
Chapel Lane, Widnes

Bat Transect & Automated Survey Report

Compiled by Ecology Services Ltd.

on behalf of

Taylor Wimpey

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1.0 Introduction

1.1 Ecology Services Ltd was commissioned by Taylor Wimpey in April 2019 to undertake bat habitat activity surveys of land at Chapel Lane, Widnes, hereinafter referred to as 'the site'. The site is located by National Grid Reference (NGR) 350000, 387800. The location and boundary of the site are shown on Figure 1.

1.2 This Bat Transect & Automated Survey report has been prepared by Ecology Services Limited on behalf of Taylor Wimpey UK Ltd to assist the local planning authority's consideration of an outline planning application for a site at Chapel Lane, Widnes for:

"Outline planning application (with all matters other than access reserved) (to be determined by Halton Borough Council only) for the development of up to 350 dwellings, public open space, landscaping and associated infrastructure works. Full details for site access arrangements via a new junction on Chapel Lane (to be determined by Knowsley Borough Council only) and emergency access via Sandy Lane (to be determined by Halton Borough Council)."

1.3 The proposed development site is located to the north-west of the Widnes urban area. The site is situated within the boundary of two separate allocations for residential development within the adopted Halton Delivery and Allocations Local Plan [DALP] (March 2022) under Policy RD1 (Residential Development Allocations). The allocations comprise two separate land parcels separated by Sandy Lane, (Site Ref. W4 to the west of Sandy Lane and Site Ref. W5 to the east). The application red line boundary does not extend to the full extent of the allocation.

1.4 At the time of compiling this report, no detailed development scheme has been prepared and only outline biodiversity enhancements are provided. This report shall be updated to ensure that mitigation and enhancement measures are incorporated at the detailed design stage.

Site Description

1.5 The site is located on the outskirts of the town of Widnes, within the Borough of Halton but on the boundary with Knowsley Council, and contains a mix of habitats including: improved and poor semi-improved grassland, species-rich and species-poor hedgerows, wet and dry ditches, two ponds, scattered trees and buildings. The land to the north and west of the site is largely under arable cultivation crossed by hedgerows and ditches with further ponds and an area of broadleaved woodland. Broadleaved woodland adjoins the site to the east, beyond which lies Queensbury Way residential development with further residential development to the south.

Background

1.6 An ecological appraisal of the site, undertaken in April 2019 by Ecology Services Ltd, identified the potential for the proposed development to affect suitable foraging and commuting habitat for bats within the site. In order to advise appropriate avoidance, mitigation and compensation measures, bat habitat activity surveys in the form of transect and automated detector surveys were recommended. An updated Ecological Appraisal of the site undertaken in June 2022, found the site to support similar habitats as when the transect surveys were undertaken and this report is therefore considered to remain a valid assessment. An updated desk study has been undertaken, the results of which are included in this report.

1.7 This report details the findings of the bat habitat activity surveys carried out to inform an assessment of the importance of habitats within the site for foraging and commuting bats.

- 1.8 The bat habitat activity surveys are undertaken in the form of walked transect surveys and automated static detector surveys, which aim to observe:
- The assemblages of bat species using the site;
 - The relative frequency with which the site is used by different bat species;
 - The locations and distribution of activity for different species within the site;
 - The nature of activity for different bat species, i.e. foraging, commuting etc.
- 1.9 The results from the habitat activity surveys detailed in this report will be used to inform any mitigation and or compensation requirements with regard to the proposed development works affecting habitats within the site.

2.0 Planning Policy and Legislation

- 2.1 This section provides a brief overview of planning policy and legislation relevant to bats in the UK. Further information is provided in Appendix 1.

Planning Policy

- 2.2 The National Planning Policy Framework (NPPF, 2021) places a clear responsibility on Local Planning Authorities (LPAs) to contribute to conserving and enhancing the natural and local environment. LPAs should promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species (e.g. Species of Principal importance, Local Biodiversity Action Plan species); and identify and pursue opportunities for securing measurable net gains for biodiversity. In accordance with the NPPF, local planning policy and guidance, development proposals should seek to maintain and enhance opportunities for bats at the site.
- 2.3 Protected species within the UK, such as bats, are a ‘material consideration’ in the determination of a planning application. Therefore, an LPA is unlikely to determine an application until all relevant information relating to protected species or habitats is submitted to fully inform the application. Relevant information includes adequate surveys and, where required, mitigation strategies, which will need to be submitted to inform a planning application.
- 2.4 The local planning authority (LPA) has a duty to ensure that protected and priority species (e.g. Species of Principal Importance, Biodiversity Action Plan species) are fully considered in a planning decision. Therefore, up to date survey information and, where required, mitigation strategies adequate to assess the impacts of the proposals and to demonstrate that opportunities for species using the site can be maintained, must be provided in support of a planning application.

Legislation

- 2.5 The Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, also known as the Habitats Directive, affords all bat species protection under Annex IV. In addition to this, four bat species (greater horseshoe, lesser horseshoe, Bechstein’s and barbastelle) are also listed under Annex II which may afford the noted species the designation of Special Areas of Conservation (SAC) (“Natura 2000” sites”).
- 2.6 All British bats and their roosts are afforded protection under the 1981 Wildlife & Countryside Act (as amended) and are listed in Schedule 2 of the Conservation of Habitats & Species Regulations 2017 (as amended)¹.

¹ The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 continue the same provision for European protected species, licensing requirements and protected areas after Brexit.

- 2.7 In brief, this legislation makes it an offence to:
- Deliberately capture, injure or kill any wild animal;
 - Deliberately disturb wild animals;
 - Damage or destroy a breeding site or resting place of such an animal.
- 2.8 Disturbance is defined as that which is likely:
- to impair their ability –
 - to survive, to breed or reproduce, or to rear or nurture their young, or
 - in the case of animals of a hibernating or migratory species, to hibernate or migrate; or
 - to affect significantly the local distribution or abundance of the species to which they belong.
- 2.9 When dealing with cases where a European Protected Species (EPS) (all UK bats) may be affected, a Local Authority is a 'competent authority' within the meaning of regulation 7 of the Conservation of Habitats & Species Regulations 2017 (as amended). The Local Authority must therefore exercise their functions under the provisions made within the 2017 Regulations and planning decisions should only be made when European Protected Species are fully considered.
- 2.10 Where bats are affected by development then a licence to derogate from the Conservation of Habitats and Species Regulations 2017 (as amended) would be required. European Protected Species (EPS) licence applications are processed and issued by Natural England and the EPS licence can only be applied for once planning permission is granted, if planning permission is required.
- 2.11 Natural England may grant an EPS licence for the purposes specified in paragraph 55 of the Regulations. The purposes are:
- 55(2)(e) preserving public health or safety or other imperative reason of overriding public interest including those of a social or economic nature and beneficial consequence of primary importance for the environment.
 - 55(2)(f) preventing the spread of disease.
 - 55(9)(a) that there is no satisfactory alternative; and
 - 55(9)(b) that the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable status in their natural range.
- 2.12 Section 40 of the Natural Environmental and Rural Communities (NERC) Act 2006 places a statutory duty on public authorities, in exercising their functions, to conserve biodiversity in England. Species of Principal Importance for the conservation of biodiversity in England, identified by the Secretary of State in consultation with Natural England, are listed Section 41 of the NERC Act. The Local Planning Authority and government bodies (e.g. Natural England) will expect the overall design of the development to have regard for the conservation of these species. Seven bat species are listed as 'Species of Principal Importance' under Section 41 of the Natural Environmental and Rural Communities (NERC) Act 2006:
- Noctule (*Nyctalus noctula*)
 - Soprano pipistrelle (*Pipistrellus pygmaeus*)
 - Lesser horseshoe (*Rhinolophus hipposideros*)
 - Greater horseshoe (*Rhinolophus ferrumequinum*)
 - Barbastelle (*Barbastella barbastellus*)
 - Bechstein's (*Myotis bechsteinii*)
 - Brown long-eared (*Plecotus auritus*)

3.0 Methodology

Ecological Desktop Study

- 3.1 Ecological data and historic record searches were undertaken, up to 2km from the site, by contacting the following sources; listed in Table 1 below.

Table 1: Ecological Desktop Study Resources and Record Centres Consulted

Source of information	Information supplied
Multi Agency Geographical Information Centre (MAGIC)	To identify any statutory protected nature conservation sites with bats qualifying as criteria for their designation within 5km of the site.
Merseyside Biobank Records Centre	To identify non-statutory designated sites (Biological Heritage Sites) and records of bats within 2km of the site.
RECORD- The Biodiversity Information System for Cheshire, Halton, Warrington and Wirral.	To identify non-statutory designated sites (Biological Heritage Sites) and records of bats within 2km of the site
Halton Biodiversity Action Plan (LBAP)	Identification of LBAP priority species known to occur in the county.
Natural Environment and Rural Communities (NERC) Act 2006	Review of UK Species of Principal Importance known to occur in the region.

- 3.2 The data searches with RECORD and Merseyside Biobank were undertaken on 27th and 15th June 2022 respectively. As part of the desktop study, a review of habitats was completed using on line aerial mapping.

Habitat Activity Survey Methodology

- 3.3 In order to understand how bats may be using the site, walked transect surveys and automated surveys were undertaken following standard methodologies set out in the Bat Conservation Trust's (BCT's) Bat Surveys for Professional Ecologists: Good Practice Guidelines (2016).
- 3.4 The site was classified in line with 'Guidelines for assessing the potential suitability of proposed development sites for bats, based on the presence of habitat features within the landscape, to be applied using professional judgement' (see Appendix 2: Table 4.1).
- 3.5 Generally, the site contains a mix of habitats including: improved and poor semi-improved grassland, species-rich and species-poor hedgerows, wet and dry ditches, two ponds, scattered trees and buildings. The land to the north and west of the site is largely under arable cultivation crossed by hedgerows and ditches with further ponds and an area of broadleaved woodland. Broadleaved woodland adjoins the site to the east, beyond which lies residential development with further residential development to the south.
- 3.6 The site is connected by hedgerows and ditches to foraging areas in the wider landscape comprising woodland to the north and east of the site. Areas of particular note include Alder Brook, George's Wood and Pex Hill Country Park which are all Local Wildlife Sites (LWS) within 1km of the site. These areas are likely to provide good quality foraging habitat and other roosting opportunities for bats. Buildings within Cronton, and farm buildings and houses to the south-west of the site are also likely to provide roosting opportunities bats.
- 3.7 Overall, habitats within the immediate and wider surrounds of the surveyed buildings are considered of low value for foraging and commuting bats. Where suitable habitats are present in close proximity to buildings/structures/trees then there is generally an increased use of these for roost sites due to a higher abundance of food and better access to food sources.

- 3.8 The BCT's Guidelines (2016) sets out guidance in relation to the number of surveys recommended in relation to the potential habitat suitability, as shown in Table 2 below.

Table 2: 'Guidelines on the number of bat activity surveys recommended to achieve a reasonable survey effort in relation to habitat suitability' (Table 8.3).

Survey Type	Low suitability habitat for bats ^a	Moderate suitability habitat for bats	High suitability habitat for bats
Transect/ spot count/ timed search surveys	One survey visit ^b per season (spring - April/May, summer - June/July/August, autumn - September/October) ^c in appropriate weather conditions for bats. Further surveys may be required if these survey visits reveal higher levels of bat activity than predicted by habitat.	One survey visit ^b per month (April to October) ^c in appropriate weather conditions for bats. At least one of the surveys should comprise dusk and pre-dawn (or dusk to dawn) within one 24-hour period.	Up to two survey visits ^b per month (April to October) ^c in appropriate weather conditions for bats. At least one of the surveys should comprise dusk and pre-dawn (or dusk to dawn) within one 24-hour period.
AND			
Automated/static bat detectors surveys ^d	One location per transect, data to be collected on five consecutive nights per season (spring - April/May, summer - June/July/August, Autumn - September/October) in appropriate weather conditions for bats.	Two locations per transect, data to be collected on five consecutive nights per month (April to October) in appropriate weather conditions for bats.	Three locations per transect, data to be collected on five consecutive nights per month (April to October) in appropriate weather conditions for bats.

^a If the habitat has been classified as having low suitability for bats, an ecologist should make a professional judgement on how to proceed based on all of the evidence available. It may or may not be appropriate or bat activity surveys to be carried out in low suitability habitats. However, caution should be exercised in fringe areas where 'low suitability habitat for bats' may be extremely important to local bat populations due to the relative scarcity of better habitats. In such situation, bats are likely to also be more widely dispersed and may use a larger number of sites, therefore survey effort may actually need to be increased to detect use on the proposed site in question.

^b A survey visits should aim to cover all habitats represented in the survey area that could be impacted by the proposed activities. This may consist of a single transect carried out on a single night for small sites (e.g. small housing developments) with low habitat diversity but could range up to multiple transects carried out over one or several nights (depending on number of ecologists) on a larger site (e.g. Road schemes) with greater habitat diversity.

^c April, September and October surveys are both weather - and location-dependent. Conditions may become more unsuitable on these months, particularly in Scotland, which may reduce the length of the survey season.

^d Detector locations should be assigned to cover all habitats represented in the survey area that could be impacted by the proposed activities. This could mean a single detector location at a small site with only one habitat represented but could range up to many detector locations on larger sites. Automated/static surveys are particularly useful when assessing collision risk, e.g. Detectors can be placed at crossing points on proposed roads or railways.

Note: Multiple survey visits should be separated by at least two weeks, preferably longer, to observed temporal changes in activity.

Transect Surveys

- 3.9 Three transect survey visits have been undertaken, one survey per season (spring - April/May, summer - June/July/August, autumn - September/ October) between May and September 2020 inclusive. The surveys consisted of walked transect surveys with a series of static listening points and were conducted by two surveyors at any one time. The recommended time and duration of walked transect surveys is to start at sunset and end between 2 to 3 hours after sunset (for dusk surveys) or to start 2 hours before sunrise and end at sunrise (for dawn surveys). All three surveys were undertaken at dusk, the level of

activity was similar between the first two surveys and overall, the level of activity was considered to be low. There was no activity indicative of a significant roost nearby. Given the generally low activity levels at the site it was considered that a dawn survey was unlikely to show any significantly different activity.

- 3.10 The walked transect surveys were aided with the use of heterodyne and frequency division bat detectors with calls recorded using AnaBat SD1/2 detectors. The transects were walked at a constant speed where possible; regular listening point (LP) counts were undertaken for a period of 3 minutes each along the route to record the number of passes, activity and species of bats. Bat passes were also recorded on the transit between the static point counts. The recorded echolocation calls were then analysed with computer software (AnaLookW) to verify the field results. The direction that the transect routes were walked was varied so as to avoid bias in the coverage.

Automated Surveys

- 3.11 Automated surveys were designed following the BCT's 2016 guidance.
- 3.12 Automated surveys to record bat echolocation calls were undertaken at two locations within the site. One along the eastern boundary on the edge of broadleaved woodland and one in the hedgerow along the public footpath in the centre of the site (see Figure 6 for the automated detector locations). While the BCT guidelines only require 1 static per transect route, two locations were chosen. The proposals indicate that the hedgerow running through the centre of the site will need to be breached to provide access and therefore data from the use of the hedgerow would be useful to assess the impacts of the development. It was also considered that it would be useful to capture data from the woodland edge in the east of the site. The automated detectors were deployed three times for a minimum of five consecutive nights at each location during each month between May and September 2020 inclusive.
- 3.13 Automated detectors deployed comprised an Anabat Express detector for all three periods. The zero crossing recordings from the Anabat Express detector were analysed using AnaLookW software.
- 3.14 Both transect and automated surveys provide a record of activity within the site for those specific periods and locations.
- 3.15 The frequency that bats are encountered during activity surveys depend upon several factors, including:
- Number of roosts within or in close proximity to the site and the number of individuals in the roost;
 - The quality of foraging habitat within site and its surrounds and the distance at which it is located from a roost;
 - The quantity and diversity of invertebrates; and
 - The extent of the survey, in terms of distance for transect surveys and duration in terms of automated surveys.

Timing

Transects

- 3.16 A total of three walked transect surveys have been undertaken at the site between May and September 2020 inclusive. The survey visits were undertaken on the 14th May, 15th July and 16th September 2020.
- 3.17 The transect surveys were undertaken at dusk, starting up to 15 minutes before sunset and finishing between 1 hour 50 minutes and 2 hours 5 minutes after sunset.

Automated Surveys

- 3.18 A total of three automated surveys have been undertaken at the site, each with two detectors being deployed for five consecutive nights each month between July and September 2020 inclusive. The surveys were conducted on the following dates; 14th to 19th May, 15th to 22nd July and 16th to 21st September 2020.
- 3.19 During the five nights in each period, weather suitable for recording bat activity generally prevailed (no heavy rain, no strong winds and temperatures at sunset >9°C).
- 3.20 The Anabat Express detectors were set to the 'night only' recording mode. This recording mode will automatically turn on the detector 30 minutes before sunset and off 30 minutes after sunrise on each night. This recording mode determines the correct sunset and sunrise times using the inbuilt GPS.

Personnel

- 3.21 The walked transect surveys were completed by two surveyors on each visit for safety reasons. The transect surveys were conducted by: Senior Consultant Ecologist Mr. S. Booth who holds a Natural England Bat Class Licence (Level 2) (Registration number 2016-27296-CLS-CLS), experienced Senior Consultant Ecologist Ms. L. Redgrave and experienced Consultant Ecologists Miss. C. Wood and Mr. C. Smith. All surveyors are experienced at undertaking bat habitat and activity surveys.
- 3.22 Analysis of bat calls was undertaken by experienced consultant ecologist Miss. C. Wood.

Constraints

- 3.23 The habitat activity surveys provide a snapshot of habitat usage at the time that each visit was undertaken and the habitats present may be used by bats species for different purposes at different times of the year.
- 3.24 Access into the farmyard was not permitted due to COVID-19 which restricted access to the southernmost part of the site, however the transect route was designed to cover the majority of the habitats present within the site and therefore this is not considered to be a significant constraint to the survey. The majority of the buildings within the farmyard were subject to presence / absence bat surveys in late summer once access was permitted, see Bat Survey Report, January 2021.
- 3.25 The weather conditions during the second transect survey in July comprised light rain throughout the survey getting heavier towards the end of the survey along with an increase in wind. Despite this, bat activity was recorded throughout the survey and therefore this is not considered to be a significant constraint to the survey.
- 3.26 For some species, the call parameters are very similar, overlapping considerably in different environments. This is particularly the case for species in the *Myotis* genus, and therefore species in the genus have not been separated to species level. In addition, species in the *Pipistrellus* can also have similar call parameters and cannot always be distinguishable. In these cases, they were not identified to species level.
- 3.27 The call of the brown long-eared bat is very quiet which often leads to this species being under recorded by bat detectors, particularly where there are high levels of activity by louder species (e.g. *Pipistrellus* spp.). This has been considered when estimating the abundance of brown long-eared bats using the site.

4.0 Results and Evaluation

Desktop Study

National Status

- 4.1 There are 18 species of bat that are native to the United Kingdom. The latest Review of the Conservation Status of British Mammals (2018) has shown that where change could be assessed with reasonable confidence there have been increases in the geographical range and population status of two species of UK bat (greater and lesser horseshoe bat) and decrease in the geographical range of one species (grey long-eared bat).
- 4.2 Increases in population were also identified in the following species: Bechstein's, Daubenton's, Natterers, serotine and brown long-eared although it is noted that the reliability of the results is poor.
- 4.3 Population data was not available for; Alcaethoe, whiskered, Brandts, Leisler's, noctule, Barbastelle and Nathusius pipistrelle.
- 4.4 Population estimates were given for common and soprano pipistrelle however could not be reliably compared to the results from Harris et al. (1995) as the two species had not been identified as separate species at the time of the survey. *Pipistrellus* spp. remain the commonest species of bat in the UK despite their decline.
- 4.5 Serotine and Barbastelle are considered vulnerable and Leisler's and Nathusius' pipistrelle, near threatened in Britain and England in the Red List for Britain's Terrestrial Mammals (Mathews and Harrower, 2020).

Regional Status

- 4.6 The north-west of England appears to be a stronghold for whiskered and Brandt's bats, both of which are reasonably rare in southern England.

Local Status

Halton and North Merseyside

- 4.7 No bat species are listed in the Halton Local Biodiversity Action Plan. The North Merseyside Local Biodiversity Action Plan (LBAP) lists eight bat species recognised as being resident in North Merseyside (refer to Appendix 3) as local priority species.

Cheshire

- 4.8 The Cheshire Local Biodiversity Action Plan (LBAP) lists ten bat species recognised as being resident in Cheshire (refer to Appendix 3) as local priority species.

Designated Sites

- 4.9 There are no statutory or non-statutory protected sites designated on the basis of their interest for bats that are located within the vicinity of the site and which could be adversely affected by the proposed development of the site.

Records Data Search

- 4.10 The data search undertaken in 2022, found 26 records of common pipistrelle, 4 records of pipistrelle sp. and one record of an un-identified species of bat within 2km of the site, dating from between 1988 to 2019.
- 4.11 Records of European Protected Species mitigation licences for bats in the area surrounding the site include; a licence relating to common pipistrelle at a location approximately 3.3km to the south of the site and a further licence for the same species located c.3km to the north of

the site. A licence pertaining to common pipistrelle, soprano pipistrelle, brown long-eared and natterer's located c. 3.45km to the north west of the site.

Transect Survey Results

- 4.12 Table 3 below shows the total bat recordings per transect on each night and the average recordings per hour during each transect.

Table 3: Bat recordings per transect & point count.

Transect	Survey 1	Survey 2	Survey 3
Month	May	July	September
Total bat recordings per survey	40	144	73
Total bat recordings per hour	22.02	68.57	36.50

- 4.13 During the three transect surveys undertaken, up to three bat species were encountered:
- Common pipistrelle – Detected during all transects.
 - Soprano pipistrelle – Detected during the July transect.
 - Noctule – Detected during the September transect.
- 4.14 Common pipistrelle accounted for the vast majority (approximately 98%) of bat activity recorded during the transect surveys and was recorded throughout all areas of the site. Soprano pipistrelle was recorded on one occasion during the July survey. Noctule was recorded on one occasion during the September survey.
- 4.15 A summary of the data from the transect activity surveys is provided in Table 4 below; the raw survey data can be found at Appendix 4. Figure 1 shows the transect route and the static point count locations. Figures 2-5 show a summary of the results of each transect survey, with Figure 5 providing a combined summary of the three transect surveys.

Table 4: Summary of the transect activity surveys, see Figures 2 - 5 for results plans.

Survey details	Summary of bat activity
Survey 1 - 14 th May 2020 21:04 – 22:53 (sunset 21:04)	(Start to LP1 - LP10 to Finish) Activity by two species Common pipistrelle: • Activity recorded from 21:38 onwards. • Approximately 40 bat registrations recorded feeding or commuting across the site as a whole. • The highest concentrations of bats were recorded in the north east of the site around the buildings and the northern boundary.
Survey 2 - 15 th July 2020 21.48-23.37 (sunset 21:31)	(Start to LP10 - LP1 to Finish) Activity by two species Common pipistrelle: • Activity recorded from 21:48 onwards. • Approximately 144 bat registrations recorded using the site, foraging or commuting mainly in the east of the site. Soprano pipistrelle: • Activity recorded at 22:27 • One registration between listening points 6 and 5 in the west of the site.

Survey details	Summary of bat activity
Survey 3 - 16th September 2020 19:23 – 21:23 (sunset 19:23)	(Start to LP1 - LP10 to Finish) Activity by up to two species Common pipistrelle: • Activity recorded from 19:48 onwards. • Approximately 72 bat registrations recorded within the site boundary throughout the site. • The highest amount of activity within the site was in the central and eastern area, with a small amount of activity in the north east of the site along the boundary with the woodland. Noctule: • One registration of a noctule was briefly recorded at 20:12 along the hedgerow in the centre of the site.

4.16 The vast majority of activity recorded during the transect surveys relates to common pipistrelle bats. An average of 85 common pipistrelle registrations were detected across the three surveys, with a maximum count in the July transect of 144 and a minimum of 40 during the May transect. The common pipistrelle bats were noted during any one survey visit foraging and feeding, mostly in the western area of the site, around the hedgerows bordering the residential houses and agricultural buildings and on the second and third survey, foraging and feeding along the central hedgerow within the site. Common pipistrelle bats were recorded on an occasional to frequent basis just outside the site boundary foraging along Chapel Lane and in the neighbouring gardens to the west of the site.

4.17 Low numbers of soprano pipistrelle and noctule bats were recorded passing or briefly foraging across the western area (soprano pipistrelle) and the central area (noctule) of the site on the first and third transect surveys respectively.

Automated Survey Results

4.18 Figure 1 shows the location of the automated detector and Figures 6 - 14 provide charts summarising the results from the automated detector survey. In total, 3,981 bat recordings were made over five nights during three automated survey periods. The most active period was July (Period 2: 2,551 recordings) followed by May (Period 1: 910 recordings). The lowest levels of activity were recorded in September (Period 3: 520 recordings). All percentages below are rounded to 2 decimal places.

4.19 Overall, the following species/ species groups were detected through data analysis:

- Common pipistrelle
- Soprano pipistrelle
- *Pipistrellus* spp
- *Myotis* spp.
- Brown long-eared
- Noctule

4.20 Species recorded included a genus of bat (*Myotis* spp.) which are difficult to separate into species due to the similarity of their calls.

4.21 Two detectors were deployed on site. One was located on a tree on the edge of woodland on the eastern boundary of the site. The second was located on a tree within the hedgerow passing through the centre of the site. Analysis of bat activity recorded at these locations during each survey period is provided below.

Period 1

4.22 During Period 1 (14th -19th May), at least four bat species were detected, as detailed below:

- Common pipistrelle – 98.13% of total bat recordings over the period. Detected on all nights at both locations.
- Soprano pipistrelle. – 1.21% of total bat recordings over the period. Detected at neither location on the second night.
- *Myotis* spp. – 0.55% of total bat recordings over the period. Detected on night two at location A and nights one and four at location B.
- Brown long-eared – 0.11% of total bat recordings over the period. Detected on night four at location B only.

4.23 Bat activity was recorded on all nights over the period. Common pipistrelle was the most frequently recorded species on every night. The second most recorded species over the period was soprano pipistrelle. Detected at neither location on the second night. *Myotis* spp. were recorded on the second night at location A (1 registration) and the first and fourth night at location B (4 registrations). Brown long-eared had the lowest number of registrations with 1 registration on the second to last night at location B only. See Figures 6 and 7.

4.24 Bat activity was recorded within all hours of every night between dusk and dawn on the third and last night at location A and on the second to last and last night at location B. The greatest levels of bat activity were recorded between the hours of 21:00 and 22:00 during each night at location A. The greatest levels of bat activity were recorded between the hours of 02:00 and 03:00 at location B. There was also a small peak at 22:00 during most nights after dusk at Location B. See Figure 8.

Period 2

4.25 During Period 2 (15th to 22nd July), at least five bat species were detected, as detailed below:

- Common pipistrelle – 97.37% of total bat recordings over the period. Detected on all five nights at both locations.
- *Myotis* spp. – 1.25% of total bat recordings over the period. Detected on all five nights at location B and nights three and four at location A.
- Soprano pipistrelle – 1.02% of total bat recordings over the period. Detected on nights one and five at location A and all nights except four at location B.
- Noctule – 0.20% of total bat recordings over the period. Detected on nights one and five at location A and night five at location B.
- Brown long-eared – 0.16% of total bat recordings over the period. Detected on nights one and five at location B only.

4.26 Bat activity was recorded on all nights over the period. Common pipistrelle was the most frequently recorded species over the period as a whole and was the most recorded species on all nights. *Myotis* spp. were the second most frequently recorded at location B, recorded on all nights. The second most frequently recorded at location A were noctule and *Myotis* spp. (3 registrations each). Noctule had the lowest number of registrations at location B (2 registrations). Brown long eared were not detected at location A during the period, they were recorded on two nights at location B (4 registrations). See Figures 9 and 10.

4.27 Bat activity was recorded within most hours of every night between dusk and dawn over the period. The times of peak levels of bat activity varied over each night. The greatest levels of bat activity were generally recorded between the hours of 21:00 and 04:00 at each location, with the peak activity between 22:00 and 23:00 at location A and a smaller peak at 01:00. At location B the peak of activity was between 00:00 and 03:00 with slight peaks at 23:00 and 04:00. See Figure 11.

Period 3

4.28 During Period 3 (16th to 21st September), at least four bat species were detected, as detailed below:

- Common pipistrelle – 89.42% of total bat recordings over the period. Detected on all nights at both locations.
- *Pipistrellus* spp. (undetermined social calls) – 9.23% of total bat recordings over the period. Detected on nights one, two and three at location A and nights one and two at location B.
- Soprano pipistrelle – 1.15% of total bat recordings over the period. Detected on night three at location A and nights one, two and three at location B.
- *Myotis* spp. – 0.19% of total bat recordings over the period. Detected on night three only at location B.

4.29 Bat activity was markedly lower compared to the other two periods. Bat activity was recorded on three nights at location B and four nights at location A over the period. Common pipistrelle was the most frequently recorded species across both locations. Undetermined *Pipistrellus* spp. bats social calls were the second most frequently recorded at both locations. Soprano pipistrelle was the third most frequently recorded at both locations (with three registrations at each) and *Myotis* spp. had the least registrations with none at location A and one on night three at location B. See Figures 12 and 13.

4.30 Bat activity was recorded within most hours of every night between dusk and dawn at both locations over the period. Peak activity was concentrated between 20:00 to 21:00 at both locations. There is also a slight peak at 01:00 at location B across all three nights. Less pronounced peaks are at 19:00 (sunset) and 22:00 for both locations. See Figure 14.

Combined Automated Survey Results

4.31 Common pipistrelle was the most frequently recorded species during all three periods at both locations (average 94.98%). Undetermined pipistrelle bats were the second most recorded species over all three periods although were only detected during period 3 (average 9.23%). The unknown pipistrelle calls comprised social calls which, on balance of probability, are considered most likely to relate to common pipistrelle bats in view of the dominance of this species recorded over all periods during the static and transect surveys.

4.32 Soprano pipistrelle were the third most recorded species and were recorded at both locations across all three periods (average 1.13%). *Myotis* spp. were the fourth most recorded overall (average 0.67%), although there were slightly more registrations during period 2 than soprano pipistrelle (32 registrations vs 26 registrations respectively).

4.33 Noctule and brown long-eared were the least recorded (both with 5 registrations). Noctule were recorded during period 2 only, at both locations (average 0.20%). Brown long-eared were recorded during periods 1 and 2 at location B only (average 0.13%). In view of the frequency that this species was recorded during the transect and automated surveys, it is expected that the site is used by a very low number of noctule bats on an infrequent/sporadic basis. Noctule bats have a large range, and it is therefore considered likely that the site and its surrounds form a very small part of a much wider foraging territory for individuals of this species. It should be noted that brown long-eared bats have a very quiet echolocation call which often leads to this species being under recorded, however, it is considered that the site is used on an infrequent/sporadic basis by very low numbers of this species.

Habitat Assessment

4.34 In addition to the three bat habitat activity surveys, a detailed habitat appraisal has been undertaken bringing together the survey results, the habitats assessment and considering the specific requirements of each bat species recorded. The assessment has been based upon experience and knowledge of the species identified at the site.

- 4.35 Habitats within the site and its immediate surrounds were assessed to assist in the determination of impacts. Table 5 reviews habitat preferences for the species identified during the surveys.

Table 5: Foraging habitat preferences and foraging strategies of different UK species (taken from BCT (2016) 3rd Edition except where otherwise stated).

Species	Habitat Preferences
Common pipistrelle	Shows preference to deciduous woodland but a generalist using a wide range of habitats. The Core Sustenance Zone ² is considered to be 2km (however, it is noted that the reliability for this calculation is poor).
Soprano pipistrelle	Tends to select riparian habitats over other habitat types available. The Core Sustenance Zone ² is considered to be 3km.
Daubenton's*	Preferred foraging habitat is over water, this species favours riverine habitats but is also known to forage in woodland. The Core Sustenance Zone ² is considered to be 2km (however, it is noted that the reliability for this calculation is poor).
Whiskered/ Brandt's	Buckley <i>et. al.</i> (2013) found whiskered bat used mixed woodland, riparian vegetation, arable and rough grassland habitats although selected the first two as core foraging habitats. Berge (2007) found that whiskered bat selected pasture and hedgerows. A German study showed Brandt's bat favours woodland and whiskered bat favours areas near water and more open habitats with hedges and coppices (Taake, 1984). The Core Sustenance Zone ² is considered to be 1km (however, it is noted that the reliability for this calculation is poor).
Natterer's (<i>Myotis</i>)*	Preferred foraging habitat is semi-natural woodland, tree-lined river corridors and ponds, but also uses grassland. Tends to avoid dense coniferous plantations. The Core Sustenance Zone ² is considered to be 4km.
Brown long-eared	Strongly associated with tree cover, prefers woodland with cluttered understorey including native species, particularly deciduous woodland. Also forages in mixed woodland edge and among conifers. Use of hedgerows increases though the active season. The Core Sustenance Zone ² is considered to be 3km (however, it is noted that the reliability for this calculation is poor).
Noctule	Found in a range of habitats, forages out in the open, often over trees and with strong affinity to water. Reported as selecting broad-leaved woodland and pasture. The Core Sustenance Zone ² is considered to be 4km (however, it is noted that the reliability for this calculation is poor).

*The above *Myotis* species were included as these are the most common across the UK.

- 4.36 The site comprises multiple broadly rectangular fields of grazed/cut grassland with the occasional scattered tree along the field boundaries, within the farmyard and adjacent to the pond in the centre of the site. The boundaries of the site include scattered treelines, hedgerows and woodland. Through the centre of the site is a hedgerow containing mature trees. There are two ponds within the site surrounded by scattered trees and scrub. Directly beyond the southern boundary of the site are houses with large gardens.
- 4.37 The wider surrounds are under mixed use with the land to the north and west of the site largely under arable cultivation crossed by hedgerows and ditches with further ponds and an area of broadleaved woodland. To the east and south of the site lies residential development.
- 4.38 In addition to areas of suitable foraging and commuting habitat nearby, there are a number of buildings and trees within the site in the wider area that could provide suitable roosting habitat for bats. A bat roost of a single common pipistrelle was identified in a residential

² BCT (2020) Core Sustenance Zones and habitats of importance for designing Biodiversity Net Gain for bats. Bat Conservation Trust, London. <https://www.bats.org.uk/resources/guidance-for-professionals/bat-species-core-sustenance-zones-and-habitats-for-biodiversity-net-gain>

building within the site during the suite of roost surveys carried out in 2020 (see Bat and Barn Owl Survey Report dated January 2021 for further information).

Summary and Evaluation

4.39 The bat habitat activity surveys (transect and automated detector surveys) recorded six bat species/ species groups foraging and/ or commuting within the site, as listed below:

- Common pipistrelle
- Soprano pipistrelle
- *Pipistrellus* spp.
- Noctule
- Brown long-eared
- *Myotis* spp.

4.40 The conservation status of the bat species identified at the site through surveys are detailed in Table 6 below and overleaf.

Table 6: Status of bat species. Detail of conservation status at a local, county and regional level.

Species	Conservation status assessment		
	Local	County	Regional
Common pipistrelle	Common and widespread.	Common and widespread in both Merseyside and Cheshire.	Common and widespread. Considered to be widely distributed across the UK and one of the commonest bat species*.
Soprano pipistrelle	Common and widespread.	Common and widespread in both Merseyside and Cheshire.	Common and widespread. Considered to be widely distributed across the UK and one of the commonest bat species*.
Nathusius pipistrelle	Widespread but not common.	Widespread but not common in both Merseyside and Cheshire.	Widespread but sparse in records, an increase in records may reflect sampling effort as opposed to expanding range*.
Natterer's	Widespread but not common.	Rare locally within Merseyside. Widespread but not common in Cheshire.	Although it is found throughout most of the British Isles it is a relatively scarce species and is classed as uncommon*.
Daubenton's	Common and widespread.	Common and widespread in both Merseyside and Cheshire.	Common and fairly widespread with ranges increasing within the UK*.
Whiskered/Brandts	Widespread but not common.	Rare locally within Merseyside. Little known about distribution within Cheshire.	Although found throughout most of the British Isles they are relatively scarce species and are classed as uncommon*.
Noctule	Common and widespread.	Common and widespread in both Merseyside and Cheshire.	Common and widespread. Considered to be widely distributed across the UK*.
Brown long-eared	Common and widespread.	Widespread but less common in Merseyside. Common and	Common and widespread. Considered to be found throughout the UK*.

Species	Conservation status assessment		
	Local	County	Regional
		widespread in Cheshire.	

- 4.41 Common pipistrelle made up the majority of activity recorded during the transect surveys with low numbers of individuals recorded on a frequent basis foraging around the site, mostly utilising interfaces between buildings (residential and agricultural within the site), hedgerows, woodland, trees and grassland habitats within the site and around the site boundaries and the neighbouring gardens of residential properties. In view of the frequency that this species was recorded during the transect and automated surveys, it is expected that the site is used by a low number of common pipistrelle bats on a regular basis. The transect and automated surveys also recorded low numbers of soprano pipistrelle foraging above the site on an occasional basis. The automated surveys also recorded low numbers of *Myotis spp.* on an occasional basis.
- 4.42 The frequency of noctule and brown long-eared bats recordings during the automated surveys (and transect surveys in the case of noctule) suggests that very low numbers of individuals of these species likely use the site and its immediate surrounds on an infrequent/sporadic basis.
- 4.43 The results of the habitat activity surveys (transect and automated) found low levels of bat activity within the survey area. Distribution of bat activity is over the survey area as a whole, with numbers of bat passes being greater to the west of the survey area, around the hedgerows bordering the residential and agricultural buildings within the site and along the hedgerow through the centre of the site. The transect surveys demonstrate that the majority of bat activity at the site is associated with interfaces between hedgerows, woodland, trees and grassland habitats on the site boundaries and the neighbouring gardens of residential properties.

5.0 Impacts and Recommendations

- 5.1 The development proposals will include the demolition of the majority of the agricultural buildings within the site and the loss of the majority of the grassland habitats within the site to facilitate construction of the proposed residential dwellings, associated infrastructure and landscaping. The ponds and the majority of the trees and hedgerows within the site will be retained. Small sections of four hedgerows will need to be removed to create necessary access through the site. Where there are existing gaps in hedgerows and where possible, these should be utilised for road accesses to minimise the loss of hedgerow.
- 5.2 The habitats around the site boundary will be retained and protected during construction. A buffer of at least 5m should be maintained along retained hedgerows which prohibits storage of materials or machinery within these areas. It is recommended that as many of the internal trees and hedgerows as possible are retained and protected during construction with any loss kept to a minimum. These buffers should be retained post development to maintain the commuting corridors throughout the site. There will also be a minimum 8m easement within the site along the watercourse which runs along the northern boundary of the site, which will allow a foraging corridor to be retained. Gardens and areas of public open space within the proposed development will provide some compensatory habitat in the long term. Bat species are reliant on Core Sustenance Zones around their roosts for foraging. The core sustenance zones for the species identified within the site range from 1km to 4km, therefore it is important that foraging and commuting habitats within the site are maintained to ensure no net loss of quality or availability for local bat colonies.

- 5.3 It is recommended that any habitat lost to the proposed development is compensated on a minimum like for like basis. Compensatory habitat could include planting up of gaps within retained hedgerows with native species of local provenance. Compensatory habitat should comprise native species of local provenance or wildlife friendly berry/nectar rich shrubs. To negate interim losses while new habitats establish, ideally several bat boxes of various types should be located within adjacent woodland or on retained mature trees within the site.
- 5.4 Proposed loss of grassland habitats from the site is considered unlikely to have a significant effect on the use of the site by foraging common pipistrelle, soprano pipistrelle and noctule bats, which have a wide range of habitat preferences and regularly forage around residential development and gardens. It is expected that the trees along the boundaries of the site and the hedgerow through the centre of the site will be retained and therefore foraging and commuting habitats would be maintained. Pipistrelles, brown long-eared bats and some *Myotis* spp. are also known to forage in gardens, parkland and along woodland edges, providing these areas are not affected by artificial light spill.

Roosting Habitat

- 5.5 Common pipistrelle day roosts were identified in one of the agricultural buildings within the site and a bungalow adjacent to the site during the suite of bat activity surveys undertaken. Please see ESL Bat Survey Reports January 2021 and September 2022 for further information.

Foraging Habitat

- 5.6 The development proposals will seek to maintain and enhance opportunities for bat species favouring wooded, parkland and scrub interface habitats such as pipistrelles, brown long-eared and some *Myotis* species. Loss of foraging habitat will be compensated for through implementing measures to maximise the value of new and retained habitats as part of the development scheme. This will include provision of native species-rich tree and shrub planting within gardens and areas of public open space. The value of proposed gardens should be further enhanced through the use of native species-rich hedgerow as boundary features and use of wildlife friendly shrubs and flowers in planting schemes to encourage a higher diversity and abundance of invertebrates at the site. Over time, residential gardens will mature and are likely to provide suitable foraging habitat for many of the bat species recorded using the site during the surveys.

Drinking Areas

- 5.7 The pond within the site adjacent to LP8 had bat activity recorded on the second and third transect surveys and could be used by bats for both foraging and drinking will be retained as part of the development plan. Two additional areas of permanent open water will be created within the attenuation basins.
- 5.8 Artificial lighting, in particular by white light, has been shown to reduce drinking behaviour by fast flying bat species and to stop drinking behaviour by slow flying bat species. Therefore, light pollution of waterbodies within and adjacent to the site has the potential to detrimentally affect the ability of bat species to drink at a site and potentially local level. The lighting proposals should seek to minimise artificial light pollution on any waterbodies within and adjacent to the site and in addition, should avoid the use of white lighting.

Commuting Features

- 5.9 It is likely that low numbers of bats use the site for commuting, in particular the woodland and hedgerows on the boundaries and the hedgerow through the site. The development seeks to maximise retention of boundary trees and hedgerows in order to maintain linear vegetated corridors for commuting bats. Provision of native species-rich hedgerow, scrub and/ or further treeline planting along the boundaries of the site is recommended to further enhance these linear habitats. It is recommended that a buffer of 5m should be maintained along retained

hedgerows which prohibits storage of materials or machinery within these areas. This buffer should be retained post development to maintain the commuting corridors throughout the site.

- 5.10 In order to maintain the suitability of retained and newly created habitat corridors for commuting bats, the proposals should seek to minimise effects of artificial light spill onto areas of semi-natural vegetation (see below).

Lighting

- 5.11 Pipistrelles and noctule are known to be relatively tolerant of artificial light spill and are even known to actively seek out light sources which can attract their insect prey. However, brown long-eared bats and some species of *Myotis* bats are very intolerant of artificial light spill and therefore the residential development within the site has the potential to significantly reduce the suitability of these areas for these species if measures are not implemented to minimise light pollution associated with the new dwellings and infrastructure.
- 5.12 Development proposals should seek to maintain suitable opportunities for these species within the site by minimising artificial light pollution with high importance given to areas of high-quality foraging habitat such as the woodlands directly adjacent to the site and commuting corridors such as the trees and hedgerows on the boundaries of the site and the hedgerow through the centre of the site.
- 5.13 In order to minimise potential effects of artificial lighting, both during construction and the operational phase upon completion of the proposed development, a sensitive lighting scheme should be designed and implemented in accordance with ILP (2018) to maintain the site as suitable for foraging and commuting bat species which are sensitive to light such as brown long-eared and *Myotis* spp. bats. Lighting levels should be at the minimum required for health and safety, and avoided wherever possible. The effects of lighting could be reduced through the use of low-level lighting and/ or using bulbs emitting low UV light and should be directed away from more sensitive habitats that could be used by foraging or commuting bats such as boundary trees, hedgerows, and neighbouring gardens. The lighting strategy should be reviewed at an appropriate stage of design by a suitably qualified ecologist.
- 5.14 The Chartered Institute for Ecology and Environmental Management's advice note on the lifespan of ecological reports and surveys (CIEEM, 2019) advises that surveys are likely to be valid in most cases for up to 18 months with the following exceptions:
- Where a site may offer existing or new features which could be utilised by a mobile species within a short timeframe;
 - Where a mobile species is present on site or in the wider area, and can create new features of relevance to the assessment; or
 - Where country-specific or species-specific guidance dictates otherwise.
- 5.15 If more than 18 months has passed since the surveys were undertaken, a site visit will need to be undertaken by an ecologist to check whether there have been any significant changes to habitats or habitat management within the site that could affect the validity of the survey results. The review should also consider whether there have been any changes in the status of roosting bats at the site and desk study information may also need to be updated. If more than three years old, the report is unlikely to be valid.

Enhancement Measures

- 5.16 Enhancement measures within the site could include the seeding of species-rich grassland which can be used by bats for foraging. Species-rich hedgerows could be planted on the boundaries of the proposed residential gardens, for foraging and commuting bats. A species-

rich hedgerow could be planted on the northern side of the footpath to provide a hedged corridor which will act as a commuting and foraging corridor for bats and also as a buffer to the residential gardens from the public footpath.

6.0 Conclusion

- 6.1 To conclude, this report details the findings of the bat habitat activity surveys (transect and automated detector surveys) that have been undertaken at this site.
- 6.2 All completed surveys have been undertaken by suitably experienced surveyors at the appropriate time of year and in line with current guidance.
- 6.3 The bat habitat activity surveys recorded six bat species/ species groups foraging and/ or commuting within the site with the majority of activity comprising common pipistrelle bats. Generally low levels of bat activity were identified within the survey area. Activity was distributed over the survey area as a whole, with numbers of bat passes being greater to the west of the survey area and along the hedgerow through the centre of the site. The majority of bat activity at the site was associated with interfaces between woodland, trees, hedgerows and grassland habitats which are located around the margins of the site and the hedgerow through the centre of the site, in addition to neighbouring residential gardens. Bat foraging was also noted around one of the ponds within the site, adjacent to LP8.
- 6.4 Effects that are likely to occur due to the proposed development have been reviewed. Through the implementation of the above measures to maintain and enhance areas of good quality foraging and commuting habitat within the site for bats and minimising potential effects of artificial lighting associated with the proposals, it is considered that opportunities for foraging and commuting bat species recorded at the site can be maintained and enhanced in the long-term. Subject to the recommended measures being implemented and no further impacts arising, it is concluded unlikely that the proposed development of the site would result in a significant reduction in the interest of the site for foraging and commuting bats.
- 6.5 The recommendations within this report should be incorporated into the detailed design and landscaping schemes. Once the detailed design is finalised this report should be reviewed.

7.0 References

Bat Conservation Trust (2017) The State of the UK's Bats 2017. National Bat Monitoring Programme Population Trends.

BCT (2020) Core Sustenance Zones and habitats of importance for designing Biodiversity Net Gain for bats. Bat Conservation Trust, London. Online - available from: <https://www.bats.org.uk/resources/guidance-for-professionals/bat-species-core-sustenance-zones-and-habitats-for-biodiversity-net-gain> [Accessed January 2021].

Berge, L., (2007). Resource partitioning between the cryptic species Brandt's bat (*Myotis brandtii*) and the whiskered bat (*M. mystacinus*) in the UK. Ph.D. thesis, University of Bristol.

Buckley, D.J., Lundy, M.G., Boston, E.S.M. et al. (2013) The spatial ecology of the whiskered bat (*Myotis mystacinus*) at the western extreme of its range provides evidence of regional adaptation. Mamm Biol 78, 198–204.

CIEEM (2019). Advice Note on the Lifespan of Ecological Reports & Surveys. CIEEM, Winchester.

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

Google Maps (<https://www.google.com/maps>)

Guidance document on the strict protection of animal species of Community interest under the Habitats Directive 92-43-EEC (2007). Online - available from: http://ec.europa.eu/environment/nature/conservation/species/guidance/pdf/guidance_en.pdf [Accessed January 2021].

Harris, S. et al. (1995) A review of British mammals: population estimates and conservation status of British Mammals other than cetaceans. JNCC, Peterborough.

Individual Species Reports – Fourth Article 17 UK Habitats Directive Report (2019): Supporting Information (habitats & species). Online – available from <https://hub.jncc.gov.uk/assets/081db8a3-afa7-442b-bd0d-701aaf830bdc> [accessed November 2020].

Institution of Lighting Professionals (ILP) (2018) Bats and artificial lighting in the UK, ILP, Rugby, Warwickshire.

Marnell, F. & Presetnik, P. (2010) Protection of over ground roosts for bats (particularly roosts in buildings of cultural heritage importance). EUROBATS Publication Series No. 4 (English Version). UNEP/EUROBATS secretariat, Bonn, Germany.

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

Mathews F, and Harrower C. (2020). IUCN – compliant Red List for Britain's Terrestrial Mammals. Assessment by the Mammal Society under contract to Natural England, Natural Resources Wales and Scottish Natural Heritage. Natural England, Peterborough.

Ministry of Housing, Communities & Local Government (July 2021). National Planning Policy Framework. Online - available from: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>. [Accessed August 2022].

Mitchell-Jones, A.J. (2004). The Bat Workers Manual (3rd Edition) JNCC. The Bat Mitigation Guidelines (English Nature 2004)

Planning Policy Wales (Edition 9, November 2016)

Rowse, E.G., Lewanzik D., Stone, E.L., Harris, S. & Jones G. (2016) *Dark Matters: The Effects of Artificial Lighting on Bats*. In: Voigt C., Kingston T. (eds) *Bats in the Anthropocene: Conservation of Bats in a Changing World*. Springer, Cham

Species Factsheet, Bat Conservation Trust, Online – individual species factsheets available from <https://www.bats.org.uk/about-bats/what-are-bats/uk-bats> [Accessed November 2019].

Stone, E.L. (2013) Bats and lighting: Overview of current evidence and mitigation guidance

The Conservation of Habitats and Species Regulations 2017 (as amended).

The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019.

The EEC Directive 1992 (European Legislation).

The Wildlife & Countryside Act 1981 (as amended)

UK Biodiversity Steering Group (1995) Biodiversity – the UK Steering Group Report. Volume 2: Action Plans. P89 SAP for Pipistrelle. London, HMSO.

White, S.J. (ed), Beattie, D., Bedford, A., Brown, M., Cripps, R., Cross, S., Greenhalgh, M.E.G., Liggett, C., Martin, S.J., Parker, A., Smith, P.H. & Tapp, S. (2017). Lancashire's Vertebrates: The Mammals, Amphibians, Reptiles and Freshwater Fish of Lancashire and North Merseyside. Lancashire & Cheshire Fauna Society, Publication No. 122. Rishton, Lancashire.

Figure 1:
Transect Route, Static Point Count and Automated Detector Locations

Figure 1: Transect Route, Static Point Count and Automated Detector Locations

Map Ref: (NGR) 350000, 387800
Map Scale: 1:2,300 @ A3

Key;

- Site boundary
- Transect route
- Listening point
- Static detector locations
- Common pipistrelle
- Soprano pipistrelle
- Noctule
- + + + Fence
- Pond
- No access

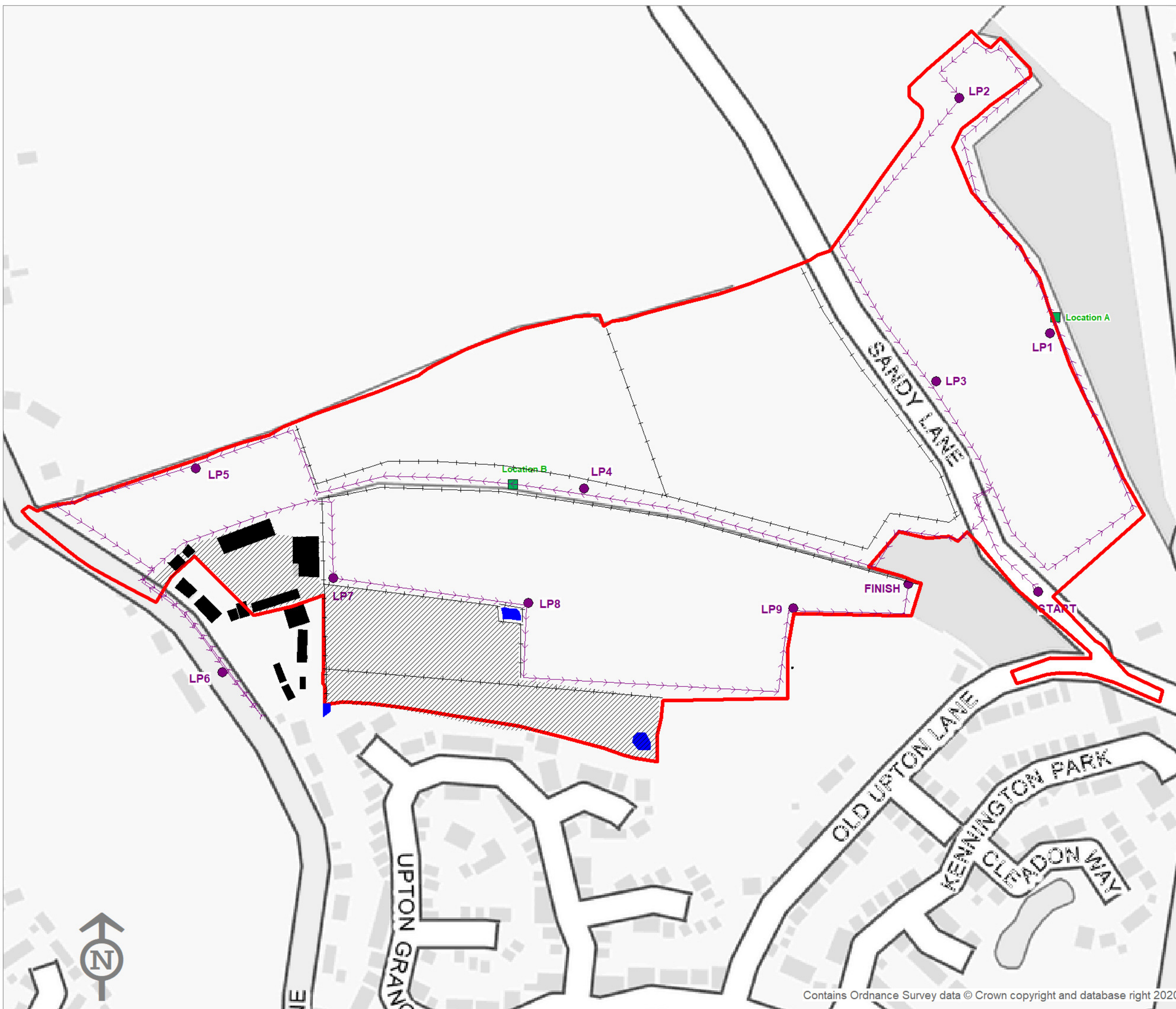


Figure 2:
Transect Survey 1 – Results Summary Plan

Figure 2: All Transect Survey 1
Results Summary Plan

Map Ref: (NGR) 350000, 387800
Map Scale: 1:2,300 @ A3

Key;

- Site boundary
- Transect route
- Listening point
- Static detector locations
- Common pipistrelle
- Soprano pipistrelle
- Noctule
- + + + Fence
- Pond
- No access

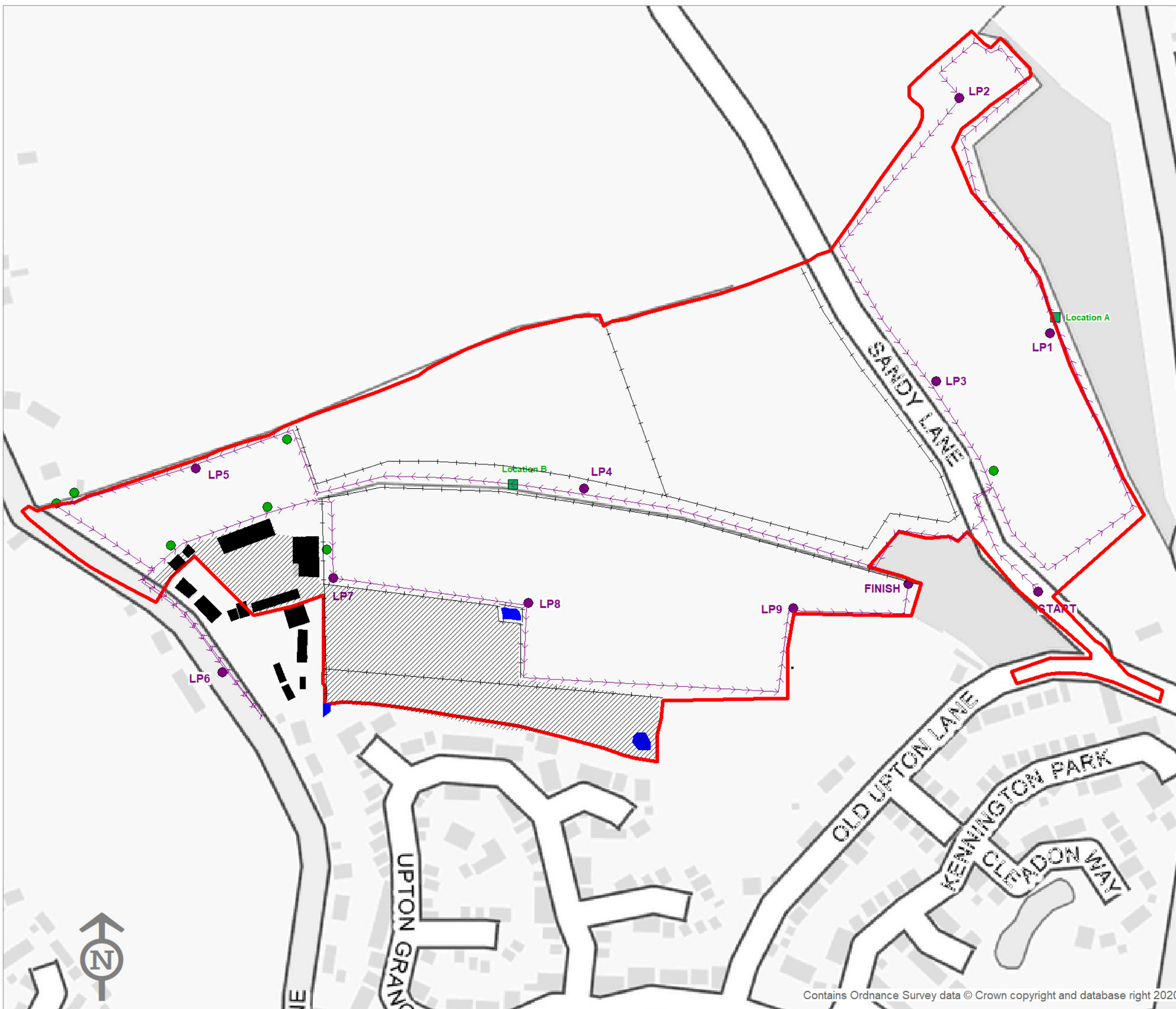


Figure 3:
Transect Survey 2 – Results Summary Plan

Figure 3: All Transect Survey 2
Results Summary Plan

Map Ref: (NGR) 350000, 387800
Map Scale: 1:2,300 @ A3

Key;

- Site boundary
- Transect route
- Listening point
- Static detector locations
- Common pipistrelle
- Soprano pipistrelle
- Noctule
- + + + Fence
- Pond
- No access

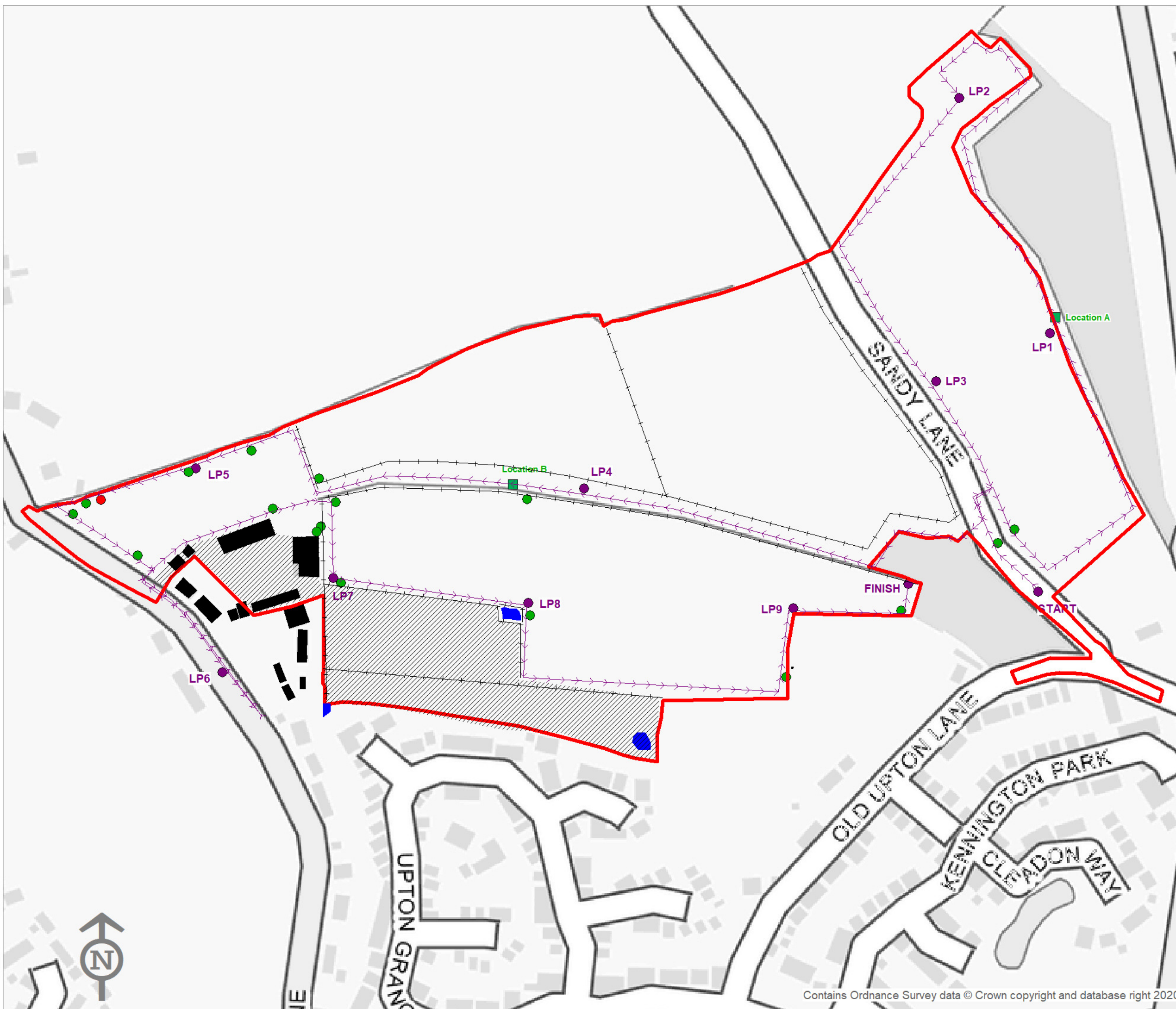


Figure 4:
Transect Survey 3 – Results Summary Plan

Figure 4: All Transect Survey 3
Results Summary Plan

Map Ref: (NGR) 350000, 387800
Map Scale: 1:2,300 @ A3

Key;

- Site boundary
- >>> Transect route
- Listening point
- Static detector locations
- Common pipistrelle
- Soprano pipistrelle
- Noctule
- + + + Fence
- Pond
- No access



Figure 5:
All Transect Surveys Combined – Results Summary Plan

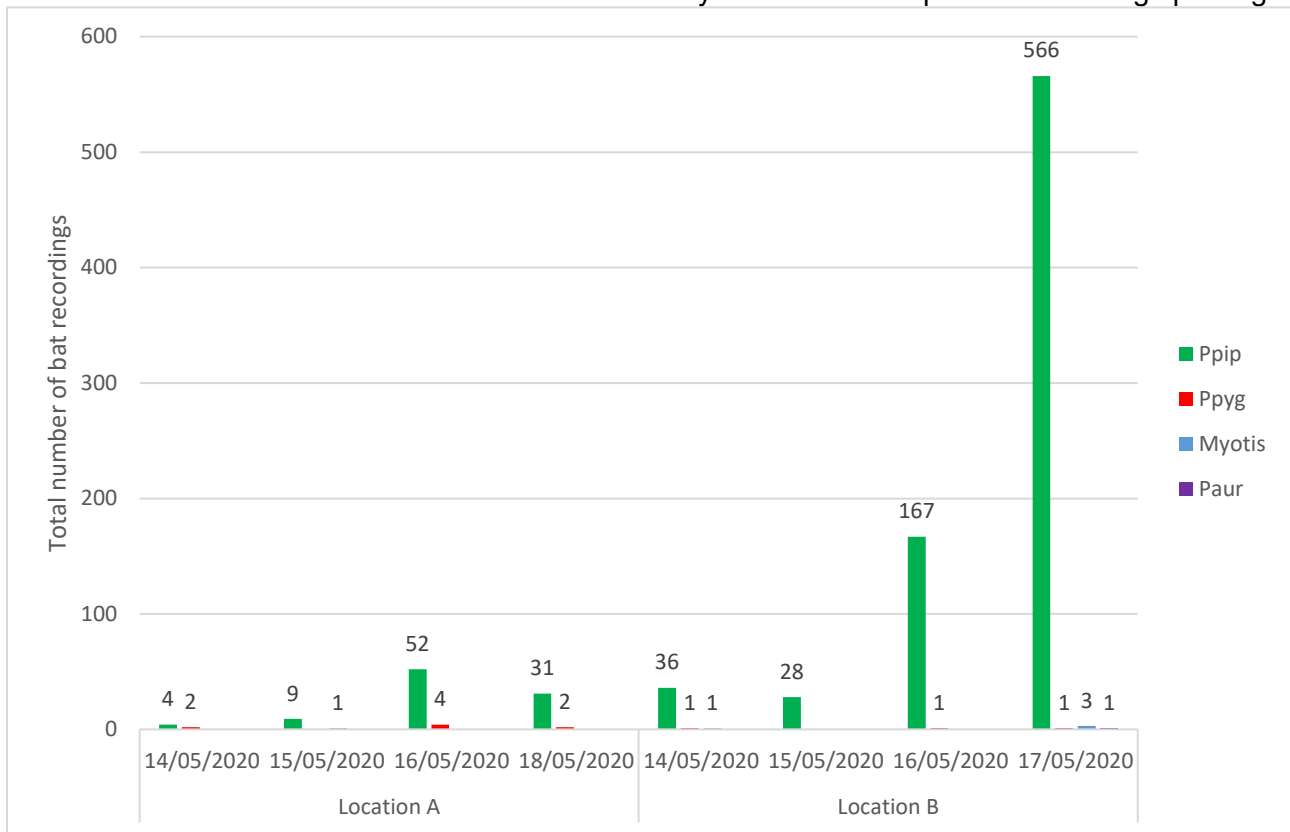
Figure 5: All Transect Surveys
Combined Results Summary Plan

Map Ref: (NGR) 350000, 387800
Map Scale: 1:2,300 @ A3

Key;

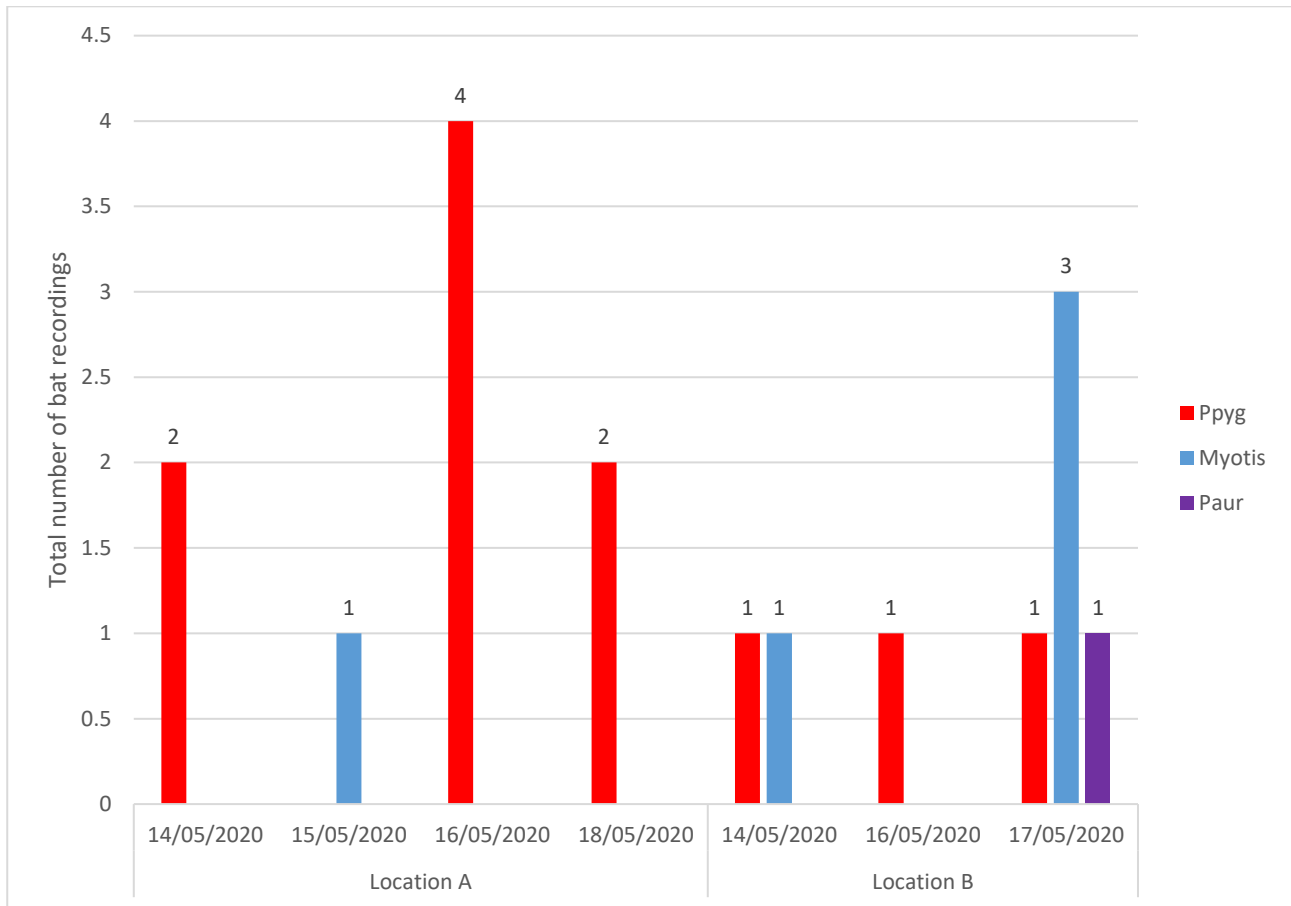
- Site boundary
- Transect route
- Listening point
- Static detector locations
- Common pipistrelle
- Soprano pipistrelle
- Noctule
- + + + + + Fence
- Pond
- No access



Figure 6:**Automated Survey Period 1 – All Species Recordings per Night**

Ppip = Common pipistrelle (*Pipistrellus pipistrellus*), Ppyg = Soprano pipistrelle (*Pipistrellus pygmaeus*), Myotis = *Myotis* spp, Paur= Brown long-eared (*Plecotus auritus*).

Figure 7:
Automated Survey Period 1 – Species Recordings per Night*



*excluding Common Pipistrelle (Ppip).

Ppyg = Soprano pipistrelle (*Pipistrellus pygmaeus*), Myotis = *Myotis* spp, Paur= Brown long-eared (*Plecotus auritus*).

Figure 8:
Automated Survey Period 1 – Total Recordings per Hour

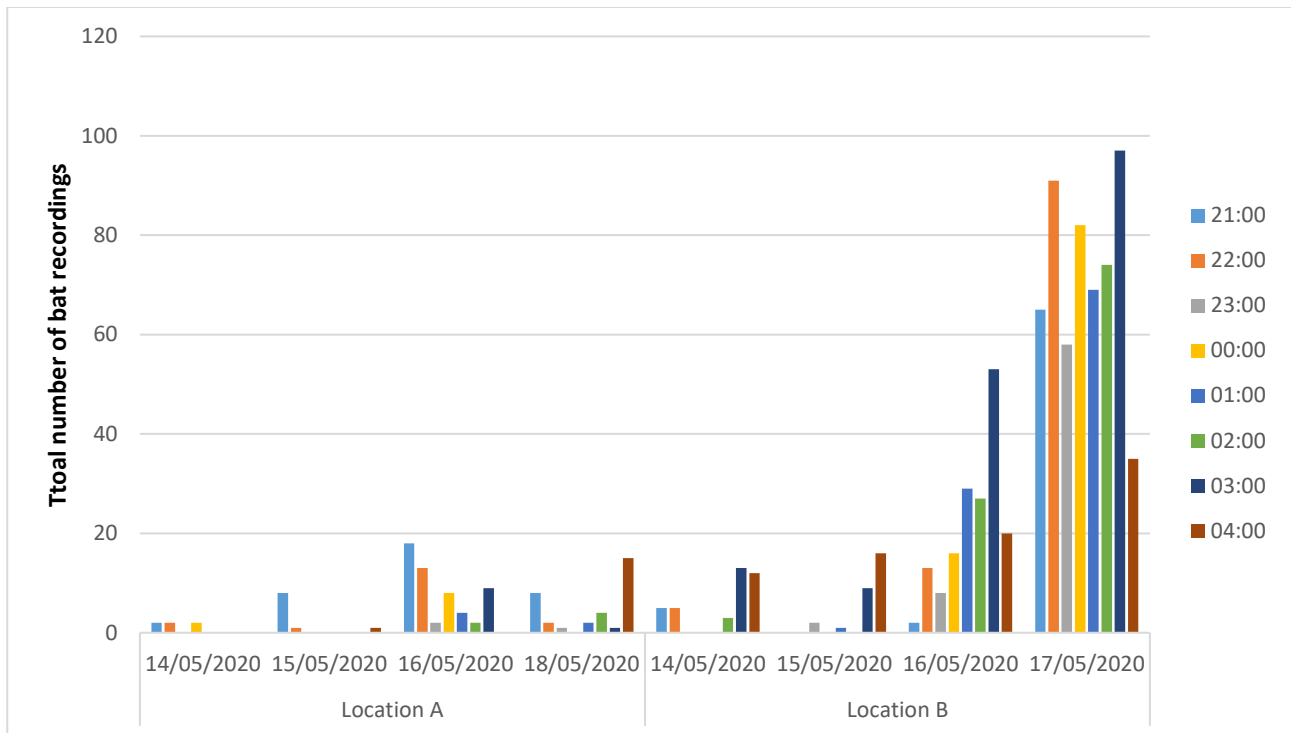
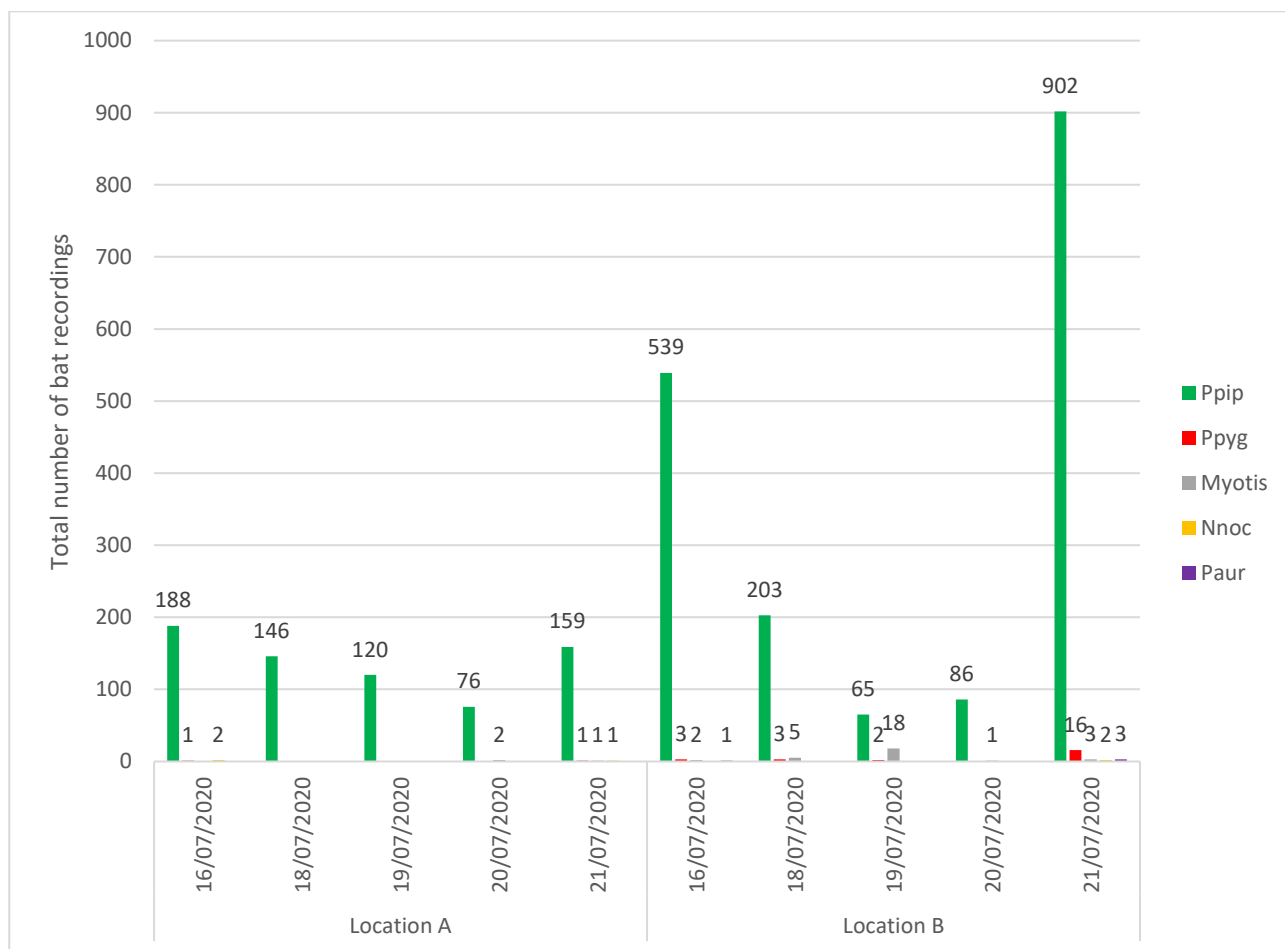
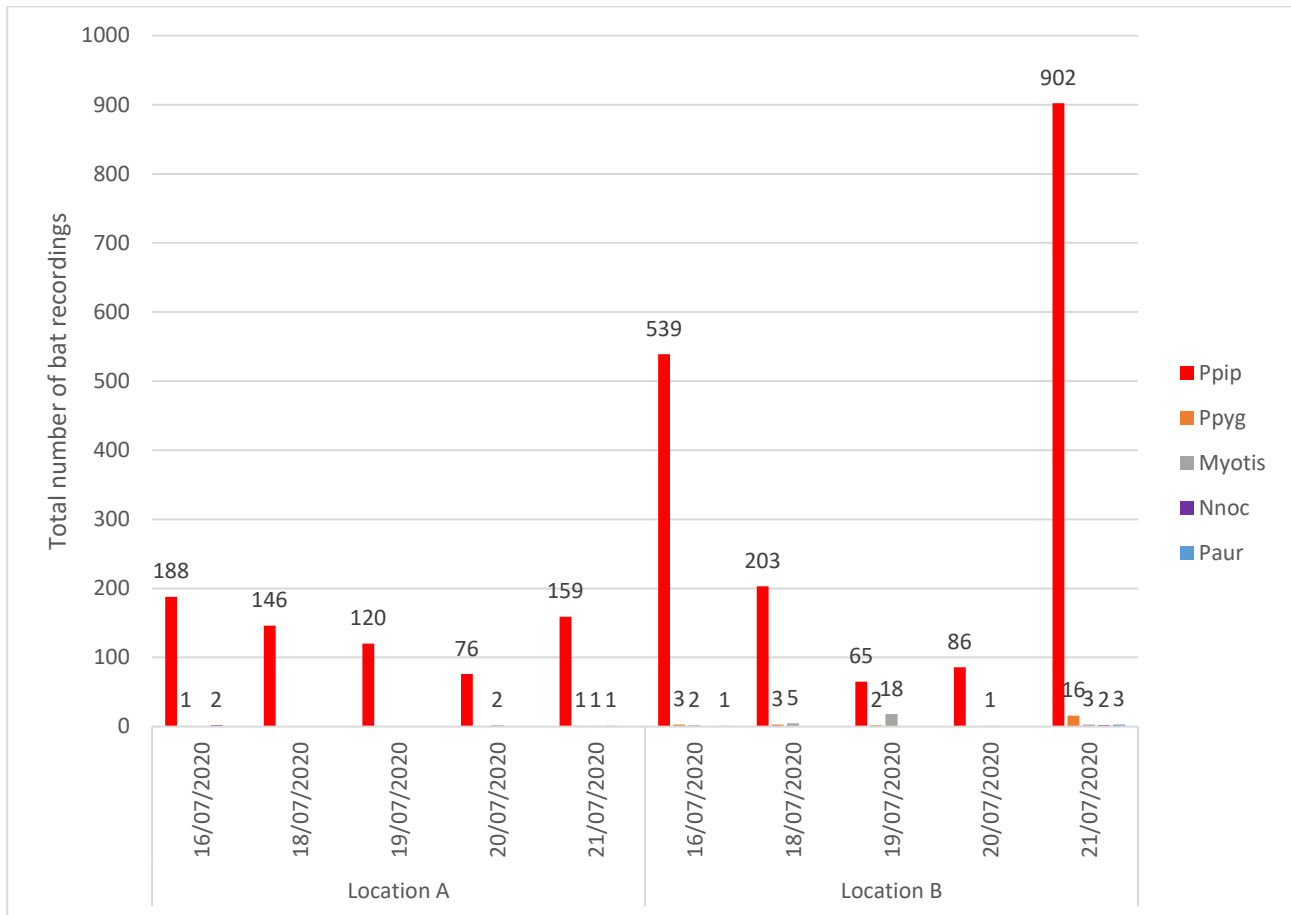


Figure 9:
Automated Survey Period 2 – All Species Recordings per Night



Ppip = Common pipistrelle (*Pipistrellus pipistrellus*), Ppyg = Soprano pipistrelle (*Pipistrellus pygmaeus*), Myotis = *Myotis* spp, Nnoc = Noctule (*Nyctalus noctula*), Paur = Brown long-eared (*Plecotus auritus*).

Figure 10:
Automated Survey Period 2 – Species Recordings per Night*



*excluding Common Pipistrelle (Ppip)

Ppip = Common pipistrelle (*Pipistrellus pipistrellus*), Ppyg = Soprano pipistrelle (*Pipistrellus pygmaeus*), Myotis = *Myotis* spp, Nnoc = Noctule (*Nyctalus noctula*), Paur = Brown long-eared (*Plecotus auritus*).

Figure 11:
Automated Survey Period 2 – Total Recordings per Hour

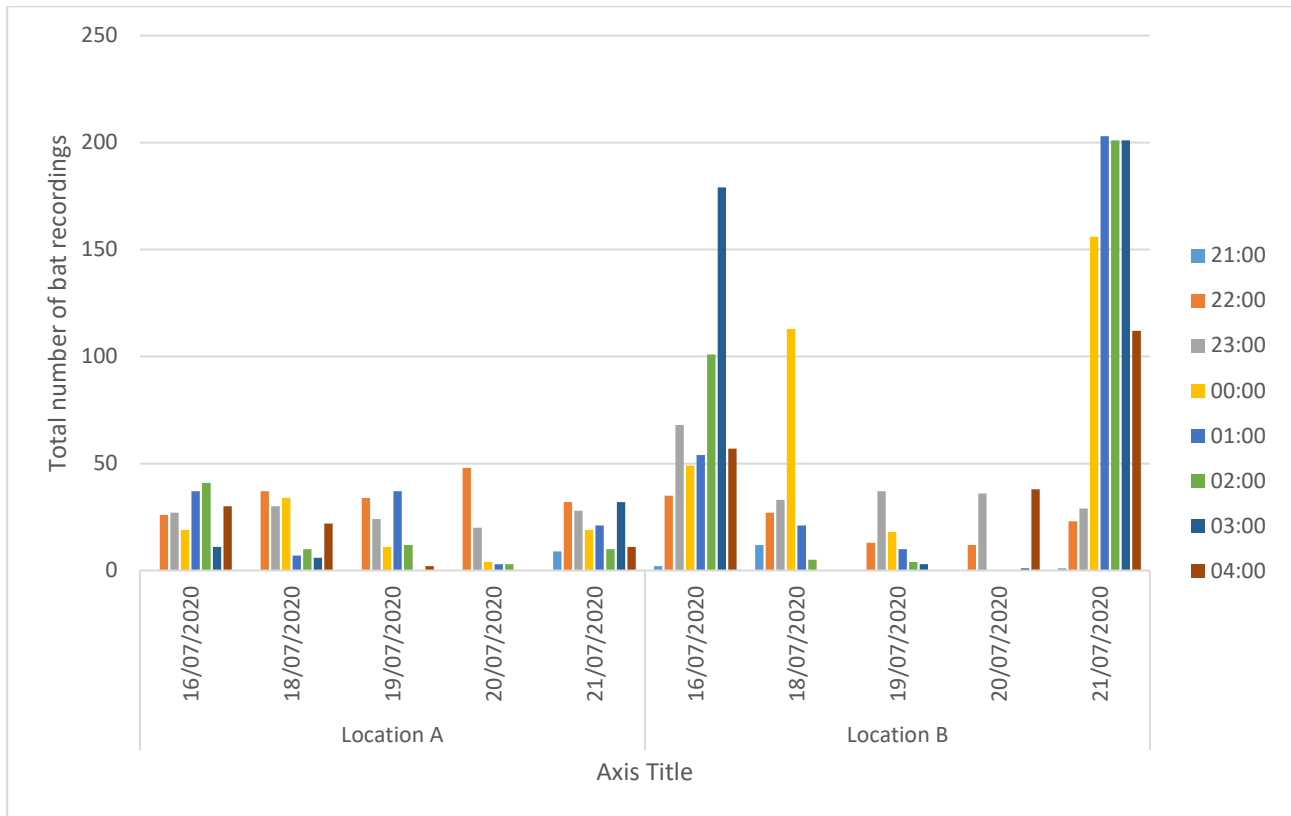
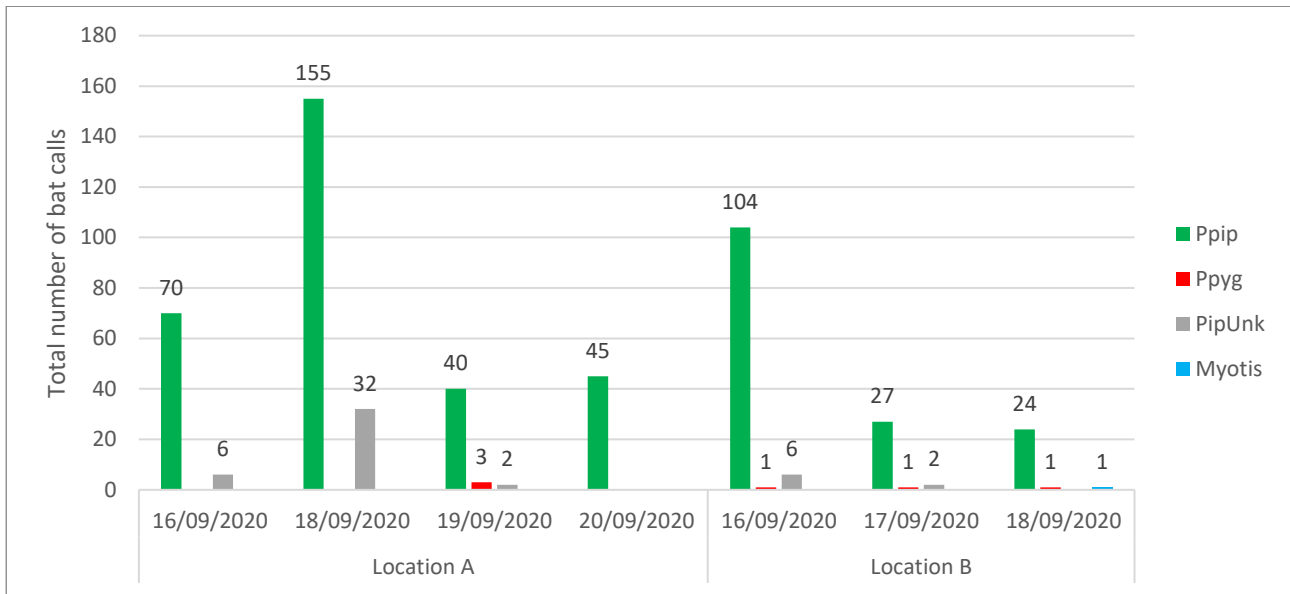
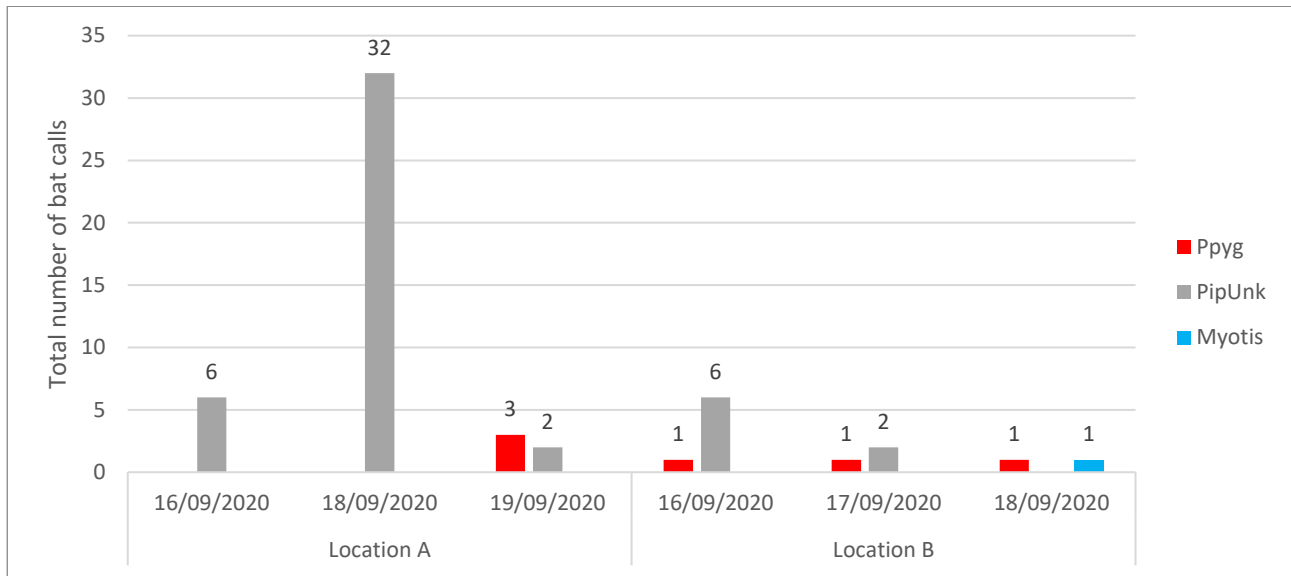


Figure 12:
Automated Survey Period 3 – All Species Recordings per Night



Ppip = Common pipistrelle (*Pipistrellus pipistrellus*), Ppyg = Soprano pipistrelle (*Pipistrellus pygmaeus*), PipUnk = *Pipistrellus* spp. (common or soprano pipistrelle), Myotis = *Myotis* spp.

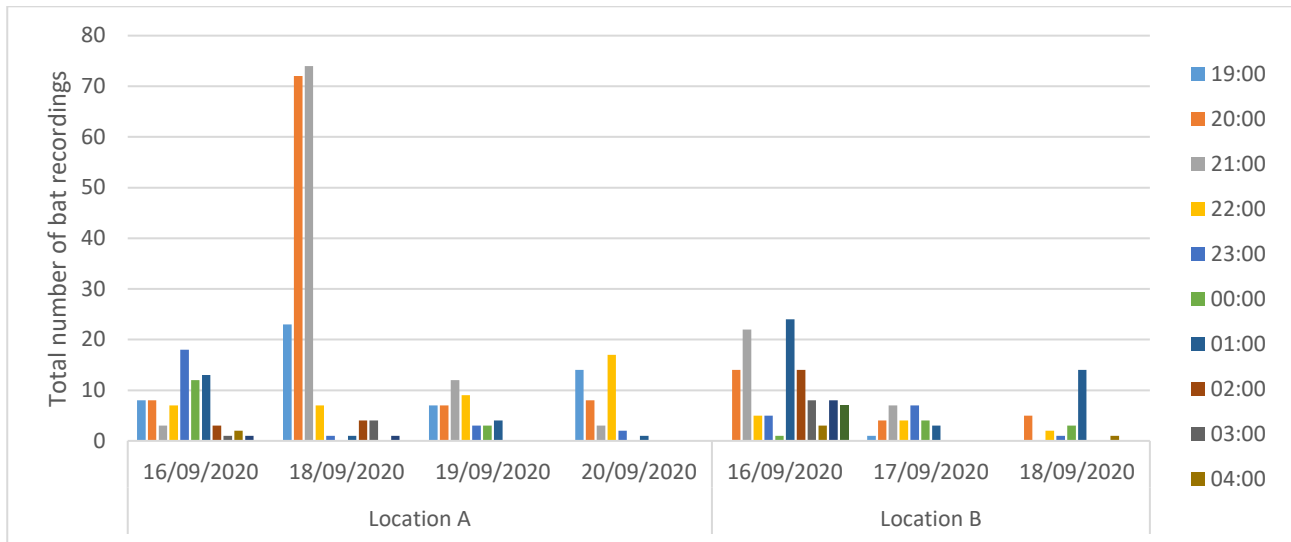
Figure 13:
Automated Survey Period 2 – Species Recordings per Night*



*Excluding Common pipistrelle (Ppip)

Ppyg = Soprano pipistrelle (*Pipistrellus pygmaeus*), PipUnk = *Pipistrellus* spp. (common or soprano pipistrelle),
Myotis = *Myotis* spp.

Figure 14:
Automated Survey Period 3 – Total Recordings per Hour



Appendix 1: Planning Policy and Legislation

Planning Context

National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF, 2021) places a clear responsibility on Local Planning Authorities (LPA) to contribute to conserving and enhancing the natural and local environment. LPAs should promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species (e.g. Species of Principal importance, Biodiversity Action Plan species); and identify and pursue opportunities for securing measurable net gains for biodiversity. The Office of the Deputy Prime Minister (ODPM) Circular 06/2005 provides administrative guidance on the application of the law in relation to planning and nature conservation.

A Local Planning Authority (LPA) has a duty to ensure that protected species and habitats within the UK are a 'material consideration' in the determination of a planning application. Therefore, an LPA is unlikely to determine an application until all relevant information relating to protected species or habitats is submitted to fully inform the application. Relevant information includes adequate surveys and, where required, mitigation strategies, which will need to be submitted in support of a planning application.

Statutory Protection Afforded UK Bats

The Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, also known as the Habitats Directive, lists all UK bat species on Annex IV which places an obligation on all member states to implement strict protection for these species. This legislation is transposed into UK law through the Conservation of Habitats & Species Regulations 2017 (as amended), which makes it an offence to:

- deliberately kill, injure or capture a wild bat;
- deliberately disturb* a bat;
- damage or destroy a breeding site or resting place of a bat.

*Disturbance, as defined by the Conservation of Habitats & Species Regulations 2017 (as amended), is that which is likely to:

- impair their ability –
 - to survive, to breed or reproduce, or to rear or nurture their young; or
 - in the case of animals of a hibernating or migratory species, to hibernate or migrate.
- affect significantly the local distribution or abundance of the species to which they belong.

The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 continue the same provision for European protected species, licensing requirements and protected areas after Brexit.

All UK bats and their roosts are afforded further protection through their inclusion on Schedule 5 of the Wildlife & Countryside Act 1981 (as amended), which makes it an offence to:

- intentionally or recklessly disturb a bat while it is occupying a structure or place which it uses for shelter or protection;
- intentionally or recklessly obstruct access to a structure or place which a bat uses for shelter or protection.

Four bat species (greater horseshoe, lesser horseshoe, Bechstein's and barbastelle) are listed under Annex II of the EC Habitats Directive which requires member states to designate sites of particularly high importance for the conservation of these species as Special Areas of Conservation (SAC) ('Natura 2000' sites).

When dealing with planning applications where a European Protected Species (EPS) (all UK bats) may be affected, a Local Authority is a 'competent authority' within the meaning of regulation 7 of the Conservation of Habitats & Species Regulations 2017 (as amended). The local authority must therefore exercise their functions under the provisions made within the 2017 Regulations (as amended), and planning decisions should only be made when European Protected Species and their habitats are fully taken into account.

Licensing of Works Affecting Roosting Bats

Where a bat roost is likely to be affected by development then a licence to derogate from the legal protection would be required. Licence applications are processed and issued by Natural England and can only be applied for once planning permission (if required) has been granted.

Natural England may grant a licence for the purposes specified in paragraph 55 of the Regulations. The purposes are:

- 55(2)(e) preserving public health or safety or other imperative reason of overriding public interest including those of a social or economic nature and beneficial consequence of primary importance for the environment.
- 55(2)(f) preventing the spread of disease.

Natural England must not grant a licence under paragraph 55 unless it is satisfied that:

- 55(9)(a) there is no satisfactory alternative; and
- 55(9)(b) the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable status in their natural range.

In December 2016, Natural England introduced four policies for European Protected Species licensing. The policies seek to achieve better outcomes for EPS and reduce unnecessary costs, delays and uncertainty that were inherent in the current system. In brief, the four policies are:

- **Policy 1** - Greater flexibility when excluding and relocating European Protected Species (EPS) from development sites;
- **Policy 2** - Greater flexibility in the location of newly created habitats that compensate for habitats that will be lost;
- **Policy 3** - Allowing EPS to have access to temporary habitats that will be developed at a later date; and
- **Policy 4** - Appropriate and relevant surveys where the impacts of development can be confidently predicted.

Policy 1 allows compensation for EPS impacts to be delivered without the need to relocate or exclude populations where: exclusion or relocation measures are not necessary to maintain the conservation status of the local population; the avoid-mitigate-compensate hierarchy is followed; and compensation provides greater benefits to the local population than would exclusion and/or relocation.

Policy 2 allows for the provision of off-site compensation measures where the licensing tests are met, the avoid-mitigate-compensate hierarchy is followed, there are good reasons for maximising

development on the site of EPS impacts and where an off-site solution provides greater benefit to the local population than an on-site solution.

Policy 3 relates to developments, such as mineral extraction, which temporarily create habitat which is likely to attract EPS and enables works to proceed without the exclusion of EPS where the conservation status of the local population would not be detrimentally affected. On completion of development such sites must contribute to the conservation status of the local population as much as or more than the land use which preceded development. The measures to achieve this should be set out in a management plan and secured by a legal agreement.

Under **Policy 4** Natural England may accept a lower than standard survey effort where: the costs or delays associated with carrying out standard survey requirements would be disproportionate to the additional certainty that it would bring; the ecological impacts of development can be predicted with sufficient certainty; and mitigation or compensation will ensure that the licensed activity does not detrimentally affect the conservation status of the local population of any EPS.

Natural Environmental and Rural Communities (NERC) Act 2006

Section 40 of the Natural Environmental and Rural Communities (NERC) Act 2006 places a statutory duty on public authorities, in exercising their functions, to conserve biodiversity in England. Species of Principal Importance for the conservation of biodiversity in England, as identified by the Secretary of State in consultation with Natural England, are listed Section 41 of the NERC Act. The Local Planning Authority and government bodies (e.g. Natural England) will expect the overall design of the development to have regard for the conservation of these species. Section 41 of the NERC Act lists seven bat species as Species of Principal Importance (refer to Section 2).

Appendix 2:**Table 4.1** Guidelines for assessing the potential suitability of proposed development sites for bats, based on the presence of habitat features within the landscape, to be applied using professional judgement (Taken from the Bat Conservation Trust Bat Surveys for Professional Ecologists: Good Practice Guidelines, 2016).

Suitability	Description	
	Roosting habitats	Commuting & foraging habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions¹ and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation²). A tree of sufficient size and age to contain PRF's but with none seen from the ground or features seen with only very limited roosting potential³.	Habitat that could be used by small numbers of commuting bats such as gappy hedgerow or un-vegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) of a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions ¹ and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back to gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland and water.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions ¹ and surrounding habitat.	Continuous, high quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broad-leaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.

¹For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.²Evidence from the Netherlands shows mass swarming events of common pipistrelle bats in the autumn followed by mass hibernation in a diverse range of building types in urban environments (Korsten *et al.*, 2015). This phenomenon requires some research in the UK but ecologists should be aware of the potential for larger numbers of this species to be present during the autumn and winter in large buildings in highly urbanised environments.³This system of categorisation aligns with BS8596:2015 Surveying for bats in trees and woodland (BSI, 2015).

Appendix 3:**Population Statuses of Bat Species in North Merseyside and Cheshire****National Status**

There are 18 species of bat that are native to the United Kingdom.

The latest Review of the Conservation Status of British Mammals (2018) has shown that where change could be assessed with reasonable confidence there have been increases in the geographical range and population status of two species of UK bat (greater and lesser horseshoe bat) and decrease in the geographical range of one species (grey long-eared bat). Increases in population were also identified in the following species: Bechstein's, Daubenton's, Natterers, Serotine and brown long-eared although it is noted that the reliability of the results is poor. Population data was not available for; Alcatheo, whiskered, Brandts, Leisler's, noctule, Barbastelle and Nathusius pipistrelle.

Population estimates were given for common and soprano pipistrelle however they could not be reliably compared to the results from Harris et al. (1995) as the two species had not been identified as separate species at the time of that survey. *Pipistrellus* spp. remain the commonest species of bat in the UK despite their decline.

The State of Bats 2017 report produced by the Bat Conservation Trust used results from multiple survey types (hibernation, roost, waterway and field) of the National Bat Monitoring Programme (NBMP) to compile population trends between 1999, 2001 or 2002 to 2016. The report identified statistically significant (95% accuracy) population increase in Great Britain in the following species; greater horseshoe (hibernation and roost surveys), lesser horseshoe (hibernation and roost surveys), Daubenton's (hibernation surveys), Natterers (hibernation surveys), common pipistrelle (field surveys), soprano pipistrelle (field surveys). Significant decreases in population in Great Britain were identified in common pipistrelle (roost surveys), soprano pipistrelle (roost surveys) and brown long-eared (roost surveys).

These trends reflect relatively recent changes to bat populations since the 1990s. It is generally considered that prior to this there were significant historical declines in bat populations dating back to at least the start of the 20th century, although evidence is fragmented and few data were collected in a systematic way.

Serotine and barbastelle are considered vulnerable and Leisler's and Nathusius' pipistrelle, near threatened in Britain and England in the Red List for Britain's Terrestrial Mammals (Mathews and Harrower, 2020).

North Merseyside**Local Status**

Eight bat species are listed as being resident in North Merseyside; these are as follows:

- Common pipistrelle (*Pipistrellus pipistrellus*)
- Soprano pipistrelle (*Pipistrellus pygmaeus*)
- Brown long-eared (*Plecotus auritus*)
- Whiskered (*Myotis mystacinus*)
- Brandt's (*Myotis brandtii*)
- Natterer's (*Myotis nattereri*)
- Daubenton's (*Myotis daubentonii*)
- Noctule (*Nyctalus noctula*)

Nine native species of bat have been recorded in North Merseyside, which include the above list with the addition of Nathusius pipistrelle (*Pipistrellus nathusii*), which have been trapped and ringed at Knowsley Safari Park and identified on bat detectors in some Liverpool parks including Newsham Park.

In addition to this, an individual record of the non-native Savi's Pipistrelle (*Pipistrellus savii*) was recorded which is thought to have arrived in the UK on a ship bound for Liverpool.

Populations of bats in many parts of North Merseyside are comparable in size and importance to some of the best areas in the country and the size and changes are believed to mirror national trends.

Pipistrelle bats occur in all four of the Merseyside districts and are widely distributed in North Merseyside, being the most encountered bats roosting within built structures and foraging in urban areas.

Brown long-eared and noctule are found throughout North Merseyside but are less common.

The distribution of Daubenton's, which feed predominately over water, are localised with records from Sefton, Liverpool and St Helens.

Whiskered/Brandt's and Natterer's are rare locally, with whiskered being recorded in Sefton and St. Helens and Natterer's only recorded in St. Helens so far.

Swarming activity has only been identified in one area in North Merseyside; Rainford of up to seven species (four species of *Myotis*, common pipistrelle, soprano pipistrelle and brown long-eared) (White, Ed.) *et. al.*, 2017).

Cheshire

Local Status

There are ten bat species listed as being resident in Cheshire; these are as follows:

- Common pipistrelle (*Pipistrellus pipistrellus*)
- Soprano pipistrelle (*Pipistrellus pygmaeus*)
- Noctule (*Nyctalus noctula*)
- Leisler's (*Nyctalus leisleri*)
- Serotine (*Eptesicus serotinus*) – although these records are yet to be confirmed.
- Whiskered (*Myotis mystacinus*)
- Brandt's (*Myotis brandtii*)
- Daubenton's (*Myotis daubentonii*)
- Natterer's (*Myotis nattereri*)
- Brown long-eared (*Plecotus auritus*)

Twelve species of bat have been recorded in Cheshire, which include the above list, with the addition of the more recent discovery of lesser horseshoe (*Rhinolophus hipposideros*) and Nathusius pipistrelle (*Pipistrellus nathusii*).

Populations of bats in many parts of Cheshire are comparable in size and importance to some of the best areas in the country and the size and changes are believed to mirror national trends.

Common and soprano pipistrelle are the most commonly widespread species found within the Cheshire districts and are widely distributed throughout Cheshire, being the most commonly encountered bats roosting within built structures and foraging in urban areas. Nathusius' pipistrelle has only to date been recorded at one site within Cheshire.

Brandt's and whiskered are difficult to distinguish and little is known about their distribution within Cheshire.

Noctule bats are the largest bat found in Cheshire and Leisler's are similar in appearance and may as a result be under recorded within the county.

The most recent discovery is of two lesser horseshoe bats recorded hibernating during a survey of man-made caves in the south of the county in 2009. Previous records for this species date back to 1948.

Appendix 4:

Raw Survey Data - Walked Transects

Type by Survey:		Survey 1	Project:	Chapel Lane		
Date:		14.05.2020	Start Time:	21:04	Finish Time:	22:56
Sunset:		21:04	Start °C:	11.0	Finish °C:	9.0
Weather conditions:		Calm	Cloud cover (%):	0	Wind strength:	Beaufort 0
Transect No. 1		Surveyors: Simon Booth & Charlotte Wood				
Time:	Listening Point (LP No.)/ Walk (W No.)	Bat Passes Heard & Activity				
21:04-21:13	Start/W1	None				
21:13-21:16	LP1	None				
21:16-21:22	W2	None				
21:22-21:25	LP2	None				
21:25-21:32	W3	None				
21:32-21:35	LP3	None				
21:35-21:47	W4	P45 commuting ~3m high. P45 foraging HNS				
21:47-21:50	LP4	None				
21:50-22:03	W5	P45 commuting HNS (faint)				
22:03-22:06	LP5	None				
22:06-22:16	W6	P45 foraging and feeding 3m high. 2x P45 HNS				
22:16-22:19	LP6	None				
22:19-22:30	W7	P45 commuting HNS. P45 foraging, 3m high. 2x P45 foraging 3m high				
22:30-22:33	LP7	P45 foraging HNS				
22:33-22:37	W8	None				
22:37-22:40	LP8	P45 faint foraging HNS				
22:40-22:47	W9	None				
22:47-22:50	LP9	None				
22:50-22:53	W10	None				
22:53-22:56	Finish	None				

P45 – Common pipistrelle; HNS – Heard Not Seen.

Type by Survey:	Survey 2	Project:	Chapel Lane		
Date:	15.07.20	Start Time:	21:48	Finish Time:	23:37
Sunset:	21:31	Start °C:	14.6	Finish °C:	15.0
Weather conditions:	Light rain throughout. Heavier rain and wind from 23:00 to end of survey.	Cloud cover (%):	100	Wind strength:	Beaufort 0-3
Transect No. 1	Surveyors: Charlotte Wood & Craig Smith				
Time:	Listening Point (LP No.)/ Walk (W No.)	Bat Passes Heard & Activity			
21:48-21:51	Finish/W11	2x P45 commuting, foraging and feeding at tree tops, social calls.			
21:51-21:54	LP9	None			
21:54-22:01	W9	2x P45 foraging and feeding between ~1m and 5m high. 2x P45 foraging and feeding ~3m high.			
22:01-22:04	LP8	2x P45 foraging and feeding ~3m high.			
22:04-22:06	W8	None			
22:06-22:09	LP7	2x P45 foraging and feeding ~3m high along treeline and over field.			
22:09-22:19	W7	2x P45 foraging and feeding ~2m high around trees/hedgerow. P45 brief call. P45 commuting. P45 HNS foraging.			
22:19-22:22	LP6	None			
22:22-22:31	W6	P45 HNS. P45 HNS. P45 Foraging ~3m high. P55 commuting towards the road. 2x P45 foraging and feeding ~2-3m high. P45 foraging and feeding in field.			
22:31-22:34	LP5	P45 foraging and feeding in field.			
22:34-22:47	W5	2x P45 foraging and feeding ~3m high. P45 foraging and feeding ~3-4m high. P45 foraging and feeding HNS. 2+ P45 foraging on other side of hedge. 2x P45 foraging and feeding on other side of hedge.			
22:47-22:50	LP4	None			
22:50-22:58	W4	None			
22:58-23:01	LP3	None			
23:01-23:08	W3	None			
23:08-23:11	LP2	None			
23:11-23:19	W2	None			
23:19-23:22	LP1	None			
23:22-23:34	W1	P45 distant foraging, HNS. 2x P45 foraging and feeding in woodland.			
22:34-22:37	Start	2x P45 foraging and feeding in woodland, above trees.			

P45 – Common pipistrelle; P55 – Soprano pipistrelle; HNS – Heard Not Seen.

Type by Survey:	Survey 3	Project:	Chapel Lane		
Date:	21.09.2020	Start Time:	19:23	Finish Time:	21:19
Sunset:	19:23	Start °C:	17.2	Finish °C:	13.1
Weather conditions:	Mild	Cloud cover (%):	100	Wind strength:	Beaufort 0-1
Transect No. 1	Surveyors: Louise Redgrave & Charlotte Wood				
Time:	Listening Point (LP No.)/ Walk (W No.)	Bat Passes Heard & Activity			
19:23-19:34	Start/W1	None			
19:34-19:37	LP1	None			
19:37-19:47	W2	None			
19:47-19:50	LP2	Probable <i>Pipistrellus</i> sp. SNH above treetops.			
19:50-19:58	W3	P45 Foraging and feeding ~1-2m high along hedgerow.			
19:58-20:01	LP3	P45 HNS commuting, foraging and feeding.			
20:01-20:17	W4	P45 commuting (2 passes). P45 (4 passes) HNS foraging and feeding, possibly above tree tops. P45 foraging and feeding above tree tops (2 passes). P45 foraging and feeding above hedgerow ~4-5m high.			
20:17-20:20	LP4	P45 HNS, brief (2 passes).			
20:20-20:29	W5	P45 foraging and feeding HNS. P45 foraging and feeding ~3m high in field.			
20:29-20:32	LP5	P45 HNS, faint calls.			
20:32-20:40	W6	P45 HNS (2 passes).			
20:40-20:43	LP6	P45 HNS (3 passes).			
20:43-20:53	W7	P45 HNS. P45 Foraging and feeding, HNS.			
20:53-20:56	LP7	None			
20:56-20:59	W8	None			
20:59-21:02	LP8	P45 Foraging and feeding, ~3m high.			
21:02- 21:09	W9	P45 Commuting, HNS.			
21:09-21:12	LP9	P45 Commuting, HNS.			
21:12-21:16	W10	None			
21:16-21:19	Finish	P45 faint call, HNS.			

P45 – Common pipistrelle; HNS – Heard Not Seen; SNH – Seen Not Heard