



LAND AND PARTNERS

BAT ACTIVITY RESULTS REPORT

LAND WEST OF HOOK NORTON

ROAD, SIBFORD FERRIS,

OXFORDSHIRE

0267.0001

REV 03

South and South East



0330 2233 806



southeast@primeenvironment.co.uk

Midlands and North



0330 2233 825



central@primeenvironment.co.uk

Document Control

Report Issue	Notes
01	Original document to client
02	Post client comment
03	Change of client name.
04	
05	
Managing Office	Derby

Copyright Prime Environment Limited. All rights reserved.

No part of this report may be copied or reproduced by any means without prior written permission from Prime Environment Limited.

This report has been prepared for the exclusive use of the commissioning party and, unless otherwise agreed in writing by Prime Environment Limited, no other party may use, make use of, or rely on the contents of the report. No liability is accepted by Prime Environment Limited for any use of this report, other than for the purposes for which it was originally prepared and provided.

Opinions and information provided in the report are on the basis of Prime Environment Limited using due skill, care and diligence in the preparation of the same and no explicit warranty is provided as to their accuracy. It should be noted and it is expressly stated that no independent verification of any of the documents or information supplied to Prime Environment Limited has been made.

Any legal information provided by Prime Environment Limited is an outline only, intended for general information and does not constitute legal advice. Consult the original legal documents and/or seek legal advice for definitive information.

CONTENTS

1	INTRODUCTION	1
	1.1 Terms of Reference	1
	1.2 Aims and Objectives.....	1
3	METHOD.....	3
	3.2 Constraints	5
4	RESULTS	7
	4.1 Species and genera identified	7
	4.2 Automated survey results	8
5	DISCUSSION	15
6	RECOMMENDATIONS.....	15

1 Introduction

1.1 Terms of Reference

In June 2017, Prime Environment Limited (Prime Environment) was instructed by Land and Partners (the Client) to undertake bat surveys at Land West of Hook Norton Road, Sibford Ferris, Oxfordshire (Ordnance Survey (OS) grid Reference SP 3544 3706).

The Survey Area is an arable field with field margins and hedgerow boundaries approximately 6.7 hectares situated on the southern outskirts of the village of Sibford Ferris. The application site (the Site) is for the northern half of this field only; approximately 3.6 ha

The current proposals are to develop the Site into approximately 25 residential homes with associated hard and soft landscaping including a community allotment, orchard, woodland copse and attenuation pond.

This report is a Bat Activity Report which presents results of a bat survey undertaken at the Site. The bat survey was recommended following a Preliminary Ecological Appraisal of the Site in April and May 2017, which identified records of lesser horseshoe *Rhinolophus hipposideros* roosts within the 2 km data search area, which may have used the hedgerows bordering the Site.

1.2 Aims and Objectives

The aims of the study were to:

- Identify the species of bats using the Survey Area's hedgerows
- Identify patterns of bat activity using the Survey Area's hedgerows
- Quantify the levels of activity of bats.

Ecological information for the assessment was provided by bat automated surveys.

Information regarding the habitats present within the Survey Area and discussions and recommendations in relation to the development are presented in a separate Ecological Impact Assessment report.



Figure 1 - Aerial photograph and detector locations

3 Method

This assessment, surveys and echolocation sound analysis were undertaken by Jon Moore MSc BSc (Hons). Jon is a full member of the Chartered Institute of Ecology and Environmental Management, holds a Class 2 bat survey licence and has over eight years' experience of professional bat sound analysis and interpretation.

The report was finalised by Jo Pedder B.Sc. hons MCIEEM. Jo is director of Prime Environment Ltd. He is an ecologist with over 15 years' experience in the environmental consulting sector. Jo holds survey licences for bats (level 2) and great crested newts (level 1) and development licences for bats and newts. Jo oversees many of Prime's projects from barn conversions to sites over 300 ha and has a range of experience in the minerals, housing and energy sectors.

The survey methodology was based on the BCT guidelines¹. In order to assess the use of the Survey Area's hedgerows it was considered that an automated survey would be the most effective method to provide the data on the species present and extent of use of the hedgerows.

With the Survey Area being a single arable field with hedgerows on three boundaries, transect surveys would have collected little extra data on the use of the hedgerows. It was therefore proposed to undertake a single automated survey in the summer months and extend the typical five-night automated survey session to a minimum of ten nights (equivalent of two standard automated surveys).

3.1.1 Automated surveys

Automated surveys were undertaken using AnaBat Express automated bat detectors. These units automatically record bat echolocation calls in zero crossing format.

Detectors were deployed over 11 consecutive nights in June and July 2017. Detectors were placed at three locations within the Survey Area (see Figure 1 for locations). Detectors were programmed to start 30 minutes before sunset and stop at 30 minutes after sunrise each day. Survey dates are provided in Table 1.

Table 1. Automated survey dates.

Month	Date start	Date end	Consecutive nights	Sum of nights (all locations)
June	22/06/2017	30/06/2017	9	27
July	01/07/2017	03/07/2017	2	6
Total			11	33

3.1.2 Data analysis

Analysis of recordings was undertaken by Jon Moore. The AnalookW 4.2n sound analysis software package was used to analyse the recorded bat echolocation data. All analysis was

¹ Collins, J. (ed.) (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London

guided by the bat call parameters published by Russ (2012²). Species were attributed to each file or group of files to calculate activity levels for each species. Species labels/codes are provided in Table 2. Species status and detection rate of calls are provided in Table 3.

There is considerable crossover between echolocation calls within British bat species. Where calls could not be attributed to a specific species, genus level identification was used where possible, any calls which could not be attributed to a genus were labelled as an unclassified bat – this includes files where only social calls are present, files with only one or two calls present, and files with poorly recorded calls. Files with no bat calls present, were labelled as noise and omitted from the data.

A bat pass was defined as the presence of a bat echolocation call or series of calls within one file. Each file records up to a maximum of 15 seconds of activity. Bat passes were extracted from the data and activity levels were calculated and graphically presented using Excel 2016. Bat passes per night (bp/n) was used as an index of activity. This was calculated by dividing the total number of bat passes by the number of survey nights for each location.

Table 2. Species labels

Genus group	Species label	Common name	Scientific
Barbastella	BABA	Barbastelle	<i>Barbastella barbastellus</i>
Big bats	BIG	Serotine OR Nyctalus species	<i>Eptesicus serotinus</i> OR <i>Nyctalus sp.</i>
Big bats	EPSE	Serotine	<i>Eptesicus serotinus</i>
Myotis	MYS	Myotis species	<i>Myotis sp.</i>
Big bats	NYLE	Leisler's	<i>Nyctalus leisleri</i>
Big bats	NYNO	Noctule	<i>Nyctalus noctula</i>
Big bats	NYSP	Nyctalus species	<i>Nyctalus sp.</i>
Pipistrellus	PINA	Nathusius' pipistrelle	<i>Pipistrellus nathusii</i>
Pipistrellus	PIPI	Common pipistrelle	<i>Pipistrellus pipistrellus</i>
Pipistrellus	PIP	Common OR Nathusius' pipistrelle	<i>Pipistrellus pipistrellus</i> OR <i>Pipistrellus nathusii</i>
Pipistrellus	PIPP	Common OR soprano pipistrelle	<i>Pipistrellus pipistrellus</i> OR <i>Pipistrellus pygmaeus</i>
Pipistrellus	PIPY	Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>
Plecotus	PAUR	Brown long-eared bat	<i>Plecotus auritus</i>
Plecotus	PAUS	Grey long-eared bat	<i>Plecotus austriacus</i>
Plecotus	PLSP	Plecotus bat	<i>Plecotus auritus</i> OR <i>Plecotus austriacus</i>
Rhinolophus	RHFE	Greater horseshoe	<i>Rhinolophus ferrumequinum</i>
Rhinolophus	RHHI	Lesser horseshoe	<i>Rhinolophus hipposideros</i>
Unclassified	NoID	Unclassified bat	<i>Chiroptera</i>
n/a	Noise	Non-bat sound	Non-bat sound

² Russ, J. (2012). *British Bat calls: A Guide to species Identification*. Pelagic Publishing: Exeter.

Table 3. Species status and detection rate

Common name	Conservation status ^a (Common, Rarer or Rare)	Echolocation call detection rate ^b
Barbastelle	Rare	Low
Greater horseshoe	Rare	Medium
Lesser horseshoe	Rare	Medium
Grey long-eared	Rare	Low
Brown long-eared	Common	Low
Serotine	Rarer	High
Myotis – Alcahoë	Rare	Medium
Myotis – Bechstein’s	Rare	Low
Myotis – Brandt’s	Rarer	Medium
Myotis – Whiskered	Common	Medium
Myotis – Daubenton’s	Common	Medium
Myotis – Natterer’s	Common	Low
Leisler’s	Rarer	High
Noctule	Common	High
Soprano pipistrelle	Common	High
Common pipistrelle	Common	High
Nathusius’ pipistrelle	Rare	High
Unclassified bat	Unclassified	Unclassified
Non-bat sound	N/A	N/A

^a There is no UK published list of the conservation status of bats. Status has been determined by applying a number of factors including: BCT statistics; Habitats Directive Annex II species; UK BAP Priority Species and the IUCN Red List.

^b Detection rate is based on knowledge of echolocation characteristics, including amplitude and directionality. High detection calls are not directional and have a high amplitude and are attributed to bats which have a significant constant frequency component in their calls. Low detection calls are either directional or of low amplitude and often have significant frequency modulated components to their calls. Medium detection rates have components from both low and high rates.

3.2 Constraints

3.2.1 Age of data

Any ecology assessment must be considered as a ‘snapshot’ of the site conditions at the time of the survey; ecological constraints will change over time and therefore the findings of this report are considered to be valid for a period of one year from the report date, after which the report should be reviewed to assess whether updated surveys are necessary.

3.2.2 Determining numbers of bats

Whilst automated detectors are able to determine levels of bat activity at a survey location, it is not possible to use the data to accurately determine the number of bats present. For example, 10 bat passes may be from 10 different bats commuting past a detector; but equally could be one bat flying past the detectors multiple times.

3.2.3 Directional and low amplitude bat calls

Brown long-eared *Plecotus auritus* have been recorded during the surveys. Due to the low amplitude of the calls of these species, it is also likely that these bats are recorded less frequently than other bats with higher amplitude such as *Nyctalus* and *Pipistrellus* bats. It is therefore likely that brown long-eared bats are underrepresented in the data.

Lesser horseshoe *Rhinolophus hipposideros* bats have directional calls which reduces the likelihood of detection in open spaces. However, with the survey equipment deployed on linear features (hedgerows) around habitat unsuitable for this species (arable), it is likely that if present these bats would be detected if using the linear features.

4 Results

4.1 Species and genera identified

Species recorded during surveys in the Study Area were as follows:

- Common pipistrelle *Pipistrellus pipistrellus*.
- Soprano pipistrelle *Pipistrellus pygmaeus*.
- Brown long-eared *Plecotus auritus*.
- Noctule *Nyctalus noctula*.

In addition to the above species, bat calls classified to the following genus level were also recorded:

- *Myotis*³ species bat.
- *Nyctalus* species bat.

No horseshoe *Rhinolophus* species bats were recorded during the survey.

Bats with echolocation calls between the given parameters for the common and soprano pipistrelle were recorded in the data, as were calls between the parameters given for the common and Nathusius' pipistrelle, although Nathusius' was not positively identified. Whilst not positively identified, Leisler's bat *Nyctalus leisleri* calls may also be present in the data.

It should also be noted that either one or multiple *Myotis* species may be present⁴. It should also be noted that some quieter echolocating bats (such as brown long-eared and Natterer's bat *Myotis nattereri*) are difficult to record with bat detectors and may be under represented.

Totalling individual identified species and single species from unaccounted genera (*Myotis*, *Nyctalus*), a minimum of five different bat species were recorded during the activity surveys. Considering the survey results and the known distribution and rarity of species and habitats in the Survey Area, up to a maximum of ten species may have been recorded in the Survey Area, although this is considered unlikely.

³ The call characteristics of the *Myotis* genus have a large overlap and so identification to species level is not usually possible from calls alone, although Bechstein's bat *M. bechsteini* and Natterer's bat can sometimes be identified due to their broadband calls.

⁴ Total of six UK resident *Myotis* species. Given the known distribution and rarity of the species, and the habitat present on and around the Study Area, up to a maximum of four *Myotis* species may have been recorded in the Study Area i.e. Daubenton's, whiskered, Brandt's and Natterer's.

4.2 Automated survey results

Successfully completed sampling nights are shown in Table 4.

Accounting for all three sampling locations, a total of 33 sampling nights of the scheduled 33 nights were successfully completed, equating to a mean of 11 nights per sampling location.

Table 4. Completed automated survey nights.

Month	Completed survey nights at locations			Site total
	North	East	West	
June	9	9	9	27
July	2	2	2	6
Total	11	11	11	33
Success rate	100%	100%	100%	100%

4.2.1 Total activity levels

A total of 1,643 bat passes were recorded during the automated surveys equating to a mean of 49.8 bat passes per night (bp/n) at each location. The distribution between each genus classification of bat is shown in Figure 2 and bat passes per night for each species in Table 5.

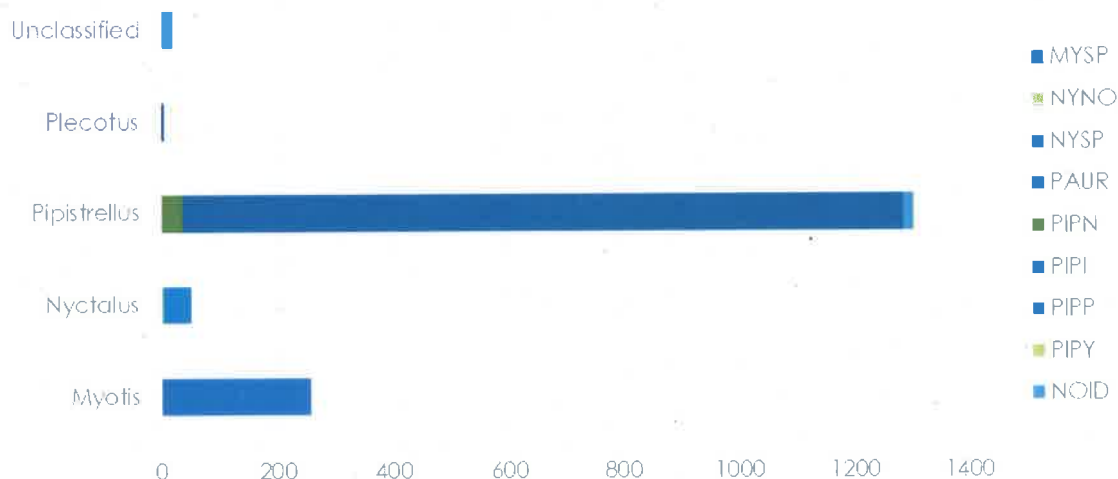


Figure 2. Total count of automated bat passes by bat genus classification, with species classification in the legend

Table 5. Bat passes per night by species and location

Location	Species label									All species
	MYS P	NYNO	NYSP	PAUR	PIPN	PIPI	PIPP	PIPY	NOID	
North	0.82	0.36	3.73	0.09	2.91	24.36	0.09	0.00	1.36	33.7
East	17.91	0.00	0.45	0.27	0.36	70.09	0.55	0.09	0.36	90.1
West	4.82	0.00	0.18	0.18	0.09	19.09	1.00	0.00	0.18	25.5
Statistic										
Sum	23.5	0.4	4.4	0.5	3.4	113.5	1.6	0.1	1.91	149.4

Mean	7.8	0.1	1.45	0.2	1.1	37.8	0.5	0.0	0.64	49.8
% of total	15.8	0.2	2.9	0.4	2.3	76.0	1.1	0.1	1.3	100.0

Pipistrellus species bats dominated activity levels accounting for 79.4% of total activity, of which common pipistrelles were the highest (94%). Only one soprano pipistrelle pass was recorded. The remainder of activity was split between the crossovers between the *Pipistrellus* species.

Myotis species bats were the second highest amongst the genera with 15.8% of total activity. *Nyctalus* and *Plecotus* was low with 3.1 % and 0.4% respectively. 1.3% of passes were classified as unidentified bats.

4.2.2 Spatial distribution

Survey detector locations are shown in Figure 1. Activity between locations is shown on Figure 3. Total activity was highest at the east hedge at Location B (60%).

Common pipistrelles had the highest level of activity at all locations and was highest at the east hedge. *Myotis* and *Plecotus* were recorded at all locations and were also highest at the east hedge. *Nyctalus* were recorded at all locations but were highest at the north hedge.

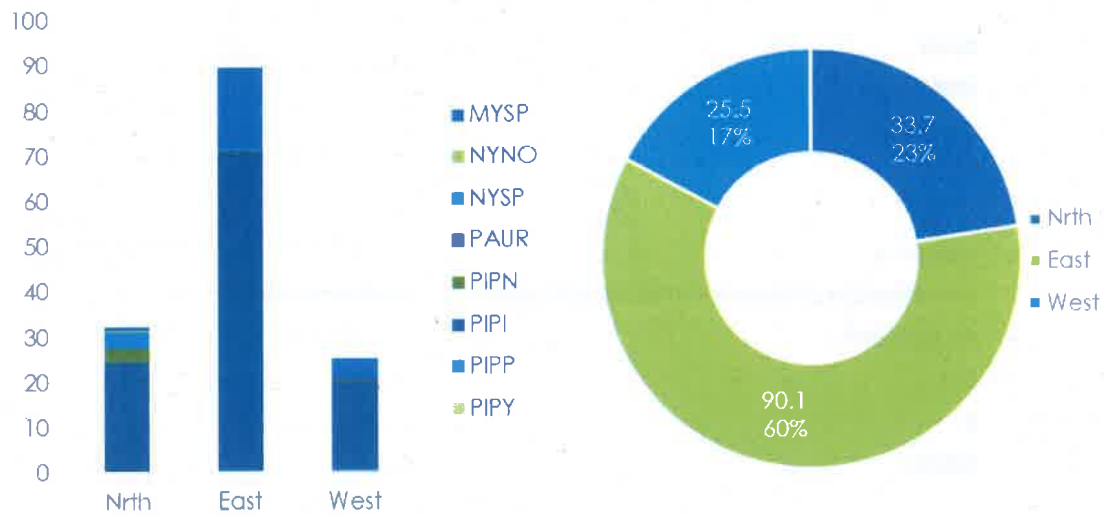


Figure 3. Bar chart (left) showing bat passes per night at each location, and pie chart (right) showing distribution of activity with % of total and bp/n.

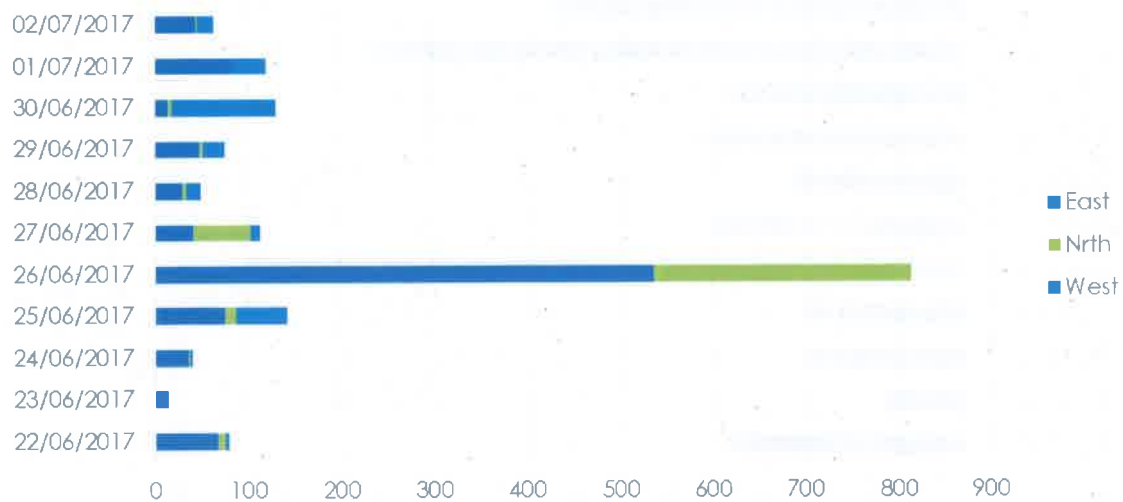


Figure 4, Figure 5 and Figure 6 plot the distribution of activity on each night of survey. Activity was recorded on all nights of the survey. There was a large peak on the 26th June when 50% of the total activity of the season was recorded. A total of 814 passes were recorded in the Survey Area on the 26th June in comparison to the second highest total of 142 passes on the 25th June, and the mean of 149 bp/n across all nights. *Nyctalus* and common pipistrelles demonstrated the highest increase in activity on the 26th June with 67% and 57% of total activity recorded on this night respectively. This night skews the data somewhat, and if this outlier were removed from the total, there is a reduced mean of 83 bp/n across all nights.

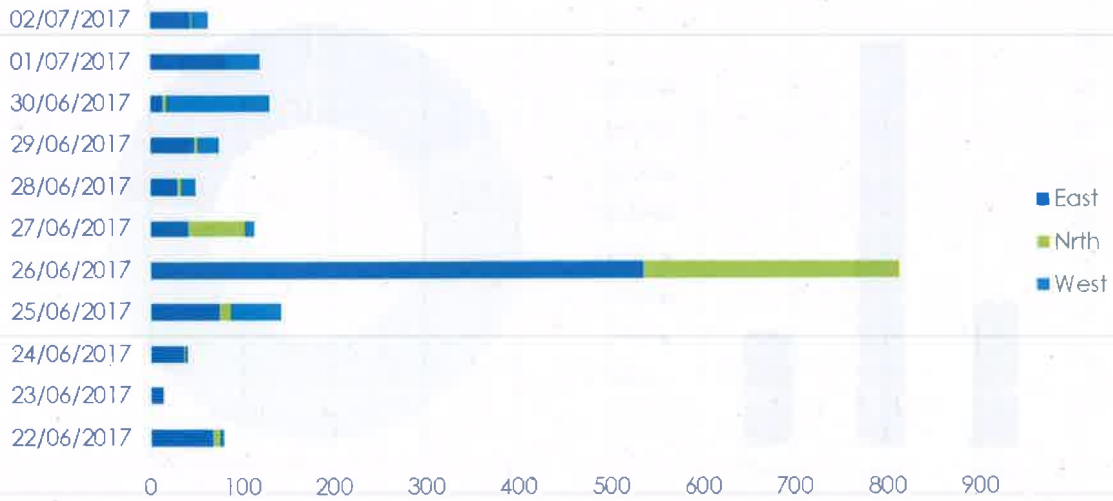


Figure 4. Bar chart showing bat pass counts at each location on each night of survey, for all species.

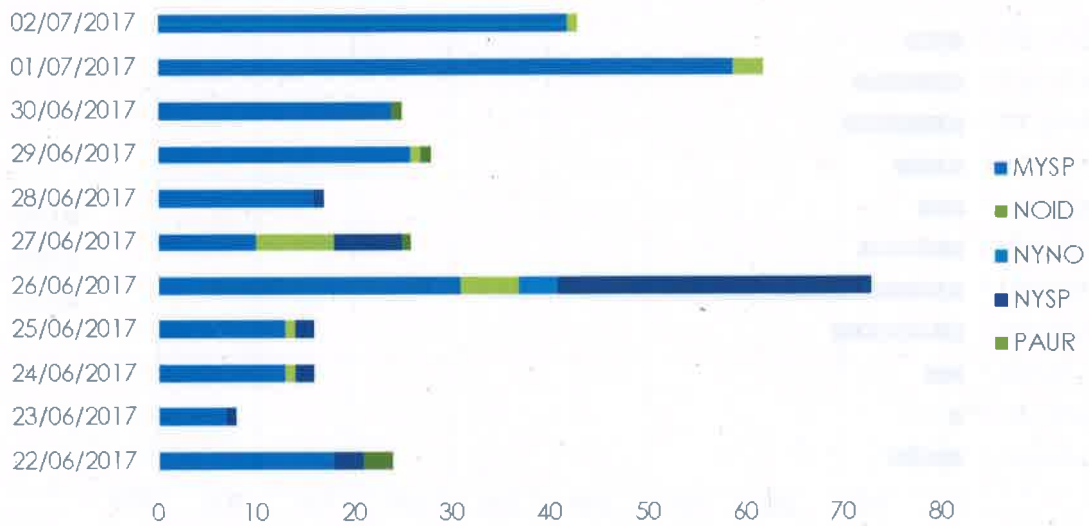


Figure 5. Bar chart showing bat pass counts for each species on each night of survey, exclusive of *Pipistrellus* species.

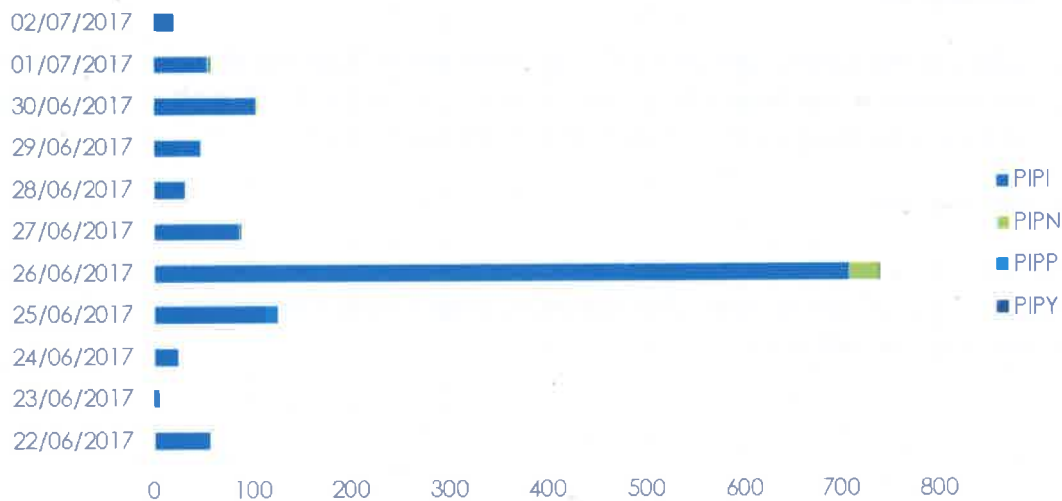


Figure 6. Bar chart showing bat pass counts for each species on each night of survey, for *Pipistrellus* species only.

4.2.3 Roosting behaviour

Roosting behaviour is analysed by examining bat activity close to typical roost emergence times in the evening. The time bats are recorded around dawn can also infer whether roosts are close to the Survey Area.

4.2.3.1 *Pipistrelle* bats

Pipistrellus bats are earlier emerging bats and would typically be recorded when a roost is nearby between sunset and 30 minutes after sunset. The data shows that these bats were recorded within 30 minutes (28 mins) on 1 night of survey, and within 60 minutes on nine of the remaining nights. These are also one of the last bats to return to roosts; however, the latest bat pass was 15 minutes before sunrise and in excess of 30 minutes on all remaining nights. It is unlikely that a significant *Pipistrellus* roost is in the immediate vicinity of the Survey Area.

4.2.3.2 *Myotis* bats

The different *Myotis* species emerge and return to roosts at different times (e.g. Natterer's emerge when it is darker, whilst whiskered bats may emerge shortly after the pipistrelle bats) but typically between 30 minutes and 60 minutes after sunset. The earliest recorded *Myotis* species bat was at 35 minutes after sunset, and were recorded within 41 to 53 minutes on a further five nights. *Myotis* were recorded within 90 minutes of sunset on three nights and over 90 minutes on the remaining two.

Myotis bats were recorded within 30 minutes of sunrise on two nights and within 60 minutes on seven nights. The latest *Myotis* bat recording was at eight minutes before sunrise. With activity regularly recorded within 30 to 60 minutes after sunset and 8 to 60 minutes before sunrise, it is likely that a *Myotis* roost is active in the area. Peak activity at dusk and pre-dawn indicate that *Myotis* bats are entering and exiting the Survey Area from the north and east.

4.2.3.3 *Nyctalus* bats

Nyctalus bats are the earliest species to emerge from roosts: typically close to sunset. No activity was recorded in the Survey Area close to sunset or sunrise for these bats, indicating bats are unlikely to be flying over the Survey Area from roosts nearby.

4.2.3.4 *Plecotus* bats

Plecotus bats are a late roost emerging and returning species. All *Plecotus* activity was recording in excess of 100 minutes after sunset or before sunrise indicating it is unlikely a roost is near to the Survey Area.

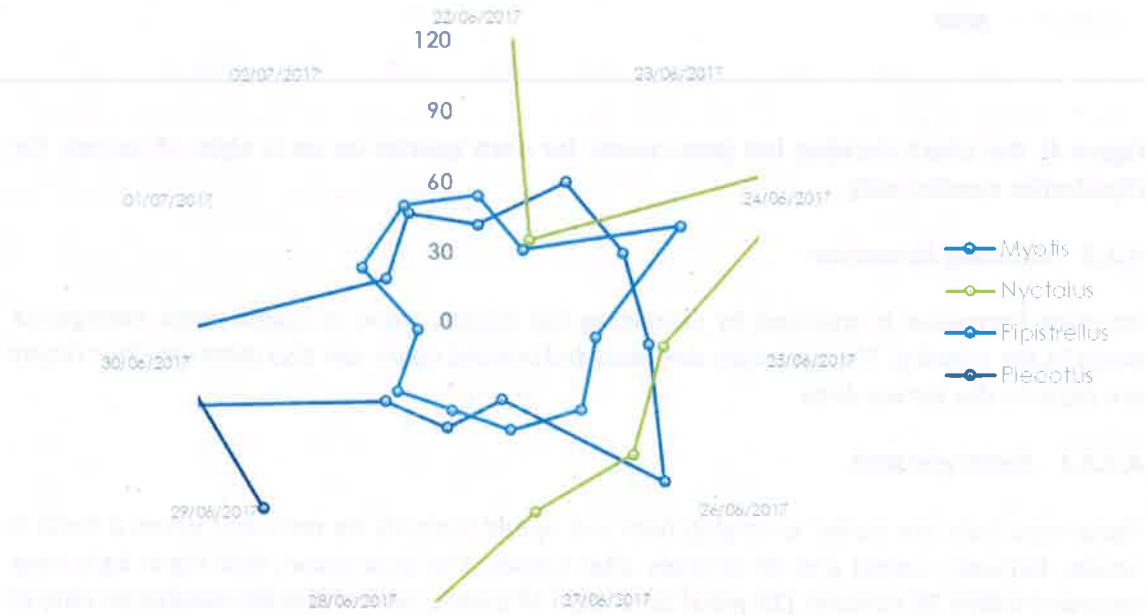


Figure 7. Radar chart showing the earliest bat passes in minutes after sunset on each night

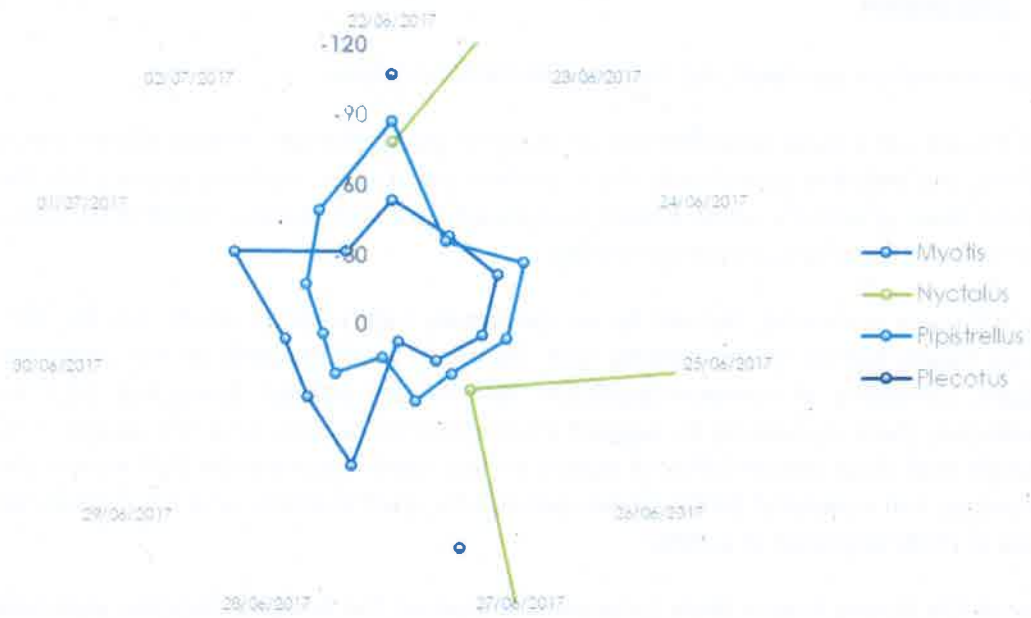


Figure 8. Radar chart showing the latest bat passes in minutes before sunset on each night

5 Discussion

Lesser horseshoe bats were not recorded in the Survey Area.

The majority of activity recorded was of common pipistrelle bats. Whilst *Myotis* was second highest, this was five times lower than common pipistrelles. *Nyctalus* species has the third highest level of activity whilst brown long-eared bats and soprano pipistrelles were rarely recorded. No other species were recorded.

The data was somewhat skewed by an abnormally high level of activity on the 26th June, where nearly half of overall activity was recorded, predominately at the north and east hedges, consisting of common pipistrelle and *Myotis* activity. Examining local weather conditions, there is nothing to suggest environmental factors were the cause. It may be possible that there was an influx of insects on this night. Including the 26th June in the data, bat passes had a mean of 50 bat passes per night at each location, which is considered to be a low to moderate level of activity.

Overall the Survey Area is likely to be most important for foraging common pipistrelle bats and small numbers of *Myotis* bats foraging and commuting from roosts nearby – there are no suitable roost features present in the Survey Area (all trees are young and in good condition) and these bats will be therefore entering from a roost elsewhere.

As lesser horseshoe roosts are present within the surrounding landscape it is possible that these bats occasionally commute past the Survey Area or forage on its boundaries; however, with no lesser horseshoes identified in an 11 night automated survey, it is considered very unlikely that the Survey Area will be important for these bats.

6 Recommendations

Full recommendations will be made in the Ecological Impact Assessment for the Site. The following recommendations are informative only and based upon the information presented in this report alone.

Any development of the Site should consider retaining the hedgerows bordering the Site, or replacing with other suitable linear habitat features if removed (e.g. hedgerows, lines of trees, watercourses).

The survey results do not suggest specific measures are required in relation to lesser horseshoe bats.

Prime Environment

Registered Office:

Ground Floor, Carriage House, Mill Road

Cromford

Derbyshire

DE4 3RQ

Company Number: 08407111

For the South and South East

southeast@primeenvironment.co.uk

Tel: 0330 2233806

For the Midlands and North

central@primeenvironment.co.uk

Tel: 0330 2233825

