

Bat Activity Survey 2017

Land at Wandleys Farm
Fontwell, West Sussex



Contents

1.0	INTRODUCTION	3
	BACKGROUND	3
	SITE CONTEXT AND STATUS.....	3
	LEGISLATION	4
2.0	METHODOLOGY	5
	BAT ACTIVITY SURVEYS	5
	LIMITATIONS.....	6
3.0	RESULTS.....	7
4.0	DISCUSSION.....	13
	BAT ACTIVITY SURVEYS	13
	ECOLOGICAL VALUE OF THE SITE	16
	RECOMMENDATIONS AND ENHANCEMENTS	17
5.0	CONCLUSIONS	22

LIABILITIES:

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

This report provides a snap shot of the species that were present at the time of the survey only and does not consider seasonal variation. Furthermore, where access is limited or the site supports habitats which are densely vegetated only dominant species maybe recorded.

The recommendations 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 was commissioned by ECE Architecture/Welbeck Land to undertake a bat activity survey on land at Wandleys Farm, Wandleys Lane, Fontwell, West Sussex, BN18 0QR. This update survey was recommended following a preliminary ecological appraisal in April 2017.
- 1.2 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 2017 survey season.
- 1.3 Section 2 of this report sets out the methodology of The Ecology Partnership's survey. The results of the surveys so far are contained in Section 3 and the implications discussed in Section 4. Conclusions are provided for in section 5 of this report.

Site Context and Status

- 1.4 The site lies to the east of Wandley's Lane in Fontwell, West Sussex (SU 95648 06681). The site covers approximately 6.98ha and consists of grassland fields with tree lines, hedgerows and a woodland edge. The surrounding area consists of medium-density housing, agricultural land and woodland. Wandley's Copse, a designated ancient woodland, lies immediately adjacent to the southern boundary of the site.
- 1.5 The approximate red line boundary of the site is shown in Figure 1 below. This is also the approximate survey area.



Figure 1: Approximate location of the red line boundary

Legislation

1.6 Under the Natural Environment and Rural Communities (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”. Seven species of bat (Barbastelle, Bechstein’s, Noctule, Soprano pipistrelle, Brown long-eared, Greater horseshoe and Lesser horseshoe) are listed as Species of Principal Importance in England under Section 41 of the NERC Act.

1.7 All bats are covered by the following relevant legislation: the Wildlife and Countryside Act (WCA) 1981 (as amended); the Countryside and Rights of Way Act 2000; the Natural Environment and Rural Communities Act 2006; and by the Conservation of Habitats and Species Regulations (CHSR) 2010.

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).

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

Bat Activity Surveys

- 2.1 A dawn activity survey was conducted on 26th May 2017 and dusk activity surveys were carried out on 26th July, 29th August and 20th September 2017. The surveys followed Bat Conservation Trust guidelines (Collins 2016). The transect route was chosen in order to cover areas of interest and record any flyovers and activity around the site. Trees of interest were observed for emergence activity. One transect was walked at least twice along the boundary of the site to cover all linear features (Figure 2).
- 2.2 Dusk surveys started at sunset and observations were maintained until 2 hours after sunset. 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.

- 2.3 A dawn survey can increase the chance of surveyors visually assessing bat behaviour and movement as well as providing good opportunities for recording. This is especially true if there is a roost on site. The dawn survey started 1.5 hours before dawn and was completed at dawn.
- 2.4 The surveyors were equipped with a Batscanner, an Echometer touch and/or anabat walkabout technology.
- 2.5 Anabat expresses were also set up in two locations on site, covering the northern boundary tree line and the ancient woodland edge in the south (Figure 2). These were deployed on 26th May, 26th July, 29th August and 20th September 2017. They were left for at least 5 nights and then collected in for analysis.



Figure 2: Transect route (yellow) and anabat locations (stars)

Limitations

- 2.6 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.

3.0 Results

- 3.1 The first transect survey was carried out at dawn on 26th May 2017. Sunrise was at 04:59 and the temperature was 13°C throughout the survey. The first bat recorded was a common pipistrelle foraging at 03:41 along the eastern boundary tree line. Another common pipistrelle was recorded commuting just south of the first recording at 03:46. At the same location a serotine was recorded foraging at 03:48. At 03:53 a common and soprano pipistrelle were recorded commuting in the southeast corner of the site. At 04:24 another common pipistrelle was seen foraging along the southern boundary of the site close to the southeast corner. The last bat recorded was a common pipistrelle at 04:25 foraging along the southern boundary towards the southeast corner. No other bats were recorded during this survey.
- 3.2 Two Anabats were deployed from 26th May to 4th June 2017. The raw data for both locations is presented in Appendix 1. Common pipistrelles were the most numerous species at both locations but there were more than twice as many passes along the woodland. Both anabats also recorded a relatively low number of passes from soprano pipistrelles, serotines, Leisler's and brown long-eared bats whilst the southern woodland anabat also recorded one Myotis call and barbastelles. A total of eight barbastelle calls were recorded over the 11 nights the anabat was deployed (Figures 3 and 4).

Figure 3: Barbastelle call recorded along the woodland edge on 29th May 2017

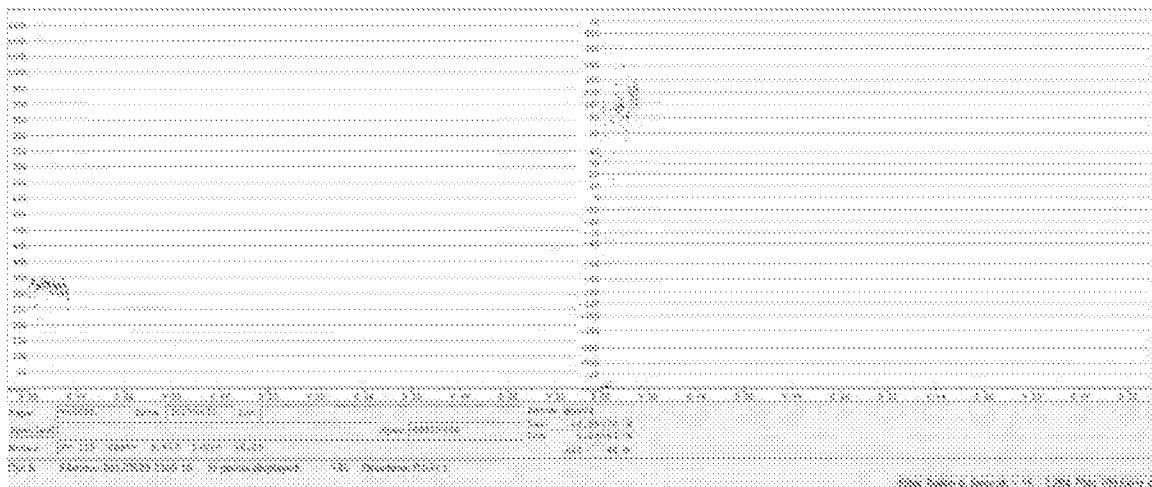
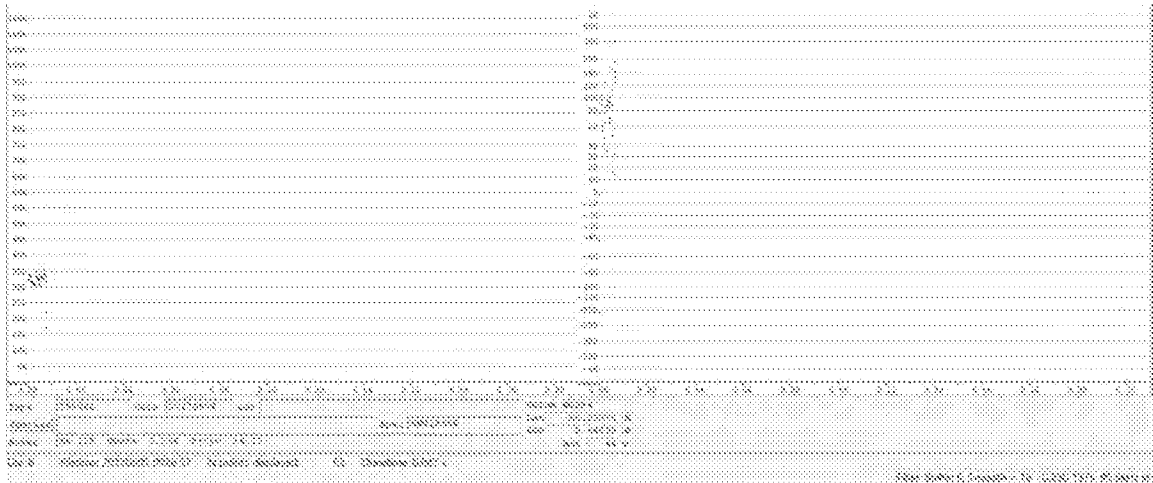


Figure 4: Barbastelle call recorded along the woodland edge on 4th June 2017



3.3 The second survey was conducted at dusk on 26th July 2017. Sunset was at 20:57 and the weather was overcast and slightly breezy with a temperature of 14°C. The first bat recorded was a common pipistrelle foraging in the southeast corner of the site at 21:14. Another common pipistrelle was recorded along the northern tree line foraging at 21:33. Lots of common pipistrelle passes were then heard along the eastern tree line at 21:40. At 21:47 another common pipistrelle was recorded again foraging in the southeast corner. The last bat of the night was a common pipistrelle foraging along the southern boundary next to the woodland. No other bats were recorded during this survey.

3.4 Anabats were deployed in the same position as the previous survey from 26th to 31st July 2017 (Appendix 1). Again, the most common species recorded in both areas was common pipistrelle, however the number of passes was lower at the northern position compared with the May-June results. Conversely, the number of passes along the woodland edge had significantly increased compared with the previous survey with a total of 905 (Appendix 1). The same species were again recorded at the northern position and included soprano pipistrelle, serotine, Leisler's and brown long eared bats in relatively low numbers. The woodland edge also recorded these species along with a single Nathusius' pipistrelle pass and another eight barbastelle passes (Figures 5-8).

Figure 5: Leisler's call recorded along the woodland edge on 27th July 2017

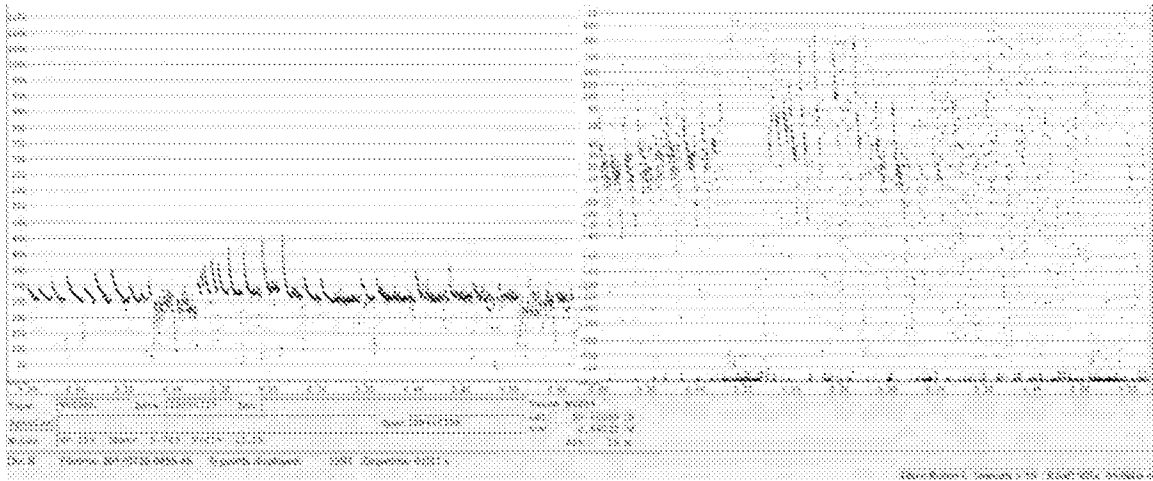


Figure 6: Noctule call recorded along the woodland edge on 30th July 2017

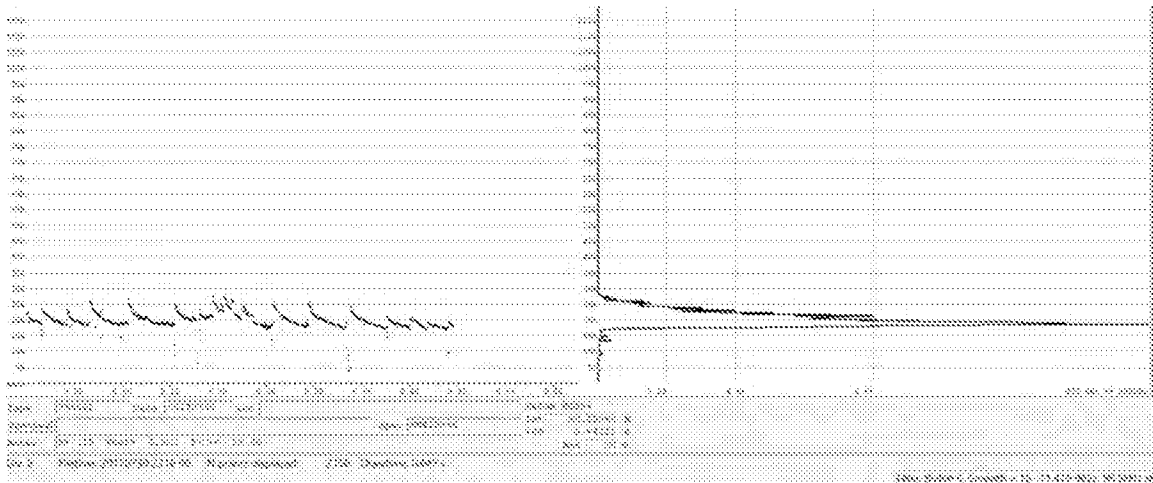


Figure 7: Barbastelle call recorded along the woodland edge on 28th July 2017

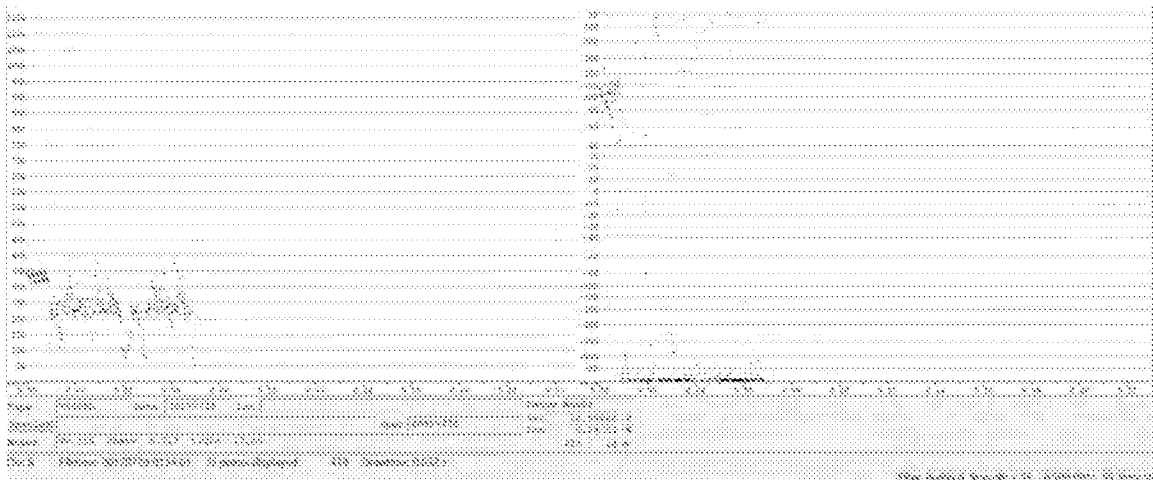
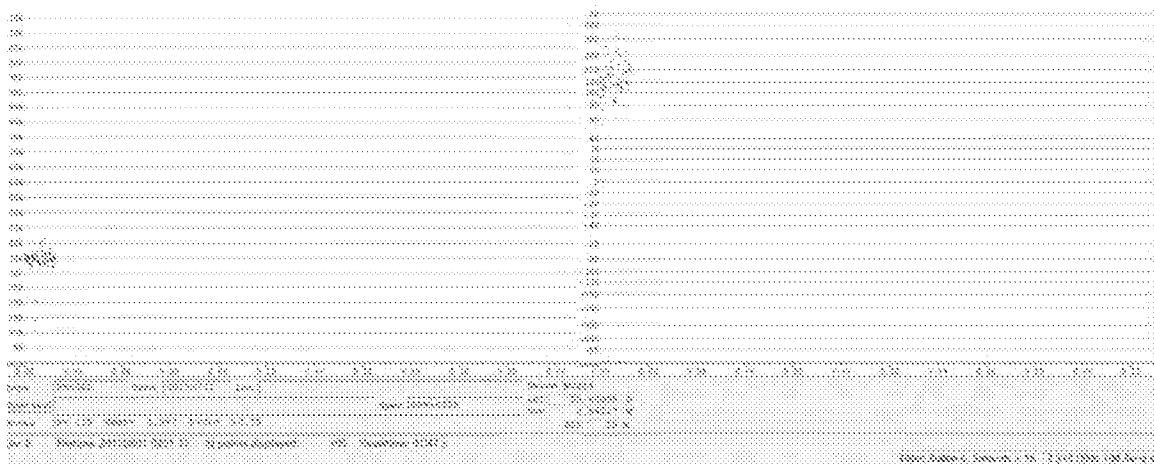
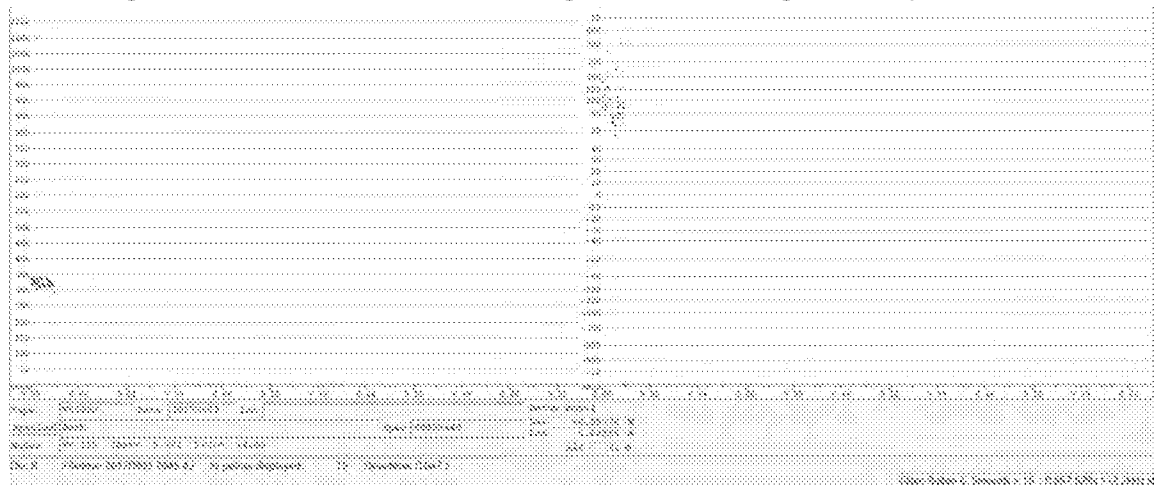
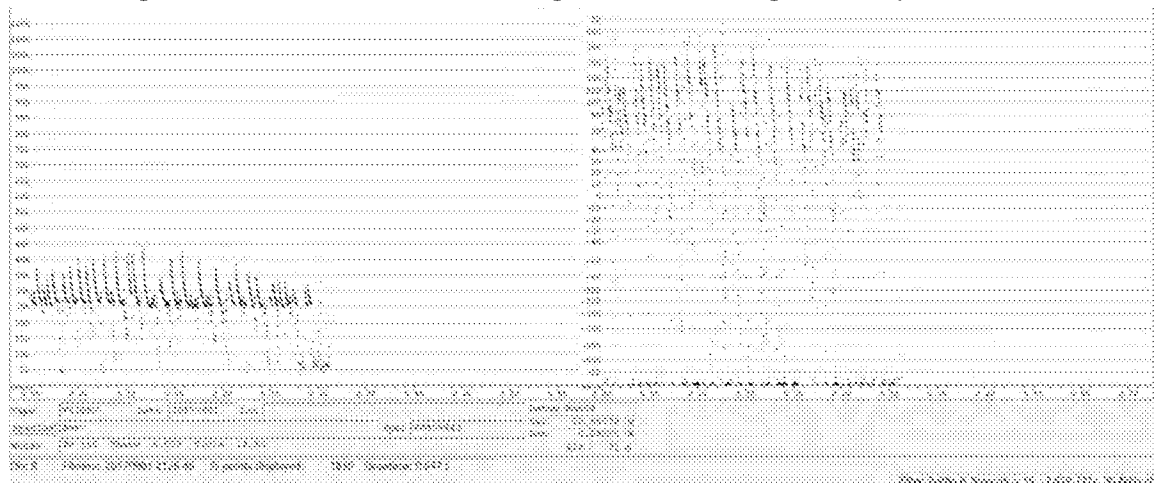
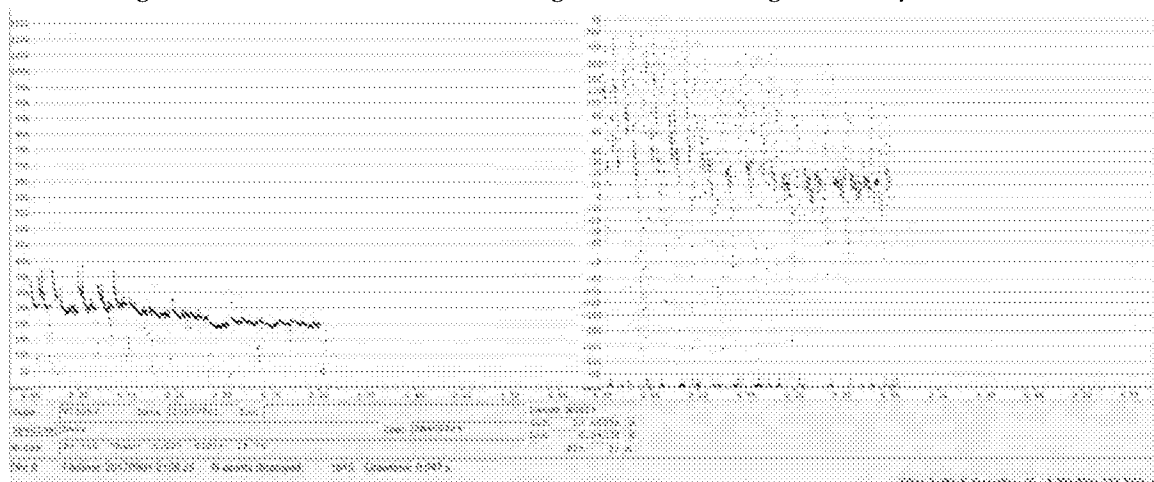


Figure 8: Barbastelle call recorded along the woodland edge on 31st July 2017



3.5 The third survey was carried out at dusk on 29th August 2017. Sunset was at 19:54 and the weather was humid and overcast with a temperature of 21°C. The first bats recorded were a common pipistrelle and a noctule at 20:07 commuting along the northeast boundary of the site. This was followed by a soprano pipistrelle at 20:15 commuting close to the northeast corner of the site and both a common and soprano pipistrelle continuously foraging in the same corner from 20:18 until 20:21. At 20:22 a soprano pipistrelle was seen foraging along the woodland edge and passing at least three times. At 20:28 a serotine was heard briefly commuting passed the woodland edge. At 20:30 and 20:32 a common pipistrelle was heard passing along the southern boundary. The last recording of the night was a common pipistrelle foraging along the eastern tree line at 20:54. No other bats were recorded and there was no activity recorded along the northern and western portions of the site.

3.6 Two anabats were deployed in the same positions as previously between 29th August and 5th September 2017 (Appendix 1). The most passes recorded were by common pipistrelles followed by soprano pipistrelles. Low numbers of noctule, serotine, Leisler's, brown long-eared, Myotis and barbastelle were also recorded (Figures 9-11). Overall more passes were recorded along the woodland edge and barbastelles were only recorded along this edge.

Figure 9: Barbastelle call recorded along the woodland edge on 1st September 2017*Figure 10: Serotine call recorded along the woodland edge on 1st September 2017**Figure 11: Leisler's call recorded along the woodland edge on 3rd September 2017*

- 3.7 The fourth survey was carried out on 20th September 2017. Sunset was at 19:05 and the weather was clear and still with a temperature of 15°C. The first bats recorded were a soprano pipistrelle and a Nathusius' pipistrelle at 19:22 foraging along the southern woodland edge. At 19:38 a common pipistrelle was recorded foraging along the northern boundary. This was followed by another common pipistrelle foraging further east at 19:42. At 19:43 and 19:44 a common pipistrelle and a soprano pipistrelle were seen foraging in the southeast corner of the site. Between 19:49 and 19:54 a common pipistrelle and a brown long-eared bat (Figure 12) were seen continuously foraging along the southern boundary. At 20:01 another common pipistrelle and brown long-eared bat were seen briefly passing along the eastern boundary. The last bat of the survey was a brown long-eared bat along the western edge at 20:14. No other bats were recorded.

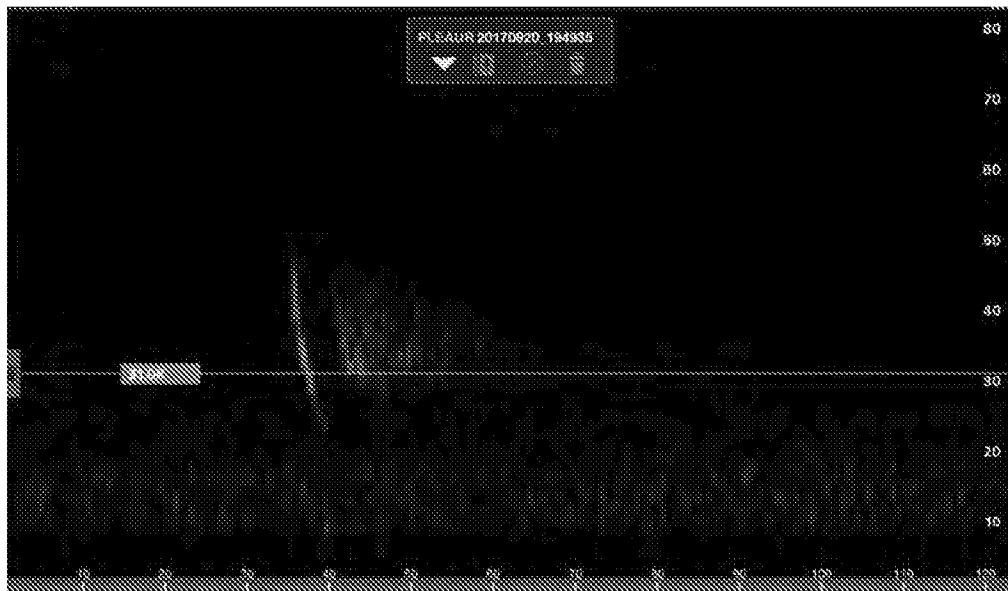


Figure 12: Brown long-eared call recorded foraging along the woodland on 20th September 2017

- 3.8 Anabats were deployed in similar positions as previous surveys from 20th-26th September 2017 (Appendix 1). Again, the most common species recorded was common pipistrelle across the whole of the site. Soprano pipistrelle, Myotis, big bats (noctule, serotine, Leisler's) and brown long-eared bats were also recorded but at much lower rates. Barbastelle passes were again recorded along the woodland edge but they were also recorded on two occasions along the northern boundary during this survey. Nathusius' pipistrelle was also recorded on two occasions along the woodland edge (Figure 13).

Again, overall bat activity was much greater along the south when compared with the northern edge.

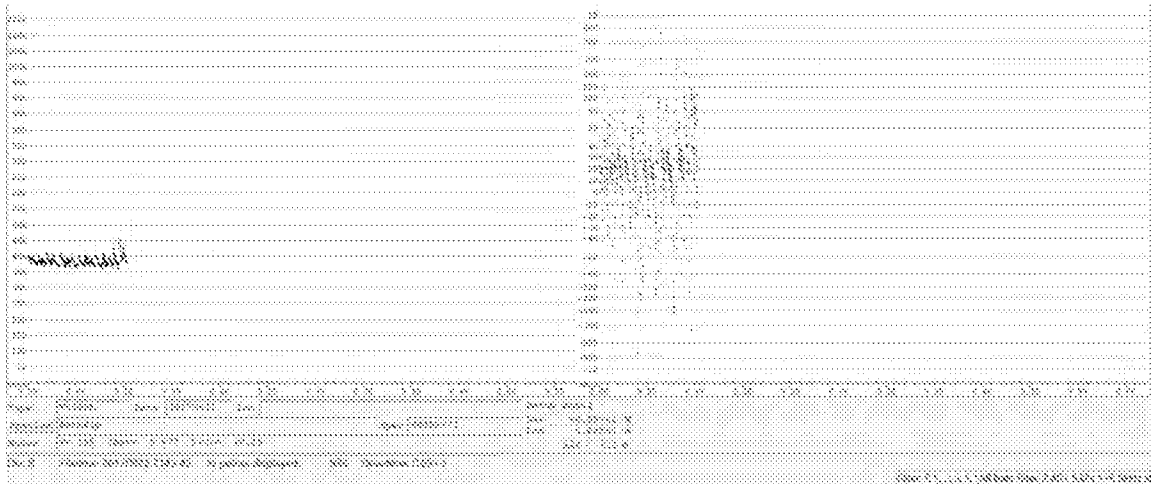


Figure 13: Nathusius' pipistrelle call recorded along the woodland edge on 22nd September 2017

4.0 Discussion

Bat Activity Surveys

- 4.1 The surveys highlight the use of the site by several different bat species. Across all surveys, the highest frequency of calls recorded were made by common pipistrelles. Soprano pipistrelles, Nathusius' pipistrelles, serotines, noctules, Leisler's, brown long-eared bats, Myotis and barbastelles were also recorded at much lower rates.
- 4.2 The northern anabat recorded a total of 515 registered calls over the course of the survey period. The number of calls across the survey period was considered to be relatively low.
- 4.3 In May / June the northern anabat registered 151 calls, of which 61% were common pipistrelle, 19.2% brown long eared bats with the big bats (noctule, serotine and leislers) accounting for 13%. Low numbers of soprano pipistrelles were recorded. In July a total of 78 registrations were recorded. 50% of the these were common pipistrelles, with big bats accounting for 28% and brown long eared bats at 18%. Again low numbers of soprano pipistrelles were recorded. In August 182 calls were registered 44.5% being common

pipistrelle, with 26% from soprano pipistrelle. Big bats accounted for 14%. Myotis and brown long eared bats were also recorded in low numbers. Finally the September survey identified a total of 104 calls, with 49% being from common pipistrelles. Brown long eared bats accounted for 22% of the passes. A total of 2 passes of barbastelles were recorded.

4.4 The southern anabat recorded a total of 2,251 calls over the survey period. This is well over 4 times more calls than the northern anabat.

4.5 The May/June anabat recorded 302 calls, with 72.5% common pipistrelles. Social calls of pipistrelles were also recorded, however, these were grouped and as such this percentage could be higher. A total of 8 passes by barbastelles were recorded, providing 2.6% of the calls registered. The big bats totalled 7.3% with brown long eared bats, myotis and soprano pipistrelles also recorded.

4.6 The July anabat recorded a total of 1,013 calls, with 89% of these being from common pipistrelles. A total of 8 barbastelle passes and 1 Nathusius pass were recorded during this period. In August 610 calls were registered of which 60% were common pipistrelles, with 18.5% being from soprano pipistrelles. Big bats provided 13.5% and barbastelles 3%. Myotis and brown long eared bats were also recorded. Finally, in September 326 calls were registered of which 58% were from common pipistrelles. A total of 25 passes by barbastelles were recorded accounting for 7.7% of the calls. Nathusius were recorded on two separate occasions only.

4.7 Foraging bats make repeated passes within a small area whilst hunting for invertebrates. This means that a high number of passes is likely to be generated by a relatively small number of bats throughout the night as opposed to a large number of bats making individual passes. Therefore, the high number of common pipistrelle passes recorded throughout the surveys are likely to have been made by a relatively small number of individuals who use the site frequently to forage. Common pipistrelles are generalists, however all three pipistrelle species do show a preference for mixed deciduous woodland.

- 4.8 The big bat species (noctule, serotine, Leisler') were recorded much less frequently than pipistrelles and often only briefly. It is considered that these individuals were using the site to commute between their roosting and foraging sites. However, serotines were recorded at much higher rates on one particular day in September and it is considered that this species may use the site for both foraging and commuting, at least on an occasional basis.
- 4.9 A *Myotis* species was also recorded on some nights but very briefly, making it difficult to identify the species. Again, it is considered that this species was commuting through the site rather than using it as a key foraging area.
- 4.10 Brown long-eared bats were recorded by the anabats during all four surveys and were also picked up by the EM Touch during the final September transect survey. These bats are often difficult to pick up on bat detectors and can be drowned out by other bats, especially where activity by pipistrelles is relatively high. Therefore, it is considered likely that this species uses the site more often than recorded, especially since brown long-eared roosts have been recorded in the local area within the last 3 years. This species gleans its prey, such as moths, spiders and flies, from the surface of leaves and is often associated with vegetation edges. The tree lines and woodland edge therefore provide good opportunities for foraging for this species.
- 4.11 A small number of barbastelle calls, considered to be typical of foraging, were identified along the ancient woodland edge in all months surveyed (May-September). This species is an Annex II (Habitats Directive) species and is considered to be Near Threatened according to the IUCN Red List. As this is one of the rarest bat species in the UK, the Habitats Directive requires certain areas where they are found to be designated as a Special Area of Conservation (SAC) to ensure their populations are maintained at a favourable conservation status.
- 4.12 The Ebernoe Common SAC lies approximately 18km north of site and was designated for its barbastelle maternity colony. There are two additional SACs close to site where

barbastelles are a qualifying feature but not a primary reason for designation. These are The Mens SAC approximately 16.5km north known to contain maternity roosts and the Singleton and Cocking Tunnels SAC approximately 10km northwest, which is an important hibernation site for barbastelles. These distances are within range for foraging barbastelles as females have been known to travel up to 20km in the summer to find suitable foraging areas (Zeale *et al.* 2012).

- 4.13 It is possible that the barbastelles visiting the site have travelled from these SACs or it may be the case that males are roosting in nearby woodlands. Barbastelles roost behind loose bark, in tree cracks and deep in hollow trees in deciduous woodlands, such as Wandley's Copse neighbouring the site. Whilst it is considered unlikely that barbastelles are roosting adjacent to the site, the small number of foraging bats passing through the site should nevertheless be considered within the design of the scheme. Foraging barbastelles are known to be spread thinly over the landscape and so a low number of passes is to be expected.

Ecological Value of the Site

- 4.14 The site supports habitats that are locally common and widespread. However, deciduous woodland, particularly ancient woodland, is an important habitat for numerous bat species due to the wide variety of invertebrate food it provides as well as being sheltered from the elements. The woodland edge and hedgerows on site are also important linear features which provide landscape connectivity and foraging habitat for certain species. The wider landscape supports large areas of ancient woodland which are connected to site by several hedgerows and tree lines as well as agricultural land.
- 4.15 It is understood that the proposals are to build around 157 residential properties within the red line boundary which would result in significant loss of grassland. Whilst this habitat may be suitable for a range of invertebrates, it is regularly cut for hay which reduces its ecological value and therefore provides fewer food resources for bats. However, it has been demonstrated by the surveys that the tree lines, hedgerows and woodland edge are used by a range of foraging bat species, including the rare barbastelle

-
- bat. This activity was much higher along the woodland edge but considered the design of the scheme, all linear features are important for connectivity across the landscape.
- 4.16 Surveys for the development proposed to the west of Wandley's Lane were carried out by FCPR and recorded bat activity in both 2014 and 2016. These surveys also found that common pipistrelle was the most frequently recorded species but also soprano pipistrelle, Nathusius' pipistrelle, noctule, serotine, brown long-eared, Myotis and barbastelle species in lower numbers. The overall activity on the site was considered to be low and close associated with mature hedgerows, tree lines and woodland edge habitat.
- 4.17 The neighbouring development area was calculated by FCPR as having value at a regional level for foraging and commuting barbastelles. However, given the low number of barbastelles recorded, it was considered that the site was only occasionally used by individual commuting/foraging barbastelles. There was no indication that the site was part of an important commuting route for local populations nor that it was a significant foraging resource. Since there were similar levels of activity on land to the east of Wandley's Lane and the site is made up of similar habitat types, it is considered that the site is also only occasionally used by foraging barbastelles on route to other foraging areas.
- 4.18 It is therefore considered that the most important habitats on site for bats are the tree lines, hedgerows and woodland edge and these should be protected and enhanced within the design of the scheme. Detailed recommendations and enhancements are outlined below. Certainly, development which considers bats within the master planning, by retaining important landscape features and providing enhancements for bats, would reduce impacts to bats species to a level which would not be considered significant.

Recommendations and Enhancements

- 4.19 It is recommended that as much of the habitat as possible, in terms of mature trees, tree lines and hedgerows, be retained as part of the proposals. Mature trees have intrinsic

value and should be maintained where possible. Since these are concentrated along the boundaries they can be incorporated into the design of the scheme. However, some trees need to be removed along the northern boundary to provide new access routes on to site. These should be checked again for their roosting bat potential by a suitably qualified ecologist prior to removal. Any trees that need to be removed should be replaced elsewhere on site with native species such as oak, ash, hazel, beech, cherry, hornbeam or rowan.

4.20 Given the scope of the plans, it is expected that much of the interior will be cleared. Therefore, it is recommended that the tree lines and hedgerows along the boundaries of the site be retained in situ and enhanced. The boundaries should be planted in such a way as to create a diversity of structure, age and species in order to increase the invertebrate food source for bats and provide different niches for foraging bats. A combination of native trees, shrubs and herbaceous plants with value to wildlife should be used. Hedgerows can be supplemented with species such as hazel, field maple, elder, privet, dog rose and dog wood to reduce gaps. Shade-tolerant wildflower seeds can also be sewn along the base of the hedgerows. Thick hedges with tussocks and an accumulation of leaf litter are preferred by invertebrates as well as the herbaceous plants which are characteristically associated with hedgerows, including species such as cow parsley and hogweed, wild parsnip and hedge parsley (the umbellifer species). Common nettles and brambles are also associated with a range of invertebrate, including micro-moths which barbastelles specialise in.

4.21 The buffer zone between the ancient woodland and the development is to be planted to provide an extension to the woodland. Not only does this protect the ancient woodland but it also provides opportunities to enhance this edge to benefit bats, especially since it has been demonstrated that this area of the site is visited most often by bats. Planting should be done in such a way as to provide structural and species diversity but only using native species. A graded profile with mixed habitats should be created to provide different niches for wildlife. This would include succession from grasslands to herbs to shrubs to trees, all of which will cater for different invertebrate species and thus increase potential prey for a range of bat species.

- 4.22 Oak trees (*Quercus robur*) are present along most of the boundaries on site. Oak trees are known for their ability to support a range of invertebrates; indeed, the oak tree provides habitats for more organisms than any other tree in the UK. Large numbers of moth larvae feed on oak trees including micro-moths. Beetles and weevils are also associated with the oak, boring into the wood or using acorns as nurseries. Therefore, it is recommended that these are retained on site where possible and sensitively managed to ensure their longevity.
- 4.23 Dead wood is present along the boundaries of the site and should be retained and incorporated into log piles along these boundaries. Dead wood is a valuable habitat for a range of invertebrate species, particularly saprophytic insects such as the beetles that noctules and serotines forage for. Log piles can be further enhanced by encouraging flowering climbers to grow over them, for example, clematis or honeysuckle. These nectar-rich plants are also an important food source for invertebrate species.
- 4.24 According to the latest plans, three new ponds are to be created on site. These can be planted to enhance invertebrate species and again increase the diversity of food sources for bats provided on site (Figure 14). Care must be taken however to ensure that aggressive alien species are not accidentally introduced. Different plants occur at different depths in a pond and so banks with a stepped gradient are best to increase biodiversity, even if only on one side of the pond.
- 4.25 As a number of bat species have been shown to use the woodland, hedgerows and tree lines on site, it is recommended that a sensitive lighting scheme is conditioned as part of the permission. Lighting can be detrimental to roosting, foraging and commuting bats. Any new lighting on site should only be installed if there is a significant need and must be directed away from the tree lines and hedgerows along the edges of the site in order to maintain 'dark corridors'. Lighting should also be aimed away from any potential roosting sites such as bat boxes/tubes. Planting or man-made structures required within the build can be used to form barriers against light. Lighting should be hooded or baffled to ensure minimal light spillage. Lamps of greater than 2000 lumens (150W) must not be installed. Low-pressure sodium lamps or high-pressure sodium should be used instead

of mercury or metal halide lamps where glass glazing is preferred due to its UV filtration characteristics.

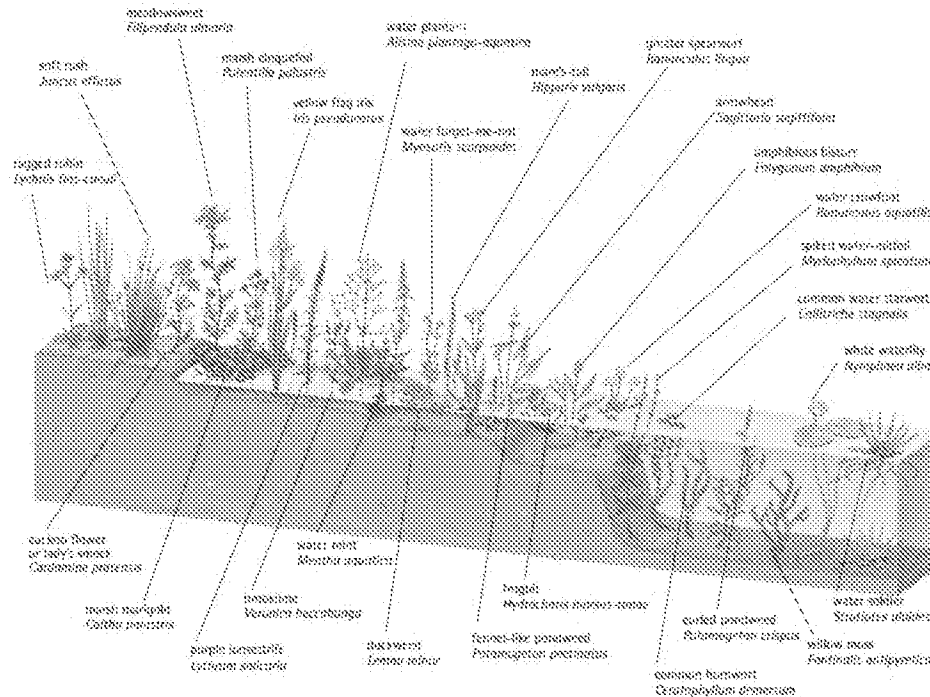


Figure 14: Typical aquatic plants in a wildlife pond (Langton et al. 2001)

- 4.26 To enhance the local bat population and provide roosting opportunities within the new development, it is recommended that integrated bat boxes/tubes be incorporated into the structure of the new buildings (Figure 15). These provide good opportunities for crevice-dwelling species such as pipistrelles. The opening of the bat box/tube will be the only section visible and they are designed so that they require little to no maintenance. Several of these tubes can be established in a row together providing a good-sized roost space. The bat tubes should be inserted as high up as possible in the brickwork. Habibat, in association with the Bat Conservation Trust, provide a range of boxes which are unfaced for render or designed to match the brickwork of the building.

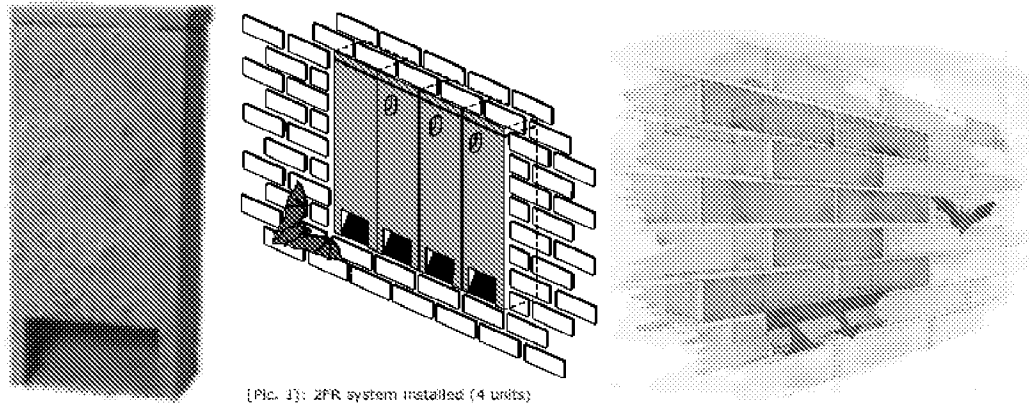


Figure 15: Bat tubes incorporated into the wall of a building to provide roosting space

4.27 Additional roosting opportunities can be provided by hanging bat boxes on mature trees or buildings around the site. Recommended boxes include:

- Schwegler 2F Bat Box – These boxes are attractive to small bats such as pipistrelles and long-eared bats and can be hung on trees (Figure 16).
- Schwegler 2FN Bat Box – This is slightly larger than the 2F and provides opportunities for the larger bats such as noctules. These should be hung on mature trees.
- Schwegler 1FD Bat Box - This box has been designed specifically for smaller bats and provides opportunities as a maternity roost (Figure 16).
- Schwegler Improved Cavity Bat Box – this is designed for cavity-dwelling species such as brown long-eared bats.

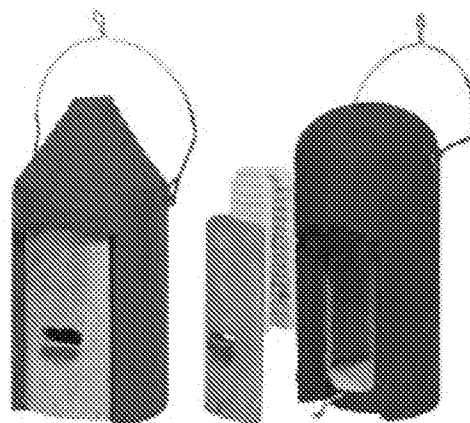


Figure 16: Schwegler 2F (left) and 1FD (right) bat boxes

5.0 Conclusions

- 5.1 A number of bat species were recorded using the site for foraging and commuting, including the rare barbastelle bat. The main areas for foraging were the tree lines along the eastern and southern boundaries of the site with some activity along the road to the north. The ancient woodland edge was considered to be the most valuable for foraging bats. All tree lines and hedgerows on site should be retained and enhanced within the scheme to continue to provide foraging opportunities for the species using the site and to allow bats to move with ease across the landscape.
- 5.2 Recommendations and enhancements have been outlined within this report, aimed at maintaining the most ecological valuable features of the site post-development. Additionally, mitigation measures such as the use of native species in any planting scheme including the incorporation of hedgerows, the careful use of lighting, the creation of log piles to enhance the site for invertebrates such as beetles and to mitigate for the loss of tree cover for the new access onto site.
- 5.3 It is considered that the development would not impact upon the favourable conservation status of bats in the local area if significant features are retained and the recommended enhancements are included within the masterplan.

6.0 References

Bat Conservation Trust (2008) *Bats and Lighting in the UK – Bats and the built environment series (Version 2)*. Bat Conservation Trust, London.

CIRIA C567 (2005) *Working with wildlife – site guide*. CIRIA, London.

Collins, J. (ed.) (2016) *Bat surveys for Professional Ecologists: Good Practice Guidelines (3rd edition)*. The Bat Conservation Trust, London.

English Nature (1994) *Species Conservation Handbook*. English Nature, Peterborough.

English Nature (2004) *Advice for the management of flightlines and foraging habitats of the barbastelle bat *Barbastella barbastellus**. English Nature Research Report Number 657, Peterborough.

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

Zeale, M.R.K., Davidson-Watts, I. & Jones, G. (2012) Home range use and habitat selection by barbastelle bats (*Barbastella barbastellus*): implications for conservation. *Journal of Mammalogy*, 93(4): 1110-1118.

Internet resources:

Magic Interactive Map: www.magic.gov.uk

Google Maps: www.google.co.uk/maps

IUCN Red List: www.iucnredlist.org

Appendix 1 – Raw Anabat Data

Anabat results for Northern Anabat between 26th May and 4th June 2017

Date	Common pipistrelle	Soprano pipistrelle	Serotine	Leisler	Brown Long-eared	Total
26/05/2017	10	1	2		1	14
27/05/2017	10	1			1	12
28/05/2017	12		4	1	6	23
29/05/2017	6		1	1	5	13
30/05/2017	7	1	4	2	4	18
31/05/2017	15	1	5			21
01/06/2017	10	1	1		3	15
02/06/2017	11	2	1	2	6	22
03/06/2017	7				2	9
04/06/2017	4				1	5
Total	92	7	18	5	29	

Anabat results for Southern Woodland Anabat between 26th May and 4th June 2017

Date	Common pipistrelle	Soprano pipistrelle	Pip Social Call	Serotine	Leisler	Brown Long-eared	Myotis	Barbastelle	Total
26/05/2017	40	2	5	6	2	1			56
27/05/2017	15	1							16
28/05/2017	5	2		2					9
29/05/2017	18	1	12	2	1	1		2	37
30/05/2017	19	1	12	1	1				34
31/05/2017	15	1		1	1			1	19
01/06/2017	35	1			1	2			39
02/06/2017	16			1	2				19
03/06/2017	18	2						1	21
04/06/2017	37	5	3		1		1	4	51
Total	219	16	32	13	9	4	1	8	

Anabat results for Northern Anabat between 26th and 31st July 2017

Date	Common pipistrelle	Soprano pipistrelle	Serotine	Leisler	Brown Long-eared	Total
26/07/2017	8			6	5	19
27/07/2017	7		2		1	10
28/07/2017						0
29/07/2017	7	2		3	6	18
30/07/2017	5			2	7	14
31/07/2017	12	1	2	1	1	17
Total	39	3	4	18	14	

Anabat results for Southern Woodland Anabat between 26th and 31st July 2017

Date	Common pipistrelle	Soprano pipistrelle	Nathusius pipistrelle	Noctule	Serotine	Leisler	Brown Long-eared	Barbastelle	Total
26/07/2017	109	4			1	1	3		118
27/07/2017	195	8			12	3			218
28/07/2017	305	6			1	2	7	2	323
29/07/2017	154	10	1			11	2	3	181
30/07/2017	97	3		1	3	10	3	2	119
31/07/2017	45	1			1	1	5	1	54
Total	905	32	1	1	18	28	20	8	

Anabat results for Northern Anabat between 29th August and 5th September 2017

Date	Common pipistrelle	Soprano pipistrelle	Noctule	Serotine	Leisler's	Brown Long-eared	Myotis	Total
29/08/2017	26	28		12	2	7	4	79
30/08/2017	9	3	1	2		4	1	20
31/08/2017	5	6	1			3	1	16
01/09/2017	31	4		1		3	1	40
02/09/2017	8	1	1	1	1	1	3	16
03/09/2017		2			1			3
04/09/2017	2	3		1	1		1	8
Total	81	47	3	17	5	18	11	

Anabat results for Southern Woodland Anabat between 29th August and 5th September 2017

Date	Common pipistrelle	Soprano pipistrelle	Noctule	Serotine	Leisler's	Brown Long-eared	Myotis	Barbastelle	Total
29/08/2017	3	65		2	1	4	1		76
30/08/2017	10	5				2	1	3	21
31/08/2017	7	2	1		1	1	2		14
01/09/2017	16	7		2	3	1			29
02/09/2017	14	2	1		2	2	1	3	25
03/09/2017	43	9						7	59
04/09/2017	276	23		67	2	6	6	6	386
Total	369	113	2	71	9	16	11	19	

Anabat results for Northern Anabat between 20th and 26th September 2017

Date	Common pipistrelle	Soprano pipistrelle	Serotine	Leisler's	Brown Long-eared	Myotis	Barbastelle	Total
20/09/2017	7	1	1	1	2			12
21/09/2017								0
22/09/2017	5	1					1	7
23/09/2017	8	2	1	1	5	2	1	20
24/09/2017	8	1	3		10	3		25
25/09/2017	23	5	2		6	2		38
Total	51	10	7	2	23	7	2	

Anabat results for Southern Woodland Anabat between 20th and 26th September 2017

Date	Common pipistrelle	Soprano pipistrelle	Nathusius' pipistrelle	Noctule	Serotine	Leisler's	Brown Long-eared	Myotis	Barbastelle	Total
20/09/2017	142	36			8	4	11	8	16	225
21/09/2017	4	2					3	1		10
22/09/2017	17	5	1			2	1	3		29
23/09/2017	13	5			1	1	3	2	4	29
24/09/2017	6	3		1	1	1		1	2	15
25/09/2017	8	2	1				3	1	3	18
Total	190	53	2	1	10	8	21	16	25	

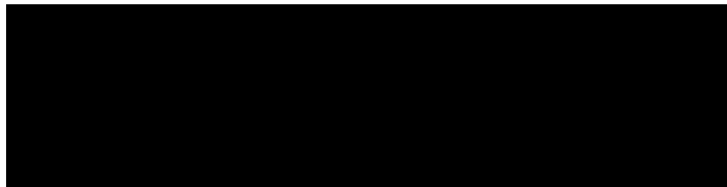
The Ecology Partnership

Thorncroft Manor

Thorncroft Drive

Leatherhead

KT22 8JB



Approved by: Alexia Tamblyn MA (Oxon) MSc CEnv MCIEEM FRGS

Date: 10/11/2017