Bat Activity Survey 2024

Land at Coombe Farm, Sayers Common

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LIABILITIES:

Whilst every effort has been made to guarantee the accuracy of this report, it should be noted that living creatures are capable of migration and whilst protected species may not have been located during the survey duration, their presence may be found on a site at a later date.

The views and opinions contained within this document are based on a reasonable timeframe between the completion of the survey and the commencement of any works. If there is any delay between the commencement of works that may conflict with timeframes laid out within this document, or have the potential to allow the ingress of protected species, a suitably qualified ecologist should be consulted.

It is the duty of care of the landowner/developer to act responsibly and comply with current environmental legislation if protected species are suspected or found prior to or during works.

1.0 Introduction

Background

1.1 The Ecology Partnership were commissioned by Welbeck to undertake monthly bat activity surveys of land at Coombe Farm, Sayers Common. The red line boundary of the site is shown in Figure 1.

Figure 1: Red line boundary

1.2 An initial preliminary ecological appraisal was undertaken by The Ecology Partnership in June 2017, with subsequent surveys in 2017 and 2018 (The Ecology Partnership 2017). An updated walkover was conducted in January 2021 and November 2022 (The Ecology Partnership 2021, 2022). These reports identified optimal foraging habitat due to the presence of woodland, hedgerows and edge habitats onsite.

1.3 The ecological surveys have been updated in 2024 due to the time lapse between the initial surveys.

1.4 This report presents the results of The Ecology Partnership's surveys in and around the site, which aims specifically to assess how bats are using the site over the course of the 2024 survey season. This report identifies if there are any changes in the use of the site by bats since the 2017/2018 surveys, and if there are significant changes to the land use, how this requires consideration and reflection within the masterplan.

Legislation

1.5 Under the NERC Act (2006) it is now the duty of every Government department in carrying out its functions "*to have regard, so far as it is consistent with the proper exercise of those functions, to the purpose of conserving biological diversity in accordance with the Convention*".

1.6 Bats are covered by the following relevant legislation: The Wildlife and Countryside Act (1981) (as amended); the Countryside and Rights of Way Act, 2000; the Natural Environment and Rural Communities Act (NERC, 2006); and by the Conservation of Habitats and Species Regulations (2010).

1.7 Under the WCA 1981 it is an offence to:

- intentionally, recklessly or deliberately disturb a roosting or hibernating bat i.e. disturbing it whilst it is occupying a structure or place used for shelter or protection)
- intentionally or recklessly obstruct access to a roost (i.e. a structure or place used for shelter or protection).

1.8 Under the CHSR 2010 it is an offence to:

- deliberately capture (or take), injure or kill a bat
- intentionally, recklessly or deliberately disturb a bat, in particular (i) any disturbance which is likely to impair their ability to survive, to breed or reproduce, or to rear or nurture their young; (ii) any disturbance which is likely to impair their ability in the case of hibernating or migratory species, to hibernate or migrate; or (iii) any disturbance which is likely to affect significantly the local distribution or abundance of the species to which they belong
- damage or destroy a breeding site or resting place (roost) of a bat.

2.0 Methodology

2.1 The surveys followed BCT guidelines (Collins, 2023) following the night time bat walkover (NBW) methodology. This involved reviewing potential roost sources and flight lines followed by transect survey. Surveyors were equipped with one of the following recording devices: Anabat Walkabout, Batlogger and/ or an Echo Meter Touch.

2.2 The predetermined transect route was designed to follow linear features such as hedgerows and tree lines which bats are known to use as commuting corridors. These habitats also provide the most suitable habitat on site for foraging. Figure 2 displays the layout of the transect route.

2.3 The surveys started at sunset and observations were maintained for 1.5-2 hours. Bats usually emerge about twenty minutes after sunset depending on the species, light level, weather conditions and time of year. Peak activity will normally last for about two hours after sunset, during times of peak insect activity.

2.4 Three Anabat remote recording devices were deployed for at least five consecutive nights from April to September. These were placed within boundary features considered most suitable for foraging and commuting bats. Their locations are shown in Figure 2, previously, to gauge activity levels and species diversity on site and within the immediate vicinity. The subsequent recordings were analysed using Anabat Insight.

Limitations

2.5 It should be noted that whilst every effort has been made to provide a comprehensive description of the site, no single investigation could ensure the complete characterisation and prediction of the natural environment.

Figure 2: Location of the transect route (yellow lines) and Anabat locations (yellow stars)

3.0 Previous Surveys 2017/2018

3.1 Dusk activity surveys were carried out on the 19th September and 3rd October 2017. Further surveys took place on the 25th April, 25th June, 24th July and 22nd August 2018. A dawn transect was carried out on the 25th May 2018.

3.2 Over the course of the surveys multiple bat species were recorded which included: common pipistrelle (*pipistrellus pipistrellus*), soprano pipistrelle (*pipistrellus pygmaeus*), nathusius pipistrelles (*Pipistrellus nathusii*), *Myotis*, noctule (*Nyctalus noctula*), serotine (*Eptesicus serotinus*), leisler (*Nyctalus leisleri*), barbastelle (*Barbastella barbastellus*), and brown long-eared bats (*Plecotus auritus*).

3.3 Throughout the survey period, common pipistrelles dominated the recordings on site. Soprano pipistrelles, myotis species and serotines were also frequently recorded species on site. The remaining species, which included noctules, Leisler's, barbastelles and brown long-eared bats had fewer calls representing low activity.

4.0 2024 Results

4.1 Bat activity surveys have been carried out in April to September 2024. The following section summarises the results from these surveys, both the walked transect and the remote recording review.

4.2 Two bat surveyors followed the predetermined route illustrated in Figure 2. Activity levels, foraging and commuting behaviour were recorded and species were identified using bat detectors. Surveyors were on site 15 minutes before sunset until 2 hours after sunset. The use of Anabat remote recording devices were placed around the site in the same locations each month as shown in Figure 2.

4.3 The date, time and weather conditions during for each monthly survey is shown in Table 1.

Table 1. Summary of the date, time and weather conditions during each monthly survey.

Survey date	Time of sunset	Weather conditions
28th May 2024	21:02	Conditions were clear, warm and dry with temperature starting 14°C and then dropping to 13°C at the end of the survey.
3rd July 2024	21.17	Conditions at the start of the survey were 80% cloud cover, with temperature 16 degrees.
30th September 2024	18.40	Conditions at the start of the survey were cool and overcast starting at a temperature of 14 degrees, 90% cloud cover and wind at 4 Beaufort.

28th May 2024

4.4 The first activity 2024 survey commenced at sunset at 21:02 on the 28th May. The temperature was 14°C, dropping to 13°C by the end of the survey, conditions were clear and dry.

4.5 The first bat was recorded at 21:26, when a common pipistrelle (*Pipistrellus pipistrellus*) was observed commuting along the northwestern edge of the site. Occasional foraging was recorded along the northern woodland edge by common pipistrelles during the course of the survey period. A single noctule (*Nyctalus noctula*) pass was recorded at 21.55, along the southwestern boundary of site. No bat activity was recorded along the east or southeastern features and no other bat species were recorded during the survey.

3rd July 2024

4.6 The survey commenced at sunset at 21:17 on the 3rd July 2024. The temperature started at 16°C.

4.7 The first bat was recorded at 21:35 when a soprano pipistrelle was heard foraging near the woodland edge on the north western boundary of site. Common pipistrelles were first heard shortly after at 21:37. At 21:41 soprano and common pipistrelles were then seen foraging and circling an oak tree in the north western boundary of the site. At 21:58, 3 soprano pipistrelles were seen foraging at the woodland edge in the north eastern corner of the site. Foraging by soprano and common pipistrelles were consistently seen foraging around the site until the last bat was heard at 22:59. No other bats were recorded during the survey period.

30th September 2024

4.8 The survey commenced at sunset, 18:40 with temperatures of 14°C. In the south of the site the first bat, a common pipistrelle, was seen foraging at 18.59. Three soprano pipistrelles were then identified foraging along the woodland edge in the west. A myotis was first heard at 19.28 and a brown long-eared bat was heard at 19.39. The last bat was a common pipistrelle foraging at 20.24. No other bat species were recorded during the survey period.

4.9 In the north of the site the first bat was heard at 18:49, when a noctule was seen commuting south to north. A soprano pipistrelle was first seen 18:57 again commuting south to north. Common pipistrelles were first heard at 19:20 but were not seen. Common and soprano pipistrelle calls were consistently heard and not seen and throughout the survey. The last bat recorded was a common pipistrelle call at 20:24.

Remote Recording – Anabat Analysis

4.10 Anabat recording devices were deployed on site at locations shown previously in Figure 2. They were positioned in north, centre and south of the site and were deployed for 5 nights each on the 29th April, 26th May, 19th June, 22nd August and 11th September.

April

4.11 April remote recording surveys identified a total of 5 species present on the recording devices, with species including common and soprano pipistrelle, myotis species, noctule and big bat species.

4.12 The most dominant species present on the AB1 north position was the common pipistrelle, with a total of 121 call registrations. The second most recorded species were soprano pipistrelles with 45 calls. There were also 20 Myotis species calls, 3 noctule calls and a single big bat call registration over the 5 nights.

4.13 On the AB2 centre location, soprano pipistrelles were the dominant recordings at 52 registrations, with common pipistrelles at 36 calls, myotis species at 23 and 8 noctule call registrations.

4.14 The AB3 south location recorded the most bat calls in April with 302 calls. This included 201 common pipistrelle calls, 98 soprano pipistrelle calls and 3 myotis species call registrations. The summary of results are shown in Appendix 1.

May

4.15 In May, a total of 6 species were recorded all three of the Anabats. The species recorded included common and soprano pipistrelle, myotis species, noctule, brown long-eared bat and serotine.

4.16 The AB1 north location was dominated by soprano pipistrelles, with 128 registrations over 5 nights, with common pipistrelles at 108 calls. Lower numbers were recorded with myotis species at 6 calls, noctules at 4 registrations and a single serotine call registration.

4.17 The AB2 centre location was dominated by common pipistrelles at 500 registrations. Other species included 146 soprano pipistrelle call registrations and 32 myotis species calls. Low numbers of noctule and serotine calls were recorded with a single brown long eared bat recorded for the first time in this survey season. It must be noted that AB2 only recorded for 3 out of the 5 nights.

4.18 The AB3 south position was dominated by 218 common pipistrelle call registration with 77 soprano pipistrelle calls and only 4 noctule call registration over the 5 nights. The summary of these recordings in shown in Appendix 1.

June

4.19 In June, a total of 6 species were recorded on site. The species recorded included common and soprano pipistrelle, myotis species, noctule, brown long-eared bat and serotine.

4.20 On the AB1 north location, common pipistrelles were again the most dominant species recorded with 320 registrations across the 5 nights. This was followed by the soprano pipistrelle with 81 call registrations. Very low numbers of myotis species, brown long-eared bats, noctule and serotine were recorded across the survey period

4.21 The central AB2 location again recorded common pipistrelle as the most dominant species with 390 call registrations. Only 25 soprano pipistrelle calls, and a very low number of noctule and serotine calls were identified throughout the survey period.

4.22 On the AB3 south location the highest number of bat call registrations were recorded, 832 of which were common pipistrelles. The second most recorded species were Myotis with 67 call registration, this was followed by soprano pipistrelles with 60 call registrations. Low numbers of brown long eared bats, noctules and serotines were recorded throughout the survey period. The recording summary is shown in Appendix 1.

July

4.23 In July a total of five species were recorded; common pipistrelle, soprano pipistrelle, serotine, myotis species and brown long eared bats.

4.24 In the AB1 north location, a total of 110 soprano pipistrelle call registrations were recorded, which were the dominant species. Common pipistrelles were the second most commonly recorded species at 85 registrations with a single brown long-eared bat call and single serotine call registration.

4.25 On the AB2 central location, a total of 25 call registrations were recorded over the whole survey period, including 14 common pipistrelle and 11 soprano pipistrelle call registrations.

4.26 The AB3 south location recorded the most call registration in July with 2109 calls. Common pipistrelles dominated, with 1881 call registrations. Myotis species were the second most commonly recorded species with 134 call registrations. There were 85 soprano pipistrelles call registrations recorded and low numbers of serotine calls were identified with 2 calls recorded across the survey period. The summary of the recordings is shown in Appendix 1.

August

4.27 In August a total of 6 species were recorded; common pipistrelle, soprano pipistrelle, myotis species, brown long eared bats, serotine, and noctule.

4.28 In the AB1 north location, a total of 2292 common pipistrelle registrations were recorded, which were the dominant species. Soprano pipistrelles were the second most commonly recorded species at 1188 registrations with a high number of myotis species calls at 944 call registrations over the survey period. Lower numbers of brown long eared bats and serotines were also recorded. Two noctule calls were recorded throughout the 5 night survey period.

4.29 No data was received from the AB2 central location in August due to a technical issue.

4.30 On the AB3 south location, common pipistrelles were the dominant species with 80 call registrations. The second most commonly recorded species was soprano pipistrelles

with 34 call registrations. Low numbers of myotis species, noctules and serotines were recorded. It must be noted that on the 22nd August no call registrations were recorded. The summary of the recordings is shown in Appendix 1.

September

4.31 In September a total of seven species were recorded including common and soprano pipistrelles, serotine, myotis species, noctule, with nathusius pipistrelle heard for the first time over the whole survey period.

4.32 In the AB1 north location, a total of 76 common pipistrelle registrations were recorded, dominating the total species recorded. Lower numbers of myotis and soprano pipistrelles were recorded and a single serotine call registration over the 5 nights. It must be noted on the 11th September, no call registrations were recorded.

4.33 The AB2 location only recorded 42 call registration over the 5 nights. The most calls were by common pipistrelles with 24 calls, followed by myotis species with 10 call registrations. Lower numbers of soprano pipistrelles were recorded as well as a single noctule and single nathusius pipistrelle call.

4.34 The most commonly recorded species on the AB3 location was common pipistrelles with 562 registrations. The second most common species was myotis species with 138 call registrations. There was also 97 soprano pipistrelle calls and only 4 serotine calls. The summary of the recordings is shown in Appendix 1. .

4.35 This data, alongside the previous data, has been used to inform any updates with regards to compensation and mitigation measures, including the design of the site.

Results Summary

4.36 The following tables summarise the data collected on site during the 2024 survey period.

Table 2: Total bat passes recorded by Anabats by species

Bat species	Total number of recordings	Percentage of total
Common Pipistrelle	7740	67.21%
Soprano Pipistrelle	2265	19.67%
Myotis sp.	1460	12.21%
Serotine	52	0.45%
Noctule	35	0.30%
BLE	16	0.14%
Nathusius Pipistrelle	1	0.01%
Big Bat	1	0.01%
Total	**11516**	

4.37 It can be seen from Table 3 that activity was dominated by common pipistrelles. Soprano pipistrelles and myotis species are also considered to be well represented across the site.

4.38 Other species are considered to have low-level use, including serotine, brown long eared bats, noctules, nathusius pipistrelles and big bats.

4.39 Table 3 shows the total number of passes recorded at each Anabat location within each month.

Table 3: Total bat passes recorded each month by location in 2024

Anabat Location	Total number of passes per month						
	April	May	June	July	August	September	**Total**
AB1	190	247	407	197	4461	113	5615
AB2	119	684	420	25	-	42	1290
AB3	302	299	976	2109	124	801	4611
Total	611	1230	1803	2331	4585	956	11516

4.40 It can be seen from Table 4 that higher levels of activity were present along AB1 in the north of the site and AB3 in the south of the site, with lower levels of activity at the AB2 location towards the centre of the site.

4.41 Table 3 also shows the highest levels of activity occurred in August and July, with the lower levels of activity occurring in April and September.

4.42 Table 4 shows the total number of passes made per species at each Anabat location. The table also shows the average number of passes per night per species at each Anabat location. As no call registration were recorded on some nights, and due to technical issues, AB1 location recorded for 28 nights, AB2 recorded for 23 nights and AB3 recorded for 29 nights over the whole survey period. This has been considered when calculating the average.

Table 4: Number of passes made by each species and average pass per species per night at each Anabat location

	AB1 location		AB2 location		AB3 location	
	Number of passes	**Average passes per night**	**Number of passes**	**Average passes per night**	**Number of passes**	**Average passes per night**
Common Pipistrelle	3002	107.21	964	41.91	3774	130.14
Soprano Pipistrelle	1567	55.96	240	10.43	458	15.79
Myotis sp.	992	35.43	65	2.83	349	12.03
Serotine	29	1.04	4	0.17	19	0.66
Noctule	11	0.39	15	0.65	9	0.31
BLE	13	0.46	1	0.04	2	0.07
Nathusius pipistrelle	-	-	1	0.04	-	-
Big Bat	1	0.04	-	-	-	-
Total	**5615**		**1290**		**4611**	

4.43 It can be seen that there are slight variables in the three Anabat locations, with notably lower numbers of species recorded at the AB2 location. In the AB3 location the highest average passes per night by common pipistrelles were recorded. The average passes per night for soprano pipistrelles and myotis however, was higher in the AB1 location.

4.44 It must be noted that low levels of serotine, noctules, brown long-eared bats, nathusius pipistrelles and big bats were recorded in all locations.

5.0 Discussion

Bat Species and Activity

5.1 The 2017 and 2024 walked transect activity surveys did not identify significant numbers of bat calls. In 2024, common pipistrelles and soprano pipistrelles were the dominant species with only low levels of activity for myotis species, noctules and brown long-eared bats across the site.

5.2 The 2024 surveys placed remote recording devices in three separate locations and were established in April, May, June, July, August and September. The surveys identified that the month of April had the lowest number of bat registrations with August showing the highest levels of activity. The remaining months showed reasonable levels of activity.

5.3 Myotis calls were grouped together as they could not be confidently identified to species; these have been grouped in the general 'myotis species' category but could include multiple species. Other species recorded included common and soprano pipistrelles, Nathusius pipistrelle, noctule, serotine, brown long eared bat and big bats, were all recorded across the site.

5.4 Remote activity surveys were also dominated by common and widespread species, largely common pipistrelle bats.

Anabat Data

5.5 Higher levels of bat activity were recorded across the site on the Anabat detectors in comparison with the walked transect surveys, with the highest levels of activity overall being recorded in August. However, it must be noted that remote recording does not distinguish between a single individual making numerous passes whilst foraging around a particular feature, and between more numerous individual bat commuting across the landscape. As such, walked transects provide a good understanding of how a particular feature is being used.

5.6 The majority of bat passes recorded on site during both the walked transects and remote recording surveys, were from common pipistrelles, with a total average of

approximately 93 passes per night across all 3 Anabat locations. During the walked transects, soprano pipistrelle were also frequently recorded. These species are both common and widespread across the UK, with population estimates of 3,040,000 and 4,670,000 respectively (Mathews *et al*., 2018). Foraging bats likely produce repeated passes within a small area whilst hunting for invertebrates and this was confirmed during the transects when a single individual was found to produce numerous passes by simply foraging up and down the same feature such as the woodland edge. Therefore, the high number of common and soprano pipistrelles passes recorded on the remote recording on site are therefore considered likely to result from a moderately small number of foraging bats.

5.7 A number of myotis species calls were also recorded on site, averaging approximately 35 passes per night in the AB1 location across the survey period. There were lower numbers of passes in the other Anabat locations, including an average of 2.8 passes in the AB2 location and 12 passes in the AB3 location. It is therefore considered likely that the northern habitats on site are used as foraging and commuting habitats for Myotis species.

5.8 Low activity levels of serotines, noctules, brown long-eared bats, nathusius pipistrelles and big bats were identified onsite, with an average of approximately 1 or less passes per night on each Anabat. As such, these species are considered to use the site on an occasional basis and that the site do not form part of their core foraging habitat.

5.9 In 2017, barbastelle and Leisler's bat were reordered on site, albeit at low levels, however, in 2024 no call registrations from barbastelle or Leisler's were identified. As the habitats on site have remained consistent, it is considered likely that the site is infrequently used by these species and as such is not part of a core commuting or foraging habitat for these species.

5.10 The scheme has been designed to retain and buffer the existing woodland edges and the majority of the linear features such as hedgerows, therefore avoiding impacts through the loss or severance of flightlines.

5.11 Where development occurs, some sections of hedgerows will be removed for access roads. Large trees on either side of the road would aid in providing an aerial bridge over the road with overhanging branches and thereby reduce the gap over which bats and birds have to cross.

5.12 All construction works will be completed in the daytime when the bats are not active and potential sources of noise/vibration will be positioned away from these features, therefore impacts relating to noise/vibration are considered highly unlikely.

5.13 It is considered that the development retains the key landscape features within the site boundaries and provides enhancements (see below) for bats within the scheme. As such, impacts to bat species can be reduced to a level which would not be considered significant to the conservation status of their local populations.

Recommendations and Enhancements

SuDS

5.14 The current development includes the creation of a SuDS ponds around the site, which would encourage new habitat for invertebrates and therefore potential for new foraging opportunities for bats.

5.15 The vegetation surrounding ponds should be managed with consideration for bats. Trees around the edges of waterbodies provide shelter from wind and rain as well as increasing invertebrate activity, trees in proximity to waterbodies are also particularly attractive to bats as roosts. It is also recommended some areas are left free from vegetation to provide an approach route for larger bats, excessively shaded banks can also reduce the abundance of invertebrates such as Diptera.

5.16 The SuDS could be planted with a grass and wildflower mixture which can survive becoming seasonally wet. This habitat will create new foraging opportunities for bats. A pond edge mix is proposed for use along the main water retention areas and should contain wildflowers and grasses suitable for sowing at the margins of pond, streams and ditches. The mixture proposed includes:

- Sneezewort (*Achillea ptarmica*)
- Wild Angelica (*Angelica sylvestris)*

- Marsh Marigold (*Caltha palustris*)
- Hemp Agrimony (*Eupatorium cannabinum*)
- Meadowsweet (*Filipendula ulmaria*)
- Square-stalked St John's Wort (*Hypericum tetrapterum*)
- Yellow Iris (*Iris pseudacorus*)
- Greater Birdsfoot Trefoil (*Lotus pedunculatus*)
- Gypsywort (*Lycopus europaeus*)
- Purple Loosestrife (*Lythrum salicaria*)
- Meadow Buttercup (*Ranunculus acris*)
- Water Figwort (*Scrophularia auriculata*)
- Ragged Robin *Silene flos-cuculi - (Lychnis flos-cuculi)*
- Devil's-bit Scabious (*Succisa pratensis*)
- Common Meadow-rue (*Thalictrum flavum*)
- Tufted Vetch (*Vicia cracca*)
- Meadow foxtail (*Alopecurus pratensis*)
- Sweet vernal-grass (*Anthoxanthum odoratum*)
- Crested dogstail (*Cynosurus cristatus*)
- Tufted hair grass (*Deschampsia cespitosa*)
- Common bent (*Agrostis capillaris).*

Lighting recommendations

5.17 As it has been identified that a number of bat species use of the boundary features on site, it is recommended that light should be directed away from these features, maintaining these as 'dark corridors'. The northern boundary habitats in particular, are key areas for bats where low levels of levels of lighting are highly recommended as these areas have been shown to be a key foraging and commuting route by light sensitive species such as myotis species.

5.18 Dark corridors must be maintained along the linear features. Lighting can alter bat behaviour significantly in terms of light avoidance with some species unable to cross lit areas even at low light levels. For example, Myotis species which are on site, are known to avoid all street lights (Stone et al., 2009, 2012, 2015). Therefore, the development could

seriously impact the abundance of these species on site post-development without careful design and mitigation.

5.19 In addition, lighting can affect the availability of insect prey with some groups attracted to lights, creating a 'vacuum effect' in adjacent habitats.

5.20 Dark corridors could be implemented through the inclusion of dark buffer zones along the habitat edges of the site. These will help to ensure that light levels (measured in lux) within a certain distance of a feature do no exceed certain defined limits.

5.21 Where lighting is required on site, a sensitive lighting scheme must be implemented. Again, collaboration between a lighting professional and ecologist may be required in order to help design this scheme but measures should include:

- The impact on bats can be minimised by the use of Light emitting diodes (LEDs) instead of mercury, fluorescent or metal halide lamps where glass glazing is preferred due to their sharp cut-off, lower intensity and their dimming capability. Lighting should be directed to where it is needed and light spillage avoided.
- This can be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvres and shields to direct the light to the intended area only.
- Soft landscape planting should also be used as a barrier or manmade features such as walls or fencing with planted climbers where required within the build can be positioned so as to form a barrier between any development and the linear features used by bats.

Roost enhancements – boxes

5.22 Bat boxes should be erected on the existing mature trees along the northern and southern boundaries of the site. This will enhance the local bat population and provide roosting opportunities. Woodcete boxes, or similar are recommended as they are durable and support good thermal properties. Recommended boxes include:

- Vivara Pro WoodStone Bat Box – A general purpose bat box that supports a range of species (Figure 3). These can be hung on trees in a variety of heights and aspects in order to provide a variety of micro-climates.
- Large Multi Chamber WoodStone Bat Box – This is a multipurpose box designed for larger colonies and a range of bat species including pipistrelles, noctules and

brown long-eared bats. These should be hung on mature trees around the site (Figure 3).

Figure 3: Vivara Pro WoodStone Bat Box (left) and Large Multi Chamber WoodStone Bat Box (right)

5.23 The development can also incorporate bat tubes integrated into the new buildings on site. It is recommended that either the Vivara Pro Build-in Woodstone bat box or the Habibat Bat Box 001 are used, Figure 4. They are unobtrusive and can fit flush into masonry of a wall during the construction phase. It is recommended that these be placed on the walls of houses close to south western and north eastern woodlands.

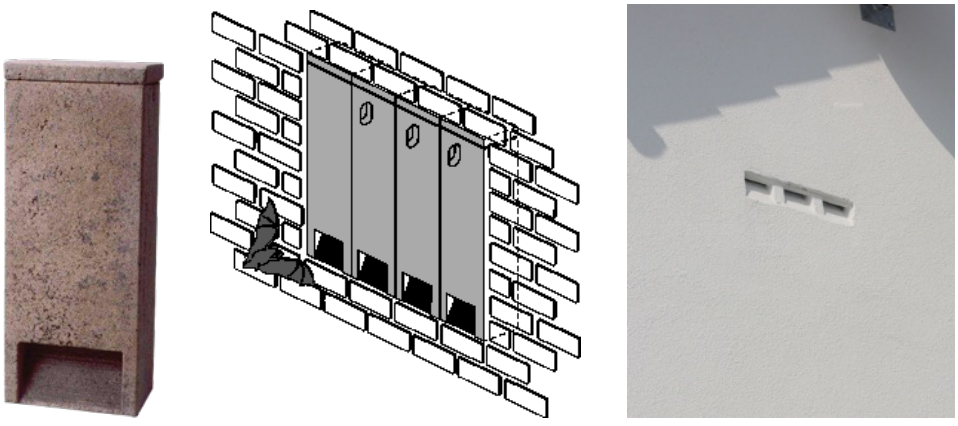

Figure 4: Use of bat tubes recommended within newly built houses on site

Additional planting schemes

5.24 Trees provide foraging opportunities for bats through provision of insect prey, as such it is recommended a number of the below native tree species are planted across the site post-development adjacent to new roads. This will help to improve wildlife corridors around the site for species such as badgers, amphibians, small mammals and birds. The following species are recommended to be used in enhancing existing hedgerows and in the creation of individual trees across the site:

- Oak (*Quercus robur*)
- Rowan (*Sorbus aucuparia*)
- Elder (*Sambucus nigra*)
- Goat willow (*Salix caprea*)
- Hazel (*Corylus avellana*)
- Hornbeam (*Carpinus betulus*)
- Common alder (*Alnus glutinosa*)
- Hawthorn (*Crataegus monogyna*)
- Blackthorn (*Prunus spinosa*)
- Field maple (*Acer campestre*)
- Dog rose (*Rosa canina*);

5.25 Gardens in developed areas can provide suitable foraging habitat for bats, in particular for pipistrelle species. It is recommended that planting includes native species that are of particular benefit to bats such as night-flowering species that attract night-flying invertebrate prey. The following native species are considered suitable:

- Nottingham catchfly (*Silene nutans*)
- Night-flowering catchfly (*Silene noctiflora*)
- Bladder campion (*Silene vulgaris*)
- Soapwort (*Saponaria officinalis*)
- Wild marjoram (*Orignaum vulgare*)
- Borage (*Borago officinalis*)
- Yarrow (*Achillea millefolium*)
- Primrose (*Primula vulgaris*)
- Corn marigold (*Glebionis segetum*)
- Perforate St John's-wort (*Hypercium perforatum*)

- Wood forget-me-not (*Myosotis sylvatica*)
- Ox-eye daisy (*Leucantheum vulgare*)

5.26 Climbing plants can be grown onto trellis along the fence line dividing the two gardens. Species which can be planted include:

- Honeysuckle (*Lonicera japonica; L. fragantissima; L. standishii*);
- Clematis (*Clematis vitalba, C. armandii, C. alpina, C. montana, C. tangutica*);
- Ivy (*Hedera helix*);
- Climbing hydrangea (*Hydrangea petiolaris*);
- Dog rose (*Rosa canina*).

5.27 Log and brash piles have been recommended for the site to provide refugia and hibernacula for reptiles, amphibians and small mammals at the edges of the site. They are also important for saprophytic bryophytes and saprophytic insects, and in turn bats. They should be placed in a variety of locations (damp and sunny spots) and next to existing vegetation, such as the hedgerows, treelines and woodland edge, so that there is cover immediately adjacent. They should contain a mixture of log piles and shapes with some small diameter material to create a diverse structure (Figure 5). Climbing plants previously mentioned can also be used to add value.

Figure 5: Use of log piles to be used across the site.

6.0 Conclusions

6.1 The site supports mature trees, hedgerows and woodland which provide suitable foraging and commuting habitats for bats, also providing connectivity both on and off site. Therefore, further bat activity surveys were considered necessary to determine how bats utilise the site and if there has been a change of usage since the 2017/18 surveys.

6.2 A transect route along the linear boundary features was followed on the 28th May, 3rd July and 30th September 2024. The transect surveys identified moderate levels of bat activity across the site, with activity on site being dominated by common and soprano pipistrelles. Other bat species were recorded in low numbers including brown long-eared bats, myotis species and noctules.

6.3 Three Anabat detectors were placed on site each month between April to September 2024. The Anabat detectors recorded higher levels of bat activity on site and recorded a greater variety of bat species on site than on the walked transects. The northern AB1 location recorded the most call registrations onsite with 5615 calls. The results of all surveys suggest the site is largely used by common bat species such a soprano and common pipistrelles as well as myotis species. The main areas for foraging identified from the walked transects and remote recording were the boundary features along the north, west and southern boundaries. These features will be retained and enhanced part of the development to ensure bats can move with ease across the landscape.

6.4 In total, 8 different species were identified using the site during the 4 months. The dominant species recorded was common pipistrelles, with soprano pipistrelles and myotis species frequently recorded. Low level use of the site by other species, including serotine, noctules, brown long eared bats, Nathusius pipistrelle and big bats were also recorded.

6.5 Current proposals will retain and enhance most of the boundary features. Where gaps in hedgerows are created to road access, large trees on either side of the road with overhanging branches will reduce the gap over which bats have to cross. These boundary features should be maintained as darkened corridors with minimal nearby lighting and a sensitive lighting scheme should also be conditioned to further minimise the potential for impacts to bats.

6.6 Recommendations have been made to also include soft landscape planting schemes and a SuDS Pond which will create new foraging opportunities for bats in the local area. If these recommendations are adhered to, it is considered that the favourable conservation status of all bat species using the site will be maintained post-development.

7.0 References

Bat Conservation Trust (2018). *Bats and artificial lighting in the UK – Bats and the built environment series, (Guidance Note 08/18).* Bat Conservation Trust, London.

Bat Conservation Trust (2023). *Bat Surveys – Good Practice Guidelines Second Edition.* Bat Conservation Trust, London.

Mitchell-Jones, A.J. (2004) *Bat Mitigation Guidelines*. English Nature, Peterborough.

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Appendix 1: Raw Bat Data

April

North						
Night/Species	BigBat	Myotis	Noc	Pip45	Pip55	Grand Total
29/04/2024		5		8	6	19
30/04/2024		5	3	12	10	30
01/05/2024	1	10		73	13	97
02/05/2024				25	15	40
03/05/2024				3	1	4
Grand Total	1	20	3	121	45	190

Centre					
Night/Species	Myotis	Noc	Pip45	Pip55	Grand Total
29/04/2024	13	1	15	14	43
30/04/2024	7	3	9	26	45
01/05/2024			5	6	11
02/05/2024	2	3	2	5	12
03/05/2024	1	1	5	1	8
Grand Total	23	8	36	52	119

South				
Night/Species	Myotis	Pip45	Pip55	Grand Total
29/04/2024		3	14	17
30/04/2024	2	26	12	40
01/05/2024		22	17	39
02/05/2024		9	40	49
03/05/2024	1	141	15	157
Grand Total	3	201	98	302

May

North							
Night/Species	Myotis	Noc	Pip45	Pip55	Sero	Grand Total	
26/05/2024	1	2	6	10		19	
27/05/2024		1	27	18	1	47	
28/05/2024			1	1		2	
29/05/2024	1	1	11	21		34	
30/05/2024	4		63	78		145	
Grand Total	6	4	108	128	1	247	
Centre							
Night/Species							
Row Labels	BLE	Myotis	Noc	Pip45	Pip55	Sero	Grand Total
28/05/2024	1	6	1	236	113		357
29/05/2024		24	2	161	10	1	198
30/05/2024		2		103	23	1	129
Grand Total	1	32	3	500	146	2	684
South							
Night/Species							
Row Labels	Noc	Pip45	Pip55	Grand Total			
26/05/2024	2	27	4	33			
27/05/2024	1	21	11	33			
28/05/2024		1		1			
29/05/2024	1	77	16	94			
30/05/2024		92	46	138			
Grand Total	4	218	77	299			

June

North							
Night/Species	BLE	Myotis	Noc	Pip45	Pip55	Sero	Grand Total
19/06/2024				63	21		84
20/06/2024	2	1		30	20		53
21/06/2024				15	1		16
22/06/2024				83	20		103
23/06/2024			2	129	19	1	151
Grand Total	2	1	2	320	81	1	407

Centre					
Night/Species	Noc	Pip45	Pip55	Sero	Grand Total
19/06/2024		211	17		228
20/06/2024		44	3	1	48
21/06/2024	1	57	2		60
22/06/2024	2	53	2		57
23/06/2024		25	1	1	27
Grand Total	3	390	25	2	420

South							
Night/Species	BLE	Myotis	Noc	Pip45	Pip55	Sero	Grand Total
19/06/2024		14		45	4	1	64
20/06/2024	1	26		128	8	3	166
21/06/2024	1	15		259	41	1	317
22/06/2024		12	2	240	4	4	262
23/06/2024			1	160	3	3	167
Grand Total	2	67	3	832	60	12	976

July

North					
Night/Species	BLE	Pip45	Pip55	Sero	Grand Total
04/07/2024		9	8	1	18
06/07/2024	1	17	2		20
07/07/2024		36	51		87
08/07/2024		23	49		72
Grand Total	1	85	110	1	197

Centre			
Night/Species	Pip45	Pip55	Grand Total
04/07/2024	4	4	8
05/07/2024		1	1
06/07/2024	4	1	5
07/07/2024	1	5	6
08/07/2024	5		5
Grand Total	14	11	25

South					
Night/Species	Myotis	Pip45	Pip55	Sero	Grand Total
04/07/2024	25	169	6		200
05/07/2024	60	1103	19		1182
06/07/2024	21	211	18		250
07/07/2024	17	365	30	2	414
08/07/2024	11	33	19		63
Grand Total	134	1881	92	2	2109

August

North							
Night/Species	BLE	Myotis	Noc	Pip45	Pip55	Sero	Grand Total
22/08/2024	1	585	2	801	545	13	1947
23/08/2024	2	94		584	178	3	861
24/08/2024	3	19		37	13		72
25/08/2024	2	144		592	336	3	1077
26/08/2024	2	102		278	116	6	504
Grand Total	10	944	2	2292	1188	25	4461

South						
Night/Species	Myotis	Noc	Pip45	Pip55	Sero	Grand Total
23/08/2024	4		33	4	1	42
24/08/2024	1		8	1		10
25/08/2024	1		20	7		28
26/08/2024	1	2	19	22		44
Grand Total	7	2	80	34	1	124

September

North						
Night/Species	Myotis	Pip45	Pip55	Sero	Grand Total	
12/09/2024	2	1	3		6	
13/09/2024	3	7	1	1	12	
14/09/2024	4	52	2		58	
15/09/2024	12	16	9		37	
Grand Total	21	76	15	1	113	
Centre						
Night/Species	Myotis	NathPip	Noc	Pip45	Pip55	Grand Total
11/09/2024	3			1	1	5
12/09/2024	2			5	2	9
13/09/2024	1			3		4
14/09/2024	3	1			1	5
15/09/2024	1		1	15	2	19
Grand Total	10	1	1	24	6	42
South						
Night/Species	Myotis	Pip45	Pip55	Sero	Grand Total	
11/09/2024	1	34	8		43	
12/09/2024	3	24	5		32	
13/09/2024	31	62	5	1	99	
14/09/2024	84	312	49		445	
15/09/2024	19	130	30	3	182	
Grand Total	138	562	97	4	801	

Figure 8: September Recording Summary

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Date: 03/01/2025