EAST PARK ENERGY

East Park Energy

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Environmental Statement
Volume 2 – Technical Appendices

Appendix 7-~~8~~7: Bat Activity Survey Report

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Appendix 7-~~8~~7: Bat Activity Survey Report

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1.0 INTRODUCTION

1.1 Legislation, Policy and Guidance

1.1.1 This appendix has been prepared to accompany **ES Vol 1 Chapter 7: Ecology and Nature Conservation [EN010141/DR/6.1]** of the Environmental Statement (ES) for the East Park Energy project (the 'Scheme'), and presents survey methodology and results surveys undertaken to establish baseline conditions with regards to bat species on Site.

1.1.2 Common and scientific names of bat species referenced within this appendix are summarised in **Annex 1**.

1.2 Survey Area

1.2.1 Bat activity surveys were undertaken within the Order Limits, as shown on **ES Vol 3: Figure 7-6 [EN010141/DR/6.3].**

2.0 METHODOLOGY

2.1 Overview

2.1.1 The approach to baseline information gathering with regards to bats has been undertaken with reference to Bat Conservation Trust (BCT) Survey Guidelines (Collins, 2023[1]), in addition to the Bat Mitigation Guidelines (Reason, P.F. & Wray, S, 2023[2]), and Bat Workers Manual (Mitchell-Jones, A. J. & McLeish, A. P, 2004[3]).

2.1.2 Additional pieces of guidance and peer reviewed literature have also been consulted and are referenced where relevant.

2.2 Field Surveys

Overview

2.2.1 The purpose of the baseline bat surveys undertaken in relation to the Scheme has been to establish the following:

- the bat species assemblage using the Site;
- spatial and seasonal distribution of bat activity; and,

2.2.2 the suitability, location and extent of roosting, commuting and foraging habitats. As such, the following assessments and/or baseline surveys have been undertaken:

- Habitat Suitability Assessment (HSA);
- Manual Bat Activity Surveys (i.e., Night-time Bat Walkovers); and,
- Automated Bat Activity Surveys (i.e., static detector surveys).

[1] Collins, J. (ed.) (2023). Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edn). The Bat Conservation Trust, London.
[2] Reason, P.F. and Wray, S. (2023). UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation and compensation for developments affecting bats. Version 1.1. Chartered Institute of Ecology and Environmental Management, Ampfield.
[3] Mitchell-Jones, A. J. & McLeish, A. P. (2004). Bat Workers Manual. 3rd Edition. Joint Nature Conservation Committee, Peterborough.

2.2.3 Bat activity survey effort was determined in reference to BCT guidance (Collins, 2023) following an assessment of **Moderate** habitat suitability for the overall Site (Results: Habitat Suitability Assessment).

2.2.4 As such, night-time bat walkovers (NBW) (i.e., manual bat activity surveys) were undertaken on a seasonal basis (i.e. spring, summer and autumn).

2.2.5 Static detector surveys (i.e. automated bat activity surveys) were undertaken monthly throughout the prescribed bat activity period (i.e. April to October).

2.2.6 Methodologies relating to each specific bat activity survey are described below.

Habitat Suitability Assessment

2.2.7 A habitat suitability assessment (HSA) was undertaken in reference to criteria detailed in Table 4-1 of BCT guidance (Collins, 2023), which provided an appraisal of the potential value of habitats located within the Site relative to foraging, commuting and roosting potential.

Bat Activity Surveys

Night-time Bat Walkover Surveys

2.2.8 The NBW surveys were designed and implemented with reference to BCT guidance (Collins, 2023) and were informed by a prior baseline survey acting in lieu of a Daytime Bat Walkover (DBW). The NBW surveys were undertaken using eight transect routes in total, as presented in **ES Vol 3: Figure 7-6 [EN010141/DR/6.3].**

2.2.9 NBW transect routes were designed to cover the recommended transect length (i.e., 3-5km) relative to the size of the Site, to be completed within 2-3 hours after sunset. Where possible, transect routes were also designed to cover a representative range of habitats and ecological features present within and bordering the Site (as determined by accessibility).

2.2.10 NBW surveys were scheduled on seasonal basis, in accordance with the recommended effort for habitats assessed as having **Moderate** suitability for foraging and commuting bats, and conducted during periods of suitable weather conducive for bat activity (i.e., mild and dry, with relatively low wind speeds).

2.2.11 Each NBW incorporated an initial 30–60-minute vantage point (VP) observation period, commencing at sunset during which potential bat activity was observed and recorded; vantage point locations were informed by prior Site walkovers, and were determined based on favourable locations which might support potential roost sources and/or flight-lines. Should emergence activity or large numbers of directionally commuting bats be observed, this methodology encourages surveyors to investigate possible emergence locations via back tracking within this initial VP period.

2.2.12 Post-VP observation, surveyors walked a pre-determined transect route, utilising a full spectrum Wildlife Acoustics Echo Meter Touch 2 Pro detector, and in some instances a night-vison aid (NVA); this equipment allowed for both acoustic recordings and observations of activity to be recorded, allowing for bat identification and a time-stamped narrative of activity to be spatially logged.

2.2.13 During each NBW, particular emphasis was placed on recording observed activity (e.g., numbers of bats, behaviour, habitat usage etc.) for the purpose of understanding how bats are using the Site, and to help further inform a response to proposed impacts. Whilst the transect routes were pre-determined, flexibility was enabled, permitting some deviation from redefined transect route to allow for a better understanding of bat activity on Site.

2.2.14 A summary of NBW survey effort is presented in **Table 2.1** below.

Table 2.1: A summary of NBW survey effort, per transect route.

Survey Date	Transect ID	Sunset Time	Lead Surveyor	Start Time	End Time	Survey Conditions
23rd October 2023	T1	17:50	C. Wood	18:04	20:09	Temperature: 13°C Precipitation: 0; Wind[4]: Light Breeze (2) Cloud Cover: 8/8
	T2		P. Baker	17:50	19:55	
	T3		K. Love	17:51	20:09	
	T4		A Hulme	18:05	20:05	
	T5		J. Stevens	18:00	20:15	
	T6		C. Scott	17:51	20:33	
	T7		A Tomlinson	17:50	20:25	
	T8		Z. Hinchcliff	17:50	19:50	
1st May 2024	T1	20:27	L. Quarton	20:27	23:03	Temperature: 18°C Precipitation: 0; Wind: Gentle Breeze (3) Cloud Cover: 8/8
	T2		P. Baker	20:28	23:14	
	T3		K. Love	20:28	22:50	
	T4		A Tomlinson	20:28	22:36	
	T5		J. Stevens	20:28	22:50	
	T6		A Crone	20:28	23:24	
	T7		A Littlechild	20:28	23:13	
	T8		F. Wilde	20:28	22:18	
25th July 2024	T1	21:02	L. Quarton	21:03	23:33	Temperature: 18°C Precipitation: 0; Wind: Light Breeze (2) Cloud Cover: 4/8
	T2		P. Baker	21:02	23:42	
	T3		K. Love	21:03	23:18	
	T4		A Hulme	21:02	22:59	
	T5		J. Stevens	21:03	22:53	
	T6		A Crone	21:03	23:34	
	T7		A Littlechild	20:58	23:41	
	T8		F. Wilde	21:07	22:35	

Automatic Bat Activity Surveys

2.2.15 Eight automated-static detectors were placed at predetermined locations, herein referred to as monitoring stations (MSs), within the Site boundary.

[4] *Beaufort wind scale.*

2.2.16 MS locations were chosen to sample activity from a representative range of habitats within the Site (where accessible), which included features considered to be ecologically important for bats.

2.2.17 MS locations are detailed in **Table 2.2** and presented in **ES Vol 3: Figure 7-6 [EN010141/DR/6.3].**

Table 2.2: A summary of static monitoring station (MS) deployment.

MS ID	Grid Reference	Habitat
MS1	TL 07585 65507	Woodland edge habitat, adjacent modified grassland and stream
MS2	TL 07018 65054	Woodand edge habitat, adjacent game-bird field mix, encompassed by cereal crop
MS3	TL 08078 63871	Wooded linear feature, placed along a hedgerow with trees adjacent ditch
MS4	TL 08929 63579	Closed habitat, placed within a small woodland parcel
MS5	TL 09993 63092	Wooded linear feature, along a hedgerow with trees, adjacent non-cereal crop
MS6	TL 10505 64574	Wooded linear feature, along a hedgerow, adjacent non-cereal crop
MS7	TL 13020 64206	Wooded linear feature, placed along line of trees adjacent modified grassland and river
MS8	TL 14160 63674	Linear feature. placed along ditch at terminus of line of trees, adjacent arable parcels

2.2.18 Static detectors deployed at MS locations during activity surveys consisted of either a full spectrum Wildlife Acoustics Song Meter (SM) Mini or Song Meter 2 (SM2) detector attached at a minimum hight of 1 m relative to a suitable on-Site feature.

2.2.19 Surveys were undertaken during time periods spanning approximately thirty minutes before sunset until thirty minutes after sunrise, with static detectors set to record simultaneously.

2.2.20 Where possible, bat activity was sampled per month for a minimum of five consecutive nights of suitable weather, in line with the minimum recommended survey effort prescribed for sites assessed to have **Moderate** habitat suitability for foraging and commuting bats (Collins, 2023).

2.2.21 Key metrics for each MS deployed throughout automatic activity surveys are detailed in **Table 2.3.**

Table 2.3: A summary of automated activity survey effort.

MS ID	Recording Period	Start Date	End Date	No. Nights Sampled	Recording Hours
MS1	April	15/04/24	22/04/24	8	86.5
	May	01/05/24	09/05/24	9	88
	June	04/06/24	11/06/24	8	66.75
	July	16/07/24	24/07/24	9	80.25
	August[5]	13/08/24	15/08/24	3	30.75
	September	24/09/24	30/09/24	7	92
	October	23/10/23	31/10/23	9	136.25
MS2	April[6]	23/04/24	30/04/24	6	61.75
	May	01/05/24	09/05/24	9	88
	June	04/06/24	11/06/24	8	66.75
	July	16/07/24	24/07/24	9	80.25
	August	13/08/24	14/08/24	2	20.5
	September	24/09/24	30/09/24	7	92
	October[7]	N/A	N/A	N/A	N/A
MS3	April	15/04/24	22/04/24	8	86.5
	May	01/05/24	05/05/24	5	49.5
	June	04/06/24	11/06/24	8	66.75
	July	16/07/24	22/07/24	7	62.25
	August	13/08/24	18/08/24	6	62.25
	September	24/09/24	29/09/24	6	78.75
	October	23/10/23	31/10/23	9	136.25
MS4	April	15/04/24	22/04/2024	8	86.5
	May	01/05/24	09/05/24	9	88
	June	04/06/24	11/06/24	8	66.75
	July	16/07/24	24/07/24	9	80.25
	August	13/08/24	17/08/24	5	51.75

[5] Due to ambient background recordings maxing out recording capacity, the August survey effort fell below the recommended survey effort for most MS locations (except for MS3 and MS4).

[6] Detector failure, redeployment required at MS2 during April. As such, MS2's April sample period unsynchronised in comparison to other MS locations. Likewise, April and May sample periods at MS2 run concurrently because of initial failure.

[7] Detector theft of MS2 during October. Discovery of theft occurred outside prescribed survey period (i.e., November). As such, redeployment deemed unsuitable.

MS ID	Recording Period	Start Date	End Date	No. Nights Sampled	Recording Hours
	September	24/09/24	30/09/24	7	92
	October	23/10/23	31/10/23	9	136.25
MS5	April	15/04/24	22/04/24	8	86.5
	May	01/05/24	09/05/24	9	88
	June	04/06/24	11/06/24	8	66.75
	July	16/07/24	24/07/24	9	80.25
	August	13/08/24	13/08/24	1	10.25
	September	24/09/24	29/09/24	6	78.85
	October	23/10/23	27/10/23	5	75
MS6	April	15/04/24	22/04/24	8	86.5
	May	01/05/24	09/05/24	9	88
	June	04/06/24	11/06/24	8	66.75
	July	16/07/24	24/07/24	9	80.25
	August	13/08/24	16/08/24	4	41.25
	September	24/09/24	28/09/24	5	65.5
	October	23/10/23	31/10/23	9	136.25
MS7	April	15/04/24	22/04/24	8	86.5
	May	01/05/24	09/05/24	9	88
	June	04/06/24	11/06/24	8	66.75
	July	16/07/24	24/07/24	9	80.25
	August	13/08/24	14/08/24	2	20.5
	September	24/09/24	30/09/24	7	92
	October	23/10/23	31/10/23	9	136.25
MS8	April	15/04/24	22/04/24	8	86.5
	May[8]	17/05/24	24/05/24	8	71.75
	June	04/06/24	11/06/24	8	66.75
	July	16/07/24	24/07/24	9	80.25
	August	13/08/24	13/08/24	1	10.25
	September	24/09/24	30/09/24	7	92
	October	23/10/23	31/10/23	9	136.25

[8] Detector theft, redeployment required at MS8 during May. As such, MS8's May sample period unsynchronised in comparison to other MS locations.

2.3 Data Analysis and Assumptions of Bat Activity

Acoustic Analysis

2.3.1 Data analysis and interpretation of results followed the principles presented in the BCT guidance (Collins, 2023). Data analysis was undertaken by L. Quarton MSc BSc (Hons.), an experienced bat ecologist who regularly carries out acoustic analysis of bat survey data.

2.3.2 Bat detectors recorded data onto digital media and were analysed using Kaleidoscope Pro (Wildlife Acoustics) software. Kaleidoscope Pro automatically identified sonograms, followed by manual verification to confirm species identified. Bat species were identified using a range of diagnostic features (e.g., frequency, slope, duration, time between calls, minimum call length etc.).

2.3.3 For the purpose of sonogram analysis, the number of 'bat registered calls' were defined as a sequence of echolocation calls consisting of two or more call notes (pulse of frequency), not separated by more than one second (White and Gehrt, 2001 and Gannon et al., 2003), with a minimum call note length of two milliseconds (Weller et al., 2009).

Bat Activity Index

2.3.4 An individual bat can pass a particular feature on several occasions while foraging. As such, it is not possible to estimate the number of individual bats or draw a fair comparison where survey times differ.

2.3.5 In response, bat activity as presented within this technical appendix is recorded as an index, accounting for bat pass rate per hour or a ‘Bat Activity Index (BAI)’, as outlined BCT guidance (Collins, 2023), and defined as follows:

2.3.6 BAI (per hour): number of registered bat calls per night / number of recording hours per night

2.3.7 BAI presented herein is a measure of average pass rate per hour relative to each MS location and recording period for both the combined bat assemblage and individual species recorded, accounting for both spatial and temporal activity across the survey effort.

2.4 Limitations

Bat Activity Surveys

Monitoring Station Failure

2.4.1 MS2 was subject to theft during the initial October 2023 static detector survey; as such, no bat activity data for this location was obtained during this period. Whilst it is not possible to make a direct comparison of bat activity for MS2 at or between locations, the broad habitat type sampled is comparable to other deployment areas (e.g., MS4). As such, it is unlikely reduced survey effort at MS2 has substantially impacted perceived presence and/or absences or activity levels of species on-Site.

2.4.2 Additionally, MS2 failed to record during its initial April deployment (technical error), whilst MS8 was subject to disturbance during its initial May deployment. Both static detectors were later re-deployed successfully during their respective recording periods. However, initial failures have resulted in de-synchronised deployments for each MS location. Whilst guidance advises recording efforts should be concurrent, in lieu of a lack of data, baseline data indicative of presence/activity within month is still viable, with the use of an average measure of BAI likely accounting for any notable variation. As such, re-deployments on both counts are not considered to be a substantial limitation.

Survey Effort

2.4.3 During the August recording period, ambient noise sources impacted the storage capacity of static detectors deployed, resulting in multiple MS locations failing to reach the recommended survey effort of five nights (apart from MS3 and MS4). Whilst recognised as a limitation, recorded activity is still

considered sufficient in confirming a minimum baseline, and is broadly indicative of presence and activity levels likely to be typical on-Site during August.

Weather Conditions

2.4.4 BCT guidance (Collins, 2023) recommends activity surveys be carried out in the following conditions: temperature above 10°C at sunset and with no rain or strong wind. For this assessment, strong wind is anything above 5m/s.

2.4.5 During the spring, summer and autumn NBW surveys, weather conditions were noted to be within the recommended range for each weather parameter; consequently, no limitations in regard to conditions on-Site were recorded during manual bat activity surveys.

2.4.6 The suitability of weather conditions during automatic activity surveys was variable, with thirty-four sampled nights noted to have been undertaken when at least one parameter would be considered sub-optimal (**Annex 2**). However, bat activity was recorded during thirty-two of the thirty-four sub-optimal nights, which have subsequently been retained within the sample-set. Conversely, the remaining two nights (both occurring during April) have been omitted from the sample-set, in line with current BCT guidance.

Acoustic Analysis

2.4.7 Kaleidoscope software can identify certain bat species from sonograms, but some species within the *Myotis* and *Nyctalus* genus can be difficult to distinguish. In some cases, calls may be partially heard or distorted by external factors like passing cars, rain or wind, resulting in unknown or genus-only labels. Likewise, brown long-eared *Plecotus auritus* and barbastelle *Barbastella barbastellus* bat species have lower detectability and may not be detected during activity surveys relative to their hunting strategies in less open habitats. Survey results have been carefully interpreted across species.

3.0 RESULTS

3.1 Habitat Suitability Assessment

3.1.1 The Site is primarily comprised of open habitat types, predominantly comprised arable crop with some areas of marginal grassland habitat. However, linear features (i.e., hedgerows, treelines, streams and diches) are commonly distributed across both field margins, and Site boundaries, whilst localised areas of woodland and woodland edge habitat are also present. As such, viable habitat capable of supporting a variety of bat guilds is present on Site, although variable in both suitability, distribution and scale.

Foraging

3.1.2 Open foraging habitat present within the Site is noted to be continuous but largely of limited value, being dominated by arable habitat types subject to frequent disturbance and/or management regimes (e.g., mowing or grazing), consequently supporting vegetative assemblages of limited diversity and structural composition. However, localised open habitats of increased ecological value are present (e.g., neutral and modified grassland), although largely present as marginal habitats that are proportionally minor in scale.

3.1.3 However, edge habitats predominantly distributed along field boundaries are frequently distributed across the Site area, and include wooded linear features (e.g., hedgerows, treelines and associated ditches), woodland edges, and riparian features. Generally, these features are of increased suitability and provide a valuable foraging resource relative to both the Site and local landscape. Standing water bodies (i.e., ponds) are occasionally found in association with these areas, providing additional foraging opportunities.

3.1.4 Closed foraging habitat (i.e., woodland) present on-Site is sparsely distributed and relatively minor in scale, although where present is generally of suitable age and character to function as a foraging resource for specialist species. Woodland parcels are found either centrally along boundary areas, and while not continuous, are well-connected via linear features. As such, these habitats

are likely to represent ecological important features relative to the Site, and local landscape.

Commuting

3.1.5 Linear features, which include treelines, hedgerows and riparian features (often comprised of mature or semi-mature assemblages) are frequently distributed throughout and bordering the Site; these function as sheltered commuting pathways suitable for most species, providing well-established direct flightpaths which facilitate connectivity on-Site and throughout the wider landscape. Additionally, the abundance of open habitat present on-Site does not represent a substantial barrier to commuting for open or generalist species.

Roosting Opportunities

3.1.6 Mature trees found in association with linear features (i.e., hedgerows and treelines) are commonly observed, being of sufficient age and character to support potential roost features (PRFs), in addition to being frequently distributed across most boundary features. Likewise, localised areas of woodland habitat present on-Site or adjourning offer additional potential roost resources. Moreover, the distribution of linear features, which function as direct flightpaths to potential roost features possibly on-Site and within the local landscape.

3.1.7 Where specific trees or structures with bat roosting potential have been identified these are listed as Target Notes in **ES Vol 2: Technical Appendix 7-1 [EN010141/DR/6.2].**

Summary

3.1.8 In reference to BCT guidance (Collins, 2023), the Site is considered to have **Moderate** habitat suitability based on its overall commuting and foraging value, in addition to its potential as a possible roost resource relative to the local landscape.

3.2 Night-time Bat Walkovers

3.2.1 Bat species identified during each NBW per transect area, in addition to the total number and percentage of call registrations recorded, are presented in **Table 3.1** and **Table 3.2**, respectively.

3.2.2 NBW transect routes are presented on **ES Vol 3: Figure 7-6 [EN010141/DR/6.3]**.

NBW Activity Overview

Species Assemblage

3.2.3 Collectively, NBW surveys recorded a minimum of six species on Site: common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, Nathusius' pipistrelle *Pipistrellus nathusii*, noctule *Nyctalus noctula*, brown long-eared, barbastelle and Myotis bats.

3.2.4 Species presence per transect area was variable, although most species were recorded during a minimum of one NBW survey, except for Nathusius' pipistrelle (being limited to T7).

3.2.5 Seasonal presence per NBW survey was also variable, with most species being recorded on-Site at a minimum of one transect area per NBW survey, although individual presence varied across transect areas (e.g., Nathusius' pipistrelle was unrecorded during both summer and autumn NBWs, whilst brown long-eared went unrecorded during autumn).

3.2.6 Notably, only common and soprano pipistrelle were consistently recorded per transect during each NBW.

Species Activity

3.2.7 Per species, common pipistrelle accounted for the highest number of recorded passes (1034 passes) over the NBW survey effort, and accounted most frequently for the highest number of passes per individual transect (apart from T1 and T2 relative to soprano pipistrelle).

3.2.8 Spatially, collective bat activity was noted to be highest overall at T7 (468 passes) and T6 (468 passes) and was relatively lower at T8 (72 passes).

3.2.9 Seasonally, collective bat activity was highest during spring NBWs, and lowest during autumn NBWs. However, seasonal activity per individual species showed variation, but was generally higher for most species during summer NBWs.

NBW Activity Distribution

Transect 1

3.2.10 Bat activity was frequently recorded in association with wooded linear features, watercourses and woodland edge habitats.

3.2.11 Per species, common pipistrelle and soprano pipistrelle were relatively well-distributed across the transect area, whilst additional species activity was relatively localised (with barbastelle activity noted relative to woodland edge habitats).

3.2.12 Observed foraging and commuting was limited to common pipistrelle, soprano pipistrelle and noctule bat activity, in association with linear features and edge habitats.

Transect 2

3.2.13 Bat activity was more frequently recorded in association with wooded linear features and woodland edge areas, with limited activity noted relative to open cropland areas.

3.2.14 Per species, common pipistrelle and soprano pipistrelle were relatively well-distributed across the transect area, whilst additional species activity was relatively localised (with barbastelle activity recorded in association with wooded linear features).

3.2.15 Observed foraging and commuting was limited to common and soprano pipistrelle activity, in association with linear features and edge habitats.

Transect 3

3.2.16 Bat activity was more frequently recorded in association with wooded linear features, with limited activity noted relative to open cropland areas.

3.2.17 Per species, common pipistrelle and soprano pipistrelle were relatively well-distributed across the transect area, whilst additional species activity was relatively localised (with barbastelle activity limited to localised wooded linear features).

3.2.18 Observed foraging and commuting was limited to common and soprano pipistrelle activity, in association with wooded linear features.

Transect 4

3.2.19 Bat activity was frequently recorded in association with wooded linear features, watercourses and woodland edge habitats.

3.2.20 Per species, common pipistrelle, soprano pipistrelle and noctule bat activity was relatively well-distributed across the transect area, whilst recorded additional species activity was relatively localised (with barbastelle activity being limited to two sperate linear features).

3.2.21 Observed foraging and commuting included common pipistrelle, soprano pipistrelle, noctule and barbastelle bat activity, in association with wooded linear features.

Transect 5

3.2.22 Bat activity was more frequently recorded in association with wooded linear features although some activity was noted relative to open cropland areas.

3.2.23 Per species, common pipistrelle, soprano pipistrelle and noctule bat activity was relatively well-distributed across the transect area, whilst recorded additional species activity was relatively localised (with barbastelle activity being limited to a central area, in association with a single hedgerow).

3.2.24 Observed foraging and commuting activity was limited to common and soprano pipistrelle, generally in association with linear or edge features.

Transect 6

3.2.25 Bat activity was frequently recorded in association with wooded linear features, and small woodland/scrub parcels.

3.2.26 Per species, common pipistrelle and soprano activity was relatively well distributed across the transect area. Additional species recordings were sparsely distributed comparison (although barbastelle was recorded in association with three separate linear features distributed across the transect area).

3.2.27 Observed foraging and commuting activity was noted for all five species recorded in association with linear or edge habitats (although only observed common and soprano pipistrelle activity was relatively well-distributed across the transect area.

Transect 7

3.2.28 Bat activity was more frequently recorded in association with wooded linear and riparian features, and woodland edge area, with limited activity noted relative to open cropland areas.

3.2.29 Per species, common pipistrelle, soprano pipistrelle and noctule bat activity was relatively well distributed across the transect area. Additional species recordings were relatively localised to the central transect area (i.e., woodland block and connecting features), with barbastelle activity also noted along the southern transect boundary.

3.2.30 Observed foraging and commuting activity was limited to common pipistrelle, soprano pipistrelle and noctule bats, and generally in association with linear or edge features, although some activity was noted in open habitat (i.e., noctule).

Transect 8

3.2.31 Bat activity was more frequently recorded in association with linear features (i.e., hedgerows, treelines and ditches), although some activity was noted relative to open cropland areas.

3.2.32 Per species, common pipistrelle, soprano pipistrelle and noctule bat activity was relatively well-distributed across the transect area, whilst recorded Myotis activity was relatively localised in comparison.

3.2.33 Observed foraging and commuting was limited to soprano pipistrelle activity, in association with a small woodland block.

Table 3.1: A summary of passes per species (per transect) recorded during NBW surveys.

Survey Dates	Species / Genus	No. Passes per NBW Transect								Species Total
		T1	T2	T3	T4	T5	T6	T7	T8	
23rd October 2023	CPIP	6	5	36	2	14	53	70	4	190
	SPIP	32	27	9	2	2	84	136	0	292
	NYNO	0	0	0	0	0	1	0	0	1
	MYsp	0	0	1	0	1	1	4	0	7
	BLE	0	0	0	0	0	0	0	0	0
	BARB	0	0	1	0	1	0	0	0	2
Autumn Total		38	32	47	4	18	139	210	4	492
1st May 2024	CPIP	53	104	137	65	34	43	93	24	553
	SPIP	58	44	33	17	10	38	51	11	262
	NPIP	0	0	0	0	0	0	1	0	1
	NYNO	2	7	6	2	1	36	7	5	66
	MYsp	3	1	0	1	0	3	0	0	8
	BLE	1	0	0	0	0	0	0	0	1
	BARB	1	2	0	8	0	2	2	0	15
Spring Total		118	158	176	93	45	122	154	40	906
25th July 2024	CPIP	18	17	43	82	29	73	22	7	291
	SPIP	17	23	67	17	16	46	58	9	253
	NYNO	6	2	4	47	3	8	16	11	97
	MYsp	1	0	0	3	0	0	3	1	8
	BLE	2	0	0	0	0	0	1	0	3
	BARB	1	1	0	0	0	32	4	0	38
Summer Total		45	43	114	149	48	159	104	28	690
Transect Total		201	233	337	246	111	420	468	72	2088

Table 3.2: A summary of percentage passes per species (per transect) recorded during NBW surveys.

Survey Dates	Species / Genus	Percentage Passes per NBW Transect (%)								Species Total
		T1	T2	T3	T4	T5	T6	T7	T8	
3rd October 2023	CPIP	15.79	15.63	76.60	50.00	77.78	38.13	33.33	100.00	38.62
	SPIP	84.21	84.38	19.15	50.00	11.11	60.43	64.76	0.00	59.35
	NYNO	0.00	0.00	0.00	0.00	0.00	0.72	0.00	0.00	0.20
	MYsp	0.00	0.00	2.13	0.00	5.56	0.72	1.90	0.00	1.42
	BLE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	BARB	0.00	0.00	2.13	0.00	5.56	0.00	0.00	0.00	0.41
Autumn Total		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1st May 2025	CPIP	44.92	65.82	77.84	69.89	75.56	35.25	60.39	60.00	61.04
	SPIP	49.15	27.85	18.75	18.28	22.22	31.15	33.12	27.50	28.92
	NPIP	0.00	0.00	0.00	0.00	0.00	0.00	0.65	0.00	0.11
	NYNO	1.69	4.43	3.41	2.15	2.22	29.51	4.55	12.50	7.28
	MYsp	2.54	0.63	0.00	1.08	0.00	2.46	0.00	0.00	0.88
	BLE	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11
	BARB	0.85	1.27	0.00	8.60	0.00	1.64	1.30	0.00	1.66
Spring Total		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
25th July 2025	CPIP	40.00	39.53	37.72	55.03	60.42	45.91	21.15	25.00	42.17
	SPIP	37.78	53.49	58.77	11.41	33.33	28.93	55.77	32.14	36.67
	NYNO	13.33	4.65	3.51	31.54	6.25	5.03	15.38	39.29	14.06
	MYsp	2.22	0.00	0.00	2.01	0.00	0.00	2.88	3.57	1.16
	BLE	4.44	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.43
	BARB	2.22	2.33	0.00	0.00	0.00	20.13	3.85	0.00	5.51
Summer Total		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

3.3 Automatic Activity Surveys

Species Assemblage

3.3.1 Bat activity was detected across a total of 70 nights subject to acoustic analysis during October 2023 and April-September 2024 April-October.

3.3.2 **Table 3.3** summarises the species identified on-Site over the survey effort, the total number and percentage of registered calls, in addition to the total BAI (passes per hour) per species for the overall Site.

3.3.3 Overall, bat calls indicative of a minimum seven species of bat were detected over the survey effort, accounting for a total of 75186 call registrations, accounting for a Total BAI of 17.46 passes per hour for the overall Site.

3.3.4 Common pipistrelle accounted for the highest number of registered calls detected on-Site (48023 passes), equating to 63.86% of total call registrations and a Total BAI of 10.94 passes per hour.

3.3.5 Soprano pipistrelle accounted for the second highest number of registered call (22329 passes), equating to 29.70% of total call registrations, and a Total BAI of 5.34 passes per hour.

3.3.6 Comparably, additional species detected on Site comprised a relatively smaller number of total call registrations, percentage of call registrations and passes per hour (e.g., each accounting for a Total BAI of < 1 pass per hour).

Table 3.3: Total bat passes, percentage of passes, and BAI per-species9.

Species/Genus	Total No. Passes	Percentage of Passes (%)	Total BAI
Common pipistrelle	48014	63.86	10.94
Soprano pipistrelle	22329	29.70	5.35
Nathusius' pipistrelle	9	0.01	> 0.01
Noctule	2957	3.93	0.64
Myotis spp.	819	1.09	0.19

[9] *The 'total' percentage may be slightly above 100% due to rounding of the percentages per species.*

Species/Genus	Total No. Passes	Percentage of Passes (%)	Total BAI
Brown long-eared	390	0.52	0.16
Barbastelle	668	0.89	0.18
Total	**75186**	**100.00**	**17.46**

3.4 Assemblage Activity

Bat Activity per Monitoring Station

3.4.1 Frequency of recorded activity per night and spatial distribution of bat activity metrics for the combined bat assemblage per MS location are summarised in **Table 3.4** and **Table 3.5**, respectively.

3.4.2 Total BAI (passes per hour) per MS location is further presented as Graph 1.

Frequency per MS (Combined Assemblage)

3.4.3 Bat activity was recorded on-Site at a minimum of one MS location during each night of the survey effort. However, registered activity per night showed variation between individual MS locations.

3.4.4 Per MS location, MS7 also recorded the greatest frequency of bat activity per night relative to survey effort, accounting for bat activity on 98.08% of sampled nights.

3.4.5 Frequency of recorded bat activity between other MS locations was noted to vary relative to survey effort, with registered activity per night ranging from 88.00% - to 96.15% of each survey effort.

Table 3.4: Frequency of nightly bat activity per monitoring station (MS)10 for the combined species assemblage.

MS ID	Total No. Nights Sampled	Total No. Active Nights	Total No. Active Nights (%)
MS1	53	49	92.45
MS2	41	38	92.68
MS3	49	47	95.92
MS4	55	50	90.91
MS5	46	44	95.65
MS6	52	50	96.15
MS7	52	51	98.08
MS8	50	44	88.00
Total	70	70	100.00

Bat Activity Metrics per MS (Combined Assemblage)

3.4.6 Bat activity was recorded at all eight MS locations deployed on-Site.

3.4.7 MS7 accounted for the highest metrics of bat activity, accounting for the greatest number combined call registrations (16598 passes), percentage of combined call registrations (22.08%), and Total BAI of any one given location surveyed (32.67 pass per hour).

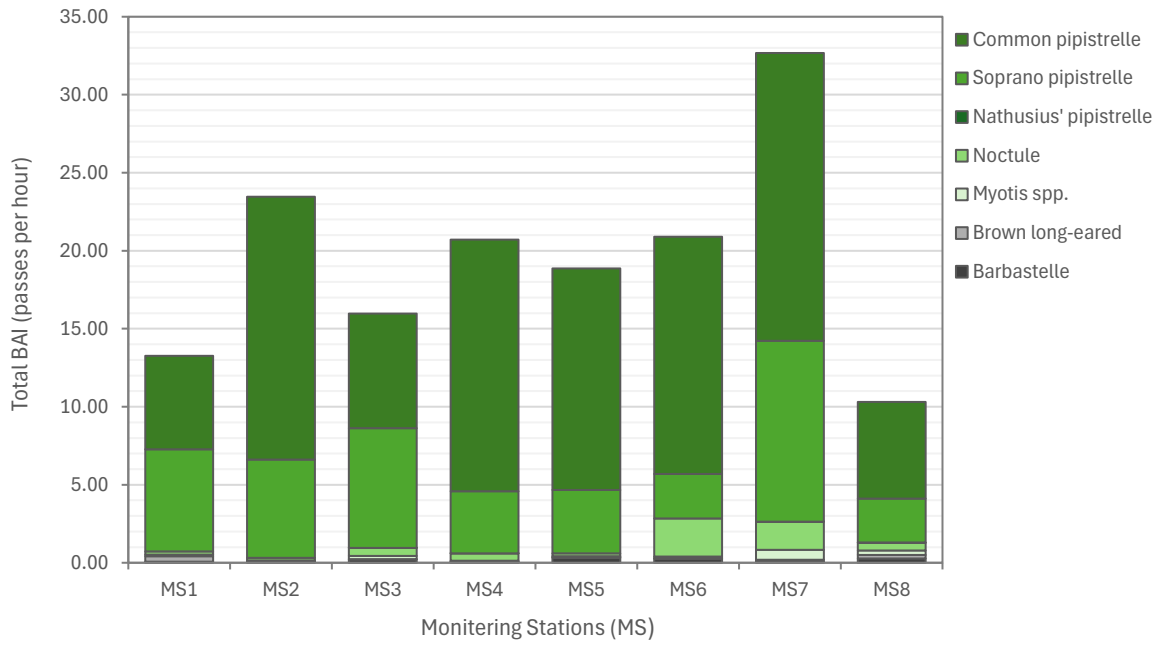
3.4.8 Bat activity metrics at other MS locations were noted to be variable (e.g. Total BAI ranging from 10.32 to 23.47 passes per hour).

Table 3.5: Bat activity survey results per monitoring station (MS) for the combined species assemblage.

MS ID	Total No. Passes	Distribution Passes (%)	Total BAI (per MS)
MS1	7040	9.36	13.27
MS2	8778	11.68	23.47
MS3	7640	10.16	15.98
MS4	11040	14.68	20.70

[10] The number of dates sampled is the number of nights each detector was operational for throughout the survey period, taking account of detector failures and unsuitable weather conditions.

MS ID	Total No. Passes	Distribution Passes (%)	Total BAI (per MS)
MS5	8788	11.69	18.86



Graph 1: Total BAI (passes per hour) per monitoring station (MS) for the overall survey effort.

Bat Activity per Recording Period

3.4.9 Frequency of recorded activity per night and seasonal bat activity metrics for the combined bat assemblage per recording period are summarised in **Table 3.6** and **Table 3.7**, respectively.

3.4.10 Total BAI (passes per hour) per recording period is further presented as Graph 2.

Frequency per Recording Period (Combined Assemblage)

3.4.11 Bat activity was recorded on-Site during each recording period, although registered activity per night showed variation between individual MS locations.

3.4.12 Per recording period, bat activity was only recorded consistently across each MS per night during June and July (i.e., 100% of sampled nights).

3.4.13 Frequency of recorded bat activity between MS locations was noted to vary relative to other recording periods, with registered activity per night ranging from 81.36% - to 98.51% of nights sampled.

Table 3.6: Frequency of nightly bat activity per recording period for the combined species assemblage.

Recording Period	Total No. Nights Sampled	Total No. Active Nights	Total No. Active Nights (%)
April	62	52	83.87
May	67	66	98.51
June	64	64	100.00
July	70	70	100.00
August	25	23	92.00
September	52	50	96.15
October	59	48	81.36
Total	399	373	93.48

Bat Activity Metrics per Recording Period (Combined Assemblage)

3.4.14 Bat activity was recorded on-Site during each monthly recording period surveyed (i.e., April-October).

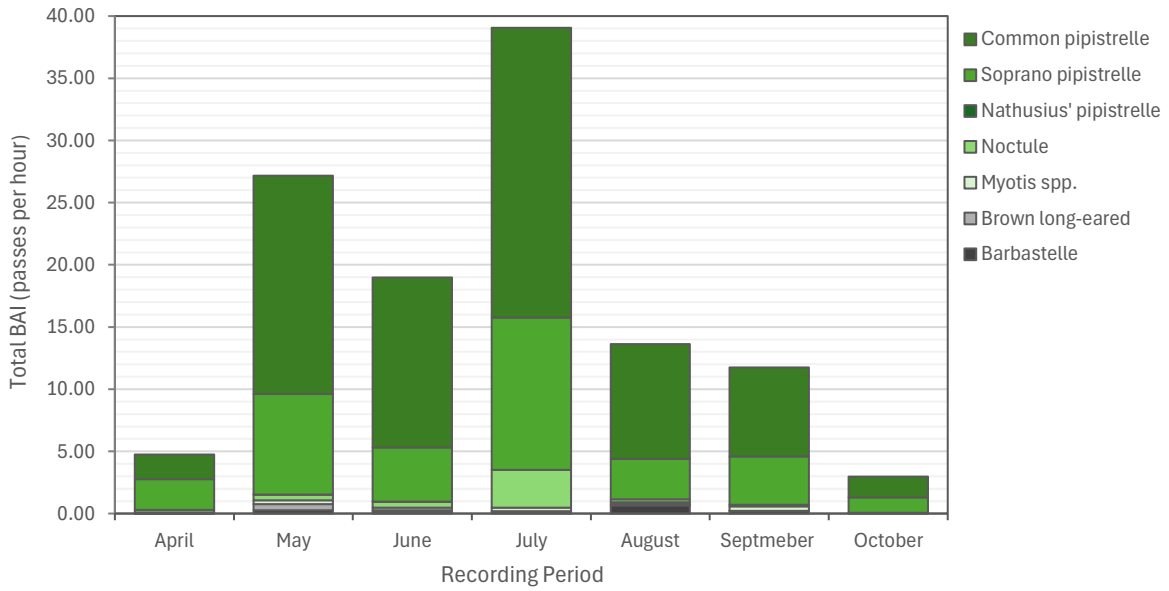
3.4.15 July and May accounted for the highest activity metrics per recording period, accounting for the greatest number of combined call registrations (24473 passes; 22137 passes), percentage of combined call registrations (32.55%; 29.44%), and Total BAI per recording period (39.05 and 35.72 pass per hour).

3.4.16 Bat activity metrics during other recording periods were noted to be variable (e.g. Total BAI ranging from 4.30 to 20.99 passes per hour).

Table 3.7: Bat activity survey results per recording period for the combined species assemblage.

Recording Period	Total No. Passes	Distribution Passes (%)	Total BAI (per Recording Period)
April	2932	3.90	4.30
May	22137	29.44	35.72

Recording Period	Total No. Passes	Distribution Passes (%)	Total BAI (per Recording Period)
June	10015	13.32	18.97
July	24473	32.55	39.05
August	4645	6.18	20.99
September	8381	11.15	11.74
October	2603	3.46	2.96
Total	75186	100.00	17.46



Graph 2: Total BAI (passes per hour) per recording period for the overall survey effort.

3.5 Species Activity

Species per Monitoring Station

3.5.1 **Table 3.8** summarises the total pass rate (Total BAI) per species at each MS location for the overall survey effort.

3.5.2 Of species detected, presence was recorded at each individual MS location (apart from Nathusius' pipistrelle), although activity levels varied between species, and between individual MS locations.

3.5.3 Likewise, presences/absence per MS location showed some variation between recording periods. A summary of pass rates (BAI) per species for each MS per recording period is provided in **Annex 3**.

Common pipistrelle

3.5.4 Total BAI for common pipistrelle ranged between 5.99 - 18.43 passes per hour, being greatest at MS7.

3.5.5 Activity was relatively comparable between MS2 and MS4-6, ranging between 14.20 – 16.84 passes per hour.

3.5.6 Likewise, whilst relatively lower, activity was also broadly comparably between MS1, MS3 and MS8 (i.e. <10 passes per hour), ranging from 5.99 – 7.35 passes per hour, being lowest at MS1.

Soprano pipistrelle

3.5.7 Total BAI for soprano pipistrelle ranged between 2.81 - 11.60 passes per hour, being relatively higher at MS7.

3.5.8 Activity was relatively comparable between MS1-MS3 (i.e. >5 passes per hour), ranging between 6.30 – 7.68 passes per hour.

3.5.9 Activity was relatively lower between MS4-MS6 and MS8 (<5 passes per hour), ranging 2.81- 4.06 passes per hour, being lowest at MS8.

Nathusius' pipistrelle

3.5.10 Nathusius' pipistrelle activity was limited to four MS locations (i.e. MS3, MS4, MS7 and MS8).

3.5.11 Total BAI for Nathusius' pipistrelle was comparable between MS locations, each accounting for < 0.01 passes per hour, ranging from 0.002 to 0.01 passes per hour (being relatively higher at MS8).

Noctule

3.5.12 Total BAI for noctule ranged between 0.17 – 2.45 passes per hour, being relatively higher at MS6 (2.45 passes per hour) and MS7 (1.80 passes per hour), both accounting for > 1 pass per hour.

3.5.13 Activity was noted to be relatively lower between remaining MS locations, each accounting for < 1 pass per hour, ranging from 0.17 – 0.51 passes per hour (being lowest at MS2).

Myotis spp.

3.5.14 Total BAI for Myotis bats were comparable between MS locations, each accounting for < 1 pass per hour, ranging from 0.06 – 0.64 passes per hour (being relatively higher at MS7).

Brown long-eared

3.5.15 Total BAI for brown long-eared bats was comparable between MS locations, each accounting for < 1 pass per hour, ranging from 0.01 – 0.34 passes per hour (being relatively higher at MS1).

Barbastelle

3.5.16 Total BAI for barbastelle was comparable between MS locations, each accounting for < 1 pass per hour, ranging from 0.04 – 0.31 passes per hour (being relatively higher at MS5).

Table 3.8: A summary of Total BAI per monitoring station (per species).

Species / Genus	Monitoring Stations (Total BAI)							
	MS1	MS2	MS3	MS4	MS5	MS6	MS7	MS8
Common pipistrelle	5.99	16.84	7.34	16.12	14.20	15.19	18.43	6.21
Soprano pipistrelle	6.56	6.30	7.68	3.97	4.06	2.86	11.60	2.81
Nathusius' pipistrelle	0.00	0.00	< 0.01	<0.01	0.00	0.00	<0.01	0.01
Noctule	0.19	0.17	0.51	0.48	0.19	2.45	1.80	0.49
Myotis spp.	0.12	0.07	0.21	0.07	0.06	0.10	0.64	0.29

Species / Genus	Monitoring Stations (Total BAI)							
	MS1	MS2	MS3	MS4	MS5	MS6	MS7	MS8
Brown Long-eared	0.34	0.03	0.02	0.01	0.04	0.03	0.11	0.23
Barbastelle	0.07	0.04	0.22	0.04	0.31	0.26	0.07	0.27

Species per Recording Period

3.5.17 **Table 3.9** presents the total pass rate (BAI) per species during each month of the survey effort (MS locations combined).

3.5.18 Species presence on-Site was consistently detected between recording periods, with the exception of both noctule and brown long-eared bat going undetected during the October survey effort.

3.5.19 A summary pass rates (per species) for each MS per recording period is provided in **Annex 3.**

Common pipistrelle

3.5.20 Total BAI for common pipistrelle showed variation between individual months, being relatively higher between May to July (> 10 passes per hour), relatively lower during August and September (>5 passes per hour), and was lowest during April and October (< 5 passes per hour).

3.5.21 Total BAI peaked during the July recording period (23.28 passes per hour) and was lowest during the August recording period (2.69 passes per hour).

Soprano pipistrelle

3.5.22 Total BAI for soprano pipistrelle showed variation between individual months, being relatively higher during-July (> 10 passes per hour), relatively lower during May (>5 passes per hour), and lowest during remaining months (<5 passes per hour).

3.5.23 Total BAI peaked during the July recording period (12.25 passes per hour) and was lowest during the October recording period (1.24 passes per hour).

Nathusius' pipistrelle

3.5.24 Nathusius' pipistrelle recordings were limited to May and June recording periods, going undetected throughout the remaining survey effort.

3.5.25 Total BAI for Nathusius' pipistrelle was relatively comparable between months when activity was recorded, accounting for < 1 pass per hour, but peaked during June (0.3 passes per hour).

Noctule

3.5.26 Total BAI for noctule showed some variation between recording periods, being relatively higher during July (> 1 pass per hour), but was comparably lower between remaining months (< 1 passes per hour).

3.5.27 Total BAI peaked during July at 3.06 passes per hour, and was lowest during April at 0.20 passes per hour (although noctule as notably unrecorded during the October recording period).

Myotis spp.

3.5.28 Total BAI for Myotis bats showed minor variation between recording periods, being relatively comparable across each month (< 1 pass per hour).

3.5.29 However, Total BAI peaked during September at 0.34 passes per hour, and was lowest during October at 0.02 passes per hour.

Brown long-eared

3.5.30 Total BAI for brown long-eared bat showed minor variation between recording periods, being relatively comparable across each month (< 1 pass per hour).

3.5.31 However, Total BAI peaked during May at 0.48 passes per hour, and was lowest during both April and September at 0.01 passes per hour (although

brown long-eared was notably unrecorded during the October recording period).

Barbastelle

3.5.32 Total BAI for Barbastelle showed minor variation between recording periods, being relatively comparable across each month (< 1 pass per hour).

3.5.33 However, Total BAI peaked during August at 0.65 passes per hour, and was lowest during April at 0.02 passes per hour.

Table 3.9: A summary of total BAI per recording period (per species).

Species / Genus	Recording Period (Total BAI)						
	April	May	June	July	August	September	October
Common pipistrelle	2.00	17.56	13.68	23.28	9.25	7.15	1.65
Soprano pipistrelle	2.45	8.08	4.35	12.25	3.22	3.88	1.24
Nathusius' pipistrelle	0.00	0.03	0.06	0.00	0.00	0.00	0.00
Noctule	0.20	0.46	0.47	3.06	0.25	0.14	0.00
Myotis spp.	0.07	0.30	0.20	0.27	0.15	0.34	0.02
Brown Long-eared	0.01	0.48	0.16	0.08	0.11	0.01	0.00
Barbastelle	0.02	0.28	0.12	0.11	0.65	0.22	0.05

4.0 SUMMARY

4.1 Habitat Suitability Assessment

4.1.1 The Site includes continuous habitat types comprised of open, edge and closed niches, which provide both foraging, commuting and roosting opportunities relative to bats. Whilst largely dominated by arable habitat types of limited value, given the distribution and quality of linear features, and overall connectivity both on-Site and relative to the local landscape, the Site is considered to by of **Moderate** habitat suitability (in reference to current BCT guidance).

4.2 Night-time Bat Walkovers

Species Assemblage

4.2.1 Throughout the full scope of NBW surveys, a minimum of seven species were recorded on-Site, which include common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, noctule, brown long-eared, barbastelle and *Myotis* bats.

4.2.2 Overall, common and soprano pipistrelle accounted for the highest number of recorded passes, equating to 49.52% and 38.65% of total activity over the survey effort. Frequency of recorded activity was followed by noctule (7.85%), barbastelle (2.63%) and *Myotis* species (1.10%), with both Nathusius' pipistrelle and brown long-eared bat each account for < 1 % of total passes.

4.2.3 Spatially, species presence was generally recorded across most transect areas, apart from barbastelle (not recorded at T8), brown long-eared (not recorded at T2-T6, T8), and Nathusius' pipistrelle (not recorded at T7). Likewise, species presence across transect areas was not recorded consistently per recording period, with only common and soprano pipistrelle being recorded uniformly per NBW (**Table 3.1**).

4.2.4 Seasonally, presence was also recorded on-Site per NBW for most species, apart from brown long-eared bat (autumn) and Nathusius' pipistrelle (autumn,

summer). Likewise, species presence per NBW was not recorded consistently between transects (**Table 3.1**).

Species Activity

4.2.5 Combined assemblage activity per transect area was greatest at T6 and T7 (each accounting for 20.11% and 22.41% of passes, respectively). Additionally transect areas accounted for 5.32-16.14% of passes, with T8 accounting for the lowest overall activity (3.45% of passes).

4.2.6 Combined assemblage activity per NBW survey was greatest during spring (34.39% of passes), followed by summer (33.05% passes), and lowest during autumn (23.56% of passes).

4.2.7 However, both assemblage and individual species activity was noted to show variation at each transect area, per NBW survey (**Table 3.1**).

Species Distribution

4.2.8 Per transect area, bat activity was most frequently distributed in association with wooded linear features and woodland edge habitats, with limited to no recorded activity recorded and/or observed in association with open pasture and croplands.

4.2.9 Per species, common and soprano pipistrelle were well-distributed across transect areas, whilst noctule, brown long-eared barbastelle and Myotis bats were more localised when recorded, per transect area.

4.2.10 Likewise, observed activity was limited to foraging and commuting activity, and was generally recorded in association with linear features or edge habitats, although some instances of open foraging and/or commuting were noted during NBW surveys at select transect areas.

4.3 Automatic Activity Surveys

Species Assemblage

4.3.1 Over the combined survey effort, a minimum of seven species were recorded on-Site, which include common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, noctule, brown long-eared, barbastelle and *Myotis* bats.

Species Distribution

4.3.2 Spatially, species presence was generally recorded across most MS locations, apart from Nathusius' pipistrelle being limited to MS3-4 and MS7-8. However, species presence per MS locations showed some variation between recording periods, with only soprano pipistrelle being recorded uniformly per survey (**Annex 3**).

4.3.3 Likewise, seasonal presence was also recorded on-Site for most species, apart from brown long-eared bat and noctule (October) and Nathusius' pipistrelle (April; July-October) being unrecorded during select months. Likewise, species presence per recording period was not recorded consistently between MS locations (**Annex 3**).

Bat Activity Index

Species Assemblage

4.3.4 In considering total BAI per species for the overall Site, activity between species showed variation. Total BAI ranged from < 0.1 passes per hour (Nathusius' pipistrelle) to 10.94 passes per hour (common pipistrelle), with an overall total BAI of 17.46 passes per hour for the combined species assemblage recorded.

4.3.5 Likewise, per MS location total BAI for the combined species assemblage also showed variation, ranging from 10.32 passes per hour (MS8) to 32.67 passes per hour (MS7). MS7, accounting for peak total BAI per MS location, was noted to be unique given the presence of an adjacent watercourse.

Conversely, MS8 is notable for sampling the terminus of a linear feature, with a relative amount of open, unsheltered habitat in the vicinity.

4.3.6 Per recording period, total BAI ranged from 2.96 passes per hour (October) to 39.05 passes per hour (July). Broadly, recording periods representative of late-spring to late-summer accounted for higher total BAI rates, with mid-summer (July) recording peak activity rates. Conversely, satellites months (April and October), and recording periods adjacent (late September) accounted for reduced BAI rates.

Per Species

4.3.7 Per MS location, total BAI per species showed variation (**Table 3.8**). Peak total BAI was recorded at MS7 for most species, including common pipistrelle (18.43 passes per hour), soprano pipistrelle (11.60 passes per hour), and *Myotis* species (0.64 passes per hour). Peak total BAI for Nathusius' pipistrelle (0.01 passes per hour), noctule (2.45 passes per hour) and brown long-eared bat (0.34 passes per hour) were recorded at MS8, MS6 and MS1, respectively. However, variation between total BAI rates were limited relative to Nathusius' pipistrelle, Myotis bats, brown-eared and barbastelle, with each MS location accounting for < 1 pass per hour. BAI for each MS location per recording period showed further variation per species, as described in **Annex 3**.

4.3.8 Per recording period, total BAI per species also showed variation (**Table 3.9**). Peak total BAI was recorded during July for most species, including common pipistrelle (23.28 passes per hour), soprano pipistrelle (12.25 passes per hour) and noctule (3.06 passes per hour). Peak total BAI for Nathusius' pipistrelle (0.06 passes per hour), *Myotis* species (0.34 passes per hour), brown long-eared bat (0.48 passes per hour) and barbastelle were recorded during June, September, May and August, respectively. However, variation between total BAI rates were also limited relative to Nathusius' pipistrelle, *Myotis* bats, brown long-eared and barbastelle, with each recording period

accounting for < 1 pass per hour. BAI for each MS location per recording period showed further variation per species, as described in **Annex 3**.

ANNEX 1

Scientific Names

Table A1-1 provides common and scientific names of bat species mentioned within this report.

Common Name	Scientific Name	Abbreviation
Common pipistrelle	*Pipistrellus pipistrellus*	*CPIP*
Soprano pipistrelle	*Pipistrellus pygmaeus*	*SPIP*
Nathusius' pipistrelle	*Pipistrellus nathusii*	*NPIP*
Noctule	*Nyctalus noctula*	*NYNO*
Brown long-eared bat	*Plecotus auritus*	*BLE*
Whiskered bat	*Myotis mystacinus*	*MYsp*
Natterer's bat	*Myotis nattererii*	*MYsp*
Brandt's bat	*Myotis brandtii*	*MYsp*
Daubenton's bat	*Myotis daubentonii*	*MYsp*
Barbastelle	*Barbastella barbastellus*	*BARB*

ANNEX 2

Weather Conditions

Table A2-1 below provides weather conditions during automatic activity sample period. Underlined text in red highlights sub-optimal weather conditions for bats, based on guidance outlined in Collins (2023).

Date	Temp at Dusk (°C)	Rainfall (mm)	Maximum Wind Speed (m/s)[11]
23/10/2023	11	1.2	6.94
24/10/2023	10	0	1.11
25/10/2023	10	0	2.22
26/10/2023	9	0	2.78
27/10/2023	10	0	3.33
28/10/2023	12	0.4	6.67
29/10/2023	10	0	6.11
30/10/2023	9	0	3.89
31/10/2023	10	0	3.33
15/04/2024	7	0	10.28
16/04/2024	8	0	3.61
17/04/2024	7	0	3.89
18/04/2024	11	0	5.00
19/04/2024	8	0.1	1.67
20/04/2024	7	0	5.00
21/04/2024	7	0	4.44
22/04/2024	4	0.1	1.67
23/04/2024	6	0	4.72
25/04/2024	9	0	2.50
27/04/2024	7	0	5.83
28/04/2024	8	0.3	5.00
29/04/2024	11	0	7.22
30/04/2024	10	0.1	2.78
01/05/2024	11	0.3	6.11
02/05/2024	11	0	3.06
03/05/2024	9	0	3.06
04/05/2024	9	0	3.06
05/05/2024	10	0	2.78
06/05/2024	10	0	2.50
07/05/2024	9	0	3.06
08/05/2024	14	0	3.33
09/05/2024	13	0	1.94
17/05/2024	13	0	1.67
18/05/2024	10	0	3.61
19/05/2024	9	0	3.33
20/05/2024	8	0	3.33
21/05/2024	12	0.1	1.11
22/05/2024	11	0	2.78

[11] *Converted from km/h*

Date	Temp at Dusk (°C)	Rainfall (mm)	Maximum Wind Speed (m/s)[11]
23/05/2024	10	0	5.28
24/05/2024	10	0	2.50
04/06/2024	10	0	3.33
05/06/2024	8	0	2.78
06/06/2024	10	0	2.50
07/06/2024	11	0	5.00
08/06/2024	8	0	3.61
09/06/2024	11	0	4.72
10/06/2024	7	0	3.33
11/06/2024	9	0	2.22
16/07/2024	15	0	3.33
17/07/2024	17	0	2.50
18/07/2024	19	0	2.50
19/07/2024	21	0	2.50
20/07/2024	18	0	1.94
21/07/2024	16	0	2.78
22/07/2024	17	0	4.72
23/07/2024	16	0	2.50
24/07/2024	17	0	2.22
13/08/2024	20	0	3.06
14/08/2024	18	0	2.78
15/08/2024	19	0.7	6.11
16/08/2024	18	0	1.67
17/08/2024	16	0	3.33
18/08/2024	17	0	1.94
24/09/2024	12	0	3.33
25/09/2024	12	4.6	3.06
26/09/2024	13	0.3	4.44
27/09/2024	10	0	2.50
28/09/2024	11	0	1.67
29/09/2024	11	0.4	7.50
30/09/2024	12	2.7	9.72

ANNEX 3

Species Activity (Monitoring Stations per Recording Period)

Common pipistrelle

A summary of common pipistrelle BAI at each MS location per recording period is presented in **Table A3-1**.

Common pipistrelle was recorded consistently at most MS locations per recording period, apart from MS2 during the August recording period. BAI at each MS location per recording period was noted to be variable.

Peak BAI ranged from 17.44 (MS1; May) – 59.90 (MS7; August) passes per hour, but was most frequently noted during the May recording period for most MS locations (i.e., MS1, MS3, MS4 and MS6).

Minimum BAI also showed variation per MS location between recording periods, ranging from 0.00 (MS2; August) to 3.15 (MS4; October) passes per hour.

Minimum BAI was largely limited to satellite months (i.e. April and October), with some exceptions (i.e. MS2; August),but was recorded most frequently during October for most locations.

Table A3-1: Common pipistrelle BAI (passes per hour) at each MS location, per recording period.

MS ID	Recording Period per MS (BAI)						
	April	May	June	July	August	September	October
MS1	3.33	17.44	1.23	7.82	15.48	0.62	0.32
MS2	0.58	22.34	12.37	42.69	0.00	0.40	N/A
MS3	1.79	36.91	8.97	4.97	4.52	3.31	0.82
MS4	9.24	32.85	30.08	19.65	5.52	6.24	3.15
MS5	3.24	12.45	1.09	37.57	14.83	25.16	0.47
MS6	1.70	33.18	15.82	22.80	21.28	11.83	0.20
MS7	0.35	15.00	30.66	34.68	59.90	13.44	5.50

MS ID	Recording Period per MS (BAI)						
	April	May	June	July	August	September	October
MS8	1.82	11.11	8.02	12.54	12.00	2.02	0.40

Soprano pipistrelle

A summary of soprano pipistrelle BAI at each MS location per recording period is presented in **Table A3-2**.

Soprano pipistrelle was recorded consistently at each MS location per recording period. BAI at each MS location per recording periods was noted to be variable.

Peak BAI ranged from 5.37 (MS8; August) – 33.39 (MS7; July) passes per hour, and was ranged from May to August recording periods. However, peak BAI was most frequently recorded during July for most MS locations.

Minimum BAI also showed variation per MS location between recording periods, ranging from 0.06 (MS4; April) to 0.90 (MS1; April) passes per hour, but was largely limited to (and most frequently recorded) during satellite months (i.e. April and October), apart from MS2 (i.e. August).

Table A3-2: Soprano pipistrelle BAI (passes per hour) at each MS location, per recording period.

MS ID	Recording Period per MS (BAI)						
	April	May	June	July	August	September	October
MS1	3.33	17.44	1.23	7.82	15.48	0.62	0.32
MS2	0.58	22.34	12.37	42.69	0.00	0.40	N/A
MS3	1.79	36.91	8.97	4.97	4.52	3.31	0.82
MS4	9.24	32.85	30.08	19.65	5.52	6.24	3.15
MS5	3.24	12.45	1.09	37.57	14.83	25.16	0.47
MS6	1.70	33.18	15.82	22.80	21.28	11.83	0.20

MS ID	Recording Period per MS (BAI)						
	April	May	June	July	August	September	October
MS7	0.35	15.00	30.66	34.68	59.90	13.44	5.50
MS8	1.82	11.11	8.02	12.54	12.00	2.02	0.40

Nathusius' pipistrelle

A summary of Nathusius' pipistrelle BAI at each MS location per recording period is presented in **Table A3-3**.

Nathusius' pipistrelle was not recorded consistently at each MS location per recording period, being limited to MS4, MS7 and MS8 during the May, and MS3 and MS8 during June. As such, activity was most frequently recorded in association with MS8 across the survey effort.

Individual BAI at each MS location per recording period was noted to be relatively comparable (< 1 pass per hour). Peak individual BAI was recorded relative to MS8 during June (0.06 passes per hour).

Table A3-3: Nathusius' pipistrelle BAI (passes per hour) at each MS location, per recording period.

MS ID	Recording Period per MS (BAI)						
	April	May	June	July	August	September	October
MS1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS2	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS3	0.00	0.00	0.02	0.00	0.00	0.00	0.00
MS4	0.00	0.01	0.00	0.00	0.00	0.00	0.00
MS5	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS6	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS7	0.00	0.01	0.00	0.00	0.00	0.00	0.00
MS8	0.00	0.03	0.06	0.00	0.00	0.00	0.00

Noctule

A summary of noctule BAI at each MS location per recording period is presented in **Table A3-4**.

Noctule was not recorded consistently at each MS location between recording period, being unrecorded consistently across MS locations during October, and being unrecorded at MS2 and MS4 during August and September, respectively.

However, when recorded BAI per MS location was noted to be variable between recording periods. Peak BAI ranged from 0.55 (MS1) – 9.93 (MS6) passes per hour, and was uniformly recorded during the July recording period (being contained to mid-summer).

Likewise, minimum BAI at each MS location (being a noted absence) was largely contained to October (0.00 passes per hour), with the exception of MS2 at which minimum BAI was recorded during August (0.00 passes per hour).

Table A3-4: Noctule BAI (passes per hour) at each MS location, per recording period.

MS ID	Recording Period per MS (BAI)						
	April	May	June	July	August	September	October
MS1	0.01	0.30	0.22	0.55	0.16	0.01	0.00
MS2	0.17	0.08	0.09	0.51	0.00	0.01	N/A
MS3	0.38	0.16	0.92	1.60	0.34	0.08	0.00
MS4	0.05	0.27	0.02	2.41	0.37	0.00	0.00
MS5	0.01	0.33	0.05	0.47	0.10	0.15	0.00
MS6	1.09	2.46	0.45	9.93	0.59	0.20	0.00
MS7	0.07	1.41	1.59	7.18	0.20	0.40	0.00
MS8	0.02	0.15	0.39	1.92	0.59	0.33	0.00

Myotis species

A summary of *Myotis* bat BAI at each MS location per recording period is presented in **Table A3-5**.

Myotis bat presence was variably recorded between MS locations per recording period, being notably absent from some MS locations during April (MS5-MS7), May (MS2), August (MS2, MS7), September (MS2, MS6) and October (MS8). As such, consistent presence across MS locations was only recorded during June and July recording periods (i.e., early to mid-summer).

When recorded, BAI per MS location was relatively comparable between recording periods, generally accounting for a BAI of < 1 pass per hour.

Peak BAI ranged 0.15 (MS4; August) to 2.02 (MS7; September) passes per hour, but was variably recorded per MS location during April, and June to September recording periods.

Minimum BAI per MS location was variable between recording periods, ranging from 0.00 passes per hour at several locations accounting for absences (**Table A3-5**), and 0.01 passes per hour (MS3-MS5; October), although most consistently noted during April (i.e., a satellite month).

Table A3-5: Myotis species BAI (passes per hour) at each MS location, per recording period.

MS ID	Recording Period per MS (BAI)						
	April	May	June	July	August	September	October
MS1	0.09	0.51	0.36	0.89	0.29	0.30	0.39
MS2	0.02	0.00	0.07	0.26	0.00	0.00	N/A
MS3	0.59	0.08	0.16	0.16	0.21	0.24	0.01
MS4	0.08	0.10	0.04	0.10	0.15	0.07	0.01
MS5	0.00	0.08	0.03	0.08	0.10	0.16	0.01
MS6	0.00	0.10	0.13	0.11	0.49	0.00	0.03
MS7	0.00	1.11	0.14	0.90	0.00	2.02	0.02
MS8	0.10	0.34	0.90	0.27	0.29	0.11	0.00

Brown long-eared bat

A summary of brown long-eared bat BAI at each MS location per recording period is presented in **Table A3-6**.

Brown long-eared bat presence was not consistently recorded at each MS location per recording period, with the July recording period being the only month during which activity was consistently detected (i.e., mid-summer).

When recorded, BAI at each MS location per recording period was noted to be relatively comparable, generally accounting for a BAI of < 1 pass per hour.

Peak BAI ranged from 0.06 passes per hour (MS2; June) – 1.33 passes per hour (MS1; May), and ranged between May, June and August recording periods, being most frequently recorded during May and August (i.e., late-spring and late--autumn).

Minimum BAI most frequently accounting for an absence of recordings but ranged from 0.00 to 0.01 passes per hour (**Table 3-6**), being most frequently noted during April and October recording periods (i.e., satellite months).

Table A3-6: Brown long-eared BAI (passes per hour) at each MS location, per recording period.

MS ID	Recording Period per MS (BAI)						
	April	May	June	July	August	September	October
MS1	0.01	1.33	0.34	0.21	0.39	0.00	0.00
MS2	0.02	0.03	0.06	0.05	0.00	0.00	0.00
MS3	0.00	0.00	0.00	0.03	0.11	0.00	0.01
MS4	0.00	0.05	0.00	0.01	0.04	0.00	0.00
MS5	0.00	0.08	0.01	0.09	0.29	0.00	0.01
MS6	0.00	0.06	0.02	0.06	0.10	0.02	0.00
MS7	0.00	0.36	0.18	0.10	0.00	0.04	0.00
MS8	0.00	0.68	0.63	0.09	0.00	0.02	0.01

Barbastelle

A summary of barbastelle BAI at each MS location per recording period is presented in **Table A3-7**.

Barbastelle presence was not recorded consistently at each MS location between recording periods, being limited to MS2 during the April recording period, and being variably detected between MS locations during June-August and October.

Peak BAI per MS location between recording periods ranged from 0.15 (MS1) – 1.85 (MS6) passes per hour, ranging from June to August recording periods, but most consistently recorded during August (i.e., late summer).

Minimum BAI at each MS location per recording period generally accounted for an absence of recordings, most frequently recorded during April (a satellite month) between the majority of MS locations (MS1, MS3-MS8), with MS4 accounting for the highest frequency of absences between recording periods (April, June and July).

Table A3-7: Barbastelle BAI (passes per hour) at each MS location, per recording period.

MS ID	Recording Period per MS (BAI)						
	April	May	June	July	August	September	October
MS1	0.00	0.08	0.15	0.11	0.16	0.01	0.02
MS2	0.05	0.01	0.09	0.06	0.00	0.02	0.00
MS3	0.00	0.12	0.03	0.14	0.87	0.57	0.01
MS4	0.00	0.07	0.00	0.00	0.19	0.03	0.04
MS5	0.00	1.01	0.00	0.22	1.17	0.34	0.01
MS6	0.00	0.29	0.02	0.06	1.85	0.58	0.01
MS7	0.00	0.08	0.02	0.26	0.00	0.04	0.03
MS8	0.00	0.32	0.65	0.04	0.98	0.43	0.19