

Land at Orchard Farm, Pershore

Bat Addendum Report 1

Planning Ref: W/23/02112/OUT

DRAFT

December 2023

Quality Management	
Client:	Formula Land
Project:	Land at Orchard Farm, Pershore
Report Title:	Bat Addendum Report
Project Number:	ECO-6596
File Reference:	6596 Eco Addend dv2 /JW/MRD
Date:	12/12/2023

Copyright

The copyright of this document remains with Aspect Ecology. All rights reserved. The contents of this document therefore must not be copied or reproduced in whole or in part for any purpose without the written consent of Aspect Ecology.

Confidentiality

This report may contain sensitive information relating to protected species. All records of Badger setts must remain confidential. Where this report is circulated publicly or uploaded to online planning portals, reference to Badger setts must be redacted and any maps pertaining to the locations of Badger setts removed from the document.

Legal Guidance

The information set out within this report in no way constitutes a legal opinion on the relevant legislation (refer to the relevant Annex for the main provisions of the legislation). The opinion of a legal professional should be sought if further advice is required.

Liability

This report has been prepared for the exclusive use of the commissioning client and unless otherwise agreed in writing by Aspect Ecology no other party may use, or rely on the contents of the report. No liability is accepted by Aspect Ecology for any use of this report, other than for the purposes for which it was originally prepared and provided. No warranty, express or implied, is made as to the advice in this report. The content of this report is partly based on information provided by third parties; Aspect accepts no liability for any reliance placed on such information. This report is subject to the restrictions and limitations referenced in Aspect Ecology's standard Terms of Business.

Contact Details

Aspect Ecology Ltd
Hardwick Business Park | Noral Way | Banbury | Oxfordshire OX16 2AF
t 01295 279721 e info@aspect-ecology.com
w www.aspect-ecology.com

Contents

Text:

1	Introduction	3
2	Methodology	4
3	Survey Results	10
4	Evaluation.....	24
5	Conclusions	28

Plans:

Plan 6596/ECO4	Bat Emergence/re-entry Results 2023
Plan 6596/ECO5	Bat Activity Survey Results (Automated Detectors) 2023
Plan 6596/ECO6	Bat Activity Survey Results (Walked Transect) 2023

1 Introduction

1.1 Background and Purpose of the Report

1.1.1 Aspect Ecology was commissioned by Formula Land to advise in respect of ecological matters relating to the proposed development of land at Orchard Farm, Pershore, centred at grid reference SO 9336 4543 (see Plan 6596/ECO1)¹. The survey findings were reported in September 2023 in the Baseline Ecological Appraisal detailing the results of the survey work that had been undertaken throughout the early part of the 2023 survey season (May and June), although the survey and data analysis for the whole of the 2023 survey season was not available at this time.

1.1.2 Bat surveys subsequently continued until the end of October 2023 and this Bat Addendum Report provides an update which collates and analyses the 2023 bat data (incorporating the results of the July to October 2023 surveys). It is anticipated that a further update report will be produced following the completion of further hibernation surveys which will continue through the winter of 2023/24.

1.2 Site Overview

1.2.1 The site is located to the west of Pershore, Worcestershire within an urban-edge context. The site is bound to the east by existing residential development, to the south by the A4104 (Defford Road), beyond which is the River Avon, to the west by Tiddesley Wood, and to the north by open agricultural fields.

1.2.2 The site itself comprises a number of semi-improved grassland fields currently grazed by livestock, bordered by a loose framework of hedgerows and tree lines, some of which are associated with ditches. A small remnant of traditional orchard exists in the central part of the site, and there are a number of agricultural buildings, together with a derelict bungalow, together with smaller areas of scattered scrub and a copse of trees.

¹ Planning ref: WD/2022/1637/MEA, which is now subject to a planning appeal (Appeal Ref: APP/C1435/W/23/33219)

2 Methodology

2.1 Desktop Study

2.1.1 In order to compile background information on the site and its immediate surroundings, Worcestershire Biological Records Centre (WBRC) was contacted in January 2023 with data requested on the basis of a search radius of 2km. Where appropriate, details of the relevant bat records were previously reported in the Ecological Appraisal, and are repeated in this report for consistency. The data search has not been refreshed during the production of this report.

2.2 Bat Survey Methodology

Visual Inspection Surveys

2.2.1 **Buildings.** Buildings within the site were subject to specific internal and external inspection surveys using ladders, torches and binoculars where necessary in April 2023.

2.2.2 During the external inspections, particular attention was given to any potential roost features or access points, such as broken or lifted roof tiles, lifted lead flashing, soffit boxes, weatherboarding, hanging tiles, etc. and for any external signs of use by bats such as accumulations of bat droppings or staining. Binoculars were used to inspect any inaccessible areas more closely where appropriate.

2.2.3 During the internal inspections, evidence for the presence of bats was searched for with particular attention paid to any loft voids and relevant potential roost features and locations, such as ridge boards, rafters, purlins, gable walls, and mortise joints. Specific searches were made for bat droppings that can indicate present or past use and extent of use, whilst other signs that can indicate the possible presence of bats were also searched for, e.g. presence of stained areas, feeding remains, corpses, etc. Any droppings collected during the course of the surveys were visually assessed and attributed to a species where possible on the basis of size/shape/texture². Where appropriate, samples of similar droppings were collected with gloved hands and put into labelled eppendorfs, and forwarded to the University of Warwick for DNA analysis.

2.2.4 **Trees.** Trees were assessed for their suitability to support roosting bats based on the presence of features such as holes, cracks, splits or loose bark. Suitability for roosting bats was rated based on the most recent relevant guidance which was available³ as:

- Negligible;
- Low;
- Moderate; or
- High.

2.2.5 Any potential roost features identified were also inspected for any signs indicating possible use by bats, e.g. staining, scratch marks, bat droppings, etc.

² Stebbings, RE, Yalden DW and Herman, JS (2007). 'Which bat is it? A guide to bat identification in Great Britain and Ireland.' The Mammal Society

³ Collins, J. (ed.) (2016) 'Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn).' Bat Conservation Trust. NB. Since the time of the original survey report, a 4th addition of the Good Practice Guidelines has been published by BCT (BCT 2023).

Dusk Emergence/ Dawn Re-entry Survey

- 2.2.6 Dusk emergence and dawn re-entry surveys were carried out on 25th May, 9th June and 22nd June 2023, to identify any bats roosting in the buildings highlighted to have potential to support roosting bats, and to confirm the roost status of those where a roost had been previously identified during internal inspections.
- 2.2.7 Surveyors employed Anabat Scout handheld bat detectors to aid identification of any bats observed. Infrared (IR) camera set-ups, comprising two Canon XA40 and two IR illuminators (floodlights), were deployed at two locations as shown on Plan 6596/ECO4. IR cameras were utilised to aid in the identification of precise roosting locations and confirm the number of any emerging / re-entering bats recorded. At dusk, surveyors were in position 15-30 minutes prior to sunset, remaining in place for approximately 2 hours. At dawn, surveyors were in place approximately 2 hours before sunrise and remained in place until 15 minutes after sunrise. This survey method aims to identify any roosting bats emerging from or returning to potential roost sites.
- 2.2.8 This survey work was carried out during suitable weather conditions, as set out in Tables 2.1 and 2.2 below.

Table 2.1. Dusk survey details.

Date	Start & end times & time of sunset	Structure reference / location	Equipment used	Weather
25/05/2023	Start time: 20.55 End time: 23.10 Sunset: 21.10	B1	Anabat Scout, x2 IR cameras	Dry, 10% cloud, BF1, 16°C
Comments: The survey was undertaken by 3 surveyors under direction of licence holder 2022-10426-CL17-BAT.				
22/06/2023	Start time: 21.16 End time: 23.31 Sunset: 21.31	B1	Anabat Scout, x2 IR cameras	Dry, 80% cloud, BF1-2, 21°C
Comments: The survey was undertaken by 3 surveyors under direction of licence holder 2022-10426-CL17-BAT.				

BF0 = calm, BF12 = hurricane force.

Table 2.2. Dawn survey details.

Date	Start & end times & time of sunrise	Structure reference / location	Equipment used	Weather
09/06/2023	Start time: 02.49 End time: 05.04 Sunrise: 04.49	B1	Anabat Scout, x2 IR cameras	Dry, 100% cloud, BF3, 10°C
Comments: The survey was undertaken by 3 surveyors under direction of licence holder 2022-10426-CL17-BAT.				

BF0 = calm, BF12 = hurricane force.

Hibernation Surveys

- 2.2.9 Due to the established presence of a Lesser Horseshoe Bat summer roost within Building B1, a series of hibernation surveys has been scheduled to assess whether the roost is also used by this species, or any other for hibernation during the winter.
- 2.2.10 The surveys will be carried out in accordance with the current best practice⁴, over the winter of 2023/24. These will comprise a total of three inspection visits are scheduled to be

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

completed between November 2023 and February 2023, together with the monthly deployment of automated detectors within the building, between November and February, to detect bat activity associated with winter hibernation or roosting.

- 2.2.11 The first of these visits was completed in November 2023, as an early season check (as recommended by the current guidelines), while two further visits are scheduled for January and February 2024.

Activity Surveys

- 2.2.12 Walked transect surveys were undertaken monthly from May to October 2023 to ascertain the level of usage of the site by foraging or commuting bats. This survey method involves walking planned transect routes with key listening points, specifically covering habitats/features with particular potential for commuting or foraging bats. Anabat Scout handheld bat detectors were employed to aid identification of any bats observed. Each transect was walked from approximately 15 minutes prior to sunset, for 2-3 hours, with a minimum 3 minute stop at each listening point. This methodology was repeated from 2 hours prior to sunrise to complete the dawn survey.

- 2.2.13 This survey work was carried out during suitable weather conditions, as set out in Tables 2.3 and 2.4 below.

Table 2.3. Dusk walked transect survey details.

Date	Start & end times & time of sunset	Transect / location	Equipment used	Weather
02/05/2023	Start time: 20.34 End time: 23.34 Sunset: 20.34	Transect A	Anabat Scout	Dry, 5% cloud, BF1, 10°C
Comments: The survey was undertaken by 2 surveyors under direction of licence holder 2022-10426-CL17-BAT.				
05/06/2023	Start time: 21.24 End time: 00.24 Sunset: 21.24	Transect A	Anabat Scout	Dry, 90% cloud, BF4, 12°C
Comments: The survey was undertaken by 2 surveyors under direction of licence holder 2022-10426-CL17-BAT.				
05/07/2023	Start time: 21.30 End time: 00.32 Sunset: 21.30	Transect A	Anabat Scout	Dry, 90% cloud, BF1, 15°C
Comments: The survey was undertaken by 2 surveyors under direction of licence holder 2022-10426-CL17-BAT.				
01/08/2023	Start time: 20.59 End time: 23.59 Sunset: 20.59	Transect A	Anabat Scout	Dry, 90% cloud, BF2, 17°C
Comments: The survey was undertaken by 2 surveyors under direction of licence holder 2022-10426-CL17-BAT.				
04/09/2023	Start time: 19.50 End time: 23.00 Sunset: 19.50	Transect A	Anabat Scout	Dry, 0% cloud, BF1-2, 24°C
Comments: The survey was undertaken by 2 surveyors under direction of licence holder 2022-10426-CL17-BAT.				
04/10/2023	Start time: 18.40 End time: 22.40 Sunset: 18.40	Transect A	Anabat Scout	Dry, 95% cloud, BF2, 14°C
Comments: The survey was undertaken by 2 surveyors under direction of licence holder 2022-10426-CL17-BAT.				

BF0 = calm, BF12 = hurricane force

Table 2.4. Dawn walked transect survey details.

Date	Start & end times & time of sunrise	Transect / location	Equipment used	Weather
03/05/2023	Start time: 02.52 End time: 05.35 Sunrise: 05.35	Transect A	Anabat Scout	Dry, 80% cloud, BF1, 5°C
Comments: The survey was undertaken by 2 surveyors under direction of licence holder 2022-10426-CL17-BAT.				

BF0 = calm, BF12 = hurricane force

2.2.14 Automated static detector surveys are also currently underway, during which Song Meter 4 (SM4) detectors are positioned at four locations within the site for at least 5 nights at a time, monthly from May to October 2023. The four SM4 detectors were deployed in the same locations once a month from May to October 2023. Detector SD1 was situated on the western boundary of the site adjacent to Tiddesley Woods, detector SD2 was located in the centre of the site at an existing hedgerow, detector SD3 was located on building B1, and detector SD4 was located on a hedgerow in the north-east of the site (see Plan 6596/ECO5). The detectors were set to switch on approximately 30 minutes before sunset and switch off approximately 30 minutes after sunrise.

2.2.15 From July onwards, the locations of static detectors was changed in response to the discovery of a Lesser Horseshoe Bat *Rhinolophus hipposideros* roost within a building within the site. In order to better understand the site utilisation by Lesser Horseshoe Bat, detectors SD1 and SD3 were moved so that they were located on the two likely flightpaths from the roost – one on the central N-S orientated hedgerow, and another on the southern E-W hedgerow connecting the roost to Tiddesley Wood to the west. These new locations were

2.2.16 The weather conditions during the static detector surveys are provided in Table 2.5 below.

Table 2.5. Automated detector survey details.

Survey Date	Weather Conditions			
	Wind (BF)	Temp(°)	Cloud Cover (%)	Precipitation
02/05/2023	2	4-9	10-60	Dry
03/05/2023	3	6-7	30-100	Dry
04/05/2023	2	9-12	55-100	Light showers
05/05/2023	2	9-11	60-100	Dry
06/05/2023	3	8-13	80-100	Light showers
07/05/2023	2	9-11	20-90	Dry
08/05/2023	2	11-13	70-100	Light showers
08/06/2023	3	8-11	5-60	Dry
09/06/2023	3	10-13	40-70	Dry
10/06/2023	1	14-17	50-80	Light showers
11/06/2023	1	15-18	80-100	Light rain
12/06/2023	2	13-16	5-80	Light shower
13/06/2023	2	10-15	0-5	Dry
14/06/2023	2	11-15	0-50	Light shower
05/07/2023	3	11-15	10-75	Dry
06/07/2023	3	13-16	0-5	Dry
07/07/2023	2	21-23	0-70	Dry
08/07/2023	2	15-17	75-85	Light showers
09/07/2023	2	13-16	35-70	Dry
10/07/2023	3	15-16	100	Light showers
11/07/2023	3	13-15	40-70	Light showers

Survey Date	Weather Conditions			
	Wind (BF)	Temp(°)	Cloud Cover (%)	Precipitation
12/07/2023	3	13-15	40-90	Dry
01/08/2023	2	14-15	75-100	Light showers
02/08/2023	3	15-16	100	Light showers
03/08/2023	3	13-14	40-100	Dry
04/08/2023	3	13-15	50-55	Dry
05/08/2023	4	10-12	70-100	Light showers
06/08/2023	2	9-13	10-70	Dry
07/08/2023	2	11-13	5-10	Dry
08/08/2023	1	11-14	30-50	Dry
04/09/2023	2	16-18	0-5	Dry
05/09/2023	3	16-19	0-5	Dry
06/09/2023	1	19-21	5-30	Dry
07/09/2023	2	18-22	20-50	Dry
08/09/2023	2	18-21	15-85	Light showers
09/09/2023	2	20-23	15-80	Dry
10/09/2023	3	17-19	10-30	Dry
11/09/2023	2	15-17	70-90	Light showers
04/10/2023	3	10-11	15-45	Dry
05/10/2023	4	13-14	100	Dry
06/10/2023	4	13-15	20-30	Dry
07/10/2023	2	13-15	45	Dry
08/10/2023	2	13-15	35-45	Dry
09/10/2023	2	13-16	15-25	Dry
10/10/2023	3	15-17	35-45	Dry
11/10/2023	2	10-11	100	Dry

BF0 = calm, BF12 = hurricane force

Analysis of Bat Survey Recordings

- 2.2.17 All bat calls were analysed using Analook W v4.4a to verify the species recorded during the survey work. Where recordings could not be reliably attributed to species (such as for *Myotis* species) or where overlaps between otherwise distinguishable species occur (such as in Pipistrelle bat calls around 40kHz or 50kHz) calls were identified to genus level; in the case of calls which could not be distinguished between *Nyctalus* sp. and Serotine, these have been labelled as 'Big Bat' species.

2.3 Survey Constraints and Limitations

- 2.3.1 All of the species that occur in each habitat would not necessarily be detectable during survey work carried out at any given time of the year, since different species are apparent during different seasons. The Phase 1 habitat survey was undertaken within the optimal season therefore allowing a robust assessment of habitats and botanical interest across the site.
- 2.3.2 A recognised limitation of the bat activity surveys is that bat detectors can only provide an index of activity rather than absolute numbers of bats. Therefore, the results of the bat activity surveys should only be considered indicative of the amount of use bats make of an area rather than the abundance of bats. In addition, some bat species, e.g. Brown Long-eared Bat, are difficult to detect due to their quiet echolocation calls.

2.3.3 Health and safety matters provide a constraint to which areas of the site can be safely accessed at night, which are limited to open areas and those with established wide and accessible even pathways.

2.4 Ecological Evaluation Methodology

2.4.1 The evaluation of the bat data is based on professional judgement whilst also drawing on the latest available industry guidance and research. The approach taken in this report is based on that described by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2019)⁵ and Bat Survey Guidelines⁶.

DRAFT

⁵ CIEEM (2019) 'Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine', Chartered Institute of Ecology and Environmental Management, Winchester

⁶ Bat Surveys for Professional Ecologists – Good Practice Guidelines 2016 and 2023

3 Survey Results

3.1 Legislation

3.1.1 All British bats are classed as European Protected Species under the Conservation of Habitats and Species Regulations 2017 (as amended) and are also listed under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). As such, both bats and their roosts (breeding sites and resting places) receive full protection under the legislation (see Annex 5719/2 for detailed provisions). If proposed development work is likely to result in an offence a licence may need to be obtained from Natural England which would be subject to appropriate measures to safeguard bats. Given all bats are protected species, they are considered to represent important ecological features. A number of bat species are also considered S41 Priority Species.

3.2 Background Records

3.2.1 A number of bat records were returned by the LRC from a 2km radius surrounding the site, including Brown Long-Eared Bat, Common Pipistrelle *Pipistrellus pipistrellus*, Soprano Pipistrelle *Pipistrellus pygmaeus*, Daubenton's Bat *Myotis daubentonii*, Natterer's Bat *Myotis nattereri*, Whiskered Bat *Myotis mystacinus*, Lesser Horseshoe Bat, Noctule *Nyctalus noctula*, Leisler's Bat *Nyctalus leisleri* and Serotine *Eptesicus serotinus*. The closest record is for a Noctule located approximately 30m to the west of the site within Tiddesley Woods. Lesser Horseshoe Bat roosts have also been recorded from Tiddesley Wood, as well as other records of Horseshoe bat roosts from further afield.

3.3 Survey Results

Visual Inspection Surveys

Buildings

3.3.1 A detailed visual inspection was undertaken of all the buildings within the site, the results of which are summarised below, and detailed at Appendix 6596/3.

3.3.2 Building **B1** (a bungalow in the centre of the site) was recorded as exhibiting a large number of potential roosting opportunities and was assessed as providing high suitability for bats. During internal inspections of this building carried out in April and May 2023, a maximum of three individual Lesser Horseshoe *Rhinolophus hipposideros* bats were identified as roosting in the building, three of which were found in the loft void, and one in the downstairs bedroom, whilst a large number of droppings and feeding remains were recorded throughout the building.

3.3.3 Building **B2** is small, dilapidated farm building with negligible bat potential, whilst building **B3** is a modern agricultural barn in active use, also with negligible potential for bats.

Trees

3.3.4 A number of semi-mature and mature trees are present on site. However, no trees present on-site were recorded as providing suitable features for roosting bats.

Dusk and Dawn Surveys

Emergence / re-entry surveys (buildings)

- 3.3.5 Building **B1** was confirmed to be a roost for Lesser Horseshoe through internal inspections and was therefore subject to further roost characterisation survey work in the form of dusk emergence and dawn re-entry surveys to establish the pattern of use of the building by Lesser Horseshoe and any other bat species. The results of the dusk emergence and dawn re-entry surveys are summarised in Table 3.1 below.

Table 3.1. Emergence / re-entry survey results.

Building	Date	Sunset/ sunrise	Emergence/ re-entry	Summary of other activity
B1	25 th May 2023	21:10	<p>Emergence of single Lesser Horseshoe at 21:48 from broken window pane in door (point 1).</p> <p>Emergence of single Lesser Horseshoe at 22:01 from large gap in soffit (point 2).</p> <p>Emergence of Lesser Horseshoe at 22:14 from point 2.</p>	<p>Multiple occasions of Lesser Horseshoe returning to point 2 and re-entering then immediately emerging. Other occasional passes by Common Pipistrelle and Soprano Pipistrelle. Very occasional passes of <i>Nyctalus/Eptesicus</i>.</p>
	9 th June 2023	04:49	<p>Re-entry of single Lesser Horseshoe at 02:56 at point 2.</p> <p>Re-entry of two Lesser Horseshoe at 04:07 at point 2.</p>	<p>Similar to activity of 25th May survey.</p>
	22 nd June 2023	21:31	<p>Emergence of single Lesser Horseshoe at 21:59 from point 2.</p> <p>Emergence of single Lesser Horseshoe at 22:13 from point 2.</p> <p>Emergence of single Lesser Horseshoe at 22:18 from point 2.</p> <p>Emergence of single Lesser Horseshoe at 22:25 from point 2.</p> <p>Emergence of single Lesser Horseshoe at 22:27 from point 2.</p>	<p>LHS flying up to boarded up door on north-west side to investigate and then hang for ~15 seconds on top of door frame before flying off again. Other LHS activity includes occasional re-entries and emergences from point 2 throughout the survey. Other occasional passes by Common Pipistrelle, Soprano Pipistrelle and <i>Nyctalus/Eptesicus</i>.</p>

Hibernation Surveys

- 3.3.6 A series of hibernation surveys are scheduled for the known Lesser Horseshoe Bat roost using Building **B1**, using the methods set out in Section 2 above. These will take place over the winter of 2023/24, in accordance with the current best practice⁷. A total of three inspection visits are scheduled to be completed between November 2023 and February 2023, together with the monthly deployment of automated detectors within the building.
- 3.3.7 The first of these visits was completed in November 2023, which included an inspection, together with the deployment of two static detectors and data logger. During the survey visit, three Lesser Horseshoe Bats were observed to be present, using various parts of the ground floor. During a subsequent visit later in the month (to replace a faulty data logger), three bats were observed again, although on this occasion one was located on the ground floor, with another two using the loft.

Activity surveys (foraging /commuting)

- 3.3.8 A number of features within the site offer potential opportunities for foraging bats as they are likely to support a reasonable biomass of invertebrate prey. The presence of field grazed by livestock is likely to result in an elevated invertebrate numbers for dung beetles, dung flies and other similar prey items which are preferred by some bat species. Lesser Horseshoe bats in particular are known to prefer to forage over fields used by livestock.
- 3.3.9 In addition, the hedgerows and tree-lines, in some cases with associated ditches, form linear corridors that could act as navigational aids for commuting bats and provide connectivity to other off-site habitats in the surrounding area such as the adjacent Tiddesley Woods, and River Avon which flows approximately 120m to the south of the site at its closest point.
- 3.3.10 As such, bat activity surveys are currently ongoing at the site, occurring monthly from May to October 2023.
- 3.3.11 **Manual walked transect surveys.** The activity survey results are illustrated on Plan 6596/ECO6, with summary tables provided below.

Table 3.2. Results of the dusk walked transect on 2nd May 2023.

Species	Number of Passes Recorded	Approximate % of Total Passes Recorded
Common Pipistrelle	122	86
Soprano Pipistrelle	18	13
'Big Bat'	2	1
Total	142	100

Table 3.3. Results of the dawn walked transect on 3rd May 2023.

Species	Number of Passes Recorded	Approximate % of Total Passes Recorded
Common Pipistrelle	34	94
'Big Bat'	2	6
Total	36	100

Table 3.4. Results of the dusk walked transect on 5th June 2023.

Species	Number of Passes Recorded	Approximate % of Total Passes Recorded
Common Pipistrelle	82	62
Soprano Pipistrelle	36	27
'Big Bat'	11	8
<i>Myotis</i> sp.	1	1
Lesser Horseshoe Bat	2	2
Total	132	100

Table 3.5. Results of the dusk walked transect on 5th July 2023.

Species	Number of Passes Recorded	Approximate % of Total Passes Recorded
Common Pipistrelle	83	83
Soprano Pipistrelle	11	11
'Big Bat'	4	4
<i>Myotis</i> sp.	2	2
Total	100	100

Table 3.6. Results of the dusk walked transect on 1st August 2023.

Species	Number of Passes Recorded	Approximate % of Total Passes Recorded
Common Pipistrelle	38	62
Soprano Pipistrelle	22	36
'Big Bat'	1	2
Total	61	100

Table 3.7. Results of the dusk walked transect on 4th September 2023.

Species	Number of Passes Recorded	Approximate % of Total Passes Recorded
Common Pipistrelle	93	69
Soprano Pipistrelle	30	22
'Big Bat'	11	8
Total	134	100

Table 3.8. Results of the dusk walked transect on 4th October 2023.

Species	Number of Passes Recorded	Approximate % of Total Passes Recorded
Common Pipistrelle	9	31
Soprano Pipistrelle	14	48
'Big Bat'	1	3
<i>Myotis</i> sp.	3	10
Barbastelle	1	3
Lesser Horseshoe Bat	1	3
Total	29	100

3.3.12 The overall activity levels for the site as a whole, across all survey dates is outlined in table 3.9 below.

Table 3.9. Summary of all 2023 walked transect survey results.

Species	Number of Passes Recorded	Approximate % of Total Passes Recorded
Common Pipistrelle	461	73
Soprano Pipistrelle	131	21
'Big Bat'	32	5
<i>Myotis</i> sp.	6	1
Barbastelle	1	<1 (0.16)
Lesser Horseshoe Bat	3	<1 (0.47)
Total	634	100

3.3.13 A discussion of activity levels for the site is set out below.

3.3.14 As shown by the above results, during the dusk and dawn surveys completed to date, Common Pipistrelle was the most commonly recorded species, accounting for 73% of all registrations. Soprano Pipistrelle and 'Big Bat' species were recorded to a lesser extent, accounting for 21% and 5% respectively. Myotis bat species were recorded in small numbers on the dusk surveys in June, July and October. Lesser Horseshoe Bats and Barbastelles were also recorded occasionally during the walked activity transect.

3.3.15 During the walked transects, the level of activity was broadly similar across the site, generally in the range between 0.25 and 1.5 passes/minute, with those higher instances

usually associated with locations close to vegetated boundaries, and lower levels at locations in open fields or away from vegetation.

3.3.16 The highest levels of bat activity were recorded in and around the borders of field **F3** and by building **B1**, in the south-east of the site, as well as along hedgerows **H4** and **H8**, and the edge of Tiddesley Wood (see Plan 6596/ECO6). However, these apparent peaks are mainly attributable to localised spates of feeding activity of common species (of particularly Common Pipistrelle) at particular locations on certain nights, and the actual level of activity with respect to these common species, in proximity to vegetated boundaries is considered to be broadly similar across the site.

3.3.17 **Remote Detector Surveys.** A total of nine bat species (or species groups⁸) were recorded over the course of all the static detector surveys, namely Common Pipistrelle, Soprano Pipistrelle, *Pipistrelle* sp., Big Bat sp., *Myotis* sp., Long-eared bat species, Barbastelle and Lesser Horseshoe Bat, as set out below.

3.3.18 Table 3.10 details the results of the static detector surveys carried out in 2023. Activity during this time was dominated by Common Pipistrelle and Soprano Pipistrelle, accounting for approximately 73.22% and 23.61% of all registrations, respectively, with all other species being represented only in low numbers, together accounting for the remaining 3.17% of registrations.

Table 3.10. Total number of bat registrations per species and % species composition recorded during static detector surveys carried out in 2023.

Species	Number of Registrations Recorded	Approximate % of Total Registrations Recorded
Common Pipistrelle	38,105	73.22
Soprano Pipistrelle	8,999	17.29
Nathusius' Pipistrelle	2	0.00
Pipistrelle sp.	13	0.03
Barbastelle	288	0.55
<i>Myotis</i> sp.	2,298	4.42
Big Bat sp.	1,052	2.02
Long-eared bat sp.	300	0.58
Lesser Horseshoe Bat	982	1.89
Total	52,039	100

3.3.19 Results from updated static detector surveys carried out in 2023 are summarised in Tables 3.10-3.17 below, and illustrated on Plan 6596/ECO5.

Table 3.11. Automated static bat survey summary for Location 1 (SD1, along western perimeter of the off-site woodland to the north of the site for 2 deployments).

Survey Date	Detector Location 1							
	Number of registrations by species [#]							
	Pip 45	Pip 55	Barb.	'Big Bat'	Myotis	BLE	Nathusius's Pip	Total
02-May	9	7	0	3	12	0	0	
03-May	1	2	0	2	2	0	0	
04-May	51	225	0	3	10	1	0	

⁸ *Myotis* sp. bats are difficult to separate based on analysis of calls alone, and have therefore been identified to species group level only. It is likely several different species within each group are present at the site. Similarly, some Pipistrelle and *Nyctalus/Eptesicus* (or 'big bat') sp. calls were not possible to identify to species level and are assigned to a species group.

Survey Date	Detector Location 1							
	Number of registrations by species [#]							
	Pip 45	Pip 55	Barb.	'Big Bat'	Myotis	BLE	Nathusius's Pip	Total
05-May	216	174	1	9	11	0	1	
06-May	147	82	0	4	11	1	0	
07-May	281	137	2	3	85	0	0	
08-May	489	18	0	1	7	0	0	
08-Jun	8	9	0	0	0	0	0	
09-Jun	83	2	0	4	0	0	0	
10-Jun	65	94	0	12	0	0	0	
11-Jun	75	10	0	14	0	0	0	
12-Jun	98	95	0	7	0	0	0	
13-Jun	346	128	0	3	0	0	0	
14-Jun	618	169	0	14	0	0	0	
Total registrations	2,487	1,152	3	79	138	2	1	3,862
Registrations per night	177.6	82.3	0.2	5.6	9.8	0.14	0.07	275.9
Approximate % of total registrations	64.4	29.8	0.1	2.0	3.6	0.1	0.0	100
<p>Key: Pip 45- Common Pipistrelle Pip 55- Soprano Pipistrelle Barb - Barbastelle 'Big Bat' - Noctule, Leislars or Serotine Myotis – <i>Myotis</i> sp. BLE – Long Eared bat sp. LHB – Lesser Horseshoe Bat Pip sp. – Pipistrelle sp.</p> <p># - Figures shown are the total no. of registrations recorded during the dusk to the proceeding dawn period for each date shown, i.e. a recording 'night' for the 20th June will be registrations recorded from ~18.00 on the 20/06 till 07.00 on the morning of the 21/06.</p>								

Table 3.12. Automated static bat survey summary for Location 2 (SD2, placed along H4, running between F6 and F7 for 6 deployments).

Survey Date	Detector Location 2								
	Number of registrations by species [#]								
	Pip 45	Pip 55	'Big Bat'	Myotis	Barb.	LHB	BLE	Pip sp.	Total
02-May	57	1	2	1	1	0	0	0	
03-May	28	0	2	0	1	0	0	0	
04-May	219	9	2	3	1	0	0	0	
05-May	302	47	5	7	1	2	0	0	
06-May	268	16	1	6	0	1	0	0	
07-May	270	16	3	7	6	4	0	0	
08-May	276	4	2	5	2	0	0	0	
08-Jun	126	8	2	11	8	15	1	0	
09-Jun	97	17	4	3	12	1	0	0	
10-Jun	105	37	8	2	3	0	0	0	
11-Jun	170	55	7	7	4	1	0	0	
12-Jun	51	19	12	2	0	1	0	0	
13-Jun	25	12	2	3	1	0	0	0	
14-Jun	61	11	3	3	5	0	0	0	
05-Jul	13	3	5	1	0	0	0	0	

Survey Date	Detector Location 2								
	Number of registrations by species#								
	Pip 45	Pip 55	'Big Bat'	Myotis	Barb.	LHB	BLE	Pip sp.	Total
06-Jul	20	6	3	2	0	0	1	0	
07-Jul	33	5	2	1	0	0	0	0	
08-Jul	45	19	28	1	1	0	0	0	
09-Jul	20	9	1	1	1	0	0	0	
10-Jul	22	5	8	0	1	0	0	0	
11-Jul	37	7	5	1	0	0	0	0	
01-Aug	27	15	0	32	0	0	1	0	
02-Aug	24	9	15	4	0	0	2	0	
03-Aug	66	5	5	4	1	3	4	0	
04-Aug	135	28	4	20	3	1	2	0	
05-Aug	7	2	5	0	0	10	1	0	
06-Aug	46	8	1	6	0	5	0	0	
07-Aug	49	5	4	5	3	5	2	0	
04-Sep	40	21	3	49	3	1	2	0	
05-Sep	36	25	2	37	6	7	3	0	
06-Sep	33	23	3	52	7	1	2	0	
07-Sep	73	36	5	76	4	2	4	0	
08-Sep	42	21	5	29	1	3	3	0	
09-Sep	26	18	6	72	1	5	5	0	
10-Sep	198	7	2	24	0	1	3	0	
04-Oct	19	1	1	44	7	3	3	0	
05-Oct	2	2	0	9	5	1	1	0	
06-Oct	45	8	2	32	9	0	1	0	
07-Oct	36	3	1	61	11	2	5	0	
08-Oct	34	7	0	63	8	12	6	1	
09-Oct	26	10	0	37	8	4	2	0	
10-Oct	12	2	1	14	1	3	2	0	
Total registrations	3221	562	171	736	126	94	56	1	4,967
Registrations per night	76.7	13.4	4.1	17.5	3	2.2	1.3	n/a	118.3
Approximate % of total registrations	64.8	11.3	3.4	14.8	2.5	1.9	1.1	0	100

Key:

Pip 45- Common Pipistrelle
Pip 55- Soprano Pipistrelle
Barb - Barbastelle
'Big Bat' - Noctule, Leislars or Serotine
Myotis – *Myotis* sp.
BLE – Long Eared bat sp.
LHB – Lesser Horseshoe Bat
Pip sp. – Pipistrelle sp.

- Figures shown are the total no. of registrations recorded during the dusk to the proceeding dawn period for each date shown, i.e. a recording 'night' for the 20th June will be registrations recorded from ~18.00 on the 20/06 till 07.00 on the morning of the 21/06.

Table 3.13. Automated static bat survey summary for Location 3 (SD3, deployed to the east of building B1 for 2 deployments).

Survey Date	Detector Location 3							
	Number of registrations by species#							
	Pip 45	Pip 55	'Big Bat'	BLE	Myotis	LHB	Barb.	Totals
03-May	11	1	1	0	0	0	0	
04-May	581	289	2	0	0	0	0	
05-May	1325	218	1	0	0	0	1	
06-May	570	533	2	0	0	0	0	
07-May	1482	1258	3	0	0	0	1	
08-May	1619	10	2	0	0	0	1	
08-Jun	4	4	2	0	0	21	0	
09-Jun	47	93	6	1	2	5	0	
10-Jun	104	29	5	0	1	15	0	
11-Jun	96	106	4	0	0	5	0	
12-Jun	48	13	9	2	1	13	0	
13-Jun	37	43	6	0	0	87	0	
14-Jun	35	62	4	1	0	68	0	
Total registrations	5959	2659	47	4	4	214	3	8890
Registrations per night	458.4	204.5	1.1	0.31	0.31	16.5	0.23	635.0
Approximate % of total registrations	67.0	29.9	0.5	0	0	2.4	0	100
<p>Key: Pip 45- Common Pipistrelle Pip 55- Soprano Pipistrelle Barb - Barbastelle 'Big Bat' - Noctule, Leislars or Serotine Myotis – <i>Myotis</i> sp. BLE – Long Eared bat sp. LHB – Lesser Horseshoe Bat Pip sp. – Pipistrelle sp.</p> <p># - Figures shown are the total no. of registrations recorded during the dusk to the proceeding dawn period for each date shown, i.e. a recording 'night' for the 20th June will be registrations recorded from ~18.00 on the 20/06 till 07.00 on the morning of the 21/06.</p>								

Table 3.14. Automated static bat survey summary for Location 4 (SD4, at northern edge of the site on Hedgerow H5 for 6 deployments).

Survey Date	Detector Location 4								
	Number of registrations by species#								
	Pip 45	Pip 55	'Big Bat'	Myotis	BLE	Barb.	Pip sp.	LHB	Totals
03-May	20	7	0	0	0	0	0	5	
04-May	277	12	1	0	0	0	0	5	
05-May	546	24	9	0	0	0	0	5	
06-May	691	145	1	0	0	0	0	9	
07-May	355	36	3	0	0	0	0	14	
08-May	42	0	1	0	0	0	0	5	
08-Jun	6	1	2	0	1	0	0	78	
09-Jun	8	12	2	1	2	0	0	74	
10-Jun	113	13	8	3	1	0	0	159	
11-Jun	58	5	2	0	0	0	0	5	

Survey Date	Detector Location 4								
	Number of registrations by species#								
	Pip 45	Pip 55	'Big Bat'	Myotis	BLE	Barb.	Pip sp.	LHB	Totals
12-Jun	37	5	7	4	2	0	0	58	
13-Jun	26	8	3	0	0	0	0	81	
14-Jun	25	6	3	1	1	0	0	69	
05-Jul	308	199	4	23	0	0	0	0	
06-Jul	319	142	0	22	0	0	0	0	
07-Jul	58	11	15	10	0	2	0	0	
08-Jul	208	103	21	4	0	0	0	0	
09-Jul	331	34	19	4	0	0	0	0	
10-Jul	367	368	8	0	0	0	0	0	
11-Jul	243	29	83	2	0	0	0	1	
01-Aug	361	20	3	5	0	0	1	0	
02-Aug	859	63	9	19	5	1	0	0	
03-Aug	133	5	0	9	0	0	0	0	
04-Aug	130	22	0	7	0	0	0	0	
05-Aug	449	23	6	4	0	0	0	2	
06-Aug	113	10	4	2	0	1	0	3	
07-Aug	300	12	2	9	0	0	0	2	
04-Sep	130	44	23	44	2	17	0	1	
05-Sep	124	39	8	31	1	1	0	1	
06-Sep	133	44	11	33	2	7	0	6	
07-Sep	100	60	16	48	2	8	0	3	
08-Sep	48	13	2	12	3	1	0	0	
09-Sep	92	53	4	54	4	12	0	3	
10-Sep	71	6	9	21	2	17	0	1	
04-Oct	424	74	0	10	1	3	0	0	
05-Oct	2078	19	0	1	0	43	0	0	
06-Oct	1600	125	0	8	2	1	0	0	
07-Oct	500	80	1	26	2	0	0	0	
08-Oct	227	36	1	15	3	0	0	0	
09-Oct	662	29	0	3	0	0	0	0	
10-Oct	361	32	0	3	1	3	0	0	
Total registrations	12933	1969	291	438	36	95	1	584	16,347
Registrations per night	307.9	46.9	6.9	10.4	0.9	2.3	n/a	13.9	389.2
Approximate % of total registrations	79.1	12.0	1.8	2.7	0.2	0.6	0.0	3.6	100

Key:

Pip 45- Common Pipistrelle
Pip 55- Soprano Pipistrelle
Barb - Barbastelle
'Big Bat' - Noctule, Leislars or Serotine
Myotis – *Myotis* sp.
BLE – Long Eared bat sp.
LHB – Lesser Horseshoe Bat
Pip sp. – Pipistrelle sp.

- Figures shown are the total no. of registrations recorded during the dusk to the proceeding dawn period for each date shown, i.e. a recording 'night' for the 20th June will be registrations recorded from ~18.00 on the 20/06 till 07.00 on the morning of the 21/06.

Table 3.15. Automated static bat survey summary for Location 5 (SD5, along the southern face of building B1 for a single deployment).

Survey Date	Detector Location 5							
	Number of registrations by species#							
	Pip 45	Pip 55	'Big Bat'	BLE	Myotis	LHB	Barb.	Totals
08-Jun	103	8	0	0	0	0	0	
09-Jun	106	4	1	0	0	0	0	
10-Jun	3	0	1	0	0	0	0	
11-Jun	0	0	1	0	0	0	0	
12-Jun	50	1	2	0	0	0	0	
13-Jun	66	6	3	0	0	0	0	
14-Jun	56	3	4	0	0	0	0	
Total registrations	384	22	12	0	0	1	0	419
Registrations per night	54.9	3.1	1.7	0	0	0.1	0	59.9
Approximate % of total registrations	91.6	5.3	2.9	0	0	0.2	0	100

Key:
Pip 45- Common Pipistrelle
Pip 55- Soprano Pipistrelle
Barb - Barbastelle
'Big Bat' - Noctule, Leislars or Serotine
Myotis – *Myotis* sp.
BLE – Long Eared bat sp.
LHB – Lesser Horseshoe Bat
Pip sp. – Pipistrelle sp.

- Figures shown are the total no. of registrations recorded during the dusk to the proceeding dawn period for each date shown, i.e. a recording 'night' for the 20th June will be registrations recorded from ~18.00 on the 20/06 till 07.00 on the morning of the 21/06.

Table 3.16. Automated static bat survey summary for Location 6 (SD6, located along H8 which runs east to west through the centre of the site for 4 deployments).

Survey Date	Detector Location 6									
	Number of registrations by species#									
	Pip 45	Pip 55	'Big Bat'	Myotis	BLE	Barb.	Pip sp.	LHB	Nathusius Pip.	Totals
05-Jul	184	38	3	6	2	0	4	0	0	
06-Jul	187	20	5	14	4	0	0	0	0	
07-Jul	80	17	5	15	4	3	3	1	0	
08-Jul	141	7	37	2	0	3	0	1	0	
09-Jul	200	14	28	17	2	1	0	1	1	
10-Jul	218	5	9	4	0	1	0	0	0	
11-Jul	158	24	4	9	3	0	1	2	0	
01-Aug	450	83	3	31	2	3	0	0	0	
02-Aug	112	14	18	4	2	0	0	1	0	
03-Aug	189	9	8	10	8	0	0	1	0	
04-Aug	229	71	24	14	5	0	0	4	0	
05-Aug	39	11	8	4	0	0	0	0	0	
06-Aug	138	20	4	10	1	0	0	4	0	
07-Aug	195	12	11	9	1	1	0	0	0	
04-Sep	199	33	7	32	3	0	0	1	0	
05-Sep	269	152	4	32	0	0	0	0	0	
06-Sep	266	75	3	38	1	0	0	0	0	
07-Sep	169	88	5	59	1	0	0	1	0	
08-Sep	2751	512	6	46	0	1	0	0	0	

Survey Date	Detector Location 6									
	Number of registrations by species#									
	Pip 45	Pip 55	'Big Bat'	Myotis	BLE	Barb.	Pip sp.	LHB	Nathusius Pip.	Totals
09-Sep	265	85	2	46	0	0	0	0	0	
10-Sep	491	67	0	39	0	1	0	1	0	
04-Oct	62	62	2	25	8	0	0	1	0	
05-Oct	25	19	2	7	0	2	0	0	0	
06-Oct	320	66	4	31	0	1	1	1	0	
07-Oct	161	38	4	34	5	0	0	2	0	
08-Oct	110	46	2	55	4	1	0	2	0	
09-Oct	116	67	0	22	5	1	0	1	0	
10-Oct	137	32	1	73	0	1	0	2	0	
Total registrations	7861	1687	209	688	61	20	9	27	1	10,563
Registrations per night	280.8	60.3	7.5	24.6	2.2	0.7	n/a	1.0	0.04	377.3
Approximate % of total registrations	74.4	16.0	2.0	6.5	0.6	0.2	0.1	0.3	0.01	100
<p>Key: Pip 45- Common Pipistrelle Pip 55- Soprano Pipistrelle Barb - Barbastelle 'Big Bat' - Noctule, Leislars or Serotine Myotis – <i>Myotis</i> sp. BLE – Long Eared bat sp. LHB – Lesser Horseshoe Bat Pip sp. – Pipistrelle sp.</p> <p># - Figures shown are the total no. of registrations recorded during the dusk to the proceeding dawn period for each date shown, i.e. a recording 'night' for the 20th June will be registrations recorded from ~18.00 on the 20/06 till 07.00 on the morning of the 21/06.</p>										

Table 3.17. Automated static bat survey summary for Location 7 (SD7, located along TL1 in the south of the site for 4 deployments).

Survey Date	Detector Location 7									
	Number of registrations by species#									
	Pip 45	Pip 55	'Big Bat'	Myotis	BLE	Barb.	Pip sp.	LHB	Nathusius Pip.	Totals
05-Jul	124	18	4	4	5	0	0	5	0	
06-Jul	228	27	8	6	9	2	0	4	0	
07-Jul	237	43	49	2	5	0	2	6	0	
08-Jul	35	1	11	1	0	0	0	0	0	
09-Jul	144	18	24	2	6	1	0	0	0	
10-Jul	62	12	12	2	3	0	0	4	0	
11-Jul	127	15	5	2	11	0	0	5	0	
01-Aug	251	37	11	23	19	26	0	1	0	
02-Aug	256	17	26	3	6	1	0	0	0	
03-Aug	212	20	6	11	16	0	0	1	0	
04-Aug	217	99	15	9	23	0	0	8	0	
05-Aug	76	9	10	4	2	0	0	1	0	
06-Aug	145	38	4	11	15	0	0	3	0	
07-Aug	198	35	12	10	12	1	0	2	0	
04-Sep	263	85	18	10	0	1	0	6	0	
05-Sep	224	49	6	16	0	1	0	1	0	

Survey Date	Detector Location 7									
	Number of registrations by species [#]									
	Pip 45	Pip 55	'Big Bat'	Myotis	BLE	Barb.	Pip sp.	LHB	Nathusius Pip.	Totals
06-Sep	336	78	11	16	1	0	0	1	0	
07-Sep	505	80	5	29	0	2	0	2	0	
08-Sep	386	37	2	14	0	1	0	1	0	
09-Sep	455	71	0	19	0	2	0	1	0	
10-Sep	737	103	1	40	0	0	0	6	0	
04-Oct	8	10	0	12	0	1	0	7	0	
05-Oct	2	6	0	4	0	1	0	3	0	
06-Oct	11	9	0	7	1	0	0	0	0	
07-Oct	11	17	1	16	4	1	0	1	0	
08-Oct	6	6	0	10	3	0	0	1	0	
09-Oct	2	4	2	7	0	0	0	2	0	
10-Oct	2	4		4	0	0	0	1	0	
Total registrations	5260	948	243	294	141	41	2	62	0	6,991
Registrations per night	187.9	33.9	8.7	10.5	5.0	1.5	n/a	2.2	0	249.7
Approximate % of total registrations	75.2	13.6	3.5	4.2	2.0	0.6	n/a	0.9	0	100
Key: Pip 45- Common Pipistrelle Pip 55- Soprano Pipistrelle Barb - Barbastelle 'Big Bat' - Noctule, Leislors or Serotine Myotis – <i>Myotis</i> sp. BLE – Long Eared bat sp. LHB – Lesser Horseshoe Bat Pip sp. – Pipistrelle sp. t # - Figures shown are the total no. of registrations recorded during the dusk to the proceeding dawn period for each date shown, i.e. a recording 'night' for the 20th June will be registrations recorded from ~18.00 on the 20/06 till 07.00 on the morning of the 21/06.										

3.3.20 A discussion of activity levels for each static detector location is set out below.

Static detector location 1 (SD1), located on SW side of site on boundary with Tiddesley Wood)

3.3.21 This static was deployed in May and June 2023, during which time moderate levels of activity were recorded at this static location, with an average with 250 passes per night on average. Of these, Common Pipistrelle accounted for 64.4% of all registrations, with Soprano Pipistrelle accounting for 29.9%, with other species recorded in very low numbers, including 138 registrations of Myotis bat species and 79 registrations from 'Big Bat' species. A small number of Barbastelle (3) were recorded during the May deployment.

Static detector location 2 (SD2), located in the central north part of the site.

3.3.22 Statics were deployed throughout the season from May to October 2023, during which time relatively low levels of activity were recorded at this location, with an average of 118 passes per night recorded across all 6 deployments. Common Pipistrelle dominated activity, accounting for 64.8% of all registrations, although a relatively large number of Myotis bats (accounting for 14.8% of all registrations). Soprano Pipistrelle accounted for 11.3% of

registrations, with other species recorded in very low numbers, including 171 registrations from 'Big Bat' species, 126 registrations from Barbastelle and 94 registrations from Lesser Horseshoe Bats. Activity peaked during May, June and September and was notably lower in July, August and October, accounting for just 0.73% and 0.86% of the total registrations, respectively. Other species were recorded in low numbers, with notable peaks in Myotis species activity in September and October with a total of 339 and 260 registrations respectively.

Static detector location 3 (SD3), located at building B1.

- 3.3.23 During the deployment of this detector during April and May 2023, relatively high levels of activity were recorded at this static location, with a total of 8,890 registrations recorded across the two deployments. Again, Common Pipistrelle dominated, accounting for 67.0% of all registrations, Soprano Pipistrelle accounting for 29.9% and Lesser Horseshoe Bat accounting for 2.4%, with other species recorded in low numbers, including four registrations for Barbastelle during June. Activity peaked during May (103.9 registrations per hour), with lower levels of activity during June (13.99 registrations per hour). Lesser Horseshoe Bat registrations were entirely confined to the June survey period, with the 214 registrations account for 100% of the Horseshoe activity recorded at this static location.

Static detector location 4 (SD4), located on the north site boundary

- 3.3.24 This detector was deployed through the survey season between May and October 2023. Moderate levels were recorded at this location over the course of the surveys, with an average of 389 passes per night. Common Pipistrelle accounted for 79.1% of registrations, whilst Soprano Pipistrelle accounted for 12.0% of registrations. Activity was highest at this location during October, accounting for 38.97% of all registrations and with a total average of 64.99 registrations per hour.
- 3.3.25 Other species were recorded in lower numbers, with 584 registrations from Lesser Horseshoe Bats, 438 from Myotis Bat species and 291 from 'Big Bat' species across all static deployments at location 4. There was an apparent peak in Lesser Horseshoe Bat numbers in June, while numbers of Barbastelle appeared to peak in September and October.

Static detector location 5 (SD5), located at Building B1

- 3.3.26 This static detector was only deployed during a single month in June 2023, and was aimed at detecting Lesser Horseshoe Bat emerging and re-entering from one particular side of building B1. Only low levels were recorded at this static location over the course of the single static deployment, with a total of 419 registrations recorded. Common Pipistrelle accounted for 91.6% of registrations, whilst Soprano Pipistrelle accounted for 5.3% of registrations, 'Big Bat' species accounted for 2.9% and Lesser Horseshoe Bats only accounting for 0.2%.

Static detector location 6 (SD6), located in the west of the site.

- 3.3.27 This static detector was deployed between July and October 2023. During its deployment, moderate levels of activity were recorded over the course of the four surveys, with an average of 377.3 passes per night. Common Pipistrelle accounted for 74.4% of registrations, whilst Soprano Pipistrelle accounted for 16.0% of registrations. Activity was highest at this location during September, accounting for 54.4% of all registrations and with a total average of 68.4 registrations per hour. Other species were recorded included Myotis species with a total of 688 registrations (24.6%), Big Bat species for 209 registrations (7.5%), Long Eared

species with 61 registrations (2.2%), Lesser Horseshoe with 27 registrations (0.3%), and Barbastelle with 20 registrations (0.2%).

Static detector location 7 (SD7), located to the SE of the site

- 3.3.28 This static detector was deployed between July and October 2023, during which time moderate levels were recorded at this location over the course of the four surveys. There were a total of 6991 registrations recorded. Common Pipistrelle accounted for 75.2% of registrations, whilst Soprano Pipistrelle accounted for 13.6%, Myotis species accounted for 4.4%, 'Big Bat' species accounted for 3.5% and Long-eared species accounted for 2.0% of registrations. Activity was highest at this location during August, accounting for 27.2% of all registrations and with a total average of 51.4 registrations per hour. Other species were recorded in low numbers, although this included 62 registrations of Lesser Horseshoe Bats (0.9% of the total).

4 Evaluation

4.1 Species Accounts

- 4.1.1 A summary of the automated activity survey and an evaluation of the importance of the site for each bat species are set out below.
- 4.1.2 *Common Pipistrelle* was the most frequently recorded species during the survey work undertaken in 2023, and dominated the counts at all static locations. Common Pipistrelle accounted for between 64.8% and 91.6% of all registrations, depending on location.
- 4.1.3 The highest numbers of pipistrelle were recorded at SD4 along the northern boundary of the site, and at SD6 in the west of the site, which are both locations where there is a linear hedgerow feature, which are likely to be favoured as foraging territory for this species.
- 4.1.4 Statics SD3 and SD5, which were both located at building **B1**, but for a restricted period of time, and recorded quite different levels of activity, suggesting that the land surrounding the building may be used for foraging. Emergence/re-entry surveys did not detect any use of the building by this species, and so this activity is unlikely to be associated with a roost.
- 4.1.5 *Soprano Pipistrelle* was the next most frequently recorded species, with a total of 8,999 registrations over the course of the 2023 surveys, accounting for 23.61% of all registrations. Activity was recorded to be highest at static location SD3 associated with building **B1** where a total of 2659 registrations were recorded, the majority of which were recorded during the May survey, although it should be noted that this detector was only deployed for a limited period of time.
- 4.1.6 *Pipistrelle sp.* has been recorded within the site where the peak frequencies of echolocation calls were recorded to be at 50kHz and could therefore not be confirmed as either Common or Soprano Pipistrelle. Pipistrelle calls were only designated for a total of 13 registrations, with activity highest at static location SD6 where a total of 9 registrations were recorded.
- 4.1.7 *Nathusius' Pipistrelle* was identified within the site from a single registration at static location SD1 and SD6, from the northern section of site bordering the off-site woodland and the area adjacent to building B1 respectively.
- 4.1.8 *Big bat sp.* was recorded occasionally within the site, with a total of 1,052 registrations over the course of the 2023 surveys, accounting for 2.0% of all registrations. Activity was recorded to be highest at static location SD4, situated on hedgerow H5 along the northern boundary of the site, where a total of 291 registrations were recorded, the majority of which were recorded during the July survey, whilst relatively high levels were also recorded at locations SD6 and SD7 (towards the west of the site).
- 4.1.9 *Myotis sp.* was recorded in moderate numbers across five of the seven statics and not at all/very low numbers at the two remaining static locations (SD3 and SD5), with a total of 2,298 registrations over the course of the 2023 surveys, accounting for 4.22% of all registrations. Activity was recorded to be highest at static location SD2 along hedgerow H4 where a total of 736 registrations were recorded. Similarly high levels of Myotis activity was also recorded at location SD6, on hedgerow H8, with 688 registrations recorded during the survey period. This is typical of a species which forages along hedgerows.
- 4.1.10 *Long-eared Bat* species were recorded infrequently, with the highest recorded activity at static locations SD2, SD4 and SD6. Just 300 registrations were recorded, across all static deployments at all 7 static locations. The proportion of Brown Long-eared Bat was generally

between 0.0% and 1.1%, with this species tending to occur more proportionately more frequently in the central hedgerow corridor of the site.

- 4.1.11 *Barbastelle* was recorded at low levels during the 2023 survey work, with some degree of activity recorded at all static locations. A total of 288 registrations were recorded across all the surveys, accounting for 0.6% of all bat registrations, with *Barbastelle* activity highest at location SD2 (126 registrations total) and peaking during the October survey (49 registrations). This species is known to forage and commute for long distances along mainly mature hedgerows, tree lines and riparian corridors, of which this hedgerow is the main example within the site. It is possible that the corridor is part of a regular commuting route orientated north/south in the northern part of the site, and then proceeding down the eastern boundary. *Barbastelle* do not appear to regularly cross the centre of the site (static location SD3, occurring only in small numbers – 0.03% of all registrations), and are relatively infrequent in the western part of the site (locations SD6 and SD7).
- 4.1.12 *Lesser Horseshoe Bat* was generally recorded in low numbers, although the highest numbers were associated with static detector SD3, which is located at B1, which is perhaps unsurprising, given that the building has been established as a roost for this species. Activity was highest in June (the detector was only deployed during May and June), which is also consistent with a summer roost being present.
- 4.1.13 Static detectors located at SD6 and SD7 (which were positioned with the intention of picking up patterns in preferred flight lines from the roost), and SD2 (in the north), recorded relatively similar low levels of activity, suggesting that there is no particular preferred flight path/s from the roost to other habitat in the wider landscape – at least not one which is orientated along one of the main vegetated corridors. *Horseshoe bats* appear to disperse relatively uniformly therefore, and are likely to be utilising the pasture fields within the site for foraging, as well as those further afield.
- 4.1.14 Finally, in relation to *Lesser Horseshoe Bat*, elevated numbers of this species occurred regularly along the northern boundary of the site (at Location SD4), with an average of 13.9 passes per night, which suggests that this is also relatively important corridor for foraging and/or commuting.

4.2 Assessment of Significance of Bat Assemblage.

- 4.2.1 Guidance on evaluation of the overall assemblage of bats at a site (Wray et al., 2010)⁹ sets out a scoring system based on the rarity of species recorded, number of individuals, proximity to roosts and habitat character. The results of this scoring exercise are described below for the bat species recorded within the site.

Table 3.18. Valuation of foraging/commuting populations of selected bat species occurring at the site, following Wray et. al.

Species	Rarity	Number of bats	Roosts/potential roosts nearby	Linear habitat characteristics	Total score
Common Pipistrelle	Common (2)	Large number of bats (20)	Not known (4)	Fragmented hedgerows and large pasture fields (3)	29 (County)
Soprano Pipistrelle	Common (2)	Large number of bats (20)	Not known (4)	Fragmented hedgerows and large pasture fields (3)	29 (County)

⁹ S. Wray, D. Wells, E. Long & T. Mitchell-Jones (December 2010). *Valuing Bats in EcIA*. In Practice, IEEM.

Species	Rarity	Number of bats	Roosts/potential roosts nearby	Linear habitat characteristics	Total score
Brown Long-eared Bat	Common (2)	Small numbers of bats (10)	Not known (4)	Fragmented hedgerows and large pasture fields (3)	19 (District, local or parish)
Noctule	Rarer (5)	Small numbers of bats (10)	Not known (4)	Fragmented hedgerows and large pasture fields (3)	22 (County)
Barbastelle	Rarest (20)	Small number of bats (10)	Not known (4)	Fragmented hedgerows and large pasture fields (3)	37 (Regional)
Lesser Horseshoe Bat	Rarer (5)	Small number of bats (10)	Large number of roosts, or close to a SSSI for the species (5)	Fragmented hedgerows and large pasture fields (3)	23 (County)

4.2.2 Based on this scoring system, the site scores 19 points for common species of bat (such as Brown Long-eared Bat) occurring at lower abundances, which indicates a population of district, local or parish significance, while Common Pipistrelle and Soprano Pipistrelle which occur at higher abundances score 29, and would be assessed as being of County-level importance. Similarly, Lesser Horseshoe is assessed as being of County Importance.

4.2.3 The presence of Barbastelle in small numbers results in a score of 37, which relates to population of regional level importance, but as set out above, the occurrence of this species within the site is likely attributable to a relatively small number of bats.

4.2.4 This species is now known to be widely distributed across the rural landscape of southern Britain (although never common)¹⁰, and therefore the valuation of regional value for this species appears an over-estimation.

4.2.5 Accordingly, it is considered that overall, the population of bats associated with the site is considered to be important at the **County** level.

4.3 Impact Assessment and Proposed Mitigation Measures

Roosting

4.3.1 An account of the internal inspections of Building B1, and the Lesser Horseshoe summer roost which is present, is provided as part of the previous Ecological Appraisal. Section 6.3.3 evaluates the effects of the proposals on the building, which is scheduled for demolition under the proposals.

4.3.2 Chapter 7 of the Ecological Appraisal, sets out details of the proposed mitigation which takes the form of a bespoke replacement bat roost building, located to west of the site, set within an area of public open space, and situated to maximise the use of habitat corridors within the site, and connections with off-site habitats.

4.3.3 At this stage the roost is considered to be at least a day roost, night roost and feeding perch of Lesser Horseshoe, and is also likely be used as a maternity roost, based on the available evidence and number of bats. The further confirmation of Lesser Horseshoe Bats hibernating within the building underlines its year-round importance for this species.

¹⁰ Mathews F, Kubasiewicz LM, Gurnell J, Harrower CA, McDonald RA, Shore RF. (2018) *A Review of the Population and Conservation Status of British Mammals. A report by the Mammal Society under contract to Natural England, Natural Resources Wales and Scottish Natural Heritage*. Natural England, Peterborough.

- 4.3.4 The previous Ecological Appraisal recommended that the proposed bat house included provision for an underground section suitable for hibernating bats, as well as an upper section suitable for breeding and casual roosting. As such, the mitigation recommendations have not changed.

Foraging / Commuting

During the bat activity surveys, moderate levels of activity were recorded within the site, with at least eight species (or species groups¹¹) recorded during the surveys including Common Pipistrelle, Soprano Pipistrelle, Nathusius' Pipistrelle, Pipistrelle sp., Big Bat sp., *Myotis* sp., Long-eared bat sp., Barbastelle and Lesser Horseshoe Bat.

- 4.3.5 The semi-improved grassland, hedgerows and trees within the site offer foraging/commuting habitat for bats and indeed foraging and commuting bats were recorded during the walked and remote detector activity surveys.
- 4.3.6 In the previously submitted Ecological Appraisal, preliminary results were presented of the distribution of bats within the site. Based on the results of the May and June surveys, activity across the site varied with negligible to low levels of activity recorded within fields **F4**, **F5** and **F7**, and moderate to high levels of activity recorded within fields **F1**, **F3** and **F6**.
- 4.3.7 Taking into account the full 2023 season of survey data, the distribution of bats within the site was rather more uniform across the site, as described in more detail above.
- 4.3.8 Nevertheless, the evaluation of the likely effects on foraging and commuting bats remains largely unchanged.
- 4.3.9 Connectivity throughout the site will be maintained through the retention of all hedgerows within the site (with the exception of a small section of **H3** for construction of an access road) as well as significant buffering from Tiddesley Woods to the west which is likely to form an important foraging resource for bats at the site. Hedgerow **H5** at the north of the site, where significant numbers of Lesser Horseshoe calls were recorded, is to be retained and enhanced with additional woodland planting that will maintain this important flight corridor and enhance linear connections with the wider landscape.
- 4.3.10 Although still only accounting for a small proportion of the total bat registrations, a relatively greater number of Barbastelle was recorded in the latter part of the year, at Hedgerow **H4** (Static location SD2). As discussed, above, this suggests that this vegetated corridor may be used as a commuting route. This hedgerow is largely retained, although it will be necessary to create a crossing point for one of the proposed service roads. As such it is considered to be a sensitive location, and it is recommended that a dark corridor is maintained at this location to ensure that lighting within the site does not impact on the movement of bats along this corridor.
- 4.3.11 The landscape proposals include the creation of new areas of species-rich wildflower grassland, a new community orchard, allotments, wildlife ponds, wetland areas within sustainable drainage features, and new native tree and scrub planting. This will provide enhanced foraging habitat for bats in the local area as the proposed mosaic of new high-quality habitat is anticipated to support a greater diversity and abundance of invertebrate prey.

¹¹ *Myotis* sp. and *Nyctalus/Eptesicus* sp. bats are difficult to separate based on analysis of calls alone, and have therefore been identified to species group level only. It is likely several different species within each group are present at the site.

5 Conclusions

- 5.1.1 Aspect Ecology has been commissioned to advise in respect of ecological matters relating to the land at Orchard Farm located to the west of Pershore in Worcestershire.
- 5.1.2 Bat surveys were conducted during the 2023 season, with static detectors deployed at a total of 7 different locations, although with the use of different static locations was varied throughout the survey season, to achieve various different survey objectives.
- 5.1.3 Overall, moderate levels of activity were recorded within the site, with at least eight species (or species groups¹²) recorded during the surveys including Common Pipistrelle, Soprano Pipistrelle, Nathusius' Pipistrelle, Pipistrelle sp., Big Bat sp., *Myotis* sp., Long-eared bat sp., Barbastelle and Lesser Horseshoe Bat.
- 5.1.4 Common Pipistrelle was the most frequently recorded species, and dominated the counts at all static locations, with sustained foraging activity by moderate numbers of bats throughout the site. Frequent registrations of foraging and commuting Soprano Pipistrelle were also recorded, along with sporadic Big Bat sp. and *Myotis* sp. indicating that the site is moderately well used by these species. In contrast the low numbers of registrations of Long-eared bat species and Nathusius' Pipistrelle indicate that the site likely to be of lower interest for these species.
- 5.1.5 Small numbers of Barbastelle bat passes were recorded at several static locations, with a slightly elevated number of passes recorded from location SD2 on a hedgerow in the north of the site, and suggestive of a commuting route, possibly orientated north-south through the site.
- 5.1.6 Numbers of Lesser Horseshoe Bat, were highest around Building **B1**, at the centre of the site, which is where there is a known roost, and the species occurred at lower frequencies elsewhere within the site. There did not appear to be any particular pattern, or defined use of the existing vegetated corridors by horseshoe bats, although the pasture land within the site is likely to provide a feeding resource forming at least part of the range of bats using the roost. The northern boundary of the site (orientated E-W) also experiences high levels of horseshoe bat activity, suggesting that it is of elevated importance for foraging and/or commuting.
- 5.1.7 The recommendations for mitigation and enhancement set out within the previous Ecological Appraisal remain largely unchanged, although the confirmed presence of Lesser Horseshoe Bats hibernating within the bungalow on site (**B1**) underlines the need for the proposed replacement Bat House to include provision for hibernating bats.
- 5.1.8 The impact assessment and recommendations relating to lighting effects from the development, remain largely unchanged. A sensitive lighting scheme will be implemented to safeguard the value of these habitats for foraging/commuting bats. Accordingly, subject to the implementation of the recommendations for mitigation and ecological enhancements outlined at Chapter 7 of the Ecological Appraisal previously submitted, it is considered that the conservation status of local bat populations will be safeguarded under the scheme. The lighting design should take account of the locations where larger numbers of bats (and particularly rarer bats) occur, and should ensure that dark corridors are maintained at these locations.

¹² *Myotis* sp. and *Nyctalus/Eptesicus* sp. bats are difficult to separate based on analysis of calls alone, and have therefore been identified to species group level only. It is likely several different species within each group are present at the site.