bats-and-artificial-lighting/

Bat Conservation Trust (2022) *Interim Guidance Note: Use of night vision aids for bat emergence surveys and further comment on dawn surveys.* BCT, London

CIEEM (2013) *Competencies for Species Survey guidance documents*. Chartered Institute of Ecology and Environmental Management, Winchester

CIEEM (2017) *Guidelines on Ecological Report Writing*. Chartered Institute of Ecology and Environmental Management, Winchester

CIEEM (2021) *Good Practice Guidance for Habitats and Species*. Chartered Institute of Ecology and Environmental Management, Winchester

CIEEM (2022) *Code of Professional Conduct*. Chartered Institute of Ecology and Environmental Management, Winchester

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

JNCC (2004) *Bat workers manual (3rd edition)*. JNCC, Peterborough.

Mitchell-Jones A.J. (2004) *Bat mitigation guidelines*. English Nature, Peterborough

Surrey Bat Group (2009) *Criteria for Bat Surveys in the Planning Process.* www.surreybats.org.uk/criteria.html.

Entwistle A. C., Racey P. A. and Speakman J. R. 1996 Habitat exploitation by a gleaning bat, *Plecotus auritus* Phil. Trans. R. Soc. Lond. B351921–931