

Cardiff Parkway
St Mellons
Cardiff
CF3 0EY



An Ecological Survey
Report By:











On Behalf Of:

ARUP

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Status	Signed	Name	Position	Date
Co-Author		Diane J Morgan BA (Hons) ACIEEM	Senior Ecologist	4 November 2019
Reviewer		Phillip L Morgan CEnv MCIEEM	Principal Ecologist	5 November 2019
Co-Author (Revision 1)		Diane J Morgan BA (Hons) ACIEEM	Senior Ecologist	15 November 2019
Reviewer (Revision 1)		Phillip L Morgan CEnv MCIEEM	Principal Ecologist	15 November 2019
Co-Author (Revision 2)		Diane J Morgan BA (Hons) ACIEEM	Senior Ecologist	20 February 2020
Reviewer (Revision 2)		Phillip L Morgan CEnv MCIEEM	Principal Ecologist	20 February 2020
Co-Author (Revision 3)		Diane J Morgan BA (Hons) ACIEEM	Senior Ecologist	4 March 2020
Reviewer (Revision 3)		Phillip L Morgan CEnv MCIEEM	Principal Ecologist	4 March 2020

Members: Phillip Morgan CEnv MCIEEM Diane Morgan BA (Hons) ACIEEM
Carola Hoskins BA (Hons) MSc ACIEEM Robert Morgan

Issuing Office: Suite 131 -136, Plas y Ffynnon, Cambrian Way, Brecon LD3 7TG

Web Site: www.justmammals.co.uk **E-Mail:** diane@justmammals.co.uk **Telephone:** 01874 623616

Registered In: Cardiff **No:** OC345272 **Registered Address:** Llys Newydd, Llanfihangel Talyllyn, Brecon LD3 7TG

VAT No: 821 6376 35

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1 Executive Summary

- 1.1 Plans are being prepared for a development proposal on a large area of land to the south of St. Mellons Business Park, on the eastern edge of the City of Cardiff. A new 'Cardiff Parkway' railway station is under consideration, for improving infrastructure, supporting travel and communications systems in South Wales.
- 1.2 A baseline ecological assessment for bats was undertaken by Wildwood Ecology in summer 2017, with a series of surveys between May and October: two transect routes were established on part of the site, which were walked at dusk in each month with data gathered recording bat presence and activity on each occasion. In addition, an assessment of trees on the site was conducted to consider the presence and potential presence of bat roosts in trees.
- 1.3 In May 2019 an update survey to refresh the data gathered previously was commenced. Five transect routes, forming a network across the site, were walked, commencing at dusk once during each month from May to October 2019 inclusive. Features of trees were also identified which offered roost potential for bats and ten trees were each the focus of dusk bat emergence observations once a month between June and August 2019.
- 1.4 A large quantity of data was gathered during the 2019 transect surveys. A grid reference location with each recording was noted to show the presence of bat species across the site. At least seven species were recorded and possibly additional myotis bats were present, but their call characteristics can be cryptic and difficult to identify to species level. Foraging and commuting bat behaviour was a consistent feature of all the survey sessions with a high level of activity by common pipistrelle bats in particular.
- 1.5 Whilst ten trees were noted to have potential roost features typical of the holes and crevices utilised by bat, no bat roosts in the trees were identified during the 2019 assessment.
- 1.6 Development of the site is anticipated to result in a loss of important forage and commuting habitat. The damp grasslands of the Gwent Levels are high in invertebrate insect life where food for bats is considered to be present in abundance. A scheme of mitigation is required to minimise impacts for bats and retain linking habitat for forage and commuting activity. Lighting issues around the site will also need to be considered so as to minimise impacts on nocturnal wildlife.

2 Introduction

- 2.1 In advance of a planning application being submitted for a new railway station, to be constructed on land south of St Mellons Business Park, surveys for bats were conducted in summer 2019. The Just Mammals Consultancy LLP was appointed to update the assessment for bats carried out by Wildwood Ecology, in summer 2017. After a two year period, ecological data must be refreshed as many constituent elements of the survey may have changed. Bats in particular are highly mobile and beyond a two year period there is a possibility that survey results are no longer relevant.
- 2.2 Located on the eastern edge of the city of Cardiff, the site covers a large area of land (100.716 hectares) with location details shown below in Table 1.

Table 1: Survey Site Details

Address	Grid Reference	Altitude
Land to the south of St Mellons Business Park	ST 24957 80953	6m Above Ordnance Datum

- 2.3 The primary objectives of the assessment were:
 - to gather data on the presence and behaviour of bat species through a review and update of the transect surveys and tree observations conducted in summer 2017;
 - present mapping layers of survey data to demonstrate focus areas of bat presence and activity;
 - consider the way bats are using the survey site;
 - gather sufficient information to be able to make appropriate recommendations.
- 2.4 This report details the survey that was carried out, and the findings of that assessment effort. Details of the planning proposal and site layout and design are not known so a full assessment of impacts for bats is not made in this report. General conclusions are stated with broad recommendations intended to minimise the impacts on bat species.

3 Survey Team Experience

- 3.1 The survey leader and author of this report is Diane Morgan. A large team of ecologists and survey assistants participated in the field work and details of their qualifications and experience is provided below.

Table 2: Survey Team Experience

Name/Position/Detector	NRW Bat Licence Details	Experience
Diane Morgan BA (Hons) ACIEEM Senior Ecologist (TE)	78057:OTH:CSAB:2018 expiry 31 January 2020	Licensed bat ecologist of 20 years with considerable experience of surveying built structures for bats. She has carried out ringing of Daubenton's bat as part of a multi-year project on the species and has undertaken monitoring work on several important lesser horseshoe bat roosts and assisted in radio tracking projects on the same species. She also holds a licence for ringing greater horseshoe. Prior to her work as a consultant ecologist, Diane was the Director of Brecknock Wildlife Trust and was involved in a wide range of nature conservation work including species and habitat protection and conservation land management. Other areas of interest include otter, dormice, water voles, reptiles, amphibians, fungi and crayfish. Diane is a Senior Ecologist with the Just Mammals Consultancy LLP, and an Associate Member of the Chartered Institute for Ecology and Environmental Management (ACIEEM).
Phil Morgan CEnv MCIEEM Principal Ecologist (TE)	78239:OTH:CSAB:2018 expiry 31 January 2020	40 years' experience of undertaking building, tree and cave surveys for all bat species. In addition he has undertaken foraging and flight line surveys using heterodyne and other echo-location equipment and in 1991 made a significant contribution to a Bristol University run project, which established the methodology used in the National Bat Monitoring Programme. Phil has also undertaken numerous radio tracking exercises on both lesser horseshoe and Daubenton's bats, and is licensed to train ecologists to work with bat species. He holds Natural Resources Wales (NRW) licence for other protected species including dormice, otter, and great crested newt. Phil is a Principal Ecologist with the Just Mammals Consultancy LLP, and is a Member of the Chartered Society for the Environment, as well as being a Member of the Chartered Institute for Ecology and Environmental Management
Andrew Ross BSc (Hons) MSc MCIEEM Ecologist (TE)	78272:OTH:CSAB:2018 expiry 31 January 2020	Andrew has over ten years of experience working as an ecological consultant with considerable experience working to safeguard wildlife at a range of development projects. As well as being a Full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM), Andrew also holds licences for bats, dormice, and great crested newts in England and Wales. Between 2017 and 2019, Andrew worked very closely with the Bat Conservation Trust on their Bat Mitigation Project where he investigated the success of numerous bat mitigation schemes in England and Wales many years after compensation roosts were created. Andrew is an Ecologist with the Just Mammals Consultancy LLP
Robert Morgan Ecologist (TE)	78046:OTH:CSAB:2018 expiry 31 January 2020	12 years' experience with bats (NRW licence holder), carrying out roost surveys, emergence surveys, radio tracking of lesser horseshoes and monitoring of important sites. He holds a City & Guilds Level 2 award for working in Medium Risk Confined Spaces. Rob has expertise in respect of dormice with 22 years' experience monitoring dormouse boxes at a Local Nature Reserve and surveying for dormice at various other sites (NRW licence holder). Recently licensed to disturb barn owls listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) with six years' experience surveying for this species (NRW licence holder). Rob has experience surveying for otters, water voles, reptiles, amphibians, birds and marsh fritillary butterfly's, and is an Ecologist with the Just Mammals Consultancy LLP
Grace Dooley BSc (Hons) MSc Ecologist (TE)		Holds an MSc in Conservation and Ecology and has 5 years' practical experience with bats, great crested newts, badger and reptile surveys, as well as botanical assessments for a variety of projects. Grace is an Ecologist with the Just Mammals Consultancy LLP and is an Associate Member of the Chartered Institute of Ecology and Environmental Management (ACIEEM)
Phoebe Williams		A Geography graduate from University of Exeter, and

BA (Hons) Trainee Ecologist (TE)		former trainee at Gwent Wildlife Trust, Phoebe has completed a Natural Talent trainee programme, studying Hemiptera at the National Museum of Wales. Practical experience includes survey for dormice, plants, newts, reptiles, and invertebrates. She has also carried out practical habitat management work and gained public engagement experience volunteering with Gwent Wildlife Trust. She is a Trainee Ecologist with the Just Mammals Consultancy LLP
Nigel Isaksson Senior Survey Assistant (TE)	S086633, expiry 31 July 2021	Nigel has over ten years' experience undertaking bat surveys, flight line observations, census counts. Nigel holds an NRW licence to disturb bats, and is also licenced to disturb dormice, and is a Senior Survey Assistant with the Just Mammals Consultancy LLP
Ben Gibson BA (Hons) Survey Assistant (TE)		A graduate of Cambridge University in 2011 with a degree in Natural Sciences, he specialised in Plant Science in his final year studies. Surveyor with four years' experience of undertaking bat surveys, flight line observations, census counts. Ben is a Survey Assistant with the Just Mammals Consultancy LLP and has undertaken transect surveys on numerous occasions
Nic Aldridge BSc (Hons) MSc Survey Assistant (TE)		Following a degree in Botany and Zoology, Nic completed an MSc in Wildlife Management, Conservation and Control, both at the University of Reading. He has practical experience of field based research with a focus on invertebrate and vegetation diversity and has produced Phase 1 habitat surveys and habitat management plans. He has attended courses with the Bat Conservation Trust to improve his knowledge and skills and has led voluntary projects to develop habitats and collect species data.
Miriam Wearing BSc (Hons) Survey Assistant (TE)		Has completed a BSc in Ecology from Aberystwyth University, within which she completed a dissertation involving a field study summer bat foraging activity. She has also attended a number of short courses to learn about various areas of bat ecology, including the use of a number of different bat detectors. She is a Survey Assistant with the Just Mammals Consultancy LLP
James Hoskins Survey Assistant (TE)		James is an experienced Survey Assistant with the Just Mammals Consultancy LLP. He has four years survey experience with bats, observing both buildings and trees
Phil Sutton Survey Assistant (TE)		A former Director of Brecknock Wildlife Trust, he has been involved in the delivery of nature conservation projects, and conservation management practices for over 15 years. Phil is a Survey Assistant with the Just Mammals Consultancy LLP
Amber Martin BSc (Hons) Survey Assistant (TE)		Amber completed a BSc in Zoology in 2018 and has subsequently assisted with procedures on a PhD project at Cardiff University to gain work experience. She is assisting with field work to learn about survey techniques and explore work experience opportunities in consultancy. Amber is a Survey Assistant with the Just Mammals Consultancy LLP
Aaron Davies BSc (Hons) MSc MIEEM Ecologist	S085246/1	Aaron has worked as a full time consultant ecologist since 2012, when he was a Trainee Ecologist with the Just Mammals Consultancy LLP. He has a particular specialism in tree climbing inspections for bats and has held CS38 qualifications in tree climbing and aerial rescue since 2014
Matthew Mott-Dowling Ecologist	S085246/1 (accredited agent)	Matt has worked as a full time consultant ecologist since 2014. He has a particular specialism in tree climbing inspections for bats and has held CS38 qualifications in tree climbing and aerial rescue since 2016. He is an accredited agent on Aaron Davies' NRW licence to inspect trees for roosting bats and assess them for roosting potential.

Note: Detectors

TE = Time expansion (Pettersson D-240X)

4 Survey Methodology

- 4.1 A general desk study was conducted to provide context for the survey but no data search or in-depth desk study was commissioned. The existing report for the 2017 bat survey by Wildwood Ecology was studied and the arboricultural survey report of Barton Hyett was also used for its valuable record of tree information.
- 4.2 Five transect routes were predetermined on site plans provided to the Just Mammals Consultancy LLP. These routes were ground truth tested in a daytime site visit in advance of the

first set of dusk transects and some minor modifications were made to correct sections blocked by impassable reens or other barriers and hazards. The site survey boundary and five labelled and colour coded transect routes are shown in Appendix I and details are shown in Table 3 below.

Table 3: Bat Transect Details

Transect	Colour code	Length (km)	Summary description
Crop	Green	5	The arable fields in the northern part of the site
Cypress	Purple	4.8	The route on the western side of the site from the A48 roundabout leading to and around Hendre Lake Park and then back to the A48 roundabout
Middle	Navy blue	2.1	The zone to the south of the crop transect
SINC	Orange	3.5	The zone between the fields of the middle transect and the railway line
Southern	Pale blue	4.4	The zone south of the railway line

- 4.3 A methodology was followed according to the Good Practice Guidelines (Collins 2016). Each transect route was walked by a pair of surveyors, given the risk of operating close to deep water whilst working in the dark. The road bridge over the railway line provided safe access between the northern and southern parts of the site. At least one of the surveyors was familiar with the route, having walked it in daylight and taken note of any hazards or challenges. The surveyors commenced the route at sunset proceeding at a steady walking pace: the direction of walking was varied between clockwise and anti-clockwise circuits, so as not to bias the data gathering. One experienced and licenced surveyor was equipped with a bat detector and was listening and recording the bats encountered. The assistant took notes of the time, grid reference location, and brief details of bat activity including the number of bats, flight direction, flight height, commuting, foraging, and any other relevant details. Notes were recorded onto a specially designed recording sheet. Details of other occasional sightings – such as owls, herons etc., were also recorded.
- 4.4 Survey teams were equipped with a Pettersson D-240X machine. This device is particularly sensitive and excellent at separating species which employ the middle range frequencies for foraging (45 – 55 kHz). It is therefore very good at identifying the different pipistrelle species (*Pipistrellus* sp.), and the different myotis bats* (*Myotis* sp.) (*myotis bat is a collective term used where the species could not be specifically identified beyond this broad group). The myotis group encompasses seven species of British bat including Alcahoe's (*Myotis alcathoe*); Bechstein's (*M. bechsteinii*); Brandt's (*M. brandtii*); Daubenton's (*M. daubentonii*); Greater Mouse-eared (*M. myotis*); Natterer's (*M. nattereri*); and the whiskered bat (*M. mystacinus*).
- 4.5 The Pettersson D-240X machine can be used in heterodyne or time expansion modes and for the purposes of this survey, only the time expansion facility was used. The received signals were then recorded to Roland RO-5, recording devices for later analysis. The time expansion method is similar to making a high speed tape recording of a bat's ultrasonic call and then playing it back at a slower speed. Digital technology is used to make the recording and slow it down for play back. Since the signal is stretched out in time, it is possible to hear details of the sound not audible with some types of detector.
- 4.6 Time expansion is also the only technique which preserves most of the characteristics of the original signal, which makes time expanded signals ideal for sound analysis. In addition to the simple echo-location calls which can be used for commuting, enabling the bat to find its way about, bats will also produce feeding 'buzzes' when foraging. These buzzes occur when the bat closes in on its prey. Such buzzes are used to assess the importance of an area for foraging. The recorded echo-location calls are then interpreted using BatSound sound analysis software. By use of the software it is possible to separate the different species by analysis of the sonograms produced.
- 4.7 Grid reference details were noted with each pair of surveyors using a Satmap Active 10 hand held Geo Positioning System (GPS) device. Surveyors remained in contact with other pairs across the site through the use of walkie-talkie radio devices, with mobile phones carried as a back-up if needed.
- 4.8 Field data were entered in Excel spreadsheets for loading in mapping software.
- 4.9 A day time visual assessment of the trees was carried out by two experienced ecologists from ground level and with the use of binoculars and a powerful torch to consider features of the trees and their potential to support bat roosts. The trees were examined from different angles: species and size were noted and general features were assessed with reference to the Bat Roosts in

Trees key, devised by H Andrews (2018). Features were assessed against a six point 'risk scale' which is set out below in Table 4. Notes were made in a field notebook and photographic records taken. Where possible, features that could be reached using ladders were examined with an endoscope in order to better view inside crevices present upon the trees. Levels 4 and above triggered additional targeted assessment with a minimum of one dusk emergence observation.

Table 4: Trees and Potential to Support Bat Roosts

Risk Scale	Level of Risk	Reasons for Assessed Risk
1	None	No features which bats could use
2	Minimal	Some light ivy growth or shallow cavities, bark damage
3	Minor Risk	Loose bark, moderate ivy growth some small broken branches
4	Potential Roost	Deep slot crevices, trunk or limb/branch cavities, dense ivy growth
5	Probable Roost	Deep slot crevices, trunk or limb/branch cavities with staining
6	Bat Roost	Actual bat or evidence of bat presence (e.g. bat droppings)

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- 4.10 When considering the likelihood of bats using the trees, the surveyors were not concerned with the size of the overall tree or its trunk diameter as even quite small trees can be used for roosting activity. Tree health is considered to be a much better indicator of the likely use by bats, as these animals have no means of making holes in wood themselves. Instead they are reliant on naturally occurring cavities caused by rot or wind damage; holes made by other species such as woodpeckers; branches or limbs damaged by vehicles or other artificial means; growth of ivy (*Hedera helix*); and loose bark on trunks.
- 4.11 In addition, as a follow up to the ground level assessment, tree climbing inspections were undertaken for a small number of trees by two licenced and suitably experienced and equipped bat ecologists. Features of the trees were examined closely using a CA330 Rigid endoscope. Photographs were taken and notes of key information made in a field notebook.
- 4.12 Dusk activity observations of trees were also undertaken with a single observation in each of June, July and August 2019 for those trees identified by the daytime assessments to have moderate to high potential for roosts to be present. The same bat detecting equipment and recording device was used for these observations as for the transect study. Observations commenced 30 minutes before sunset and continued for at least one hour after sunset. By this time, low light levels made it unlikely that any emergence activity could be observed. A single observer was positioned for each tree at ground level in a location which gave optimum views of the feature(s) offering bat roost potential.

5 Site Description

- 5.1 The site covers a large area of land (100.716 ha) to the south of St Mellons Business Park, on the eastern edge of the City of Cardiff. New housing developments lie directly to the west of the site, and a short distance to the east are the communities of Marshfield and Wentlooge. Hendre Lake Park lies adjacent to the west of the survey site.
- 5.2 Dissecting the southern portion of the survey site is the Cardiff to Paddington main railway line which cuts through the site on a north-east/south-west axis; with the larger proportion of the site to the north of the railway line. Extending south to the coast, is low lying agricultural land: from the southern boundary it is 1.4km to the mean high water mark of the Severn Estuary (Ramsar Site, Special Protection Area, Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI)).
- 5.3 The survey site is fully within the designated area of the Gwent Levels – Rumney and Peterstone SSSI. It is low lying land enclosed into numerous fields used for both arable agriculture and pastoral cattle grazing, which is criss-crossed with a network of ditches and drainage reens. The more significant Faendre Reen extends on a roughly north/south line along the western side of the survey site and drains into Hendre Lake.
- 5.4 Field margins are composed of a combination of ditches, reens, scrub habitat, and hedgerows with occasional trees. Hedgerow vegetation is dominated by willow (*Salix sp.*), hawthorn (*Crataegus monogyna*), and blackthorn (*Prunus spinosa*): mature trees, mostly pendunculate oaks (*Quercus robur*), are scattered across the site, generally within the field margin zones. Some post and rail livestock fencing is present to a small degree and secure wire fences protect access to the railway line.

6 Survey Constraints

- 6.1 A tree climbing assessment for several trees was undertaken by specialist ecologists who have been involved with Just Mammals Consultancy LLP in the past. Due to the timing of the project commissioning in late May 2019, the ground level tree assessment was not conducted until mid-June and due to weather and availability issues, the tree climbing assessment was not carried out until mid-July. As a consequence of the tree climbing inspection, two additional trees were included in the monthly dusk emergence observations of trees, and these were conducted in July and August 2019 only.
- 6.2 Livestock in the fields were treated with suitable caution. Young livestock were generally curious when the surveyors were in the fields, and a bull running with cows was observed and a respectful distance maintained. There were no incidents where livestock had an adverse effect on the survey.
- 6.3 On certain transect routes it was necessary to cross ditches and reens and depending on the prevailing weather conditions, water levels varied making this challenging on occasions to remain strictly on the transect route. Barbed wire fences and wire on gates obstructed the route in limited locations which required care to negotiate in the dark.
- 6.4 Crops in some of the fields were treated with respect with the surveyors restricting access to the field margins. Access to a tree in the centre of the field utilised tractor tram lines where possible. Crop harvesting activity resulted in the transect routes being altered at the last minute in August as the presence of heavy machinery operating in the fields late in the evening presented a high level of risk of accidents for the surveyors.
- 6.5 Surveyors needed to take careful precautions against mosquito bites. Unprotected skin resulted in a severe number of bites for two of the surveyors. No follow-up medical attention was required, but the extent of the bites and severity of swelling and irritation resulted in these incidents being entered into the accident log.
- 6.6 Access was achieved at all times and no access restrictions were imposed on the survey.

7 Survey Results

- 7.1 The series of site visits was undertaken from May to October 2019. Table 5 below summarises the details of the survey sessions, staff who were present, times and weather conditions under which the surveys were undertaken. Wind speeds shown employ the Beaufort scale.

Table 5: Summary of Transect Survey Activity and Weather Conditions

Date	Dusk Transect Survey	Timings (British Summer Time)	Weather Conditions
27/05/2019	Crop (DM, BG) Middle (PM, AM)	Sunset start time: 21.14 hours Finish time: 23.13 hours	Air temperature: 11.5°C Cloud cover: 8/8 oktas Wind speed: F1, light air Conditions: Dry, after earlier rain
29/05/2019	Cypress (RM, PW) SINC (PM, AM) Southern (GD, BG)	Sunset start time: 21.17 hours Finish time: 23.30 hours	Air temperature: 14°C Cloud cover: 8/8 oktas Wind speed: F4/5, moderate to fresh breeze Conditions: Dry, brief period of light drizzle
19/06/2019	SINC (PM, PS) Southern (GD, BG)	Sunset start time: 21.34 hours Finish time: 23.37 hours	Air temperature: 15°C Cloud cover: 2/8 oktas Wind speed: F2, light breeze Conditions: Dry
20/06/2019	Crop (GD, BG) Cypress (RM, PW) Middle (PM, NA)	Sunset start time: 21.34 hours Finish time: 23.33 hours	Air temperature: 13.5°C Cloud cover: 1/8 oktas Wind speed: F2, light breeze Conditions: Dry
16/07/2019	Crop (DM, MW) Cypress (RM, PW) SINC (PM, NA)	Sunset start time: 21.24 hours Finish time: 23.40 hours	Air temperature: 21°C Cloud cover: 7/8 oktas Wind speed: F2, light breeze Conditions: Dry
17/07/2019	Middle (PM, RM) Southern (AR, PW)	Sunset start time: 21.23 hours Finish time: 23.00 hours	Air temperature: 17.7°C Cloud cover: 7/8 oktas Wind speed: F3, gentle breeze Conditions: Dry
26/08/2019	Cypress (MW, PW) Southern (DM, BG)	Sunset start time: 20.16 hours Finish time: 22.10 hours	Air temperature: 19°C Cloud cover: 4/8 oktas Wind speed: F1, calm

27/08/2019	Crop (AR, BG) Middle (RM, MW) SINC (PM, NA)	Sunset start time: 20.13 hours Finish time: 22.00 hours	Conditions: Dry Air temperature: 19.5°C Cloud cover: 8/8 oktas Wind speed: F0, calm Conditions: Dry
10/09/2019	Cypress (PM, MW) Middle (RM, BG)	Sunset start time: 19.42 hours Finish time: 21.10 hours	Air temperature: 15°C Cloud cover: 7/8 oktas Wind speed: F2, light breeze Conditions: Dry
11/09/2019	Crop (DM, MW) SINC (PM, BG) Southern (AR, PW)	Sunset start time: 19.40 hours Finish time: 21.20 hours	Air temperature: 17.7°C Cloud cover: 6/8 oktas Wind speed: F3, gentle breeze Conditions: Dry
21/10/2019	SINC (PM, RM) Southern (AR, DM)	Sunset start time: 18.09 hours Finish time: 20.00 hours	Air temperature: 12°C Cloud cover: 6/8 oktas Wind speed: F1, light air Conditions: Dry
22/10/2019	Crop (AR, DM) Cypress (RM, PW) Middle (RM, NA)	Sunset start time: 18.07 hours Finish time: 20.15 hours	Air temperature: 13°C Cloud cover: 7/8 oktas Wind speed: F1, light air Conditions: Dry

7.2 A survey to identify the presence of bat roosts in trees was also conducted with a series of site visits as indicated below in Table 6. Tree assessments were conducted with ground level inspections as well as with ladders and climbing with ropes. Depending on the outcome of the daytime inspections, dusk activity observations were carried out in June, July and August 2019.

Table 6: Summary of Tree Assessment and Observations Activity and Weather Conditions

Date	Survey Type	Timings	Weather Conditions
11/06/2019	Daytime ground level assessment (PM, GD)	10.30 – 15.45 hours British Summer Time (BST)	Air temperature: 10°C Cloud cover: 8/8 oktas Wind speed: F3, gentle breeze Conditions: Showers
12/06/2019	Daytime ground level assessment (PM, GD)	10.15 – 16.00 hours BST	Air temperature: 11°C Cloud cover: 8/8 oktas Wind speed: F3, gentle breeze Conditions: Generally dry with showers
13/06/2019	Daytime ground level assessment (PM, GD)	09.40 – 14.30 hours BST	Air temperature: 12°C Cloud cover: 8/8 oktas Wind speed: F2, light breeze Conditions: Dry, occasional drizzle
13/06/2019	T31 (JH); T39 (PM); T97 (NA); T113 (RM); T114 (PW)	21.00 – 22.40 hours BST (Sunset 21.31 hours)	Air temperature: 13.5°C Cloud cover: 8/8 oktas Wind speed: F3/4, gently to moderate breeze Conditions: Dry
17/06/2019	T16 (PW); T21 (GD); T312 (PM)	21.00 – 22.40 hours BST (Sunset 21.31 hours)	Air temperature: 16°C Cloud cover: 7/8 oktas Wind speed: F2, light breeze Conditions: Dry
12/07/2019	Daytime assessment with tree climbing inspections (DM, AR, AD, MM-D)	10.30 – 16.00 hours BST	Air temperature: 23°C Cloud cover: 0/8 oktas Wind speed: F1, light air Conditions: Dry
24/07/2019	T39 (PM); T97 (NA); T113 (RM); T114 (PW); T132 (AR)	20.45 – 22.30 hours BST (Sunset 21.15 hours)	Air temperature: 18°C Cloud cover: 3/8 oktas Wind speed: F2, light breeze Conditions: Dry
25/07/2019	T16 (PW); T21 (NA); T31 (PM); T41 (JH); G67 (DM)	20.45 – 22.30 hours BST (Sunset 21.14 hours)	Air temperature: 25°C Cloud cover: 1/8 oktas Wind speed: F0, calm Conditions: Dry
19/08/2019	T16 (MW); T21 (NA); T31 (PM); T41 (JH); G67 (AR)	20.00 – 21.35 hours BST (Sunset 20.30 hours)	Air temperature: 16°C Cloud cover: 3/8 oktas Wind speed: F3/4, gentle to moderate breeze Conditions: Dry
22/08/2019	T39 (PM); T97 (NA); T113 (JH); T114 (NI); T132 (PW)	19.55 – 21.30 hours BST (Sunset 20.24 hours)	Air temperature: 17°C Cloud cover: 7/8 oktas Wind speed: F2/3, light to gentle breeze Conditions: Dry

- 7.3 The number of recordings for each species on the five transect routes is shown below in Table 7. Abbreviations for the species are as follows: common pipistrelle = PipPip; soprano pipistrelle PipPyg; Nathusius' pipistrelle = PipNat; unidentified pipistrelle species = Pip sp; noctule = NycNoc; Pleuc = long-eared.

Table 7: Transect Survey Results 2019

Transect	Species	May (Arup)	May	June	July	August	September	October
Crop	PipPip	49	39	26	40	15	14	28
	PipPyg	17	9	6	2	2	5	6
	PipNat	-				2	1	
	Pip sp	14						
	NycNoc	1	2	1	6	3	2	
	MyoDau					1		
	MyoNat		2					2
	Myotis	2						1
	Pleuc	1						
	% of all bats	22%	26%	16%	31%	13%	20%	36%
Cypress	PipPip	73	53	57	34	27	21	17
	PipPyg	28	41	20	7	18	10	5
	PipNat	2		1				
	Pip sp	14						
	NycNoc	4		3	5	22	1	
	MyoDau		10				1	
	MyoNat		1	1		2		
	Myotis	7	1	3	2	1		
	Pleuc	-						
	% of all bats	33%	39%	43%	31%	39%	30%	21%
Middle	PipPip	24	7	12	13	18	10	7
	PipPyg	7	1			6	8	2
	PipNat	-						
	Pip sp	5						
	NycNoc	7	5	2	2	2		
	MyoDau			1			3	1
	MyoNat					5		
	Myotis	19						
	Pleuc	1						1
	% of all bats	17%	7%	8%	9%	17%	19%	11%
SINC	PipPip	29	15	17		16	9	12
	PipPyg	1	1	1		3	3	
	PipNat	-						
	Pip sp	4						
	NycNoc	4	2				2	
	MyoDau							
	MyoNat		1	4			1	
	Myotis	3		1		1		
	Pleuc	-						
	% of all bats	11%	9%	11%	13%	11%	14%	12%
Southern	PipPip	45	35	35		18	17	18
	PipPyg	5	3	3		7	1	3
	PipNat	-						
	Pip sp	6						
	NycNoc		1	3		7		
	MyoDau							
	MyoNat			1				
	Myotis	7				4		
	Pleuc	1		1				
	% of all bats	17%	19%	22%	16%	20%	17%	20%

Number of bat recordings shown by species and as a % of the total number of recordings from all the transect recordings

- 7.4 Apart from a dip in October, the cypress transect, along the western side of the site, was generally the most active with a range of 21% – 43% of all the recordings made on this route. The central bands of the site on the middle and SINC transects, were reasonably consistent in being less active as indicated by fewer recordings.
- 7.5 At least seven species were recorded at the site and additional myotis bats may be present within the echo-location calls that it was not possible to determine to a precise species. Table 8 shows the percentage of recordings each month.

Table 8: Survey Results 2019

Month	May		June		July		August		September		October	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
PipPip	149	73.5	147	73.5	125	80%	94	52%	71	65%	82	80%
PipPyg	28	14%	30	15%	11	7%	36	20%	27	25%	16	15%
PipNat			1	0.5%			2	1%	1	0.5%		
Pip sp												
NycNoc	10	5%	9	5%	17	11%	34	19%	5	5%		
MyoDau	10	5%	1	0.5%			1	0.5%	4	4%	1	1%
MyoNat	4	2%	6	3%			7	4%	1	0.5%	2	2%
Myotis	1	0.5%	4	2%	3	2%	6	3.5%			1	1%
Pleuc			1	0.5%							1	1%
Total	202		199		156		180		109		103	

Monthly Analysis, total count of recordings for each species and as a % of total number of the recordings per month (Just Mammals Consultancy LLP data only)

- 7.6 Common pipistrelle presence dominated the survey results - by far exceeding the number of recordings for other species. Soprano pipistrelle bats were generally the second most frequent presence. Noctule bats varied in their presence in terms of numbers of recordings with none heard in October. Daubenton's and Natterer's bats were recorded in low numbers through most of the transect survey sessions. The presence of myotis bats overall was generally low. Recordings for long-eared bats (*Plecotus sp.*) were very few and only a small number of recordings were made for Nathusius' pipistrelle. No recordings were made for serotine bat (*Eptesicus serotinus*).
- 7.7 With reference to site plans showing locations of the different bat species recorded (Figures 9 – 14 (see Appendix III), comments on the general level of bat activity across the site are summarised below. Full details of the transect notes are provided in Tables 21 – 26 in Appendix III.

Table 9: Summary of Transect Survey Results

Transect	Comments
Crop	Bats were recorded on most parts of the transect with the exception of the eastern part where very few bats were recorded. The business park at the northern end of the site was brightly illuminated at night but there was regular bat activity on the fringe of the light zone. Foraging was observed along the hedgerows and tree lines within the transect and the habitat west of Faendre Reen was a regular foraging area
Cypress	A bat crossing point from south to north over Cypress Drive was noted near the northern end of the transect. The habitat around the southern end of the transect within Hendre Lake Park recorded a good variety of bat species
Middle	These fields recorded the presence of common pipistrelle, with occasional noctule bats, and very occasionally other species. Activity was generally light by comparison with other transects
SINC	Similar to the neighbouring Middle transect with common pipistrelle presence dominating with other species providing a small level of diversity
Southern	Apart from the dominant common pipistrelles, noctule bats were recorded at both east and west sections of the transect. Long-eared bats were recorded twice with very few myotis

- 7.8 A regular feature noted by the surveyors of the cypress transect was commuting activity across Cypress Drive, near the northern end of the transect. A regular passage of common pipistrelle bats were seen to fly over the road from south to north suggesting the presence of a maternity roost in the area of houses to the west of Cypress Drive, in the vicinity of Pennyroyal Close.
- 7.9 Full details of the tree assessment from ground level and tree climbing inspections are shown in Table 10 and Figure 8 indicates the locations of these trees (see Appendix II). Ten trees were noted to have potential roost features (PRFs) typical of the holes and crevices occupied by bats. During the dusk emergence surveys in June, July, and August 2019, no bat activity was detected as exiting from a roost location. No tree roosts for bat species were identified. Full details of the observations are shown in Tables 11 – 20 in Appendix II. Barn owl presence is recorded from tree T114 in both 2017 and 2019.
- 7.10 Occasional records were noted for other species outside of the target bat species. These included fox (*Vulpes vulpes*), heron (*Ardea cinerea*), and Canada goose (*Branta canadensis*). Records are shown in Table 27 (see Appendix V). Barn owl (*Tyto alba*) sightings were a regular feature of dusk transect surveys with birds seen during June, July, August, September and October visits and also during four of the 28 tree observation sessions. On one occasion (22/08/2019), two adult birds flew out from T114 shortly after sunset.

8 Discussion and Conclusions

- 8.1 Bat foraging activity was a regular and consistent occurrence over the majority of the site. Only the eastern parts of the crop transect failed to record bat passes. It is difficult to assess the significance of the site in terms of its importance as a resource for local bat populations without greater in-depth study which would demand considerable resources. A bat study of an area a short distance (1.2km) to the west of Cardiff Parkway containing very similar habitats of grassland, tree lines and tall hedgerows was undertaken by the Just Mammals Consultancy LLP in summer 2014. This 2014 survey site is now part of a dense area of residential housing which covers the zone to the west. The 2014 survey data was dominated by common pipistrelle activity with occasional activity noted by soprano pipistrelle, noctule, Daubenton's bats and one Nathusius' pipistrelle bat. The bat activity was similarly observed to be focused on the tree lines and the tall hedgerow features of the site. When compared to a site of similar habitats in the local environment which recorded similar species and generally similar levels of bat activity, it is reasonable to conclude that the Cardiff Parkway site is typical for the local area in terms of it serving as a resource for foraging bats. It does not suggest that the bat activity at Cardiff Parkway is exceptionally high or indicating a site of particular importance, but the comparison does highlight the continual loss of natural habitat and increasing pressures on wildlife. The area at the southern end of the Cypress Drive transect was noted to record regular foraging of a good diversity of species possibly pointing towards an area with a higher level of local importance for foraging bats in the Hendre Lake Park area.
- 8.2 Common pipistrelle activity dominated the survey results: the species was a consistent regular presence across the majority of the site. Of the remaining six bat species, soprano pipistrelle was recorded from across all parts of the site. Open grassland areas especially in the southern parts of the site recorded a low but regular level of noctule bat activity. They were not recorded to be present in high numbers.
- 8.3 A high proportion of the linear features of hedges and tree lines beside the reens which form the field boundaries have regular commuting and foraging activity by bats. The reens are likely to be an important habitat for invertebrate insects which have an aquatic life cycle phase for reproduction. Any loss of hedge and tree habitats will result in loss of forage areas and will have a negative impact on bat behaviour. There is also the risk of habitat fragmentation resulting from any partial removal of the tree lines and hedgerow features.
- 8.4 The northern edge of the Cardiff Parkway site is illuminated by the lighting and street lights around the business park, and despite a bright pool of light, regular pipistrelle activity was recorded in this area on the fringe of the light zone. Pipistrelle species and noctule bats are known to be more tolerant of artificial lighting and only these species were recorded in the northern half of the site which currently has a higher level of artificial lighting than the southern half. Any additional lighting features introduced to the site are likely to affect bat foraging and commuting activity and will present a greater negative impact for the myotis and long-eared bat species recorded to be present within the southern parts of the site.
- 8.5 Regular early evening commuting activity over Cypress Drive, from south to north on the cypress transect, suggests the presence of a common pipistrelle maternity colony in the houses to the west of this road, near the northern end of the transect. No other distinct commuting routes were identified to or from the survey site.

9 Recommendations

- 9.1 Recommendations are made within this section in the absence of any site specific design for the development of railway infrastructure. To avoid negative impacts for foraging and commuting bats all existing trees, tree lines and hedgerow habitat must be retained. Loss of grassland habitat is also likely to affect foraging noctule bats to some degree and alterations to the reens have potential to affect insect populations which are bat prey and their food source. In order to minimise impacts on protected bat species, the areas of habitat loss must be kept to a minimum.
- 9.2 To compensate for any loss of tree and hedgerow habitat and to minimise the risk of impacts on bats from habitat loss due to fragmentation, a new planting of native trees and native hedgerow species must be created and planted in a design layout to support and link to existing habitat on site as well as habitat adjacent to the site. The extent (measured in ground surface m²) of the new planting must match or exceed the area that is lost to development activity. The retention and/or creation of natural corridors across the site for movement along various vectors (east/west

and north/south) is recommended to minimise impacts of fragmentation for bat species but this is only viable if lighting can be designed to keep these corridors a naturally dark zone.

- 9.3 Loss of grassland will reduce the forage area available to noctule bats. To avoid the total loss of forage habitat and the negative impact on noctule species, the retention of a grassland area on the west side of the development site is recommended of a minimum size of 5 Ha. This size represents a small proportion of the site which covers just over 100 Ha. The design of this mitigation grassland zone is proposed in order to extend the natural habitats of the Hendre Lake Park area and additional appropriate natural linking habitat must be part of the design of this scheme of mitigation between the development site and Hendre Lake Park.
- 9.4 Artificial lighting will be an important issue for the proposed development as new lighting installations are potentially detrimental to nocturnal wildlife. A detailed and sensitive lighting design with consideration for nocturnal wildlife must be prepared with all new lighting installations avoiding any light spill towards the retained or mitigation habitats of trees and hedgerows: they must be at a height not exceeding 4m so as to retain a dark zone above the illuminated area. Lights must be of a downward directional design or fitted with cowls such that all light is directed downward towards ground level areas where it is essential for safety purposes, with no upward light spill. Ultra Violet (UV) and blue-rich light sources must be avoided. Current studies suggest red light sources are less damaging to foraging bat species.
- 9.5 Retained, mitigation and compensation habitats (grassland, trees, tree lines and hedges) will require that a Habitat Management Plan is prepared to guide future management of these features to ensure future and ongoing benefits for wildlife and biodiversity.

10 References

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Appendix I: Site Location Plan

Figure 1: Site location aerial view



Key

Legend

May Livestock

Bat Transect Routes

Crop Transect

Middle Transect

SINC Transect

Cypress Transect

Southern Transect

Study Area

Figure 2: Transect routes



Cardiff Parkway - transects

Site Reference:
BAT2319

Created By:
GD

Checked By:
PM

Map Scale:
1: 9500

Source:
© Google Satellite Imaging
2019

Just
MAMMALS
Consultancy
Limited Liability Partnership

Legend

- Start/finish locations
- 1 - Cypress - 4.8km
- 2 - Crop - 5km
- 3 - Middle - 2.1km
- 4 - SINC - 3.5km
- 5 - Southern - 4.4km

Figure 3: Route of crop transect



Figure 4: Route of cypress transect



Figure 5: Route of middle transect



Figure 6: Route of SINC transect



Figure 7: Route of southern transect



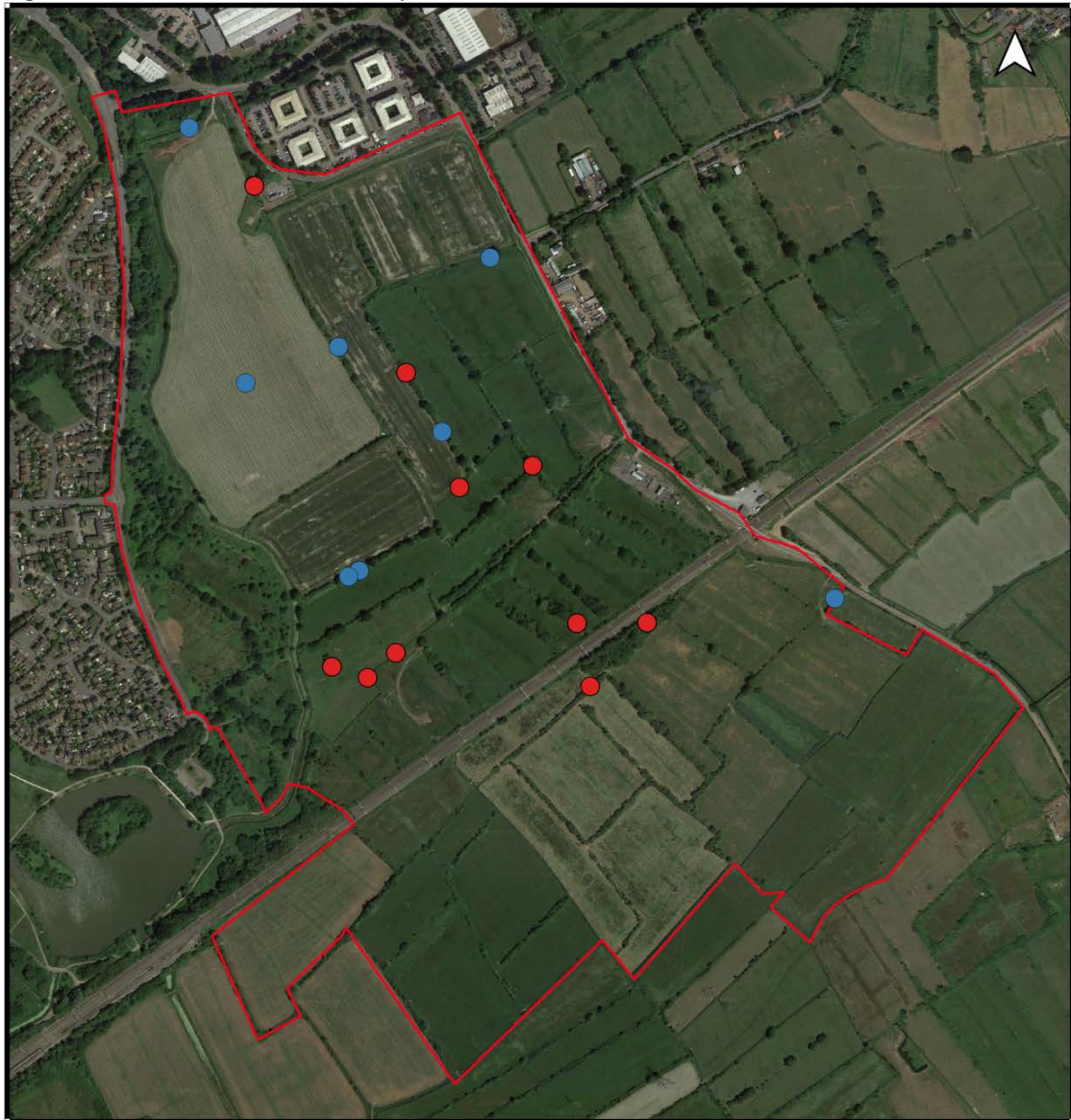
Appendix II: Tree Survey Results and Field Notes

Table 10: Summary of Tree Assessment Results

Tree	Species	Feature	Action Taken/ Comment	Risk	2019 Obs Y/N
T2	Willow	Vertical split on trunk at low level	Endoscope inspection, low potential	3	N
T5	Ped oak	Damaged limb E 5m and tear out hole in branch NE 5m	Endoscope check found nothing. Light ivy, and hole has no depth. Owl pellet found beneath tree	2	N
T6	Ped oak	Cavity on trunk S 2.5m	Appears shallow	2	N
T7	Ped oak	Tear out wound and hole S 3m	No depth to cavities	2	N
T16	Ped oak	Crack in branch SW 5m	Potential is appropriate for dusk observations	4	Y
T19	Ped oak	Dense ivy at low level	Possible hibernation potential	2	N
T21	Ped oak	Large rot hole S 4m, plus woodpecker hole SW 5m	Veteran status, obvious potential for bats and barn owl	5	Y
T31	Ped oak	Several features: tear out broken limb NE and SE 5m, rotten branch N 5m	Emerging veteran status, observation appropriate	4	Y
T39	Ped oak	Several features: split and large cavity in trunk N. Crack in limb S at 4m. Split in dead limb W at 4m	Endoscope found no bat evidence. Owl pellet found	5	Y
T41	Ped oak	Numerous features: hole in trunk SE 1.2m, tear out cavity N 4m, tear out and knot hole NW 6m	Endoscope inspection found old bird nest, slugs in hole on trunk	5	Y
T42	Ped oak	Numerous features: holes on N, desiccation fissure S, knot hole S, fissure on dead limb, butt damage with holes various sides.	Endoscope inspection found no bat evidence	3	N
T52	Ped oak	Dense ivy	No signs	2	N
G67	Willow and hawthorn	Numerous features: rot holes and extensive crevices in trunks, branch cavities N and NW, split and low level cavities S and SW	Low level endoscope inspection. Upper level tree climbing endoscope inspection	5	Y
T97	Ped oak	Numerous features: decay hole E at 3m, split wound N at 5m	Endoscope inspection found nothing	5	Y
T113	Ped oak	Several features: rot hole N 5m, woodpecker hole N 5.5m, split branch and limb damage S at 6m	Endoscope inspection found nothing	5	Y
T114	Ped oak	Numerous features: large open rot cavity N 2-4m, broken limb W 4m, rot hole S 2m, woodpecker hole on limb S 5m	Endoscope inspection found nothing. Barn owl tree with emergences (x2) in August 2019	5	Y
T132	willow	Numerous features of rot: cavity and crack in branches W, broken limb, rot NW at 1.8m	Unsafe for tree climbing, endoscope at low level nothing found other than cobwebs	5	Y
T140	Ped oak	Moderate ivy, minor limb damage SW		2	N

Tree numbers and locations as shown in Arboricultural Survey Report (Barton Hyett 2018)

Figure 8: Location of trees assessed for potential bat roosts

**Tree Assessments**

Site Reference:
GEN2319

Map Scale:
1:7500

Source:
© Google Satellite Imaging
2019

**Legend**

- Daytime assessment only (ground/tree climbing)
- Dusk activity observations
- Site boundary

Table 11: Tree Observation Notes for T16

Date	Time	Rec No	Species	Comment
17/06/2019	21.38 hours	1 PW	NYCNOC	Flying east of T16
	22.01 hours	2 PW	NYCNOC	Commuting south to north, past the east side of T16
	22.04 hours	3 PW	PIPPIP	Commuting north to south, past the east of T16
	22.07 hours	4 PW	PIPPYG	Commuting north to south, past the east of T16
	22.14 hours	5 PW	MYODAU	Commuting north to south, past the west side of T16
	22.16 hours	6 PW	MYODAU	Commuting north to south, past the west side of T16
	22.19 hours	7 PW	PIPPIP	Foraging in field east of T16
	22.24 hours	8 PW	MYODAU	Commuting north to south, past the west side of T16
	22.27 hours	9 PW	MYODAU	Commuting north to south-east, past the east side of T16
	22.29 hours	10 PW	PIPPIP	Foraging in field to the north of T16
	22.31 hours	11 PW	PIPPYG	Foraging in field to the east of T16
25/07/2019	21.49 hours	1 PW	PIPPIP	Commuting south-west to north-east along reen
	21.54 hours	2 PW	PIPPIP	Flying in field north-west of T16
	21.58 hours	3 PW	PIPPIP	Flying in field north-west of T16
	22.08 hours	4 PW	MYOTIS	Commuting north-east to south-west along the reen
	22.10 hours	5 PW	MYOTIS	Flying in field to the south-east of T16
19/08/2019	21.10 hours	1 MW	PIPPIP	Commuting north
	21.14 hours	2 MW	PIPPIP	Heard but not seen
	21.15 hours	3 MW	PIPPIP	Heard but not seen
	21.19 hours	4 MW	PIPPIP	Heard but not seen
	21.20 hours	5 MW	MYONAT	Heard but not seen
	21.22 hours	6 MW	PIPPIP	Foraging south of T16
	21.28 hours	7 MW	PIPPIP	Foraging in circles to the east of T16

Table 12: Tree Observation Notes for T21

Date	Time	Rec No	Species	Comment
17/06/2019	21.30 hours	1 GD	NYCNOC	Heard but not seen
	21.42 hours	2 GD	NYCNOC	Heard but not seen
	21.48 hours	3 GD	PIPPIP	Commuting north-west to south-east along hedgerow
	21.52 hours	4 GD	PIPPYG	Commuting north-west to south-east along hedgerow
	21.55 hours	5 GD	PIPPIP	Commuting north-west to south-east along hedgerow
	21.59 hours	6 GD	PIPPIP	Foraging in the field to the west of T21
	22.00 hours	7 GD	PIPPIP	Commuting across the field west to east, then south-east along the hedgerow
	22.07 hours	8 GD	PIPPYG	Heard but not seen
	22.10 hours	9 GD	PIPPIP	Commuting north-west to south-east along hedgerow
	22.12 hours	10 GD	PIPPIP	Foraging overhead
	22.15 hours	11 GD	PIPPIP	Foraging around tree canopy of T21
	22.18 hours	12 GD	PIPPIP	Foraging overhead
	22.20 hours	13 GD	PIPPIP	Heard but not seen
	22.22 hours	14 GD	PIPPIP	Foraging under tree canopy of T21
	22.25 hours	15 GD	PIPPIP x2	Foraging under tree canopy of T21
	22.33 hours	16 GD	PIPPIP x2	Heard but not seen
	22.36 hours	17 GD	PIPPIP	Commuting overhead
25/07/2019	21.39 hours	1 NA	NYCNOC	Commuting south-west to north-east to the west of T21
	21.55 hours	2 NA	PIPPIP	Foraging west to east along the treeline
	21.56 hours	3 NA	PIPPIP	Foraging west to east along the treeline
	22.02 hours	4 NA	PIPPYG	Commuting west to east along treeline, followed by two other bats
	22.03 hours	5 NA	PIPPIP	Foraging against tree line to the east
	22.04 hours	6 NA	PIPPIP	Commuting west to east along treeline
	22.07 hours	7 NA	PIPPIP	Commuting west to east along treeline
	22.08 hours	8 NA	PIPPIP	Heard but not seen
	22.08 hours	9 NA	PIPPIP	Foraging against tree line to the east
	22.09 hours	10 NA	PIPPIP	Foraging east to west over the field to the west of T21. Barn owl seen flying east to west, in field to the west
	22.12 hours	11 NA	PIPPIP	Commuting west to east along treeline
	22.13 hours	12 NA	PIPPIP	Heard but not seen
19/08/2019	21.07 hours	1 NA	PIPPYG	Heard but not seen
	21.11 hours	2 NA	PIPPIP	Foraging west to east along hedgerow
	21.12 hours	3 NA	PIPPIP	Foraging west to east along hedgerow, quickly followed by a second bat
	21.18 hours	4 NA	PIPPIP	Foraging west to east along hedgerow
	21.20 hours	5 NA	PIPPIP	Heard but not seen
	21.21 hours	6 NA	PIPPIP	Foraging west to east along hedgerow
	21.22 hours	7 NA	PIPPYG	Foraging west to east along hedge and across field
	21.24 hours	8 NA	PIPPIP	Heard but not seen
	21.29 hours	9 NA	PIPPIP	Heard but not seen
	21.30 hours	10 NA	PIPPIP	Heard but not seen

Table 13: Tree Observation Notes for T31

Date	Time	Rec No	Species	Comment
13/06/2019	21.48 hours	1 JH	PIPPIP	Foraging under canopy of T31
	21.56 hours	2 JH	PIPPYG	Foraging under canopy of T31
	22.19 hours	3 JH	PIPPIP x3	Circling under canopy of T31
25/07/2019	21.41 hours	1 PLM	NYCNOC	Heard but not seen
	21.52 hours	2 PLM	PIPPIP	Heard but not seen
	21.55 hours	3 PLM	PIPPIP	Heard but not seen
	21.56 hours	4 PLM	PIPPIP	Foraging east of T31
	21.58 hours	5 PLM	PIPPIP	Foraging east of T31
	22.00 hours	6 PLM	PIPPIP	Heard but not seen
	22.09 hours	7 PLM	MYOTIS	Heard but not seen
	22.11 hours	8 PLM	PIPPIP	Foraging west of T31
19/08/2019	20.56 hours	1 PLM	PIPPIP	Heard but not seen
	21.01 hours	2 PLM	PIPPIP	Heard but not seen
	21.10 hours	3 PLM	PIPPIP	Briefly foraging under canopy of T31, before flying off to the west
	21.12 hours	4 PLM	PIPPIP	Heard but not seen
	21.14 hours	5 PLM	PIPPIP	Foraging above field to east of T31
	21.16 hours	6 PLM	PIPPIP	Foraging above field to east of T31
	21.21 hours	7 PLM	PIPPIP	Foraging above field to east of T31
	21.23 hours	8 PLM	PIPPIP	Foraging above field to east of T31
	21.26 hours	9 PLM	PIPPIP	Foraging above field to east of T31

Table 14: Tree Observation Notes for T39

Date	Time	Rec No	Species	Comment
13/06/2019	21.55 hours	1 PLM	NYCNOC	Heard but not seen
	21.55 hours	2 PLM	NYCNOC	Foraging overhead at the west end of the SINC transect
	21.57 hours	3 PLM	PIPPIP	Foraging overhead at the west end of the SINC transect
	21.59 hours	4 PLM	NYCNOC	Heard but not seen
	22.10 hours	5 PLM	PIPPYG	Commuting north to south past T39
	22.11 hours	6 PLM	PIPPIP	Commuting north to south past T40
	22.13 hours	7 PLM	PIPPIP	Commuting north-west to south-west
	22.17 hours	8 PLM	NYCNOC x2	Heard but not seen
	22.18 hours	9 PLM	PIPPIP	Foraging around T39
	22.19 hours	10 PLM	PIPPIP + NYCNOC	Foraging around T39
	22.27 hours	11 PLM	PIPPIP + NYCNOC	Heard but not seen
	22.29 hours	12 PLM	PIPPIP + NYCNOC	Heard but not seen
	22.31 hours	13 PLM	PIPPIP	Foraging around T39
	22.32 hours	14 PLM	PIPPIP	Foraging around T39
24/07/2019	21.21 hours	PLM	BARNOWL	Barn owl flew past observer to the west, and landed briefly in trees next to T39 then flew off east
	21.27 hours	1 PLM	NYCNOC	Foraging north to south overhead
	21.30 hours	2 PLM	NYCNOC	Heard but not seen
	21.31 hours	3 PLM	NYCNOC	Heard but not seen
	21.37 hours	4 PLM	NYCNOC	Foraging north to south overhead
	21.40 hours	5 PLM	NYCNOC	Heard but not seen
	21.41 hours	6 PLM	NYCNOC	Heard but not seen
	21.43 hours	7 PLM	NYCNOC	Heard but not seen
	21.48 hours	8 PLM	PIPPIP	Heard but not seen
	21.51 hours	9 PLM	PIPPIP	Heard but not seen
	22.02 hours	10 PLM	NYCNOC	Heard but not seen
	22.06 hours	11 PLM	PIPPIP	Heard but not seen
	22.10 hours	12 PLM	NYCNOC	Heard but not seen
	22.12 hours	13 PLM	NYCNOC	Heard but not seen
	22.14 hours	14 PLM	MYONAT x2	Heard but not seen
22/08/2019	20.34 hours	1 PLM	NYCNOC	Foraging overhead, east to west
	20.41 hours	2 PLM	NYCNOC	Heard but not seen
	20.47 hours	3 PLM	NYCNOC	Heard but not seen
	20.50 hours	4 PLM	NYCNOC	Heard but not seen
	20.59 hours	5 PLM	PIPPIP	Commuting west to east
	21.09 hours	6 PLM	PIPPYG	Heard but not seen
	21.18 hours	7 PLM	PIPPIP	Heard but not seen
	21.19 hours	8 PLM	PIPPIP	Heard but not seen
	21.20 hours	9 PLM	PIPPIP	Heard but not seen

Table 15: Tree Observation Notes for T41

Date	Time	Rec No	Species	Comment
25/07/2019	21.41 hours	1 JH	PIPPYG	Foraging north of T41
	21.45 hours	2 JH	PIPPIP	Commuting north to south past the east side of T41
	22.06 hours	3 JH	PIPPIP	Foraging under tree canopy
19/08/2019	20.52 hours	1 JH	PIPPIP	Circling under canopy of T41 and around substation, located south-east of T41
	21.05 hours	2 JH	PIPPYG	A second bat seen circling under canopy of T41 and around substation, located south-east of T41

Table 16: Tree Observation Notes for T97

Date	Time	Rec No	Species	Comment
13/06/2019	21.44 hours	1 NA	NYCNOC	Commuting north to south
	21.47 hours	2 NA	PIPPYG	Commuting west to east along the treeline
	21.52 hours	3 NA	PIPPIP	Foraging around the treeline
	22.06 hours	4 NA	PIPPIP	Heard but not seen
	22.15 hours	5 NA	PIPPIP	Foraging east to west along the treeline
	22.16 hours	6 NA	PIPPIP	Foraging over field to the east of T97
	22.18 hours	7 NA	PIPPIP	Foraging over field to the east of T97
	22.20 hours	8 NA	PIPPIP	Foraging around field to the east of T97
	22.24 hours	9 NA	PIPPIP	Foraging along the treeline
	22.26 hours	10 NA	PIPPIP	Heard but not seen
	22.27 hours	11 NA	PIPPIP	Commuting west to east along the treeline
	22.31 hours	12 NA	PIPPIP	Heard but not seen
	22.32 hours	13 NA	PIPPIP + NYCNOC	Foraging around field to the east of T97, several passes
	22.34 hours	14 NA	PIPPIP	Foraging around field to the east of the T97
24/07/2019	21.37 hours	1 NA	NYCNOC	Heard but not seen
	21.38 hours	2 NA	NYCNOC	Foraging over adjacent field to the north of T97
	21.41 hours	3 NA	PIPPIP	Commuting west to east along hedgerow towards railway line
	21.54 hours	4 NA	PIPPYG	Foraging east to west along the treeline
	21.56 hours	5 NA	PIPPIP	Foraging west to east along treeline
	22.00 hours	6 NA	PIPPIP	Heard but not seen
	22.01 hours	7 NA	PIPPIP	Heard but not seen
	22.05 hours	8 NA	PIPPIP	Heard but not seen
	22.12 hours	9 NA	PIPPIP	Heard but not seen
	22.15 hours	10 NA	MYONAT	Heard but not seen
22/08/2019	20.35 hours	1 NA	PIPPIP	Heard but not seen
	21.02 hours	2 NA	PIPPIP	Heard but not seen
	21.04 hours	3 NA	PIPPIP	Heard but not seen
	21.19 hours	4 NA	PIPPIP	Heard but not seen
	21.20 hours	5 NA	PIPPIP	Heard but not seen
	21.20 hours	6 NA	MYOTIS	Heard but not seen

Table 17: Tree Observation Notes for T113

Date	Time	Rec No	Species	Comment
13/06/2019	21.54 hours	1 RM	PIPPIP	Commuting from north-west to south-east past the observer
	22.10 hours	2 RM	PIPPIP	Foraging beneath T113
	22.10 hours	3 RM	PIPPIP	Foraging beneath T113
	22.11 hours	4 RM	PIPPIP x2	Foraging beneath T113
	22.13 hours	5 RM	PIPPYG	Bats seen chasing and foraging under T113
	22.14 hours	6 RM	PIPPYG x2	Foraging beneath T113
	22.16 hours	7 RM	PIPPIP + PIPPYG	Foraging under and around T113
	22.17 hours	8 RM	PIPPIP + PIPPYG	Foraging under T113
	22.24 hours	9 RM	PIPPIP x2	Foraging under T113
	22.28 hours	10 RM	PIPPIP x2	Foraging under T114
	22.31 hours	11 RM	PIPPIP + PIPPYG	Foraging under T115
	22.35 hours	12 RM	PIPPIP x2 + PIPPYG	Foraging under T116
	22.39 hours	13 RM	PIPPIP + PIPPYG	Foraging under T117
	22.39 hours	14 RM	PIPPIP + PIPPYG	Foraging under T118
24/07/2019	21.26 hours	1 RM	NYCNOC	Heard but not seen
	21.41 hours	2 RM	NYCNOC	Commuting south to north over the observer
	21.46 hours	3 RM	NYCNOC + ?	Commuting north to south over the observer
	21.54 hours	4 RM	PIPPYG	Heard but not seen
	21.59 hours	RM	HERON	Heron seen flying south to north
	22.05 hours	5 RM	PIPPIP	Heard but not seen

22/08/2019	22.07 hours	6 RM	PIPPIP	Heard but not seen
	22.11 hours	7 RM	PIPPYG	Foraging north-east of T113
	20.40 hours	1 JH	NYCNOC	Heard but not seen
	21.06 hours	2 JH	PIPPIP	Heard but not seen
	21.13 hours	3 JH	PIPPIP	Flying east to west along the southern field boundary

Table 18: Tree Observation Notes for T114

Date	Time	Rec No	Species	Comment
13/06/2019	21.55 hours	1 PW	PIPPIP	Heard but not seen
	21.59 hours	2 PW	NYCNOC	Heard but not seen
	22.11 hours	3 PW	PIPPIP	Flying to the east of T114
	22.13 hours	4 PW	PIPPIP	Foraging in the field to the north of T114
	22.15 hours	5 PW	PIPPIP	Commuting east to south along south-east side of T114
	22.18 hours	6 PW	PIPPYG	Foraging in field to the south-east and around T114
	22.24 hours	7 PW	PIPPIP	Heard but not seen
	22.27 hours	8 PW	PIPPYG	Foraging in field to the south-east of T114
	22.29 hours	9 PW	PIPPIP x2	Foraging in field to the south-east of T114
24/07/2019	21.37 hours	1 PW	NYCNOC	Heard but not seen
	21.47 hours	2 PW	PIPPIP	Commuting west to south-east along reën
	21.59 hours	3 PW	PIPPIP	Heard but not seen, foraging
	22.01 hours	4 PW	NYCNOC	Heard but not seen
	22.10 hours	5 PW	PIPPIP	Flying east of T114
22/08/2019	20.36 hours	NI	BARNOWL	Barn owl emerged from T114 and flew north
	20.41 hours	1 NI	NYCNOC	Heard but not seen
	20.53 hours	NI	BARNOWL	Barn owl emerged from T114 and flew north
	21.05 hours	2 NI	PIPPIP	Heard but not seen
	21.09 hours	3 NI	PIPPIP	Heard but not seen
	21.13 hours	4 NI	PIPPYG	Heard but not seen
	21.18 hours	5 NI	PIPPYG	Heard but not seen

Table 19: Tree Observation Notes for T132

Date	Time	Rec No	Species	Comment
17/06/2019	21.36 hours	1 PLM	NYCNOC	Commuting south to north
	21.48 hours	2 PLM	PIPPIP + NYCNOC	Heard but not seen
	21.49 hours	3 PLM	PIPPIP	Foraging in gap in hedge just east of T132
	21.52 hours	4 PLM	PIPPIP + NYCNOC	Foraging over field to the west of T132
	21.53 hours	5 PLM	PIPPIP x2 + NYCNOC	Foraging overheard
	21.56 hours	6 PLM	NYCNOC x2	Foraging overheard
	21.58 hours	7 PLM	PIPPIP + NYCNOC	Heard but not seen
	22.00 hours	8 PLM	PIPPIP + NYCNOC	Commuting west to east
	22.02 hours	9 PLM	PIPPIP + NYCNOC	Foraging in field to west of T132
	22.06 hours	10 PLM	PIPPIP	Heard but not seen
	22.08 hours	11 PLM	PIPPIP	Heard but not seen
	22.12 hours	12 PLM	PIPPIP	Foraging in field to west of T132
	22.15 hours	13 PLM	PIPPIP x2	Foraging in field to west of T132
	22.24 hours	14 PLM	PIPPIP	Foraging in field to west of T132
	22.26 hours	15 PLM	PIPPIP	Foraging in field to west of T132
	22.26 hours	16 PLM	PIPPIP	Foraging in field to west of T132
	22.29 hours	17 PLM	PIPPIP	Foraging in field to west of T132
	22.31 hours	18 PLM	PIPPIP x2	Foraging in field to west of T132
	22.33 hours	19 PLM	PIPPIP	Foraging in field to west of T132
	22.40 hours	20 PLM	PIPPIP	Foraging in field to west of T132
24/07/2019	21.32 hours	1 AR	NYCNOC	Heard but not seen
	21.39 hours	2 AR	NYCNOC	Foraging overhead
	21.42 hours	3 AR	NYCNOC	Foraging overhead
	21.47 hours	4 AR	PIPPIP	Foraging west to east
	21.54 hours	5 AR	PIPPIP	Foraging around hedgerow
22/08/2019	20.41 hours	1 PW	PIPPIP	Flew north to south, to the east of T132
	20.47 hours	2 PW	PIPPIP	Heard but not seen
	20.52 hours	3 PW	PIPPIP	Flying to the north of T132
	20.58 hours	4 PW	PIPPIP	Foraging north of T132
	21.04 hours	5 PW	PIPPIP	Foraging north of T132. Barn owl seen flying north over hedgerow
	21.05 hours	6 PW	PIPPIP	Heard but not seen
	21.10 hours	7 PW	PIPPYG	Foraging in field north of T132


Table 20: Tree Observation Notes for G67

Date	Time	Rec No	Species	Comment
25/07/2019	21.39 hours	1 DM	NYCNOC	Heard but not seen
	21.42 hours	2 DM	NYCNOC	Heard but not seen
	21.51 hours	3 DM	PIPPIP	Heard but not seen
	21.53 hours	4 DM	PIPPIP	Foraging around tree canopy of G67
	21.58 hours	5 DM	PIPPIP	Brief foraging passes over canopy above
	22.04 hours	6 DM	PIPPIP	Brief foraging passes over canopy above
	22.07 hours	7 DM	PIPPIP	Brief foraging passes over canopy above
	22.08 hours	8 DM	PIPPIP	Brief foraging passes over canopy above
	22.15 hours	9 DM	PIPPIP	Brief foraging passes over canopy above
19/08/2019	21.07 hours	1 AR	PIPPIP	Heard but not seen, constant foraging and social calls heard
	21.09 hours	2 AR	PIPPIP	Heard but not seen
	21.11 hours	3 AR	PIPPIP	Foraging high overhead in the tree canopy of G67

Appendix III: Transect Data Results and Field Notes

Figure 9: May 2019 transect data

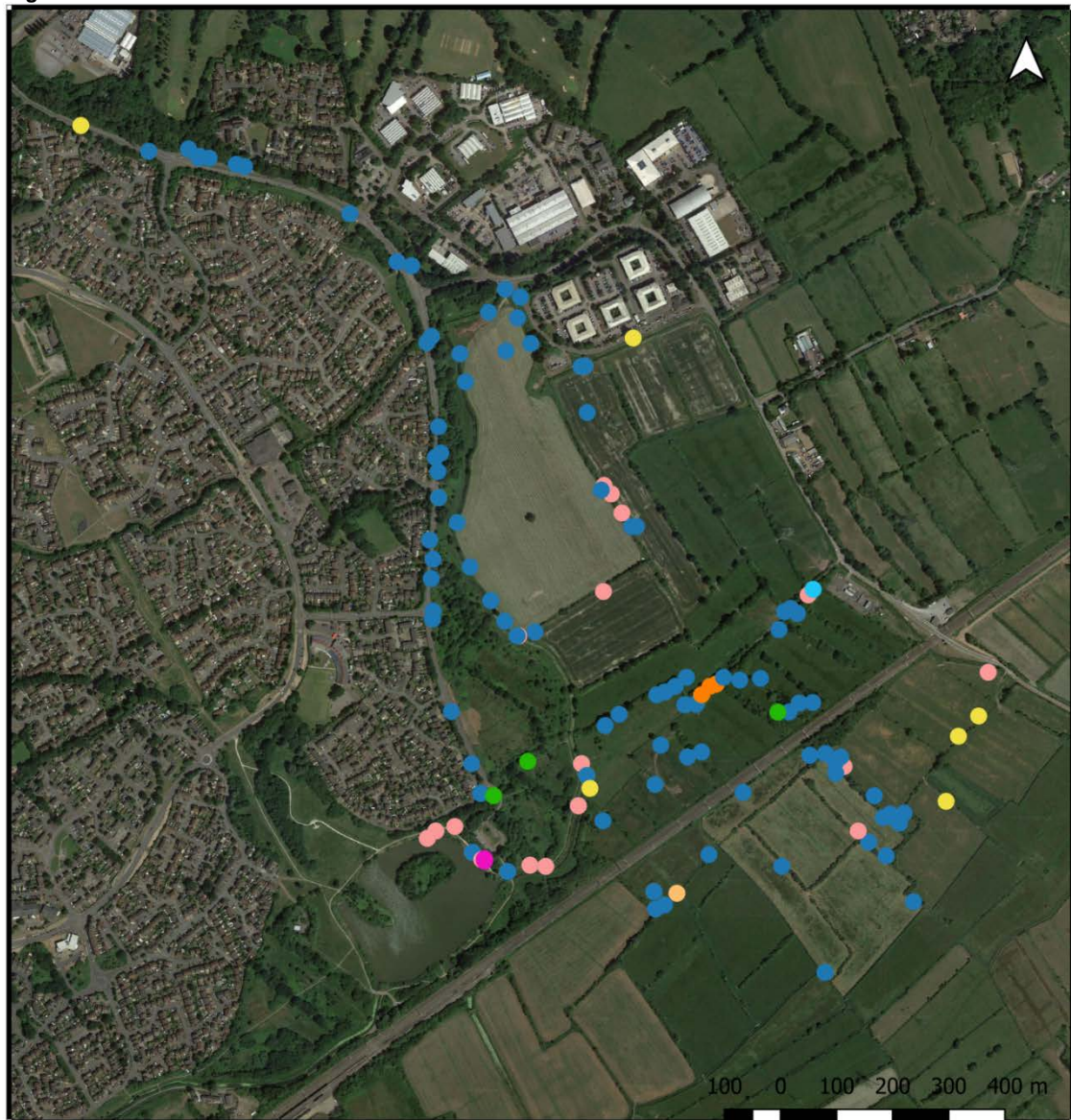


Aerial View of the Site	
Site Reference: GEN2319	
Created By: PW	Checked By: DM
Map Scale: 1:9250	
Source: © Google Satellite Imaging 2019	

Legend

- MYODAU
- MYONAT
- MYOTIS
- NYCNO
- PIPPIP
- PIPPYG

Figure 10: June 2019 transect data



Aerial View of the Site

Site Reference:
GEN2319

Created By:
PW

Checked By:
DM

Map Scale:
1:9250

Source:
© Google Satellite Imaging
2019



Legend

- PIPNAT
- MYODAU
- MYONAT
- MYOTIS
- NYCNOC
- PIPPIP
- PIPPYG
- PLEUC

Figure 11: July 2019 transect data

**Aerial View of the Site**

Site Reference:
GEN2319

Created By:
PW

Checked By:
DM

Map Scale:
1:9250

Source:
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- MYOTIS
- NYCNOC
- PIPPIP
- PIPPYG

Figure 12: August 2019 transect data

**Aerial View of the Site**

Site Reference:
GEN2319

Created By:
PW

Checked By:
DM

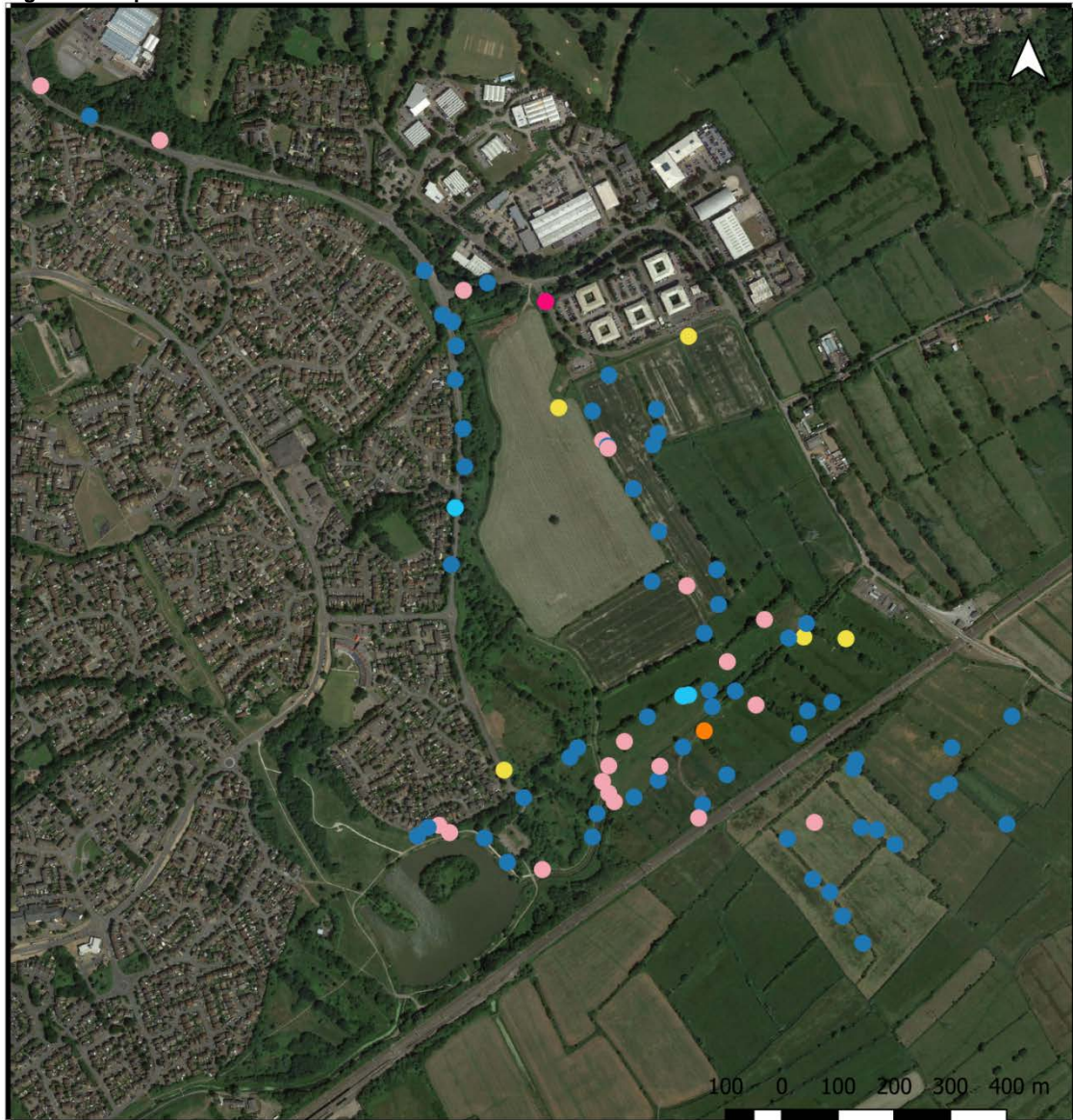
Map Scale:
1:9250

Source:
© Google Satellite Imaging
2019

**Legend**

- MYOTIS
- NYCNO
- MYODAU
- MYONAT
- PIPNAT
- PIPPIP
- PIPPYG

Figure 13: September 2019 transect data



Aerial View of the Site

Site Reference:
GEN2319

Created By:
PW

Checked By:
DM

Map Scale:
1:9250

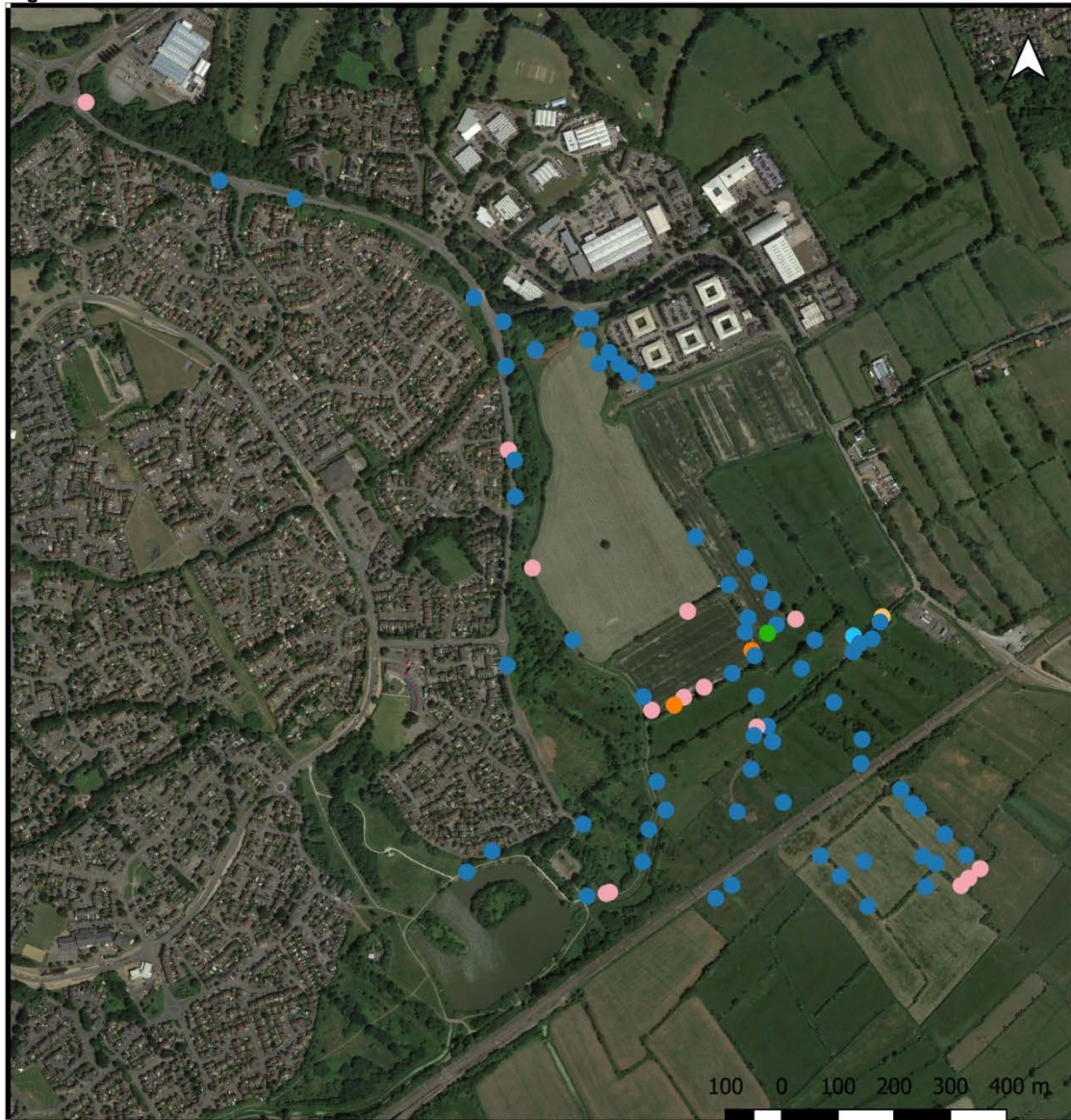
Source:
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- NYCNO
- PIPNAT
- MYODAU
- MYONAT
- PIPPIP
- PIPPYG

Figure 14: October 2019 transect data



Aerial View of the Site

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1:9250

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- MYODAU
- MYONAT
- MYOTIS
- PIPPIP
- PIPPYG
- PLEUC

Table 21: May 2019 Transect Notes

Date	Time	Rec	Species	Transect	Comment
29/05/2019	21.24	RM	PIPIIP	Cypress	Foraging around trees next to road
29/05/2019	21.25	RM	PIPIIP	Cypress	Foraging between trees either side of the road
29/05/2019	21.28	RM	PIPIIP	Cypress	Foraging either side of trees on road
29/05/2019	21.31	RM	PIPIIP	Cypress	Foraging on path below bridge
29/05/2019	21.34	RM	PIPIIP	Cypress	Under tree canopy
29/05/2019	21.39	RM	MYOTIS	Cypress	Commuting along tree line parallel to road
29/05/2019	21.40	RM	PIPIIP	Cypress	Foraging in trees
29/05/2019	21.42	RM	PIPIIP	Cypress	Foraging trees nest to road
29/05/2019	21.48	RM	PIPPYG	Cypress	Bat over road
29/05/2019	21.51	RM	PIPIIP	Cypress	Foraging
29/05/2019	21.51	RM	PIPIIP	Cypress	Foraging
29/05/2019	21.54	RM	PIPIIP	Cypress	Foraging
29/05/2019	21.54	RM	PIPIIP	Cypress	Foraging
29/05/2019	21.56	RM	PIPIIP	Cypress	Crossed road
29/05/2019	21.59	RM	PIPIIP	Cypress	Foraging in field beyond road
29/05/2019	22.09	RM	PIPIIP	Cypress	Commuting
29/05/2019	22.10	RM	MYODAU	Cypress	Heard not seen
29/05/2019	22.11	RM	PIPPYG	Cypress	commuting south east to north west
29/05/2019	22.12	RM	MYODAU	Cypress	Foraging along path
29/05/2019	22.13	RM	MYODAU	Cypress	Foraging along path
29/05/2019	22.14	RM	MYODAU	Cypress	Commuting along path
29/05/2019	22.15	RM	MYODAU	Cypress	Commuting north to south
29/05/2019	22.16	RM	PIPIIP	Cypress	Foraging along path
29/05/2019	22.17	RM	PIPIIP	Cypress	Next to path
29/05/2019	22.20	RM	PIPIIP	Cypress	Foraging along path
29/05/2019	22.20	RM	PIPIIP	Cypress	Commuting along path
29/05/2019	22.23	RM	PIPIIP	Cypress	Foraging
29/05/2019	22.23	RM	PIPPYG	Cypress	Foraging
29/05/2019	22.23	RM	PIPIIP	Cypress	Foraging
29/05/2019	22.23	RM	PIPIIP	Cypress	Foraging
29/05/2019	22.23	RM	PIPPYG	Cypress	Foraging
29/05/2019	22.23	RM	MYODAU	Cypress	Foraging
29/05/2019	22.25	RM	PIPIIP	Cypress	Foraging along path
29/05/2019	22.25	RM	PIPPYG	Cypress	Foraging along path
29/05/2019	22.25	RM	MYODAU	Cypress	Foraging along path
29/05/2019	22.25	RM	PIPIIP	Cypress	Foraging along path
29/05/2019	22.25	RM	PIPIIP	Cypress	Foraging along path
29/05/2019	22.25	RM	PIPPYG	Cypress	Foraging along path
29/05/2019	22.27	RM	PIPIIP	Cypress	Foraging along path
29/05/2019	22.27	RM	PIPIIP	Cypress	Foraging along path
29/05/2019	22.27	RM	PIPIIP	Cypress	Foraging
29/05/2019	22.27	RM	PIPIIP	Cypress	Foraging
29/05/2019	22.27	RM	PIPIIP	Cypress	Foraging
29/05/2019	22.27	RM	PIPPYG	Cypress	Foraging
29/05/2019	22.29	RM	PIPIIP	Cypress	Foraging along path
29/05/2019	22.29	RM	MYODAU	Cypress	Foraging along path
29/05/2019	22.32	RM	PIPIIP	Cypress	Foraging at cross roads
29/05/2019	22.32	RM	PIPPYG	Cypress	Foraging at cross roads
29/05/2019	22.33	RM	PIPIIP	Cypress	Foraging at cross roads
29/05/2019	22.33	RM	PIPIIP	Cypress	Foraging at cross roads
29/05/2019	22.33	RM	PIPPYG	Cypress	Foraging at cross roads
29/05/2019	22.33	RM	MYODAU	Cypress	Foraging at cross roads
29/05/2019	22.35	RM	PIPIIP	Cypress	Foraging
29/05/2019	22.35	RM	PIPIIP	Cypress	Foraging
29/05/2019	22.35	RM	PIPPYG	Cypress	Foraging
29/05/2019	22.35	RM	MYONAT	Cypress	Foraging
29/05/2019	22.37	RM	PIPIIP	Cypress	Foraging at edge of lake
29/05/2019	22.38	RM	PIPIIP	Cypress	Foraging at edge of lake
29/05/2019	22.38	RM	PIPPYG	Cypress	Foraging
29/05/2019	22.39	RM	PIPIIP	Cypress	Foraging east to west along path
29/05/2019	22.41	RM	PIPPYG	Cypress	Foraging along path
29/05/2019	22.44	RM	PIPIIP	Cypress	Foraging along path and water
29/05/2019	22.44	RM	PIPPYG	Cypress	Foraging along path and water
29/05/2019	22.44	RM	MYODAU	Cypress	Foraging along path and water
29/05/2019	22.45	RM	PIPIIP	Cypress	Foraging along path and water
29/05/2019	22.45	RM	PIPIIP	Cypress	Foraging along path and water
29/05/2019	22.45	RM	PIPPYG	Cypress	Foraging along path and water
29/05/2019	22.46	RM	PIPIIP	Cypress	Foraging along path and water
29/05/2019	22.48	RM	PIPIIP	Cypress	On street
29/05/2019	22.55	RM	PIPIIP	Cypress	Heard not seen
29/05/2019	23.01	RM	PIPIIP	Cypress	Heard not seen
29/05/2019	23.01	RM	PIPIIP	Cypress	Along tree line

29/05/2019	23.10	RM	PIPIIP	Cypress	Foraging
29/05/2019	23.14	RM	PIPIIP	Cypress	Heard not seen
29/05/2019	23.15	RM	PIPIIP	Cypress	Foraging along foot path
29/05/2019	23.16	RM	PIPIIP	Cypress	Foraging along foot path
29/05/2019	23.23	RM	PIPIIP	Cypress	Commuting
29/05/2019	23.24	RM	PIPIIP	Cypress	Foraging on footpath below road
29/05/2019	23.26	RM	PIPIIP	Cypress	Foraging in trees above road
29/05/2019	21.34	PLM	NYCNOC	SINC	Heard not seen
29/05/2019	21.38	PLM	PIPIIP	SINC	Heard not seen
29/05/2019	21.40	PLM	PIPIIP	SINC	Foraging in NW corner of field
29/05/2019	21.40	PLM	PIPPYG	SINC	Heard not seen
29/05/2019	21.50	PLM	PIPIIP	SINC	Heard not seen
29/05/2019	21.53	PLM	PIPIIP	SINC	Heard not seen
29/05/2019	21.58	PLM	NYCNOC	SINC	Heard not seen
29/05/2019	22.05	PLM	PIPIIP	SINC	Heard not seen
29/05/2019	22.18	PLM	PIPIIP	SINC	Heard not seen, foraging
29/05/2019	22.18	PLM	PIPIIP	SINC	Heard not seen, foraging
29/05/2019	22.18	PLM	PIPIIP	SINC	Heard not seen
29/05/2019	22.27	PLM	PIPIIP	SINC	Heard not seen
29/05/2019	22.33	PLM	PIPIIP	SINC	Heard not seen
29/05/2019	22.33	PLM	MYONAT	SINC	Heard not seen
29/05/2019	22.58	PLM	PIPIIP	SINC	Heard not seen, foraging
29/05/2019	23.02	PLM	PIPIIP	SINC	Heard not seen
29/05/2019	23.02	PLM	PIPIIP	SINC	Heard not seen
29/05/2019	23.05	PLM	PIPIIP	SINC	Heard not seen
29/05/2019	23.11	PLM	PIPIIP	SINC	Heard not seen
29/05/2019	21.39	GD	PIPIIP	Southern	Heard not seen
29/05/2019	21.40	GD	PIPIIP	Southern	Heard not seen
29/05/2019	21.42	GD	PIPIIP	Southern	Heard not seen
29/05/2019	21.43	GD	PIPIIP	Southern	Foraging at south west corner
29/05/2019	21.43	GD	NYCNOC	Southern	Foraging at south west corner
29/05/2019	21.43	GD	PIPIIP	Southern	Foraging at south west corner
29/05/2019	21.43	GD	PIPIIP	Southern	Foraging at south west corner
29/05/2019	21.45	GD	PIPIIP	Southern	Foraging along hedge
29/05/2019	21.46	GD	PIPIIP	Southern	Foraging along hedge
29/05/2019	21.46	GD	PIPPYG	Southern	Foraging along hedge
29/05/2019	21.47	GD	PIPIIP	Southern	Foraging along hedge
29/05/2019	21.47	GD	PIPIIP	Southern	Foraging along hedge
29/05/2019	21.48	GD	PIPPYG	Southern	Foraging along hedge
29/05/2019	21.50	GD	PIPPYG	Southern	Heard not seen
29/05/2019	21.51	GD	PIPIIP	Southern	Commuting south along west hedge
29/05/2019	21.52	GD	PIPIIP	Southern	Commuting south along west hedge
29/05/2019	21.52	GD	PIPIIP	Southern	Commuting south along west hedge
29/05/2019	21.55	GD	PIPIIP	Southern	Heard not seen
29/05/2019	21.57	GD	PIPIIP	Southern	Heard not seen
29/05/2019	21.59	GD	PIPIIP	Southern	Heard not seen
29/05/2019	22.00	GD	PIPIIP	Southern	Heard not seen
29/05/2019	22.01	GD	PIPIIP	Southern	Commuting through gap south west to north east
29/05/2019	22.04	GD	PIPIIP	Southern	Heard not seen
29/05/2019	22.05	GD	PIPIIP	Southern	Heard not seen
29/05/2019	22.08	GD	PIPIIP	Southern	Heard not seen
29/05/2019	22.10	GD	PIPIIP	Southern	Heard not seen
29/05/2019	22.14	GD	PIPIIP	Southern	Heard not seen
29/05/2019	22.16	GD	PIPIIP	Southern	Heard not seen
29/05/2019	22.17	GD	PIPIIP	Southern	Foraging
29/05/2019	22.35	GD	PIPIIP	Southern	Heard not seen
29/05/2019	22.35	GD	PIPIIP	Southern	Heard not seen
29/05/2019	22.37	GD	PIPIIP	Southern	Commuting south to north
29/05/2019	22.51	GD	PIPIIP	Southern	Heard not seen
29/05/2019	22.52	GD	PIPIIP	Southern	Foraging
29/05/2019	22.53	GD	PIPIIP	Southern	Heard not seen
29/05/2019	22.55	GD	PIPIIP	Southern	Heard not seen
29/05/2019	22.56	GD	PIPIIP	Southern	Foraging along trees
29/05/2019	22.57	GD	PIPIIP	Southern	Foraging along trees
29/05/2019	23.01	GD	PIPIIP	Southern	Heard not seen
27/05/2019	21.58	DM	PIPPYG	Crop	Foraging south to north
27/05/2019	21.58	DM	PIPPYG	Crop	Foraging south to north
27/05/2019	21.59	DM	PIPPYG	Crop	Heard not seen
27/05/2019	21.59	DM	PIPIIP	Crop	Heard not seen
27/05/2019	22.00	DM	PIPPYG	Crop	Foraging along hedge
27/05/2019	22.01	DM	PIPIIP	Crop	Flying north
27/05/2019	22.01	DM	PIPPYG	Crop	Flying north
27/05/2019	22.02	DM	PIPPYG	Crop	Flying west to east
27/05/2019	22.04	DM	PIPIIP	Crop	Flying south
27/05/2019	22.05	DM	PIPIIP	Crop	Faint

27/05/2019	22.09	DM	PIPPIP	Crop	Heard not seen
27/05/2019	22.10	DM	PIPPIP	Crop	Commuting south
27/05/2019	22.10	DM	PIPPIP	Crop	Commuting south
27/05/2019	22.12	DM	PIPPIP	Crop	Commuting south
27/05/2019	22.12	DM	PIPPIP	Crop	Commuting south
27/05/2019	22.14	DM	PIPPIP	Crop	Heard not seen
27/05/2019	22.15	DM	PIPPYG	Crop	Heard not seen
27/05/2019	22.16	DM	PIPPIP	Crop	Heard not seen
27/05/2019	22.16	DM	PIPPIP	Crop	Heard not seen
27/05/2019	22.18	DM	NYCNOC	Crop	Heard not seen
27/05/2019	22.22	DM	PIPPIP	Crop	Heard not seen
27/05/2019	22.25	DM	NYCNOC	Crop	Heard not seen
27/05/2019	22.29	DM	PIPPIP	Crop	Heard not seen
27/05/2019	22.34	DM	MYONAT	Crop	Heard not seen
27/05/2019	22.35	DM	MYONAT	Crop	Heard not seen
27/05/2019	22.41	DM	PIPPIP	Crop	Heard not seen
27/05/2019	22.42	DM	PIPPIP	Crop	Heard not seen
27/05/2019	22.43	DM	PIPPIP	Crop	Heard not seen
27/05/2019	22.43	DM	PIPPIP	Crop	Heard not seen
27/05/2019	22.44	DM	PIPPIP	Crop	Heard not seen
27/05/2019	22.44	DM	PIPPIP	Crop	Heard not seen
27/05/2019	22.45	DM	PIPPIP	Crop	Heard not seen
27/05/2019	22.46	DM	PIPPIP	Crop	Heard not seen
27/05/2019	22.46	DM	PIPPIP	Crop	Heard not seen
27/05/2019	22.49	DM	PIPPIP	Crop	Heard not seen
27/05/2019	22.56	DM	PIPPIP	Crop	Heard not seen
27/05/2019	22.56	DM	PIPPYG	Crop	Heard not seen
27/05/2019	22.59	DM	PIPPIP	Crop	Heard not seen
27/05/2019	23.02	DM	PIPPIP	Crop	Heard not seen
27/05/2019	23.05	DM	PIPPIP	Crop	Heard not seen
27/05/2019	23.06	DM	PIPPIP	Crop	Heard not seen
27/05/2019	23.07	DM	PIPPIP	Crop	Heard not seen
27/05/2019	23.08	DM	PIPPYG	Crop	Heard not seen
27/05/2019	23.09	DM	PIPPIP	Crop	Heard not seen
27/05/2019	23.10	DM	PIPPIP	Crop	Heard not seen
27/05/2019	23.11	DM	PIPPIP	Crop	Heard not seen
27/05/2019	23.11	DM	PIPPIP	Crop	Heard not seen
27/05/2019	23.12	DM	PIPPIP	Crop	Heard not seen
27/05/2019	23.12	DM	PIPPIP	Crop	Heard not seen
27/05/2019	23.12	DM	PIPPIP	Crop	Heard not seen
27/05/2019	23.12	DM	PIPPIP	Crop	Heard not seen
27/05/2019	23.13	DM	PIPPIP	Crop	Heard not seen
27/05/2019	21.46	PLM	NYCNOC	Middle	Heard not seen
27/05/2019	21.48	PLM	PIPPIP	Middle	Foraging
27/05/2019	21.49	PLM	PIPPIP	Middle	Commuting north west to south east
27/05/2019	21.50	PLM	PIPPIP	Middle	Foraging
27/05/2019	21.50	PLM	PIPPIP	Middle	Foraging
27/05/2019	21.53	PLM	NYCNOC	Middle	Heard not seen
27/05/2019	21.53	PLM	NYCNOC	Middle	Heard not seen
27/05/2019	21.55	PLM	NYCNOC	Middle	Heard not seen
27/05/2019	21.55	PLM	PIPPYG	Middle	Heard not seen
27/05/2019	22.00	PLM	PIPPIP	Middle	Commuting north west to south east
27/05/2019	22.03	PLM	PIPPIP	Middle	Heard not seen
27/05/2019	22.09	PLM	NYCNOC	Middle	Heard not seen
27/05/2019	22.11	PLM	PIPPIP	Middle	Heard not seen

Table 22: June 2019 Transect Notes

Date	Time	Rec	Species	Transect	Comment
19/06/2019	21.53	GD	NYCNOC	Southern	Heard not seen
19/06/2019	21.55	GD	NYCNOC	Southern	Foraging heading south west
19/06/2019	22.05	GD	NYCNOC	Southern	Heard not seen
19/06/2019	22.12	GD	PIPPIP	Southern	Heard not seen
19/06/2019	22.14	GD	PIPPIP	Southern	Foraging along hedge
19/06/2019	22.15	GD	PIPPIP	Southern	Foraging along hedge
19/06/2019	22.16	GD	PIPPIP	Southern	Foraging along hedge
19/06/2019	22.17	GD	PIPPIP	Southern	Foraging along hedge
19/06/2019	22.17	GD	PIPPIP	Southern	Foraging along hedge
19/06/2019	22.18	GD	PIPPIP	Southern	Foraging along hedge
19/06/2019	22.19	GD	PIPPIP	Southern	Foraging along hedge
19/06/2019	22.21	GD	PIPPIP	Southern	Foraging along hedge, commuting south
19/06/2019	22.21	GD	PIPPYG	Southern	Foraging along hedge, commuting south
19/06/2019	22.22	GD	PIPPIP	Southern	Foraging under canopy
19/06/2019	22.22	GD	PIPPIP	Southern	Foraging under canopy
19/06/2019	22.23	GD	PIPPIP	Southern	Foraging under canopy

19/06/2019	22.23	GD	PIPIIP	Southern	Foraging under canopy
19/06/2019	22.23	GD	PIPIIP	Southern	Foraging under canopy
19/06/2019	22.25	GD	PIPIIP	Southern	Foraging above hedge
19/06/2019	22.29	GD	PIPIIP	Southern	Commuting along hedge west to east
19/06/2019	22.31	GD	PIPIIP	Southern	Foraging along hedge
19/06/2019	22.31	GD	PIPIIP	Southern	Foraging along hedge
19/06/2019	22.31	GD	PIPIIP	Southern	Foraging along hedge
19/06/2019	22.32	GD	PIPIIP	Southern	Foraging along hedge
19/06/2019	22.33	GD	PIPIIP	Southern	Commuting north west to south
19/06/2019	22.34	GD	PIPPYG	Southern	Heard not seen
19/06/2019	22.41	GD	PIPIIP	Southern	Heard not seen
19/06/2019	22.49	GD	PIPIIP	Southern	Heard not seen
19/06/2019	22.54	GD	PIPIIP	Southern	Foraging
19/06/2019	22.55	GD	PIPIIP	Southern	Foraging up and down reen
19/06/2019	23.02	GD	PIPIIP	Southern	Heard not seen
19/06/2019	23.04	GD	PIPIIP	Southern	Heard not seen
19/06/2019	23.05	GD	PLEUC	Southern	Heard not seen
19/06/2019	23.06	GD	PIPIIP	Southern	Foraging south along hedge
19/06/2019	23.07	GD	PIPIIP	Southern	Foraging south along hedge
19/06/2019	23.08	GD	PIPIIP	Southern	Heard not seen
19/06/2019	23.09	GD	MYONAT	Southern	Heard not seen
19/06/2019	23.09	GD	PIPIIP	Southern	Heard not seen
19/06/2019	23.17	GD	PIPIIP	Southern	Heard not seen
19/06/2019	23.20	GD	PIPIIP	Southern	Heard not seen
19/06/2019	23.20	GD	PIPIIP	Southern	Heard not seen
19/06/2019	23.27	GD	PIPIIP	Southern	Heard not seen
19/06/2019	23.27	GD	PIPPYG	Southern	Heard not seen
19/06/2019	21.57	PLM	PIPIIP	SINC	Foraging on track
19/06/2019	22.00	PLM	PIPIIP	SINC	Foraging in field
19/06/2019	22.06	PLM	PIPIIP	SINC	Foraging in field
19/06/2019	22.10	PLM	PIPIIP	SINC	Foraging in field
19/06/2019	22.15	PLM	PIPIIP	SINC	Foraging in field
19/06/2019	22.18	PLM	PIPIIP	SINC	Foraging in field
19/06/2019	22.21	PLM	PIPIIP	SINC	Foraging in field
19/06/2019	22.24	PLM	PIPIIP	SINC	Foraging in field
19/06/2019	22.24	PLM	MYOTIS	SINC	Foraging in field
19/06/2019	22.37	PLM	PIPIIP	SINC	Foraging in field
19/06/2019	22.40	PLM	PIPIIP	SINC	Foraging in field
19/06/2019	22.47	PLM	PIPIIP	SINC	Foraging in field
19/06/2019	22.54	PLM	PIPIIP	SINC	Foraging in field
19/06/2019	23.00	PLM	PIPIIP	SINC	Foraging in field
19/06/2019	23.03	PLM	PIPIIP	SINC	Foraging in field
19/06/2019	23.03	PLM	PIPIIP	SINC	Foraging in field
19/06/2019	23.03	PLM	PIPIIP	SINC	Foraging in field
19/06/2019	23.04	PLM	PIPIIP	SINC	Foraging in field
19/06/2019	23.04	PLM	MYONAT	SINC	Foraging in field
19/06/2019	23.06	PLM	MYONAT	SINC	Foraging on track
19/06/2019	23.07	PLM	MYONAT	SINC	Foraging on track
19/06/2019	23.09	PLM	MYONAT	SINC	Foraging on track
19/06/2019	23.14	PLM	PIPPYG	SINC	Foraging on track
20/06/2019	21.35	RM	PIPIIP	Cypress	Foraging on footpath below road
20/06/2019	21.36	RM	PIPIIP	Cypress	Foraging in trees north east of footpath
20/06/2019	21.43	RM	PIPIIP	Cypress	In trees to the north of the road
20/06/2019	21.45	RM	PIPIIP	Cypress	Foraging in band of woodland north of the road
20/06/2019	21.46	RM	PIPIIP	Cypress	Foraging in band of woodland north of the road
20/06/2019	21.48	RM	PIPIIP	Cypress	Foraging over road
20/06/2019	21.49	RM	PIPIIP	Cypress	Commuting across the road
20/06/2019	21.49	RM	PIPIIP	Cypress	Commuting across the road
20/06/2019	21.53	RM	PIPIIP	Cypress	Foraging in woods north of the road
20/06/2019	21.53	RM	PIPIIP	Cypress	Foraging in woods north of the road
20/06/2019	21.56	RM	PIPIIP	Cypress	Foraging over footpath that goes under the road
20/06/2019	21.56	RM	PIPIIP	Cypress	Foraging over footpath that goes under the road
20/06/2019	22.02	RM	NYCNOC	Cypress	Heard not seen
20/06/2019	22.18	RM	PIPIIP	Cypress	Heard not seen
20/06/2019	22.21	RM	PIPIIP	Cypress	Foraging south side of road, path below bridge
20/06/2019	22.22	RM	PIPIIP	Cypress	Foraging south side of road, path below bridge
20/06/2019	22.27	RM	PIPIIP	Cypress	Foraging in trees south west of the road
20/06/2019	22.31	RM	PIPIIP	Cypress	Foraging on other side of the road
20/06/2019	22.32	RM	PIPIIP	Cypress	Foraging on other side of the road
20/06/2019	22.34	RM	PIPIIP	Cypress	Foraging west of the road
20/06/2019	22.35	RM	PIPIIP	Cypress	Foraging west of the road
20/06/2019	22.38	RM	PIPIIP	Cypress	Foraging on other side of hedge
20/06/2019	22.43	RM	PIPIIP	Cypress	Foraging around trees south of road
20/06/2019	22.48	RM	PIPPYG	Cypress	Foraging over lake
20/06/2019	22.48	RM	PIPIIP	Cypress	Foraging over lake

20/06/2019	22.49	RM	PIPIIP	Cypress	Foraging over lake
20/06/2019	22.49	RM	PIPIIP	Cypress	Foraging over lake
20/06/2019	22.49	RM	PIPIIP	Cypress	Foraging over lake
20/06/2019	22.49	RM	PIPPYG	Cypress	Foraging over lake
20/06/2019	22.52	RM	PIPPYG	Cypress	Foraging over lake
20/06/2019	22.52	RM	PIPIIP	Cypress	Foraging over lake
20/06/2019	22.52	RM	PIPPYG	Cypress	Foraging over lake
20/06/2019	22.54	RM	PIPPYG	Cypress	Foraging over lake
20/06/2019	22.55	RM	PIPIIP	Cypress	Foraging over lake
20/06/2019	22.55	RM	PIPPYG	Cypress	Foraging over lake
20/06/2019	22.55	RM	PIPPYG	Cypress	Foraging over lake
20/06/2019	22.56	RM	PIPIIP	Cypress	Foraging over lake
20/06/2019	22.56	RM	PIPPYG	Cypress	Foraging over lake
20/06/2019	22.57	RM	PIPPYG	Cypress	Foraging over lake
20/06/2019	22.57	RM	PIPPYG	Cypress	Foraging over lake
20/06/2019	22.57	RM	PIPIIP	Cypress	Foraging over lake
20/06/2019	22.57	RM	PIPIIP	Cypress	Foraging over lake
20/06/2019	22.58	RM	MYONAT	Cypress	Foraging over lake
20/06/2019	22.58	RM	PIPIIP	Cypress	Foraging over lake
20/06/2019	22.58	RM	PIPNAT	Cypress	Foraging over lake
20/06/2019	22.58	RM	PIPPYG	Cypress	Foraging over lake
20/06/2019	22.58	RM	PIPPYG	Cypress	Foraging over lake
20/06/2019	23.00	RM	PIPIIP	Cypress	Foraging over lake
20/06/2019	23.00	RM	PIPPYG	Cypress	Foraging over lake
20/06/2019	23.02	RM	PIPIIP	Cypress	at crossroad
20/06/2019	23.02	RM	PIPIIP	Cypress	at crossroad
20/06/2019	23.03	RM	PIPIIP	Cypress	Foraging along reen
20/06/2019	23.03	RM	PIPIIP	Cypress	Foraging along reen
20/06/2019	23.03	RM	PIPIIP	Cypress	Foraging along reen
20/06/2019	23.03	RM	PIPPYG	Cypress	Foraging along reen
20/06/2019	23.03	RM	PIPPYG	Cypress	Foraging along reen
20/06/2019	23.04	RM	PIPIIP	Cypress	Foraging along reen
20/06/2019	23.04	RM	PIPIIP	Cypress	Foraging along reen
20/06/2019	23.04	RM	PIPPYG	Cypress	Foraging along reen
20/06/2019	23.05	RM	PIPIIP	Cypress	Foraging along reen
20/06/2019	23.05	RM	PIPIIP	Cypress	Foraging along reen
20/06/2019	23.05	RM	PIPIIP	Cypress	Foraging along reen
20/06/2019	23.05	RM	PIPPYG	Cypress	Foraging along reen
20/06/2019	23.07	RM	NYCNOC	Cypress	Foraging along reen
20/06/2019	23.07	RM	PIPIIP	Cypress	Foraging along reen
20/06/2019	23.07	RM	PIPIIP	Cypress	Foraging along reen
20/06/2019	23.07	RM	PIPIIP	Cypress	Foraging along reen
20/06/2019	23.07	RM	PIPPYG	Cypress	Foraging along reen
20/06/2019	23.07	RM	PIPPYG	Cypress	Foraging along reen
20/06/2019	23.09	RM	MYOTIS	Cypress	Foraging along reen
20/06/2019	23.09	RM	PIPIIP	Cypress	Foraging along reen
20/06/2019	23.09	RM	PIPPYG	Cypress	Foraging along reen
20/06/2019	23.12	RM	MYOTIS	Cypress	Foraging over footpath
20/06/2019	23.14	RM	MYOTIS	Cypress	Foraging east of the road
20/06/2019	23.16	RM	PIPIIP	Cypress	Foraging east of the road
20/06/2019	23.17	RM	PIPIIP	Cypress	Heard not seen
20/06/2019	23.20	RM	PIPIIP	Cypress	Foraging east of the road
20/06/2019	23.22	RM	PIPIIP	Cypress	Foraging east of the road
20/06/2019	23.23	RM	PIPIIP	Cypress	Heard not seen
20/06/2019	23.26	RM	NYCNOC	Cypress	Foraging on road and roadside
20/06/2019	23.26	RM	PIPIIP	Cypress	Foraging on road and roadside
20/06/2019	23.27	RM	PIPIIP	Cypress	East of road
20/06/2019	23.28	RM	PIPIIP	Cypress	East of road
20/06/2019	23.30	RM	PIPIIP	Cypress	East of road
20/06/2019	23.32	RM	PIPIIP	Cypress	East of road
20/06/2019	21.59	PLM	PIPIIP	Middle	Heard not seen
20/06/2019	22.03	PLM	PIPIIP	Middle	Commuting west to east along hedgerow
20/06/2019	22.04	PLM	PIPIIP	Middle	Commuting west to east along hedgerow
20/06/2019	22.04	PLM	PIPIIP	Middle	Commuting west to east along hedgerow
20/06/2019	22.05	PLM	PIPIIP	Middle	Foraging at hedgerow edge
20/06/2019	22.09	PLM	PIPIIP	Middle	Commuting west to east along hedgerow
20/06/2019	22.10	PLM	PIPIIP	Middle	Commuting west to east along hedgerow
20/06/2019	22.15	PLM	NYCNOC	Middle	Foraging high over the water course
20/06/2019	22.15	PLM	PIPIIP	Middle	Foraging high over the water course
20/06/2019	22.18	PLM	NYCNOC	Middle	Foraging high over the water course
20/06/2019	22.25	PLM	Barn owl	Middle	Barn owl flying west to east along hedgerow
20/06/2019	22.30	PLM	PIPIIP	Middle	Foraging at hedgerow edge
20/06/2019	22.33	PLM	PIPIIP	Middle	Commuting
20/06/2019	22.38	PLM	PIPIIP	Middle	Commuting
20/06/2019	22.39	PLM	PIPIIP	Middle	Commuting

20/06/2019	22.41	PLM	MYODAU	Middle	Commuting
20/06/2019	22.21	GD	PIPPYG	Crop	Foraging west to east along hedge
20/06/2019	22.27	GD	PIPIIP	Crop	Heard not seen
20/06/2019	22.27	GD	PIPIIP	Crop	Foraging over crop
20/06/2019	22.29	GD	PIPPYG	Crop	Heard not seen
20/06/2019	22.31	GD	PIPPYG	Crop	Foraging under tree
20/06/2019	22.32	GD	PIPIIP	Crop	Foraging under tree
20/06/2019	22.32	GD	PIPPYG	Crop	Foraging under tree
20/06/2019	22.39	GD	PIPIIP	Crop	Heard not seen
20/06/2019	22.40	GD	PIPIIP	Crop	Heard not seen
20/06/2019	22.40	GD	PIPIIP	Crop	Heard not seen
20/06/2019	22.40	GD	PIPPYG	Crop	Foraging over ree
20/06/2019	22.40	GD	PIPIIP	Crop	Foraging over ree
20/06/2019	22.47	GD	NYCNOC	Crop	Heard not seen
20/06/2019	22.50	GD	PIPIIP	Crop	Heard not seen
20/06/2019	22.51	GD	PIPIIP	Crop	Foraging over ree
20/06/2019	22.53	GD	PIPIIP	Crop	Heard not seen
20/06/2019	22.54	GD	PIPIIP	Crop	Heard not seen
20/06/2019	22.59	GD	PIPIIP	Crop	Foraging under tree canopy
20/06/2019	23.06	GD	PIPIIP	Crop	Heard not seen
20/06/2019	23.07	GD	PIPPYG	Crop	Heard not seen
20/06/2019	23.09	GD	PIPIIP	Crop	Foraging over ree
20/06/2019	23.09	GD	PIPIIP	Crop	Foraging over ree
20/06/2019	23.10	GD	PIPIIP	Crop	Foraging over ree
20/06/2019	23.11	GD	PIPIIP	Crop	Foraging over ree
20/06/2019	23.11	GD	PIPIIP	Crop	Foraging over ree
20/06/2019	23.13	GD	PIPIIP	Crop	Heard not seen
20/06/2019	23.15	GD	PIPIIP	Crop	Heard not seen
20/06/2019	23.19	GD	PIPIIP	Crop	Foraging over ree
20/06/2019	23.20	GD	PIPIIP	Crop	Heard not seen
20/06/2019	23.22	GD	PIPIIP	Crop	Heard not seen
20/06/2019	23.22	GD	PIPIIP	Crop	Heard not seen
20/06/2019	23.24	GD	PIPIIP	Crop	Heard not seen
20/06/2019	23.28	GD	PIPIIP	Crop	Heard not seen

Table 23: July 2019 Transect Notes

Date	Time	Rec	Species	Transect	Comment
16/07/2019	21.45	PLM	NYCNOC	SINC	Heard not seen
16/07/2019	21.56	PLM	NYCNOC	SINC	Heard not seen
16/07/2019	22.05	PLM	PIPIIP	SINC	Heard not seen
16/07/2019	22.07	PLM	PIPIIP	SINC	Heard not seen
16/07/2019	22.09	PLM	PIPIIP	SINC	Heard not seen
16/07/2019	22.14	PLM	PIPIIP	SINC	Heard not seen
16/07/2019	22.19	PLM	PIPIIP	SINC	Heard not seen
16/07/2019	22.21	PLM	PIPIIP	SINC	Heard not seen
16/07/2019	22.24	PLM	PIPIIP	SINC	Heard not seen
16/07/2019	22.32	PLM	PIPIIP	SINC	Foraging
16/07/2019	22.34	PLM	PIPIIP	SINC	Heard not seen
16/07/2019	22.36	PLM	PIPIIP	SINC	Heard not seen
16/07/2019	22.37	PLM	PIPIIP	SINC	Heard not seen
16/07/2019	22.44	PLM	PIPIIP	SINC	Heard not seen
16/07/2019	22.45	PLM	NYCNOC	SINC	Heard not seen
16/07/2019	22.48	PLM	PIPIIP	SINC	Heard not seen
16/07/2019	22.51	PLM	PIPIIP	SINC	Heard not seen
16/07/2019	22.55	PLM	PIPIIP	SINC	Heard not seen
16/07/2019	22.57	PLM	PIPIIP	SINC	Foraging overhead
16/07/2019	23.06	PLM	PIPIIP	SINC	Heard not seen
16/07/2019	21.26	RM	PIPIIP	Cypress	Foraging over road between trees
16/07/2019	21.28	RM	PIPIIP	Cypress	Commuting across road west to east
16/07/2019	21.35	RM	PIPIIP	Cypress	Foraging in woodland north side
16/07/2019	21.40	RM	PIPIIP	Cypress	Foraging in tree tops north of road
16/07/2019	21.43	RM	PIPIIP	Cypress	Foraging in centre of road
16/07/2019	21.43	RM	PIPIIP	Cypress	Foraging in centre of road
16/07/2019	21.44	RM	PIPIIP	Cypress	Commuting down road, foraging above street light
16/07/2019	21.46	RM	PIPIIP	Cypress	Foraging in rear garden, south west of road
16/07/2019	21.46	RM	PIPIIP	Cypress	Foraging in rear garden, south west of road
16/07/2019	21.55	RM	PIPIIP	Cypress	Foraging south side of road
16/07/2019	22.03	RM	PIPIIP	Cypress	Foraging below road
16/07/2019	22.03	RM	PIPIIP	Cypress	Foraging below road
16/07/2019	22.05	RM	PIPIIP	Cypress	Foraging amongst trees
16/07/2019	22.07	RM	PIPIIP	Cypress	Foraging around house south east of the road
16/07/2019	22.07	RM	PIPIIP	Cypress	Foraging around house south east of the road
16/07/2019	22.18	RM	NYCNOC	Cypress	Heard not seen
16/07/2019	22.19	RM	NYCNOC	Cypress	Heard not seen

16/07/2019	22.21	RM	PIPIIP	Cypress	Commuting west to east
16/07/2019	22.24	RM	PIPPYG	Cypress	Commuting west to east along path
16/07/2019	22.24	RM	PIPPYG	Cypress	Commuting west to east along path
16/07/2019	22.25	RM	PIPIIP	Cypress	Over water
16/07/2019	22.25	RM	PIPPYG	Cypress	Over water
16/07/2019	22.25	RM	PIPIIP	Cypress	Over water
16/07/2019	22.25	RM	PIPIIP	Cypress	Over water
16/07/2019	22.25	RM	PIPPYG	Cypress	Over water
16/07/2019	22.25	RM	PIPPYG	Cypress	Over water
16/07/2019	22.25	RM	NYCNOC	Cypress	Over water
16/07/2019	22.26	RM	PIPIIP	Cypress	Over water
16/07/2019	22.26	RM	PIPIIP	Cypress	Over water
16/07/2019	22.26	RM	PIPIIP	Cypress	Over water
16/07/2019	22.26	RM	PIPPYG	Cypress	Over water
16/07/2019	22.26	RM	PIPPYG	Cypress	Over water
16/07/2019	22.29	RM	MYOTIS	Cypress	Over water
16/07/2019	22.29	RM	MYOTIS	Cypress	Over water
16/07/2019	22.31	RM	PIPIIP	Cypress	Over water
16/07/2019	22.31	RM	PIPIIP	Cypress	Over water
16/07/2019	22.33	RM	PIPIIP	Cypress	Foraging over reed
16/07/2019	22.33	RM	PIPIIP	Cypress	Foraging over reed
16/07/2019	22.33	RM	PIPIIP	Cypress	Foraging over reed
16/07/2019	22.36	RM	NYCNOC	Cypress	Heard not seen
16/07/2019	22.41	RM	PIPIIP	Cypress	Foraging over field
16/07/2019	22.43	RM	NYCNOC	Cypress	Heard not seen
16/07/2019	22.50	RM	PIPIIP	Cypress	Foraging in trees east of road
16/07/2019	22.52	RM	PIPIIP	Cypress	Foraging in trees east of road
16/07/2019	22.55	RM	PIPIIP	Cypress	East side of road
16/07/2019	22.56	RM	PIPIIP	Cypress	Commuting east side of the road
16/07/2019	22.57	RM	PIPIIP	Cypress	South east of the road
16/07/2019	23.00	RM	PIPIIP	Cypress	South east of the road
16/07/2019	22.01	DM	PIPIIP	Crop	Foraging along hedgerow
16/07/2019	22.03	DM	PIPIIP	Crop	Foraging along hedgerow
16/07/2019	22.06	DM	PIPIIP	Crop	Foraging along hedgerow
16/07/2019	22.09	DM	NYCNOC	Crop	Heard not seen
16/07/2019	22.11	DM	PIPIIP	Crop	Heard not seen
16/07/2019	22.13	DM	PIPIIP	Crop	Heard not seen
16/07/2019	22.16	DM	PIPIIP	Crop	Heard not seen
16/07/2019	22.17	DM	PIPIIP	Crop	Foraging along hedgerow
16/07/2019	22.19	DM	PIPIIP	Crop	Foraging along hedgerow
16/07/2019	22.20	DM	PIPIIP	Crop	Heard not seen, + 2 barn owls flying low and to west
16/07/2019	22.29	DM	PIPIIP	Crop	Heard not seen
16/07/2019	22.31	DM	PIPIIP	Crop	Heard not seen
16/07/2019	22.39	DM	PIPIIP	Crop	Foraging along hedgerow
16/07/2019	22.43	DM	PIPIIP	Crop	Heard not seen
16/07/2019	22.48	DM	PIPIIP	Crop	Foraging along hedgerow
16/07/2019	22.49	DM	PIPIIP	Crop	Foraging along hedgerow
16/07/2019	22.50	DM	PIPIIP	Crop	Foraging along hedgerow
16/07/2019	22.53	DM	PIPIIP	Crop	Heard not seen
17/07/2019	22.54	DM	PIPIIP	Crop	Heard not seen
16/07/2019	22.54	DM	PIPIIP	Crop	Heard not seen
16/07/2019	22.55	DM	PIPIIP	Crop	Heard not seen
16/07/2019	22.56	DM	PIPIIP	Crop	Heard not seen
16/07/2019	22.59	DM	PIPIIP	Crop	Heard not seen
16/07/2019	23.04	DM	PIPIIP	Crop	Heard not seen
16/07/2019	23.07	DM	PIPIIP	Crop	Foraging on edge of light zone
16/07/2019	23.12	DM	PIPIIP	Crop	Heard not seen
16/07/2019	23.13	DM	PIPIIP	Crop	Heard not seen
16/07/2019	23.15	DM	PIPIIP	Crop	Heard not seen
16/07/2019	23.16	DM	PIPIIP	Crop	Heard not seen
16/07/2019	23.17	DM	PIPIIP	Crop	Heard not seen
16/07/2019	23.24	DM	PIPPYG	Crop	Foraging along hedgerow
16/07/2019	23.24	DM	PIPIIP	Crop	Foraging along hedgerow
16/07/2019	23.26	DM	PIPIIP	Crop	Foraging along hedgerow
16/07/2019	23.26	DM	NYCNOC	Crop	Heard not seen
16/07/2019	23.26	DM	PIPIIP	Crop	Heard not seen
16/07/2019	23.28	DM	PIPIIP	Crop	Heard not seen
16/07/2019	23.29	DM	PIPIIP	Crop	Foraging along treeline
16/07/2019	23.29	DM	PIPIIP	Crop	Foraging along treeline
16/07/2019	23.31	DM	PIPIIP	Crop	Foraging along treeline
16/07/2019	23.31	DM	NYCNOC	Crop	Foraging along treeline
16/07/2019	23.34	DM	PIPIIP	Crop	Foraging along treeline
16/07/2019	23.34	DM	PIPPYG	Crop	Foraging along treeline
16/07/2019	23.35	DM	PIPIIP	Crop	Foraging along treeline
16/07/2019	23.35	DM	PIPIIP	Crop	Foraging along treeline

16/07/2019	23.35	DM	NYCNOC	Crop	Foraging along treeline
16/07/2019	23.37	DM	NYCNOC	Crop	Heard not seen
16/07/2019	23.38	DM	PIPIIP	Crop	Heard not seen
16/07/2019	23.38	DM	NYCNOC	Crop	Heard not seen
17/07/2019	21.51	PLM	PIPIIP	Middle	Foraging, travelling to the north west
17/07/2019	21.54	PLM	PIPIIP	Middle	Foraging along treeline to the north west
17/07/2019	21.55	PLM	NYCNOC	Middle	Heard not seen
17/07/2019	21.55	PLM	PIPIIP	Middle	Heard not seen
17/07/2019	21.56	PLM	PIPIIP	Middle	Heard not seen
17/07/2019	21.56	PLM	NYCNOC	Middle	Heard not seen
17/07/2019	21.57	PLM	BARN OWL	Middle	Barn owl flying west to east across the field
17/07/2019	22.00	PLM	PIPIIP	Middle	Foraging to north west
17/07/2019	22.11	PLM	PIPIIP	Middle	Foraging on access track
17/07/2019	22.13	PLM	PIPIIP	Middle	Foraging on track way
17/07/2019	22.15	PLM	PIPIIP	Middle	Foraging beneath trees on track
17/07/2019	22.16	PLM	PIPIIP	Middle	Foraging along track
17/07/2019	22.19	PLM	PIPIIP	Middle	Heard not seen
17/07/2019	22.21	PLM	PIPIIP	Middle	Heard not seen
17/07/2019	22.23	PLM	PIPIIP	Middle	Foraging in trees on side on track
17/07/2019	22.25	PLM	PIPIIP	Middle	Foraging near gateway
17/07/2019	21.58	AR	PIPIIP	Southern	Heard not seen
17/07/2019	22.02	AR	PIPIIP	Southern	Foraging around south west side of hedgerow
17/07/2019	22.06	AR	PIPIIP	Southern	Heard not seen
17/07/2019	22.13	AR	PIPIIP	Southern	Heard not seen
17/07/2019	22.14	AR	PIPIIP	Southern	Foraging over reen
17/07/2019	22.17	AR	PIPIIP	Southern	Foraging in field north to south
17/07/2019	22.21	AR	PIPIIP	Southern	Heard not seen
17/07/2019	22.21	AR	PIPIIP	Southern	Heard not seen
17/07/2019	22.24	AR	PIPIIP	Southern	Heard not seen
17/07/2019	22.28	AR	PIPIIP	Southern	Heard not seen
17/07/2019	22.31	AR	PIPIIP	Southern	Heard not seen
17/07/2019	22.35	AR	PIPIIP	Southern	Heard not seen
17/07/2019	22.35	AR	PIPIIP	Southern	Heard not seen
17/07/2019	22.36	AR	MYOTIS	Southern	Flying close to hedgerow
17/07/2019	22.41	AR	PIPIIP	Southern	Heard not seen
17/07/2019	22.44	AR	PIPIIP	Southern	Heard not seen
17/07/2019	22.46	AR	PIPIIP	Southern	Heard not seen
17/07/2019	22.46	AR	NYCNOC	Southern	Heard not seen
17/07/2019	22.49	AR	PIPIIP	Southern	Heard not seen
17/07/2019	22.50	AR	PIPIIP	Southern	Other side of hedgerow
17/07/2019	22.50	AR	PIPIIP	Southern	Other side of hedgerow
17/07/2019	22.52	AR	PIPPYG	Southern	Heard not seen
17/07/2019	22.52	AR	PIPPYG	Southern	Heard not seen
17/07/2019	22.56	AR	PIPIIP	Southern	Heard not seen
17/07/2019	22.56	AR	PIPIIP	Southern	Heard not seen

Table 24: August 2019 Transect Notes

Date	Time	Rec	Species	Transect	Comment
27/08/2019	20.18	AR	PIP NAT	Crop	Heard not seen
27/08/2019	20.18	AR	PIP NAT	Crop	Heard not seen
27/08/2019	20.19	AR	NYCNOC	Crop	Heard not seen
27/08/2019	20.29	AR	NYCNOC	Crop	Heard not seen
27/08/2019	20.40	AR	PIPIIP	Crop	Heard not seen
27/08/2019	20.46	AR	PIPIIP	Crop	Heard not seen
27/08/2019	21.02	AR	PIPIIP	Crop	Heard not seen
27/08/2019		AR	BARN OWL	Crop	Flying round to north
27/08/2019	21.08	AR	PIPIIP	Crop	Heard not seen
27/08/2019	21.10	AR	PIPIIP	Crop	Heard not seen
27/08/2019	21.14	AR	PIPPYG	Crop	Heard not seen
27/08/2019	21.18	AR	PIPIIP	Crop	Heard not seen
27/08/2019	21.2	AR	PIPPYG	Crop	Heard not seen
27/08/2019	21.22	AR	PIPIIP	Crop	Heard not seen
27/08/2019	21.22	AR	PIPIIP	Crop	Heard not seen
27/08/2019	21.22	AR	NYCNOC	Crop	Heard not seen
27/08/2019	21.23	AR	PIPIIP	Crop	Heard not seen
27/08/2019	21.23	AR	PIPIIP	Crop	Heard not seen
27/08/2019	21.28	AR	MYODAU	Crop	Heard not seen
27/08/2019	21.31	AR	PIPIIP	Crop	Heard not seen
27/08/2019	21.38	AR	PIPIIP	Crop	Heard not seen
27/08/2019	21.40	AR	PIPIIP	Crop	Heard not seen
27/08/2019	21.40	AR	PIPIIP	Crop	Heard not seen
27/08/2019	21.46	AR	PIPIIP	Crop	Heard not seen

26/08/2019	20.42	DM	NYCNOC	Southern	Flying to west
26/08/2019	20.46	DM	NYCNOC	Southern	Heard not seen
26/08/2019	20.48	DM	NYCNOC	Southern	Heard not seen
26/08/2019	20.49	DM	NYCNOC	Southern	Heard not seen
26/08/2019	20.52	DM	PIPPYG	Southern	Commuting west to east along hedge
26/08/2019	20.52	DM	NYCNOC	Southern	Heard not seen
26/08/2019	20.53	DM	PIPPYG	Southern	Heard not seen
26/08/2019	20.53	DM	NYCNOC	Southern	Commuting east to west along hedge
26/08/2019	20.55	DM	NYCNOC	Southern	Heard not seen
26/08/2019	20.56	DM	PIPIPI	Southern	Heard not seen
26/08/2019	20.59	DM	PIPIPI	Southern	Heard not seen
26/08/2019	21.02	DM	PIPIPI	Southern	Heard not seen
26/08/2019	21.03	DM	PIPIPI	Southern	Heard not seen
26/08/2019	21.06	DM	PIPPYG	Southern	Heard not seen
26/08/2019	21.08	DM	PIPPYG	Southern	Heard not seen
26/08/2019	21.09	DM	PIPIPI	Southern	Heard not seen
26/08/2019	21.11	DM	PIPIPI	Southern	Heard not seen
26/08/2019	21.12	DM	PIPIPI	Southern	Foraging along hedge
26/08/2019	21.16	DM	PIPIPI	Southern	Heard not seen
26/08/2019	21.18	DM	PIPIPI	Southern	Heard not seen
26/08/2019	21.19	DM	PIPIPI	Southern	Foraging along reën
26/08/2019	21.20	DM	PIPIPI	Southern	Heard not seen
26/08/2019	21.23	DM	PIPIPI	Southern	Heard not seen
26/08/2019	21.27	DM	MYOTIS	Southern	Heard not seen
26/08/2019	21.29	DM	PIPIPI	Southern	Heard not seen, foraging
26/08/2019	21.37	DM	PIPPYG	Southern	Heard not seen
26/08/2019	21.41	DM	PIPPYG	Southern	Heard not seen
26/08/2019	21.43	DM	PIPIPI	Southern	Heard not seen
26/08/2019	21.44	DM	PIPIPI	Southern	Heard not seen
26/08/2019	21.46	DM	PIPIPI	Southern	Heard not seen
26/08/2019	21.49	DM	PIPIPI	Southern	Heard not seen, foraging
26/08/2019	21.53	DM	PIPPYG	Southern	Heard not seen
26/08/2019	21.57	DM	MYOTIS	Southern	Heard not seen
26/08/2019	21.59	DM	PIPIPI	Southern	Heard not seen
26/08/2019	22.02	DM	MYOTIS	Southern	Heard not seen
26/08/2019	22.03	DM	MYOTIS	Southern	Heard not seen
26/08/2019	20.24	PW	NYCNOC	Cypress	Heard not seen
26/08/2019	20.36	PW	PIPIPI	Cypress	Commuting along fence to the south
26/08/2019	20.38	PW	NYCNOC	Cypress	Heard not seen
26/08/2019	20.41	PW	NYCNOC	Cypress	Heard not seen
26/08/2019	20.43	PW	NYCNOC	Cypress	Heard not seen
26/08/2019	20.43	PW	PIPIPI	Cypress	Commuting north, west of path
26/08/2019	20.45	PW	NYCNOC	Cypress	Heard not seen
26/08/2019	20.45	PW	PIPIPI	Cypress	Commuting along path
26/08/2019	20.50	PW	NYCNOC	Cypress	Heard not seen
26/08/2019	20.50	PW	NYCNOC	Cypress	Heard not seen
26/08/2019	20.50	PW	MYOTIS	Cypress	Heard not seen
26/08/2019	20.51	PW	PIPPYG	Cypress	Heard not seen
26/08/2019	20.51	PW	NYCNOC	Cypress	Heard not seen
26/08/2019	20.51	PW	NYCNOC	Cypress	Commuting along path
26/08/2019	20.54	PW	NYCNOC	Cypress	Commuting along path
26/08/2019	20.54	PW	NYCNOC	Cypress	Commuting along path
26/08/2019	20.54	PW	PIPIPI	Cypress	Commuting along path
26/08/2019	20.56	PW	PIPIPI	Cypress	Commuting along reën
26/08/2019	20.58	PW	PIPPYG	Cypress	Commuting along reën
26/08/2019	20.58	PW	PIPPYG	Cypress	Heard not seen
26/08/2019	20.58	PW	NYCNOC	Cypress	Heard not seen
26/08/2019	20.58	PW	NYCNOC	Cypress	Heard not seen
26/08/2019	20.58	PW	MYONAT	Cypress	Commuting to the east
26/08/2019	21.00	PW	PIPPYG	Cypress	Heard not seen
26/08/2019	21.00	PW	NYCNOC	Cypress	Commuting from lake to woodland
26/08/2019	21.01	PW	PIPPYG	Cypress	Commuting along path
26/08/2019	21.03	PW	PIPPYG	Cypress	Around lake
26/08/2019	21.03	PW	PIPPYG	Cypress	Around lake
26/08/2019	21.03	PW	NYCNOC	Cypress	Around lake
26/08/2019	21.04	PW	PIPIPI	Cypress	Around lake
26/08/2019	21.04	PW	NYCNOC	Cypress	Around lake
26/08/2019	21.05	PW	PIPIPI	Cypress	Around lake
26/08/2019	21.07	PW	PIPIPI	Cypress	Around lake
26/08/2019	21.07	PW	PIPIPI	Cypress	Around lake
26/08/2019	21.07	PW	PIPPYG	Cypress	Around lake
26/08/2019	21.07	PW	PIPPYG	Cypress	Around lake
26/08/2019	21.08	PW	PIPIPI	Cypress	Around lake and path
26/08/2019	21.08	PW	PIPIPI	Cypress	Around lake and path
26/08/2019	21.08	PW	PIPPYG	Cypress	Around lake and path

26/08/2019	21.08	PW	PIPPYG	Cypress	Around lake and path
26/08/2019	21.08	PW	PIPPYG	Cypress	Around lake and path
26/08/2019	21.08	PW	NYCNOC	Cypress	Around lake and path
26/08/2019	21.08	PW	NYCNOC	Cypress	Around lake and path
26/08/2019	21.08	PW	MYONAT	Cypress	Around lake and path
26/08/2019	21.10	PW	NYCNOC	Cypress	Around lake
26/08/2019	21.10	PW	NYCNOC	Cypress	Around lake
26/08/2019	21.10	PW	PIPIPI	Cypress	Around lake
26/08/2019	21.10	PW	PIPIPI	Cypress	Around lake
26/08/2019	21.10	PW	PIPPYG	Cypress	Around lake
26/08/2019	21.10	PW	PIPPYG	Cypress	Around lake
26/08/2019	21.10	PW	PIPPYG	Cypress	Around lake
26/08/2019	21.14	PW	NYCNOC	Cypress	Commuting along road by houses
26/08/2019	21.14	PW	NYCNOC	Cypress	Commuting along road by houses
26/08/2019	21.14	PW	PIPIPI	Cypress	Commuting along road by houses
26/08/2019	21.22	PW	PIPIPI	Cypress	Heard not seen
26/08/2019	21.22	PW	PIPIPI	Cypress	Heard not seen
26/08/2019	21.23	PW	PIPIPI	Cypress	Foraging in gardens
26/08/2019	21.26	PW	PIPPYG	Cypress	Foraging in gardens
26/08/2019	21.33	PW	PIPIPI	Cypress	Heard not seen
26/08/2019	21.36	PW	PIPIPI	Cypress	In trees alongside road
26/08/2019	21.38	PW	PIPIPI	Cypress	In trees alongside road
26/08/2019	21.38	PW	PIPPYG	Cypress	In trees alongside road
26/08/2019	21.39	PW	PIPIPI	Cypress	In trees alongside road
26/08/2019	21.40	PW	PIPIPI	Cypress	Alongside road
26/08/2019	21.41	PW	PIPIPI	Cypress	Alongside road
26/08/2019	21.42	PW	PIPIPI	Cypress	Alongside road
26/08/2019	21.43	PW	PIPIPI	Cypress	Alongside road
26/08/2019	21.46	PW	PIPIPI	Cypress	Alongside road
26/08/2019	21.50	PW	PIPIPI	Cypress	Alongside road
26/08/2019	21.53	PW	PIPPYG	Cypress	On path under road
27/08/2019	20.40	PM	PIPIPI	SINC	Foraging
27/08/2019	20.47	PM	PIPIPI	SINC	Commuting
27/08/2019	20.49	PM	PIPIPI	SINC	Commuting
27/08/2019	21.00	PM	PIPPYG	SINC	Foraging
27/08/2019	21.06	PM	PIPIPI	SINC	Foraging
27/08/2019	21.06	PM	PIPIPI	SINC	Foraging
27/08/2019	21.10	PM	PIPIPI	SINC	Foraging
27/08/2019	21.12	PM	PIPIPI	SINC	Foraging
27/08/2019	21.12	PM	PIPIPI	SINC	Foraging
27/08/2019	21.13	PM	PIPIPI	SINC	Foraging
27/08/2019	21.23	PM	PIPIPI	SINC	Heard not seen
27/08/2019	21.27	PM	PIPIPI	SINC	Foraging
27/08/2019	21.29	PM	PIPPYG	SINC	Foraging
27/08/2019	21.30	PM	PIPIPI	SINC	Foraging
27/08/2019	21.32	PM	PIPPYG	SINC	Foraging
27/08/2019	21.33	PM	PIPIPI	SINC	Foraging
27/08/2019	21.36	PM	PIPIPI	SINC	Commuting
27/08/2019	21.39	PM	PIPIPI	SINC	Foraging
27/08/2019	21.39	PM	MYOTIS	SINC	Foraging
27/08/2019	21.40	PM	PIPIPI	SINC	Foraging
27/08/2019	20.34	RM	NYCNOC	Middle	Heard not seen
27/08/2019	20.38	RM	PIPIPI	Middle	Commuting along water way north east to south west
27/08/2019	20.46	RM	PIPIPI	Middle	Foraging
27/08/2019	20.47	RM	NYCNOC	Middle	Heard not seen
27/08/2019	20.50	RM	PIPIPI	Middle	Foraging along hedge
27/08/2019	20.52	RM	MYONAT	Middle	Foraging
27/08/2019	20.52	RM	MYONAT	Middle	Foraging
27/08/2019	20.53	RM	MYONAT	Middle	Foraging
27/08/2019	20.54	RM	MYONAT	Middle	Foraging 6 m from treeline
27/08/2019	20.55	RM	PIPPYG	Middle	Foraging 6 m from treeline
27/08/2019	20.55	RM	MYONAT	Middle	Foraging 6 m from treeline
27/08/2019	20.57	RM	PIPIPI	Middle	Foraging along treeline to the south west
27/08/2019	20.57	RM	BARN OWL	Middle	Owl flew from tree
27/08/2019	21.03	RM	PIPIPI	Middle	South to north
27/08/2019	21.06	RM	PIPPYG	Middle	South to north
27/08/2019	21.06	RM	PIPIPI	Middle	South to north
27/08/2019	21.07	RM	PIPIPI	Middle	Commuting
27/08/2019	21.09	RM	PIPIPI	Middle	Commuting across field north to south
27/08/2019	21.14	RM	PIPIPI	Middle	Foraging
27/08/2019	21.14	RM	PIPIPI	Middle	Foraging
27/08/2019	21.14	RM	PIPPYG	Middle	Foraging
27/08/2019	21.14	RM	PIPIPI	Middle	Foraging

27/08/2019	21.14	RM	PIPPIP	Middle	Foraging
27/08/2019	21.16	RM	PIPPIP	Middle	Heard not seen
27/08/2019	21.16	RM	PIPPYG	Middle	Heard not seen
27/08/2019	21.19	RM	PIPPIP	Middle	Foraging
27/08/2019	21.20	RM	PIPPIP	Middle	Foraging
27/08/2019	21.23	RM	PIPPYG	Middle	Foraging
27/08/2019	21.25	RM	PIPPIP	Middle	Foraging along treeline
27/08/2019	21.27	RM	PIPPIP	Middle	Heard not seen
27/08/2019	21.29	RM	PIPPYG	Middle	Foraging
27/08/2019	21.31	RM	PIPPIP	Middle	Foraging

Table 25: September 2019 Transect Notes

Date	Time	Rec	Species	Transect	Comment
11/09/2019	20.14	AR	PIPPIP	Southern	Flying north to south along hedgerow
11/09/2019	20.16	AR	PIPPIP	Southern	Heard not seen
11/09/2019	20.18	AR	PIPPIP	Southern	North to south 10m away from hedge
11/09/2019	20.20	AR	PIPPIP	Southern	Heard not seen
11/09/2019	20.27	AR	PIPPIP	Southern	Heard not seen
11/09/2019	20.28	AR	PIPPIP	Southern	Heard not seen
11/09/2019	20.30	AR	PIPPIP	Southern	Heard not seen
11/09/2019	20.35	AR	PIPPYG	Southern	Heard not seen
11/09/2019	20.40	AR	PIPPIP	Southern	Heard not seen
11/09/2019	20.42	AR	PIPPIP	Southern	Heard not seen
11/09/2019	20.43	AR	PIPPIP	Southern	Heard not seen
11/09/2019	20.48	AR	PIPPIP	Southern	Heard not seen
11/09/2019	20.50	AR	PIPPIP	Southern	Heard not seen
11/09/2019	20.57	AR	PIPPIP	Southern	Heard not seen
11/09/2019	20.59	AR	PIPPIP	Southern	Heard not seen
11/09/2019	21.04	AR	PIPPIP	Southern	Heard not seen
11/09/2019	21.10	AR	PIPPIP	Southern	Heard not seen
11/09/2019	21.13	AR	PIPPIP	Southern	Heard not seen
11/09/2019	19.58	PM	NYCNOC	SINC	Heard not seen
11/09/2019	20.01	PM	NYCNOC	SINC	Heard not seen
11/09/2019	20.06	PM	PIPPIP	SINC	Heard not seen
11/09/2019	20.13	PM	PIPPIP	SINC	Commuting east to west
11/09/2019	20.19	PM	PIPPIP	SINC	Heard not seen
11/09/2019	20.22	PM	PIPPYG	SINC	Heard not seen
11/09/2019	20.26	PM	PIPPIP	SINC	Heard not seen, foraging
11/09/2019	20.29	PM	PIPPIP	SINC	Heard not seen, foraging
11/09/2019	20.32	PM	PIPPYG	SINC	Heard not seen
11/09/2019	20.36	PM	PIPPYG	SINC	Heard not seen, foraging
11/09/2019	20.4	PM	PIPPIP	SINC	Heard not seen
11/09/2019	20.42	PM	PIPPIP	SINC	Heard not seen, foraging
11/09/2019	20.43	PM	PIPPIP	SINC	Heard not seen
11/09/2019	20.44	PM	MYONAT	SINC	Heard not seen
11/09/2019	20.49	PM	PIPPIP	SINC	Heard not seen
11/09/2019	19.38	DM	Canada geese	Crop	Big flock of Canada geese circa 50, flew off south
11/09/2019	19.55	DM	NYCNOC	Crop	Heard not seen
11/09/2019	20.02	DM	PIP NAT	Crop	commuting along hedgerow around buildings
11/09/2019	20.10	DM	NYCNOC	Crop	Heard not seen
11/09/2019	20.13	DM	PIPPIP	Crop	Heard not seen
11/09/2019	20.15	DM	PIPPIP	Crop	Commuting along hedge line
11/09/2019	20.16	DM	PIPPYG	Crop	Commuting south along hedgerow
11/09/2019	20.18	DM	PIPPIP	Crop	Foraging along hedgerow
11/09/2019	20.19	DM	PIPPYG	Crop	Foraging along hedgerow
11/09/2019	20.19	DM	PIPPYG	Crop	Foraging along hedgerow
11/09/2019	20.21	DM	PIPPYG	Crop	Around mature oak in hedge
11/09/2019	20.21	DM	PIPPIP	Crop	Around mature oak in hedge
11/09/2019	20.24	DM	PIPPIP	Crop	South along hedgerow
11/09/2019	20.26	DM	PIPPIP	Crop	South along hedgerow
11/09/2019	20.37	DM	PIPPIP	Crop	Along tree line
11/09/2019	20.40	DM	PIPPYG	Crop	Along hedgerow
11/09/2019	20.42	DM	PIPPIP	Crop	Heard not seen
11/09/2019	20.44	DM	PIPPIP	Crop	Along treeline
11/09/2019	20.45	DM	PIPPIP	Crop	Along treeline
11/09/2019	20.50	DM	PIPPIP	Crop	Along treeline
11/09/2019	20.51	DM	PIPPIP	Crop	Along treeline
11/09/2019	20.55	DM	PIPPIP	Crop	Along hedgerow, foraging
11/09/2019	20.56	DM	PIPPIP	Crop	Along treeline
10/09/2019	19.53	PLM	PIPPYG	Cypress	Heard not seen
10/09/2019	19.57	PLM	PIPPIP	Cypress	Heard not seen
10/09/2019	19.59	PLM	PIPPYG	Cypress	Heard not seen, foraging
10/09/2019	20.07	PLM	PIPPIP	Cypress	Heard not seen, foraging

10/09/2019	20.09	PLM	PIPIIP	Cypress	Heard not seen, foraging
10/09/2019	20.11	PLM	PIPIIP	Cypress	Heard not seen, foraging
10/09/2019	20.15	PLM	PIPIIP	Cypress	Heard not seen
10/09/2019	20.15	PLM	MYODAU	Cypress	Heard not seen
10/09/2019	20.17	PLM	PIPIIP	Cypress	Heard not seen, foraging
10/09/2019	20.23	PLM	NYCNOC	Cypress	Heard not seen
10/09/2019	20.26	PLM	PIPPYG	Cypress	Heard not seen, commuting
10/09/2019	20.27	PLM	PIPIIP	Cypress	Heard not seen
10/09/2019	20.29	PLM	PIPPYG	Cypress	Over lake
10/09/2019	20.29	PLM	PIPIIP	Cypress	Over lake
10/09/2019	20.31	PLM	PIPPYG	Cypress	Foraging over lake
10/09/2019	20.31	PLM	PIPPYG	Cypress	Foraging over lake
10/09/2019	20.33	PLM	PIPIIP	Cypress	Foraging near lake
10/09/2019	20.35	PLM	PIPIIP	Cypress	Foraging near lake
10/09/2019	20.35	PLM	PIPIIP	Cypress	Foraging near lake
10/09/2019	20.37	PLM	PIPPYG	Cypress	Heard not seen, foraging
10/09/2019	20.40	PLM	PIPIIP	Cypress	Heard not seen
10/09/2019	20.41	PLM	PIPIIP	Cypress	Heard not seen, foraging
10/09/2019	20.43	PLM	PIPPYG	Cypress	Heard not seen, commuting
10/09/2019	20.46	PLM	PIPIIP	Cypress	Heard not seen, foraging
10/09/2019	20.47	PLM	PIPIIP	Cypress	Heard not seen, foraging
10/09/2019	20.49	PLM	PIPIIP	Cypress	Heard not seen, foraging
10/09/2019	21.00	PLM	PIPIIP	Cypress	Heard not seen, commuting
10/09/2019	21.02	PLM	PIPIIP	Cypress	Heard not seen, foraging
10/09/2019	21.04	PLM	PIPIIP	Cypress	Heard not seen, foraging
10/09/2019	21.06	PLM	PIPPYG	Cypress	Heard not seen, foraging
10/09/2019	21.06	PLM	PIPIIP	Cypress	Heard not seen, foraging
10/09/2019	21.08	PLM	PIPPYG	Cypress	Heard not seen, foraging
10/09/2019	21.09	PLM	PIPIIP	Cypress	Heard not seen, foraging
10/09/2019	20.00	RM	PIPPYG	Middle	Foraging south east to north west along hedgerow
10/09/2019	20.03	RM	PIPPYG	Middle	Foraging south east to north west along hedgerow
10/09/2019	20.06	RM	PIPIIP	Middle	Foraging at crossroads west to east
10/09/2019	20.08	RM	PIPIIP	Middle	Commuting west to south east
10/09/2019	20.09	RM	MYODAU	Middle	Foraging low close to trees
10/09/2019	20.10	RM	PIPPYG	Middle	Foraging close to treeline
10/09/2019	20.10	RM	PIPIIP	Middle	Foraging close to treeline
10/09/2019	20.10	RM	MYODAU	Middle	Foraging close to treeline
10/09/2019	20.11	RM	PIPIIP	Middle	Foraging close to treeline
10/09/2019	20.11	RM	PIPPYG	Middle	Foraging close to treeline
10/09/2019	20.11	RM	MYODAU	Middle	Foraging close to treeline
10/09/2019	20.14	RM	PIPIIP	Middle	Heard not seen, foraging
10/09/2019	20.18	RM	PIPPYG	Middle	Heard not seen, foraging over reen
10/09/2019	20.19	RM	PIPPYG	Middle	Foraging over reen
10/09/2019	20.21	RM	PIPPYG	Middle	Foraging along trees, heard not seen
10/09/2019	20.23	RM	PIPIIP	Middle	Heard not seen, commuting
10/09/2019	20.25	RM	PIPIIP	Middle	Heard not seen
10/09/2019	20.26	RM	PIPPYG	Middle	Heard not seen
10/09/2019	20.28	RM	BARN OWL	Middle	Barn owl flying north to east
10/09/2019	20.33	RM	PIPIIP	Middle	Heard not seen
10/09/2019	20.37	RM	PIPIIP	Middle	Heard not seen
10/09/2019	20.38	RM	PIPIIP	Middle	Heard not seen, commuting

Table 26: October 2019 Transect Notes

Date	Time	Rec	Species	Transect	Comment
21/10/2019	18.33	DM	PIPIIP	Southern	Commuting south along hedge
21/10/2019	18.37	DM	PIPIIP	Southern	Heard but not seen
21/10/2019	18.39	DM	BARNOWL	Southern	Barn owl seen flying across field east to west into nest west field
21/10/2019	18.39	DM	PIPIIP	Southern	commuting north
21/10/2019	18.40	DM	PIPIIP	Southern	Heard but not seen
21/10/2019	18.41	DM	PIPIIP	Southern	Heard but not seen
21/10/2019	18.42	DM	PIPIIP	Southern	Foraging along hedge
21/10/2019	18.42	DM	PIPIIP	Southern	Foraging along hedge
21/10/2019	18.44	DM	PIPIIP	Southern	Foraging along hedge
21/10/2019	18.45	DM	PIPIIP	Southern	Foraging along hedgerow and social calls
21/10/2019	18.45	DM	PIPPYG	Southern	Foraging along hedgerow and social calls
21/10/2019	18.47	DM	PIPPYG	Southern	Foraging east to west along north side of hedge
21/10/2019	18.48	DM	PIPPYG	Southern	Foraging over hedge
21/10/2019	18.50	DM	PIPIIP	Southern	Foraging over hedge north to south
21/10/2019	18.52	DM	PIPIIP	Southern	Foraging at reen crossing point
21/10/2019	18.56	DM	PIPIIP	Southern	Heard but not seen
21/10/2019	18.59	DM	PIPIIP	Southern	Heard not seen at gateway
21/10/2019	19.01	DM	PIPIIP	Southern	Heard but not seen

21/10/2019	19.03	DM	PIPIIP	Southern	Heard but not seen
21/10/2019	19.07	DM	PIPIIP	Southern	Foraging overhead
21/10/2019	19.33	DM	PIPIIP	Southern	Heard but not seen
21/10/2019	19.53	DM	PIPIIP	Southern	Heard but not seen
22/10/2019	18.20	RM	PIPPYG	Cypress	Heard not seen, east of the road
22/10/2019	18.26	RM	PIPIIP	Cypress	Foraging south-west of road over pathway
22/10/2019	18.29	RM	PIPIIP	Cypress	Commuting south of road, commuting south to north under power lines
22/10/2019	18.36	RM	PIPIIP	Cypress	Foraging along cycle path
22/10/2019	18.41	RM	PIPPYG	Cypress	Heard not seen, west of the road
22/10/2019	18.53	RM	PIPIIP	Cypress	Foraging along treeline south of road
22/10/2019	18.58	RM	PIPIIP	Cypress	Commuting along pathway
22/10/2019	19.02	RM	PIPIIP	Cypress	Commuting along pathway
22/10/2019	19.04	RM	PIPPYG	Cypress	Heard but not seen
22/10/2019	19.04	RM	PIPIIP	Cypress	Heard but not seen
22/10/2019	19.05	RM	PIPPYG	Cypress	Commuting east to west along path
22/10/2019	19.08	RM	PIPIIP	Cypress	Foraging along path
22/10/2019	19.10	RM	PIPIIP	Cypress	Foraging, heard but not seen
22/10/2019	19.15	RM	PIPIIP	Cypress	Foraging, heard but not seen
22/10/2019	19.21	RM	PIPIIP	Cypress	Foraging, heard but not seen
22/10/2019	19.22	RM	PIPIIP	Cypress	Foraging across road
22/10/2019	19.22	RM	PIPIIP	Cypress	Foraging across road
22/10/2019	19.28	RM	PIPIIP	Cypress	Foraging above edge of road
22/10/2019	19.30	RM	PIPIIP	Cypress	Heard but not seen, foraging close
22/10/2019	19.33	RM	PIPPYG	Cypress	Heard but not seen, foraging east of road
22/10/2019	19.33	RM	PIPIIP	Cypress	Heard but not seen, foraging east of road
22/10/2019	19.39	RM	PIPIIP	Cypress	Heard but not seen
22/10/2019	18.29	PM	PIPPYG	Middle	Heard not seen, foraging bat
22/10/2019	18.29	PM	HERON	Middle	Heron x2 fly over
22/10/2019	18.35	PM	PIPIIP	Middle	Heard but not seen
22/10/2019	18.38	PM	PIPIIP	Middle	Several bats commuting south
22/10/2019	18.41	PM	PIPIIP	Middle	Commuting north to south
22/10/2019	18.44	PM	PIPIIP	Middle	Commuting
22/10/2019	18.45	PM	PIPPYG	Middle	Foraging
22/10/2019	18.51	PM	PIPIIP	Middle	Heard but not seen
22/10/2019	18.53	PM	PIPIIP	Middle	Foraging
22/10/2019	19.03	PM	PIPIIP	Middle	Foraging to the west
22/10/2019	19.10	PM	MYODAU	Middle	Commuting up and down the path
22/10/2019	19.12	PM	PLEUC	Middle	Regular commuting
21/10/2019	18.30	PM	PIPIIP	SINC	Foraging along reen
21/10/2019	18.33	PM	PIPIIP	SINC	Foraging to the east
21/10/2019	18.37	PM	PIPIIP	SINC	Foraging along treeline
21/10/2019	18.39	PM	PIPIIP	SINC	Foraging along treeline
21/10/2019	18.42	PM	PIPIIP	SINC	Foraging in open
21/10/2019	18.44	PM	HERON	SINC	
21/10/2019	18.48	PM	PIPIIP	SINC	Foraging
21/10/2019	18.56	PM	PIPIIP	SINC	Commuting along treeline
21/10/2019	19.01	PM	PIPIIP	SINC	Commuting, quick pass
21/10/2019	19.11	PM	PIPIIP	SINC	Foraging
21/10/2019	19.12	PM	PIPIIP	SINC	Foraging
21/10/2019	19.34	PM	PIPIIP	SINC	Foraging
21/10/2019	19.36	PM	PIPIIP	SINC	Foraging
22/10/2019	18.20	DM	BARNOWL	Crop	Barn owl flying west across field at south end of transect
22/10/2019	18.30	DM	PIPIIP	Crop	Foraging around oak tree
22/10/2019	18.31	DM	PIPIIP	Crop	Foraging around oak tree
22/10/2019	18.31	DM	PIPIIP	Crop	Foraging around oak tree
22/10/2019	18.32	DM	PIPIIP	Crop	Foraging around oak tree
22/10/2019	18.34	DM	PIPIIP	Crop	Foraging along hedgerow
22/10/2019	18.34	DM	PIPIIP	Crop	Foraging along hedgerow
22/10/2019	18.36	DM	PIPIIP	Crop	Heard but not seen
22/10/2019	18.37	DM	MYOTIS	Crop	Heard but not seen, quick pass
22/10/2019	18.39	DM	PIPIIP	Crop	Foraging along hedgerow
22/10/2019	18.40	DM	PIPIIP	Crop	Foraging along line of reen
22/10/2019	18.45	DM	PIPIIP	Crop	Heard but not seen
22/10/2019	18.46	DM	MYONAT	Crop	Commuting north to south along line of reen
22/10/2019	18.47	DM	PIPIIP	Crop	Heard but not seen
22/10/2019	18.47	DM	PIPIIP	Crop	Heard but not seen
22/10/2019	18.49	DM	PIPIIP	Crop	Foraging along trees, east to west
22/10/2019	18.51	DM	PIPPYG	Crop	Foraging around trees
22/10/2019	18.52	DM	PIPPYG	Crop	Foraging around trees
22/10/2019	18.53	DM	MYONAT	Crop	Flying low south to north over open field
22/10/2019	18.55	DM	PIPPYG	Crop	Heard but not seen
22/10/2019	18.57	DM	PIPIIP	Crop	Heard but not seen
22/10/2019	19.02	DM	PIPPYG	Crop	Heard but not seen

22/10/2019	19.04	DM	PIPPIP	Crop	Heard but not seen
22/10/2019	19.07	DM	PIPPIP	Crop	Heard but not seen
22/10/2019	19.22	DM	PIPPIP	Crop	Heard but not seen
22/10/2019	19.23	DM	PIPPIP	Crop	Heard but not seen
22/10/2019	19.23	DM	PIPPIP	Crop	Heard but not seen
22/10/2019	19.24	DM	PIPPIP	Crop	Heard but not seen
22/10/2019	19.25	DM	PIPPIP	Crop	Heard but not seen
22/10/2019	19.27	DM	PIPPIP	Crop	Heard but not seen
22/10/2019	19.28	DM	PIPPIP	Crop	Heard but not seen
22/10/2019	19.30	DM	PIPPIP	Crop	Heard but not seen
22/10/2019	19.31	DM	PIPPIP	Crop	Heard but not seen
22/10/2019	19.46	DM	PIPPIP	Crop	Heard but not seen
22/10/2019	19.50	DM	PIPPYG	Crop	Heard but not seen
22/10/2019	19.59	DM	PIPPIP	Crop	Heard but not seen
22/10/2019	20.01	DM	PIPPYG	Crop	Heard but not seen
22/10/2019	20.01	DM	PIPPIP	Crop	Heard but not seen

Appendix IV: Site Photographs

Plate 1: Tree T21 with large cavity



Plate 2: Tree T21 additional cavities



Plate 3: Tree T41 climbing inspection



Plate 4: Tree T41 climbing inspection



Plate 5: Tree T42 butt cavities



Plate 6: Tree T114



Plate 7: Tree T113



Plate 8: Tree T114



Appendix V: Occasional Records

Table 27: Occasional Species Records

Date	Grid Reference	Common Name	Scientific Name	Recorder
27/05/2019	ST 2510 8132	Fox	<i>Vulpes vulpes</i>	Diane Morgan
27/05/2019	ST 2471 8104	Canada goose (and goslings)	<i>Branta canadensis</i>	Diane Morgan
27/05/2019	ST 2509 8134	Reed bunting	<i>Emberiza schoeniclus</i>	Diane Morgan
12/06/2019	At Tree T39: ST 2493 8075	Owl pellet		Grace Dooley
12/07/2019	At Tree T5: ST 2494 8120	Owl pellet		Diane Morgan
21/10/2019	ST 25110 80806	Heron	<i>Ardea cinerea</i>	Phil Morgan
22/10/2019	ST 25151 81024	Heron x 2	<i>Ardea cinerea</i>	Phil Morgan

Ad Hoc records for barn owl sightings are recorded in the tables of the transect notes

Appendix VI: Ecology of British Bats

There are at least 18 species of bats breeding in Britain. Most of them are regarded as threatened due to a variety of factors including habitat loss, intolerance and disturbance/damage or loss of roosts. Of these species a number regularly use buildings at certain times of year in order to find safe secure roost sites. Often several different species can use a building over the course of the year, and not all species are present at the same time, making assessment of their presence complex.

Bats are highly mobile flying mammals, which in Britain, feed entirely on insects. They have evolved over seventy million years and have developed sophisticated mechanisms to allow them to effectively 'see' in the dark by using sound waves. This system is called echo-location which enables them to track and hunt down small moving insects whilst in flight, rather like radar does in a modern military fighter aircraft. It is possible to record this sound, and because each species of bat echo-locates in a different way, determine what the species is without actually handling the animal which made the call.

In winter, when their prey is scarce, British bats hibernate or enter torpor, in cool parts of caves, buildings (cavity walls), and tree cavities. They may wake occasionally and will feed if evening temperatures are greater than 7°C, when flying insects can be active. Generally however, activity during cold winters is very limited and bats only become fully active in spring, with late March and early April being a critical time for animals desperately trying to save energy whilst gaining weight. Disturbance during these months can therefore be more devastating to bats than at other times of year.

By late spring female bats will gather together in maternity roosts in order to give birth and rear their single baby in June. Such maternity roosts are often near to important foraging areas in order to save energy as flight requires vast energy resources. Flight routes to and from such roosts can therefore also be important and some bats are extremely light averse preferring dark locations without street or security lamps which can force them to take complex routes to reach foraging areas. Such lighting can also badly degrade foraging areas where they occur close to buildings and hedgerows and tree lines can be particularly important areas for bat foraging to take place particularly when close to the roost building.

Whilst females form maternity colonies, usually in warmer roofs or trees, male bats tend to seek out cooler sites which may not be so close to the foraging areas. Males are often solitary and do not exhibit the social behaviour that marks out females during the birthing period. Non-breeding females will also roost in this way, when they have no need to spend energy on raising a single baby.

Several British bat species are known to rely heavily on buildings to roost. Of these species, the most likely are the soprano pipistrelle bat and the common pipistrelle. Other bat species regularly found in buildings are the brown long-eared bat; Natterer's bat; Brandt's bats and whiskered bat. Pipistrelle species and the small myotis or mouse-eared species (Brandt's, whiskered etc.) often favour locations at the ridge or around the exterior shell of the structure. Brown long-eared and Natterer's tend to prefer living within the roof area of a building – large lofts being popular.

Other species that are known to use the internal areas of built structures such as barns include the two horseshoe species, the greater horseshoe bat (*Rhinolophus ferrumequinum*), and lesser horseshoe bat (*Rhinolophus hipposideros*), as well as Western barbastelle bat (*Barbastella barbastellus*).

Appendix VII: Relevant Legislation

All species of bat in Britain, and their places of rest are protected under the provisions of the Wildlife and Countryside Act 1981 (WCA), Section 9(1), 9(4)(a) and 9(4)(b) as amended by Schedule 12 of the Countryside and Rights of Way Act 2000. Further protection is afforded by the Conservation of Habitats and Species Regulations (Amended) (EU Exit) 2019. In relation to structures used by bats for shelter or protection (i.e. roosts), this legislation makes it an offence to either intentionally or recklessly damage, destroy or obstruct access to any site used by bats, whether bats are present at the time or not, or to intentionally or recklessly disturb bats within a roost.

Infringements under this legislation include building demolition, removal of hollow trees, blocking, filling or installing grills over old mines or tunnels, building alteration or maintenance work, re-pointing of stone walls, getting rid of unwanted bat colonies, re-roofing, remedial timber treatment, re-wiring or plumbing in roofs, treatment of wasps, bees or cluster flies (Mitchell-Jones, 1992; Childs, 2001). Greater horseshoe bat, lesser horseshoe bat, Bechstein's bat, greater mouse eared bat and barbastelle are included in Annex II of the Conservation of Habitats and Species Regulations (Amended) (EU Exit) 2019 and hence require special protection.

Maximum penalties for committing offences relating to bats or their roosts can amount to imprisonment for a term not exceeding six months or to fines of up to Level 5 on the standard scale under the Criminal Justice Act 1982/1991 (i.e. £5000 in April 2001) per roost or bat disturbed or killed, or to both. Bodies corporate and their directors/secretaries are liable for offences under the 2019 Regulations and the WCA. Additionally, where such an offence results in the offender benefitting in a monetary form from the illegal action, confiscation or civil recovery of the proceeds can occur under the Proceeds of Crime Act 2002.

It is sensible to assess as soon as possible if bats are present at potential sites for development – preferable before the land is acquired. In some cases, the period required for adequate survey work may span more than one calendar year. If a development, including demolition or change of use, is likely to impact on bats and their roosts then a licence will usually be required. Adequate survey results are a necessary input to any licence application. If bats are not found until late in the development stage this may result in delays while a licence is sought and even in offences being committed.

The law with respect to dwellings and other structures is applied equally. Where disturbance is deemed likely to have a significant effect on bats to survive, breed and rear their young or will affect the local distribution and abundance of the species, a European Protected Species licence issued by Natural Resources Wales. A licence application must demonstrate that the development will not be detrimental to the maintenance and conservation status of the species concerned.

This explanation must be regarded only as a guide to the law. For further details, reference must be made to the Wildlife and Countryside Act 1981 (as amended), the Conservation of Habitats and Species Regulations (Amended) (EU Exit) 2019, and the Countryside and Rights of Way Act 2000.

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Clients include government departments, local and regional authorities, development agencies, commercial and industrial enterprises as well as statutory nature conservation organisations, wildlife trusts and other charitable bodies.

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Natural Problem Solvers

Just Mammals Consultancy LLP, Suite 131-136, Plas y Ffynnon, Cambrian Way, Brecon LD3 7HP Tel: 01874 623616