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Tyrone - Cavan Interconnector

Appendix 7.3
Bat Report (2019)

SONI

July 2019

Quality information

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Table of Contents

1. Introduction 1
1.1 Background 1
1.1.1 Previous work 1
1.2 Survey Aims 2
2. Methods 2
2.1 Emergence and Re-entry Surveys 2
2.2 Tree Assessments for Roosting Bats 2
2.2.1 Ground-based Assessment 2
2.2.2 PRF Inspections 3
2.3 Activity Surveys 3
2.4 Data Collection and Analysis 4
2.5 Surveyor experience 4
2.6 Limitations 4
3. Results 5
3.1 Emergence and Re-entry Surveys 5
3.2 Tree Assessments 6
3.3 Activity surveys 7
4. Discussion 10
4.1 Confirmed Bat Roosts 10
4.2 Potential Bat Roosts 10
4.3 Bat Activity 11
5. Recommendations and Conclusion 13
6. References 14
Appendix A Photographs 15
Appendix B Emergence/Re-entry bat survey results 17

Tables

Table 1.1: Confirmed roost locations 1
Table 2.1: Criteria for assessing the potential suitability of PRF for roosting bats. 2
Table 3.1: Date, survey type and surveyors present for each survey. 5
Table 3.2: Weather conditions during emergence / re-entry surveys. 5
Table 3.3: Emergence and re-entry survey results 5
Table 3.4: Tree assessment results. 6
Table 3.5: May activity transect survey date, location and weather. 7
Table 3.6: June activity transect survey date, location and weather. 8
Table 3.7: Activity transect results. 9
Table 3.8: Bat Activity Index (BAI) for the 2019 activity surveys. 9
Table 4.1 Foraging hotspots and associated linear features affected by the Tyrone - Cavan Interconnector 11

1. Introduction

1.1 Background

AECOM was commissioned by SONI to conduct updated bat surveys along the route of the proposed Tyrone – Cavan Interconnector.

Bat surveys have been carried out along the route corridor during 2009, 2010, 2011, 2012, 2013, 2015 and 2016. These 2018 - 2019 surveys have been carried out to ensure that the data presented was contemporary and any seasonal variations were adequately reported. This includes updated emergence / re-entry surveys at known bat roost locations, a revised tree assessment along the route for bat roost suitability, and updated bat activity surveys.

This document describes the results of the updated assessments to determine any changes to the status of roosting, foraging and commuting bats along the route of the Tyrone - Cavan Interconnector including the oversail, proposed tower and stringing locations, the associated access tracks and the substation site.

Information on the relevant legislation and policy pertaining to bats is presented in Consolidated ES Addendum (2015).

1.1.1 Previous work

All results from previously conducted bat surveys within the Tyrone - Cavan Interconnector area are listed in the Consolidated ES Addendum (2015), the Tyrone - Cavan Interconnector Bat Report 2015 (AECOM, 2016a), and the Emergence Re-Entry Bat Survey 152 Trewmount Road (AECOM, 2016b).

An assessment of buildings and mature trees along the route of the Tyrone - Cavan Interconnector for their suitability to support roosting bats was originally carried out in June 2009 and reviewed in 2013 with subsequent emergence and re-entry surveys conducted on trees and buildings with suitability to support roosting bats between May and July 2013, July and September 2015, and August and September 2016.

Bat roosts had been recorded at four locations along the proposed route. A summary of these confirmed roosts is given in Table 1.1, and full details are reported in the Consolidated ES Addendum (2015) Bat Report. The figure labels given below relate to Figure 7.1 (Volume 4 of this Addendum).

Table 1.1: Confirmed roost locations

Location	Species	Roost Type	Figure label
152 Trewmount Road (Substation site)	i. Leisler's bat ii. Soprano pipistrelle	i. Transitional / mating roost ii. Transitional roost	RL01 RL02
Tin-roofed shed (Substation site)	Common pipistrelle	Transitional roost	RL03
Alder tree (Substation site)	Leisler's bat	Transitional roost	BAT1
Treeline east of T60	Soprano pipistrelle	Transitional roost	BAT2

Bat activity was assessed in order to identify bat commuting routes between roosts and foraging areas using a combination of walked transects, driven transects and static detectors between 2009 and 2013.

Walked transects around proposed tower and stringing locations and associated access tracks were initially carried out between May-September in 2009 and 2010; then again between July – September 2012; May – July in 2013 and July – September 2015. Each year the surveyed area included the footprint of the proposed substation and between 24 to 64 of the 102 proposed tower locations dependent upon available land access. All eight species of bat resident in Northern Ireland have been recorded at least once. These are:

- Daubenton's bat *Myotis daubentonii*;

- Whiskered bat *Myotis mystacinus*;
- Natterer's bat *Myotis nattereri*;
- Leisler's bat *Nyctalus leisleri*;
- Nathusius' pipistrelle *Pipistrellus nathusii*;
- Common pipistrelle *Pipistrellus pipistrellus*;
- Soprano pipistrelle *Pipistrellus pygmaeus*; and,
- Brown long-eared bat *Plecotus auritus*.

Full details of the previous bat activity surveys are reported in the Consolidated ES Addendum (2015) Bat Report and the Tyrone – Cavan Interconnector Bat Report 2015 (AECOM, 2016a).

1.2 Survey Aims

The overall aim of the 2018 and 2019 surveys was to produce up to date data and ensure seasonal variations are adequately report and to corroborate the results from previous years.

2. Methods

Updated guidance (Collins, 2016) for bat surveys has been published since previous surveys were carried out for the Tyrone - Cavan Interconnector. Although updates on the specifications and guidelines for bat survey were published in 2016, the new guidelines largely follow the 2012 guidelines used in previous bat survey in the Consolidated ES (2013) and the Consolidated ES Addendum (2015) and therefore survey effort and implementation has remained the same across the years, and results are comparable.

2.1 Emergence and Re-entry Surveys

A single updated emergence or re-entry survey was conducted at each of the four previously identified roost locations on 12 and 13 September 2018 during suitable weather conditions. The surveys were carried out following standard methodology in accordance with the relevant Northern Ireland Environment Agency (NIEA) Specific Requirements (NIEA, 2017) and recommendations and good practice as highlighted in Bat Surveys: Good Practice Guidelines (3rd Edition), produced by the Bat Conservation Trust (BCT) (Collins, 2016).

2.2 Tree Assessments for Roosting Bats

2.2.1 Ground-based Assessment

An updated ground-based visual inspection of trees along the Tyrone - Cavan Interconnector was conducted on 18, 26 and 30 April 2019 and 2 and 9 May 2019 to determine the presence of any Potential Roost Features (PRF) following the same methodology as before, in particular to note any change in suitability since the previous survey. Trees growing within a 100 m buffer of the centre line of the Tyrone - Cavan Interconnector and associated access tracks were assessed according to a range of criteria used to grade suitability of roost features as having Negligible, Low, Moderate, or High suitability for roosting bats, or noted as a Confirmed roost, in general accordance with BCT guidelines (Collins, 2016), as detailed in Table 2.1.

Table 2.1: Criteria for assessing the potential suitability of PRF for roosting bats.

Suitability for Roosting Bats	Description
Confirmed	A feature within which bats are seen to be present (either live bats or bat carcasses) or heard 'chattering' inside will be classified as a confirmed roost. In addition, any feature/structure found to contain droppings during inspections will in the first instance be considered as a confirmed roost. N.B. In some cases it may be appropriate to revise this assessment following further survey (e.g. for buildings containing low numbers or old droppings and showing no evidence of use during emergence surveys).

Suitability for Roosting Bats	Description
High	A feature which, due to its size, depth, shape, orientation or other physical properties (such as ability to maintain a constant temperature, accessibility for bats) is considered to be ideal for use by bats. Potential feeding remains, urine staining or scratch marks (in the absence of droppings) within or around the feature are likely to indicate presence of a bat occupation and therefore suggest high potential that a roost is present. In the absence of such signs, assigning a feature high potential will also be informed by the surveyor's knowledge of bat ecology and preferred roost types (relative to the feature being assessed). The quality of the surrounding habitat for bats will also be considered.
Moderate	A feature which would be considered ideal for use by bats were it not for one or more key factors which limit its potential. For example, an ideal feature in sub-optimal surrounding habitat (e.g. within an area of predominately hard standing) may be considered to have moderate potential.
Low	A tree/structure containing features where use by bats cannot be ruled out but is considered unlikely based on size, depth, construction aspect, habitat location etc.
Negligible	A tree/structure with no features capable of supporting roosting bat species.

Source: Category descriptions adapted from Collins (2016) to be applied using professional judgement

Trees categorised as having Moderate suitability or above require further survey according to the guidelines (Collins, 2016). This is the equivalent to Categories 1 and 1* from the previous guidance used in the Consolidated ES Addendum (2015).

2.2.2 PRF Inspections

Following the ground-based assessment, further PRF inspections were carried out on 5 June 2019 of the eight trees assessed as having Moderate or High suitability for roosting bats. These PRF inspections were conducted by a licensed ecologist using either ladder or by climbing the tree using ropes, under the supervision of a suitably trained assistant. Once accessed, all identified PRF were examined using a mirror, high-powered torch or endoscope. Any bats or evidence of bat use were noted, in addition to the internal conditions and characteristics of each feature were described and used to revise each trees' potential suitability to support roosting bats.

2.3 Activity Surveys

In May and June 2019, 19 transects were walked following the transect routes walked in previous surveys for consistency. These transects covered habitats within the substation site, tower and stringing locations, oversail and associated access routes. In May transects were surveyed over seven nights on 13, 14, 15, 16, 30, 21 and 23 May 2019. In June, transects were surveyed over six nights on the 11, 13, 17, 20, 24 and 26 June 2019.

During the surveys, each surveyor noted each bat seen or heard, on a mobile mapping device which was later compared to the acoustic recordings made in the field to confirm species identification.

These data provide an estimate of the number of individuals, where obvious passes by the same bat were not double counted. Thus, the number of passes recorded was higher than the total number of bats. Surveys commenced at dusk (30-40mins after sunset) to allow for bats of differing emergence times to emerge and continued for up to 2 hours after dusk, with often more than one transect completed in a single night. Surveys were carried out during suitable weather conditions, taking account of the BCT guidelines (Collins, 2016). The data collected were used to provide an index of bat activity along each transect and thus along the route of the Tyrone - Cavan Interconnector and associated access tracks. This was the method used to assess use in the 2013 and 2015 reports and has been repeated in this document, for consistency and robustness.

Of the 102 proposed tower locations covered by these transects, 47 were surveyed in 2019, (where the surveyor had access to the field in which the proposed tower was located); the remaining 55 proposed tower locations could not be surveyed as land access was not permitted. Out of the total of 47 proposed tower locations surveyed in 2019, 26 of these were surveyed in 2015, while 38 had been previously surveyed in 2013.

2.4 Data Collection and Analysis

All spatial survey data were initially recorded onto a mobile mapper in the field before being transferred into ArcGIS to enable accurate high-quality drawings to be produced.

All bat surveys were digitally recorded using Batlogger M detectors, and Pettersson D240x detectors recording in time expansion onto Roland R-05 recorders, during emergence and re-entry surveys.

Bat recordings collected during surveys were stored and subsequently analysed using Kaleidoscope Pro (v4.5.4) sound analysis software, to identify any bats not heard in the field by the surveyors, but recorded, and to confirm species identifications made in the field.

2.5 Surveyor experience

Bat surveys were led by Dr Emma Boston (Principal Ecologist, AECOM) with the assistance of Jenny Jones (Consultant Ecologist, AECOM), Scott McCollum (Graduate Ecologist, AECOM) Rachel Whyte (Graduate Ecologist, AECOM), Ashleen Higgins (Consultant Ecologist, AECOM) and Paul Donaghey (Ecological Placement Student, AECOM). Surveyor experience is provided in Appendix 7.2.

2.6 Limitations

Access was not provided to all land parcels along the route. Surveys were only conducted along the Tyrone - Cavan Interconnector route including the oversail, proposed tower and stringing locations, the associated access tracks and the substation site, where access was permitted.

Due to permission restrictions and Health and Safety considerations (e.g. aggressive or unpredictable animals), parcels which included 55 tower locations (outside of the substation) were not available during the 2019 surveys. These were: T6, T7, T11, T14, T15, T16, T17, T18, T19,T29, T30, T33, T34, T35, T36, T37, T38, T39, T40, T41, T42, T43, T46, T47, T48, T49, T53, T56, T57, T61 ,T65, T66, T67, T68, T69, T70, T71, T72, T73, T74, T75, T79, T83, T84, T85, T86, T90, T91, T92, T93, T96, T97, T98 and T102.

At only parcels that include 28 tower locations (T10, T14, T15, T18, T20, T21, T23, T24, T28, T30, T33, T44, T48, T53, T62, T65, T68, T76 T78, T79, T80, T81, T85, T87, T88, T90, T99 and T102) will the removal of trees and hedgerows be required to facilitate both the installation of tower bases and as part of temporary clearance of areas around the tower bases to facilitate the 35 m x 35 m working area. Of these 28 parcels, 15 (T1, T10, T20, T21 T23, T24, T44, T62, T76, T78, T80, T81, T87, T88 and T99) were covered by surveys in 2019. This is not considered a significant limitation however, since mitigation has been recommended to minimise and/or replace flight lines at all locations where hedgerow removal is required.

During the dusk emergence survey on 12 September 2018 a light rain shower came on between 19:52 and 20:06, and again from 20:20 to 20:28. Similarly on 13 September 2018 there was a light rain shower between 21:04 to 21:06. These were of short duration, and bats were active both before and after the showers, suggesting that the rain had little impact on the results.

During June 2019 there was higher than average rainfall, with rain 123.2 mm recorded, compared to the 64 mm average. Surveys were conducted on nights with no rain where possible, however, during an activity transect survey on 13 June 2019, light rain showers began at 23:30. No bats were detected during rain showers, suggesting bat activity may have been reduced during this period. Bat activity overall was lower for the month of June than that recorded during May.

No other constraints were identified to limit the findings of these surveys.

3. Results

3.1 Emergence and Re-entry Surveys

Details of survey locations and associated dates are given in Table 3.1.

Table 3.1: Date, survey type and surveyors present for each survey.

Site	Date	Survey	Surveyors
152 Trewmount Road	12/09/2018	Dusk	Emma Boston, Jenny Jones, Rachel Whyte, and Scott McCollum
Tin-roofed shed	13/09/2018	Dawn	Jenny Jones and Rachel Whyte
Alder tree	13/09/2018	Dawn	Emma Boston and Scott McCollum
Treeline east of T60	13/09/2018	Dusk	Emma Boston and Scott McCollum

Weather conditions and survey start and end times are presented in Table 3.2.

Table 3.2: Weather conditions during emergence / re-entry surveys.

Time	Temperature	Cloud cover (%)	Wind description	Precipitation
12/09/2018	**Sunset: 19:51**			
Start: 19:36	14	50	Still	Dry with spells of drizzle throughout the survey
End: 21:21	14	30	Still	Dry
13/09/2018	**Sunrise: 06:56**			
Start: 04:50	10	80	Light breeze	Dry
End: 06:56	8	60	Gentle breeze	Dry
13/09/2018	**Sunset: 19:48**			
Start: 19:35	13	100	Light breeze	Dry
Finish: 21:21	14	100	Light breeze	Dry with spells of drizzle during survey

Bat roosts were confirmed at three out of four previously Confirmed roosts. The alder tree (BAT1) had collapsed since the previous survey, and no longer provided suitable roosting habitat for bats. A description of results for each emergence and re-entry survey is given in Table 3.3. Photographs of each roost location are given in Appendix A. Detailed survey results are presented in Appendix B.

Table 3.3: Emergence and re-entry survey results

Site	Survey results
152 Trewmount Road	A single Leisler's bat was observed emerging from the apex at the northwest of this property, approximately 34 minutes after sunset (RL01). One minute later, at the southwestern side of the property, a single soprano pipistrelle bat emerged from under a tile at the apex (RL02). No other bats emerged from this property. On two occasions during the survey, a pass of brown long-eared bat was recorded, and twice a Nathusius' pipistrelle was recorded foraging whilst commuting through the site. At 20:48 a Leisler's bat re-entered the roost at the apex. This bat remained in the roost for the remainder of the survey emitting social calls continuously, likely a male calling for a mate. Survey results are illustrated in Figure 7.2, Sheet 1.
Tin-roofed shed	No bats were observed emerging from the tin-roofed shed (however, at one point a soprano pipistrelle bat flew into the shed, circled and flew out again). Throughout the survey, a Nathusius' pipistrelle was recorded foraging and social calling along the hedgerow to the west of the tin-roofed shed and could be heard calling from

Site	Survey results
	somewhere static nearby, possibly from a tree within the field in which the tin-roofed shed is located. This individual moved off just before dawn. Soprano pipistrelle was heard intermittently commuting past the tin-roofed shed, and a single pass of Leisler's bat was recorded in the vicinity of the surveyors. Survey results are illustrated in Figure 7.2, Sheet 2.
Alder tree	The alder tree at the substation site (BAT1), previously identified as hosting a Leisler's bat roost, was found to have fallen in the interim years. Sections of this tree remained, however, the tree was reclassified as having Negligible suitability for bats. A survey was carried out observing this and other adjacent trees. Throughout the dawn survey, Nathusius' pipistrelle and soprano pipistrelle bats were observed foraging along this treeline. No bats were observed re-entering the alder tree. Survey results are illustrated in Figure 7.2, Sheet 3.
Treeline east of T60	Two soprano pipistrelle bats were observed to emerge from a knothole in the ash tree previously identified as a soprano pipistrelle roost (BAT2). The first bat emerged approximately 16 minutes after sunset and the second, 22 minutes after sunset. Throughout the survey, soprano pipistrelle and common pipistrelle were recorded commuting and foraging along the treeline. One pass of an unidentified bat of the *Myotis* genus was recorded at 47 minutes after sunset. At 65 minutes after sunset, a Leisler's bat began social calling from trees to the northwest of this treeline, for 6 minutes at approximately 1 hour and 5 minutes after sunset before moving on. Survey results are illustrated in Figure 7.2, Sheet 4.

3.2 Tree Assessments

Trees assessed as having Moderate to High suitability for roosting bats during the initial ground-based tree assessment in May 2019 were followed up with a detailed PRF inspection survey at height on 5 June 2019. Results are detailed in Table 3.4. The labels continue on from the two previously Confirmed tree roosts identified in previous surveys (BAT 1 and BAT 2).

Table 3.4: Tree assessment results.

Tree Ref.	Species	Potential Roost Features	Suitability following ground assessment	PRF assessment	Suitability following PRF assessment (at height)
BAT3	Horse-chestnut	Hollow from the bottom extending 2 m+ up.	Moderate	Hollow narrows but remains fairly open and accessible from the base. No bat evidence, slugs present on inspection.	Negligible
BAT4	Beech	One knot hole 6m facing east, possible cavity. Tear out at 6 m south east facing	Moderate	Knot hole contains 25 cm crevice which narrows at the top. Rather damp during inspection, no evidence of bats, several slugs present. Tear out no suitable crevices.	Low
BAT5	Ash	Many canker sores and hollow trunk.	Moderate	First canker extends about 50 cm but remains quite open. Full of cobwebs during inspection. Second canker crevice extends 20 cm again quite open. Full of cobwebs and woodlouse. Could be suitable for one or two bats opportunistically.	Low
BAT6	Ash	Heavily cankered, several holes that may leading to cavities.	Moderate	Large canker leads to hollow centre. Large space extends for almost 1 m but open to the sky at the top end, very damp.	Negligible

Tree Ref.	Species	Potential Roost Features	Suitability following ground assessment	PRF assessment	Suitability following PRF assessment (at height)
BAT7	Ash	Thin tree with large knot hole at 1m. Extends up.	Moderate	Knot hole cavity extends about 30 cm up, dry but quite open. No evidence of bats, woodlouse present on inspection. Could be suitable for one or two bats opportunistically.	Low
BAT8	Ash	Thin tree with small knot hole at 1 m.	Moderate	Knot hole cavity extends 30 cm up, dry. Full of cobwebs and rotten wood. No evidence of use. But cavity suitable for one or two bats opportunistically.	Low
BAT9	Beech	Butt rott at the base. Two knot holes at 3 m.	Moderate	One knot hole closed. Second knot hole opens down into a large cavity. Nesting bird material visible.	Negligible
BAT10	Ash	Multiple canker wounds including on trunk at 5 m and 8 m.	High	Tree re-assessed from the ground, but no PRFs considered likely to be impacted with its position adjacent to the access lane.	High – but not expected to be impacted given location.

Following the PRF (at height) inspection surveys, three of the seven trees with Moderate suitability were re-classified as having Negligible suitability on closer inspection, and four as having Low suitability. In trees categorised as Low, based on the characteristics of the features, use by bats cannot be ruled out, but it is not considered likely. The tree with High suitability was re-assessed from the ground only, it is not considered, given the location of the tree adjacent to an access track and the location of PRFs within the tree, that it will be impacted by the Tyrone - Cavan Interconnector. As such no further survey is considered necessary.

3.3 Activity surveys

Walked transect surveys were conducted in May and June 2019. Survey condition summaries are shown in Table 3.5 and Table 3.6: June activity transect survey date, location and weather.below.

Table 3.5: May activity transect survey date, location and weather.

Transect No.	Tower Locations included in transect	Date	Start	End	Tm (°C) start	Cloud cover (%) start	Wind (0-7) Beaufort scale at start	Precipitation start
1	T1, T2	13/05/2019	22:10	23:20	11	15	0	Dry
2	T3, T4, T5	13/05/2019	23:40	00:20	11	15	0	Dry
3	T8, T9, T10	13/05/2019	22:08	23:28	11	15	0	Dry
4	T12, T13	14/05/2019	22:08	23:23	16	40	0	Dry
5	T20, T21	14/05/2019	22:10	23:10	13	30	0	Dry
6	T22, T23,T24, T25	15/05/2019	22:15	23:10	13	50	0	Dry
7	T26, T27	15/05/2019	22:14	23:42	13	60	0	Dry
8	T31, T32	16/05/2019	22:16	23:01	8	20	0	Dry
9	T44, T45	16/05/2019	23:29	00.00	8	20	0	Dry
10	T50, T51, T52	16/05/2019	22:23	23:28	10	25	1	Dry

Transect No.	Tower Locations included in transect	Date	Start	End	Tm (°C) start	Cloud cover (%) start	Wind (0-7) Beaufort scale at start	Precipitation start
11	T54, T55	20/05/2019	22:15	22:47	8	20	1	Dry
12	T58, T59, T60	20/05/2019	23:11	23:47	8	20	1	Dry
13	T62, T63	21/05/2019	22:30	23:05	9	20	1	Dry
14	T64	21/05/2019	23:11	00:01	9	20	1	Dry
15	T76, T77, T78	21/05/2019	22:40	23:55	15	10	1	Dry
16	T80, T81, T82	23/05/2019	22:30	23:41	12	90	1	Dry
17	T87, T88, T89	23/05/2019	23:53	00:24	12	90	1	Dry
18	T94, T95	23/05/2019	23:37	00:20	12	90	1	Dry
19	T99, T100, T101	23/05/2019	22:23	23:16	12	90	1	Dry

Table 3.6: June activity transect survey date, location and weather.

Transect No.	Tower Locations included in transect	Date	Start	End	Tm (°C) start	Cloud cover (%) start	Wind (0-7) Beaufort scale at start	Precipitation start
1	T1, T2	11/06/2016	22:45	00:00	12	100	2	Dry
2	T3, T4, T5	20/06/2019	22:50	23:21	17	70	0	Dry
3	T8, T9, T10	11/06/2019	00:26	01:30	12	100	2	Dry
4	T12, T13	20/06/2019	23:40	00:26	11	30	0	Dry
5	T20, T21	11/06/2019	22:35	23:50	12	100	2	Dry
6	T22, T23,T24, T25	13/06/2019	00:00	00:45	12	100	2	Dry
7	T26, T27	24/06/2019	22:40	23:46	18	70	2	Dry
8	T31, T32	24/06/2019	23:56	00:30	18	70	2	Dry
9	T44, T45	13/06/2019	00:00	00:30	12	100	1	Light rain
10	T50, T51, T52	24/06/2019	22:30	23:45	16	95	1	Dry
11	T54, T55	24/06/2019	23:45	00:35	15	90	0	Dry
12	T58, T59, T60	20/06/2019	23:40	00:57	13	25	2	Dry
13	T62, T63	13/06/2019	00:00	00:45	7	100	0	Light rain
14	T64	20/06/2019	22:40	23:07	16	75	0	Dry
15	T76, T77, T78	13/06/2019	22:02	23:21	6	95	1	Dry
16	T80, T81, T82	17/06/2019	22:40	23:35	12	5	1	Dry
17	T87, T88, T89	17/06/2019	00:00	00:40	12	0	1	Dry
18	T94, T95	26/06/2019	22:40	23:35	15	40	1	Dry
19	T99, T100, T101	17/06/2019	22:40	23:35	11	5	2	Dry

In total, all eight bat species found in Northern Ireland were recorded during the May and June 2019 updated activity surveys. A summary of the results per transect are given in Table 3.7: Activity transect results. and presented in Figures 7.3 and 7.3.1, Volume 4 of this Addendum.

Table 3.7: Activity transect results.

Transect No.	Common pipistrelle	Soprano pipistrelle	Nathusius' pipistrelle	Leisler's bat	Daubenton's bat	Natterer's bat	Whiskered bat	Brown long-eared bat	Survey Total No. Bats
1	7	13	0	4	1	0	0	0	**25**
2	3	11	0	2	0	0	0	0	**16**
3	10	7	2	10	0	0	0	0	**29**
4	7	4	2	1	0	0	0	0	**14**
5	15	11	3	2	0	0	0	0	**31**
6	12	12	4	6	0	0	0	0	**34**
7	14	5	2	6	1	0	0	0	**28**
8	7	5	0	10	0	0	0	0	**22**
9	4	4	1	1	0	0	0	0	**10**
10	8	9	0	6	0	0	0	0	**23**
11	4	7	1	10	0	0	0	0	**22**
12	5	1	3	1	0	0	0	0	**10**
13	10	5	1	0	0	0	0	1	**17**
14	9	2	1	4	0	0	0	0	**16**
15	6	11	0	2	0	0	0	0	**19**
16	16	6	0	5	1	0	0	0	**28**
17	12	3	1	2	0	0	0	0	**18**
18	17	6	0	1	0	0	0	0	**24**
19	10	4	0	0	0	1	1	0	**16**
Total	**176**	**126**	**21**	**73**	**3**	**1**	**1**	**1**	**402**

The total number of bats recorded during the transect surveys during May and June was 402. The species with the highest number recorded over the transect surveys was common pipistrelle bat with 176 bats recorded followed by soprano pipistrelle (126 bats), and then Leisler's bat and Nathusius' pipistrelle. Three Daubenton's bat, one Natterer's bat, whiskered bat and brown long-eared bat were detected during these surveys in 2019.

The data was analysed to give an estimate of relative bat activity displayed as Bat Activity Index (BAI) (BAI = bat passes / hour). Table 3.8: Bat Activity Index (BAI) for the 2019 activity surveys.provides the BAI for each of the species encountered on each of the dusk activity surveys.

Table 3.8: Bat Activity Index (BAI) for the 2019 activity surveys.

Transect No.	Common pipistrelle	Soprano pipistrelle	Nathusius' pipistrelle	Leisler's bat	Daubenton's bat	Natterer's bat	Whiskered bat	Brown long-eared bat	Survey Total
1	2.9	5.3	0	1.6	0.41	0.00	0.00	0.00	**10.20**
2	1.3	4.6	0.0	0.8	0.00	0.00	0.00	0.00	**6.72**
3	4.3	3.0	0.9	4.3	0.00	0.00	0.00	0.00	**12.61**
4	3.8	2.2	1.1	0.5	0.00	0.00	0.00	0.00	**7.69**
5	6.7	4.9	1.3	0.9	0.00	0.00	0.00	0.00	**13.78**
6	9.2	9.2	3.1	4.6	0.00	0.00	0.00	0.00	**26.15**
7	5.8	2.1	0.8	2.5	0.41	0.00	0.00	0.00	**11.62**
8	4.5	3.2	0.0	6.4	0.00	0.00	0.00	0.00	**14.10**

Transect No.	Common pipistrelle	Soprano pipistrelle	Nathusius' pipistrelle	Leisler's bat	Daubenton's bat	Natterer's bat	Whiskered bat	Brown long-eared bat	Survey Total
9	4.2	4.2	1.1	1.1	0.00	0.00	0.00	0.00	**10.53**
10	4.4	5.0	0.0	3.3	0.00	0.00	0.00	0.00	**12.78**
11	1.9	3.3	0.5	4.7	0.00	0.00	0.00	0.00	**10.23**
12	2.9	0.6	1.7	0.6	0.00	0.00	0.00	0.00	**5.71**
13	9.1	4.5	0.9	0.0	0.00	0.00	0.00	0.91	**15.45**
14	9.5	2.1	1.1	4.2	0.00	0.00	0.00	0.00	**16.84**
15	2.5	4.7	0.0	0.8	0.00	0.00	0.00	0.00	**8.05**
16	11.6	4.3	0.0	3.6	0.72	0.00	0.00	0.00	**20.29**
17	10.5	2.6	0.9	1.75	0.00	0.00	0.00	0.00	**15.79**
18	10.4	3.7	0.0	0.61	0.00	0.00	0.00	0.00	**14.72**
19	5.1	2.0	0.0	0.0	0.00	0.51	0.51	0.00	**8.16**
Total	5.23	3.75	0.62	2.17	0.09	0.19	0.19	0.19	**11.95**

Overall the total BAI across all transects was 11.95. The highest BAI recorded during any one transect was 26.15, at proposed towers T22 – T25, followed by 20.29 at around proposed towers T80 – T82.

4. Discussion

4.1 Confirmed Bat Roosts

Following these updated surveys there remains three confirmed bat roost locations and one historical bat roost along the Tyrone - Cavan Interconnector. Three are located at the proposed substation site: two roosts were confirmed within the property at 152 Trewmount Road and there is a historical roost within the tin-roofed shed. The previously confirmed roost within an alder tree (BAT1) at the substation site is no longer considered a bat roost, since it has now collapsed. At the proposed T60 site, there is one confirmed roost within an ash tree in the treeline east of T60 (BAT2). All roosts are considered transient or contained one or two of bats.

Based on the current understanding of the Tyrone - Cavan Interconnector, the property at 152 Trewmount Road and the tin-roofed shed are to be demolished, and the treeline east of the proposed T60 is due to be pruned to facilitate the Tyrone - Cavan Interconnector. This will result in the loss of these three roost sites. As such, before any works commence European Protected Species (EPS) Licence must be applied for from NIEA Natural Environment Division (NED) for the exclusion of bats at each roost as detailed in the Consolidated ES Addendum (2015).

4.2 Potential Bat Roosts

A further eight trees along the Tyrone - Cavan Interconnector were identified as having Moderate to High suitability for roosting bats during the ground-based assessment, but seven were revised to Low or Negligible suitability following a PRF inspection. The single tree classified as High was re-assessed from the ground which concluded that any PRF identified are unlikely to be impacted.

Following these updated tree assessment surveys it is not considered that any of the eight trees identified will require further survey. Trees with Low suitability may be felled taking reasonable measures to remove any PRF identified. In the unlikely event that bats are encountered during felling, works must stop, and advice sought from the NIEA, in order to comply with the relevant legislation.

4.3 Bat Activity

Dusk activity surveys were carried out during May and June 2019 at locations close to 48 of the proposed tower locations. Eight species were recorded during the 2019 survey: common, soprano and Nathusius' pipistrelle bats, Leisler's bat, Daubenton's bat, Natterer's bat, whiskered bat and brown long-eared bat. Brown long-eared bats were also recorded in 2015 at the same tower location.

A total of 402 bats were recorded during the 2019 surveys. Activity was higher during the May surveys, with 60.4% of all bat calls recorded during these transects. It is thought that the poor weather in general throughout June, including the higher than average rainfall may have had an impact on the level of bat activity.

Common pipistrelle bats were the most encountered species followed by soprano pipistrelle bat, Leisler's bat and Nathusius' pipistrelle, during both the May and June transects. The species with the highest BAI was common pipistrelle, followed by soprano pipistrelle. Leisler's bat had a similar BAI to the observations from the 2015 surveys. Nathusius' pipistrelle had the next highest BAI, which was over six times as high as that recorded in 2015, and two thirds that of 2013. Whether this increase in detection is as a result of an improvement in detection methodologies or through increasing population numbers, it is hard to determine.

The survey with the highest BAI was transect 6 (T22 –T25), followed by transect 16 (T80 – T82), both as a result of high common pipistrelle bat activity. The former was in the vicinity of the proposed towers which had the highest BAI in the 2012 and 2015 surveys and the third highest BAI in the 2013 surveys. The proposed towers with the highest BAI from the 2013 (T28, T29, and T30) were not surveyed in 2015 or 2019 due to restricted access.

Of the 102 tower locations, there are 28 that will impact a hedgerow (Species-Poor Intact Hedgerow / Species-Poor Hedgerow with Trees), details can be found in the Consolidated ES Addendum (2015).

Following the 2013 surveys a number of foraging hotspots were identified, these together with hotspots identified in 2015 and 2019 are listed in Table 4.1, with associated linear features to be affected by the Tyrone - Cavan Interconnector listed.

Table 4.1 Foraging hotspots and associated linear features affected by the Tyrone - Cavan Interconnector

Proposed Tower Locations	Impact on linear features	2013	2015	2019
T1-T4	No linear feature impacted	Several roosts on this substation site. Foraging Leisler's bats.	Constant activity recorded around the farm buildings but not dominated by foraging Leisler's, *Pipistrellus* spp. including Nathusius' pipistrelle.	Soprano and common pipistrelle and foraging along hedgerows and laneways. Leisler's commuting overhead.
T10, T11	T10 Species-Poor Intact Hedgerow	Hotspots were focussed along the hedgerows, roads and at a barn/shed.	The activity focused along the hedgerows, roads and at a barn/shed but not dominated by foraging.	Mostly brief passes of soprano and common pipistrelles along hedgerows and roads.
T22-T25	T23 Species-Poor Hedgerow with Trees T24 Species-Poor Intact Hedgerow	Not considered a hotspot.	Highest number of bats recorded in any one survey (21 common pipistrelles)	Mostly brief passes of soprano and common pipistrelles, and four Nathusius' pipistrelles. Several noted foraging around stream and artificial lake close to T23 and along at the hedgerow boundary at T23.
T28, T29, T30	T28 Species-Poor Intact Hedgerow	Hotspots here include the orchard and area	Not surveyed	Not surveyed.

Proposed Tower Locations	Impact on linear features	2013	2015	2019
	T30 Species-Poor Intact Hedgerow	adjacent to the orchard (T28).		Several passes of soprano pipistrelle, and one Daubenton's bat foraging along the field boundary close to T27.
T41	No linear feature impacted	Hotspots included the hedgerows, roads and close to Tullysaran House	Not surveyed	Not surveyed
T45	No linear feature impacted	Hotpots here included a large garden tree and hedgerow lined road,	Not surveyed	Hotspot for soprano and common pipistrelles foraging.
T47-T49	T48 Species-Poor Intact Hedgerow	Hotspots include the farmyard	Not surveyed	Not surveyed
T58-61	No linear feature impacted	Hotspots include the hedgerow line to the north of T60, hedgerow line by Laneway, the access road and hedgerow line south T60.	The activity focused on linear features including the hedgerow line to the north of Tower 60, hedgerow line by laneway, the access road and hedgerow line south T60.	Small number of bat passes including common and Nathusius' pipistrelle. Common pipistrelle foraging along the access lane leading to T59.
T62-T63	T62 Species-Poor Intact Hedgerow	Hotspots included the farmyard west, the lane and the hedgerow lines.	The activity focused on the farmyard west, the lane and the hedgerow lines.	Hotspot for common pipistrelle foraging activity along access lane to T62 and around field boundary at this tower in May. Brown long-eared bat pass recorded.
T64	No linear feature impacted	Not considered a hotspot.	Highest number of bats recorded in any one survey (21 common pipistrelle).	Remains a foraging hotspot for common pipistrelle.
T78	T78 Species-Poor Hedgerow with Trees	Not surveyed	Not surveyed	Hotspot for soprano pipistrelles foraging up and down hedgerow at T78.
T80-T83	T80 Species-Poor Hedgerow with Trees T81 Species-Poor Intact Hedgerow	Hotspots are located north of proposed tower 81, the hedgerow northwest of proposed tower 81 and the Drumhilly road.	Not surveyed	Bat active at same locations as in 2013, with another hotspot noted at the field boundary close to a stream on the boundary between T81 and T82. Commuting Daubenton's bat recorded. Several bats recorded commuting along hedgerow at T80, particularly during the June transects.
T88, T89	T88 Species-Poor Intact Hedgerow	Not surveyed	Not surveyed	Foraging hotspots for common pipistrelle around access lanes at both T88 and T89.
T94, T95	No linear feature impacted	Not surveyed	Not surveyed	Foraging hotspots for common pipistrelle along field boundaries.

Proposed Tower Locations	Impact on linear features	2013	2015	2019
T97-T98	No linear feature impacted	Hotspots area located along the hedgerow lines and tracks in close proximity to proposed tower T97 and T98.	Not surveyed	Not surveyed
T100-T101	No linear feature impacted	Hotspots here include a hedgerow line by marshy ground between T100 and T101 and other hedgerow lines in the vicinity.	Not surveyed	Hotspot for common and soprano pipistrelle along hedgerow line with stream close to T100. Natterer's bat pass recorded along access path to T101.

Bats were recorded foraging in other areas, but in fewer numbers or for shorter times as those areas listed above (see Volume 4 Figure 7.3). Several of the linear features identified as foraging hotspots are at proposed tower locations, in particular the Species-Poor Intact Hedgerow or Hedgerow with Trees at T23, T28, T62, T80. It is at these locations in particular, without mitigation, that the Tyrone - Cavan Interconnector has the potential to negatively impact on bat foraging habitats and commuting routes, in the absence of mitigation.

5. Recommendations and Conclusion

Bats are highly mobile species and it is not expected that the Tyrone - Cavan Interconnector will result in a temporary or permanent negative effect on the bat population within or around the survey area. It is considered that the Tyrone - Cavan Interconnector will not affect the bat population due to the minimal lengths of permanent hedgerow loss and the fact that the hedgerow network is already connected to the wider environment which provides alternative routes for bats to follow.

Where linear features and roosts may be affected, they are in areas which were largely identified in 2013 and mitigation is already in place. For those additional linear features, particularly those at hotspot locations for bat activity these same mitigation measures will be implemented. There is no requirement for additional mitigation over and above the mitigation measures for bats and bat habitats prescribed previously in the Consolidated ES Addendum (2015).

The Tyrone - Cavan Interconnector will result in the removal of four confirmed roosts, at three locations. Prior to the removal of the roosts, EPS licences will be required. Compensation has been proposed to enhance roosting opportunities, and there is no requirement for compensation over and above that prescribed previously.

6. References

AECOM (2016a) Tyrone – Cavan Interconnector Bat Report 2015.

AECOM (2016b) Emergence Re-entry Bat Survey 152 Trewmount Road.

Bat Conservation Trust and Institute of Lighting Professionals (2018) Bats and artificial lighting in the UK, Guidance Note 08/18.

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

NIEA (2017) 'Bat Survey - Specific Requirements'.

SONI (2015) Tyrone – Cavan Interconnector Consolidated Environmental Statement (ES) Addendum Appendix 8.3.

The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 (as amended).

Appendix A Photographs

Photograph 1: 152 Trewmount Road RL01.

Photograph 2: 152 Trewmount Road RL02.

Photograph 3: Tin-roofed shed at substation site.

Photograph 4: Alder tree on substation site.

Photograph 5: Soprano roost east of T60 site.

Appendix B Emergence/Re-entry bat survey results

Table A. 1: Emergence/re-entry bat survey results.

Time	Species	Activity	Count	Description	Key
12/09/2018 Dusk Trewmount Road					
Surveyor 1					
20:25	Leisler's bat	Emergence	1	Observed emerging, did not echolocate immediately.	a
20:28	Leisler's bat	Foraging/ Commuting	1	From field passed over house.	b
20:35	Soprano pipistrelle	Foraging	1	Heard not seen	
20:45	Soprano pipistrelle	Foraging	1	Faint, heard not seen	
20:48	Leisler's bat	Re-entry	1	Returned to roost in apex and calls very loudly for 1 minute then quiet at 20:50	
20:55-20:56	Leisler's bat	Social call	1	Social call. Many calls, continuous but not visible at apex.	
21:05	Brown long-eared	Foraging/ commuting.	1	Bat pass, heard not seen.	
	Leisler's bat	Social call		Still calling from apex	
21:10	Nathusius' pipistrelle	Foraging/ commuting.	1	Heard not seen.	
	Leisler's bat			Continuous calling.	
Surveyor 2					
20:13	Leisler's bat	Commuting	1	Flew over house	b
20:23	Soprano pipistrelle		1	Heard not seen.	
20:24	Leisler's bat	Commuting	1	Flying high in a southwestern direction, at a height halfway between ground and powerlines.	b
20:25	Soprano pipistrelle	Commuting	1	Up and down hedgerow.	c
20:27	Leisler's bat	Commuting	1	Heard not seen.	
20:34	Nathusius' pipistrelle	Commuting	1	Heard not seen, one pass.	
20:43	Soprano pipistrelle	Commuting	1	Heard not seen, brief.	
20:44	Soprano pipistrelle	Commuting	1	Heard not seen.	
21:08	Nathusius' pipistrelle	Commuting	1	Heard not seen, brief.	
Surveyor 3					
20:24	Soprano pipistrelle	Commuting	1	Fast pass	d

Time	Species	Activity	Count	Description	Key
20:25	Leisler's Bat	Commuting	1	Around 3 metres above house height.	b
20:26	Soprano pipistrelle	Emergence, social calls	1	Emergence from apex, under tile.	e
20:29	Leisler's Bat	Commuting	1	Same height as 20:25 call	b
20:46	Soprano pipistrelle	Commuting	1	Quiet, heard not seen.	
20:48	Brown long-eared	Commuting	1		f
20:56	Leisler's Bat	Commuting, social calls?	1	Very faint, heard not seen	
20:58	Leisler's Bat	Social calls	1	Very faint	
21:05	Brown long-eared	Commuting	1		g
21:10	Nathusius' pipistrelle	Commuting	1	Heard not seen.	
Surveyor 4					
20:24	Soprano pipistrelle	Commuting	1	Heard not seen, brief pass.	
20:25	Leisler's Bat	Commuting	1	Heard not seen, very faint.	
20:27	Leisler's Bat	Commuting	1	Heard not seen, faint.	
20:31	Leisler's Bat	Commuting	1	Seen not heard	h
20:34	Common pipistrelle	Foraging/Commuting		Flying at tree height.	i
20:45	Leisler's Bat	Brief pass		Heard not seen, very faint.	
21:17	Soprano pipistrelle	Brief pass		Heard not seen, flew past sounded like it was just overhead.	
13/09/2018 Dawn Tin Shed					
Surveyor 1					
05:00	Nathusius' pipistrelle	Commuting	1	Briefly heard not seen.	
05:02	Nathusius' pipistrelle	Foraging	1	Social calls heard not seen.	
05:05	Nathusius' pipistrelle	Foraging	1	Heard not seen, social calling as well. Heard for several minutes	
05:12	Nathusius' pipistrelle	Foraging/Social calling	1	Heard not seen, possibly two.	
05:20	Nathusius' pipistrelle	Foraging/Social calling	1	Heard not seen, loud, and continuous.	
05:29	Nathusius' pipistrelle	Foraging/Social calling	1	Brief pass, heard not seen, intermittent, several minutes	
05:39	Nathusius' pipistrelle	Foraging	1	Seen not heard. Flying around shed and tree.	a

Time	Species	Activity	Count	Description	Key
05:41	Nathusius' pipistrelle	Social calling	1	Social calling	
05:57	Nathusius' pipistrelle	Foraging, Social calling		Heard not seen. Constant social calls in background.	
06:00	Nathusius' pipistrelle	Commuting, social calls	1	Heard not seen.	
06:04	Soprano pipistrelle	Commuting	1	Brief and quiet, from shed to tree	b
06:06	Soprano pipistrelle	Commuting	1	Quiet	c
06:08	Nathusius' pipistrelle	Commuting	1	Around trees close to the shed.	d
06:20	Nathusius' pipistrelle	Commuting	1	Flew over the shed.	e
Surveyor 2					
05:00	Nathusius' pipistrelle	Commuting	1	Heard not seen - faint	
05:01	Nathusius' pipistrelle	Commuting	1	Heard not seen – faint and brief	
05:03	Nathusius' pipistrelle	Commuting	1	Heard not seen – faint and brief	
05:06	Nathusius' pipistrelle	Commuting	1	Heard not seen – passed by	
05:07	Nathusius' pipistrelle	Commuting	1	Heard not seen – passed by	
05:08	Nathusius' pipistrelle	Commuting	1	Heard not seen – passed by	
05:09	Nathusius' pipistrelle	Commuting	1	Heard not seen – passed by. Two passes	
05:10	Nathusius' pipistrelle	Commuting	1	Heard not seen – passed by	
05:12	Nathusius' pipistrelle	Commuting	1	Heard not seen – passed by	
05:16	Soprano pipistrelle	Commuting	1	Heard not seen – very brief	
05:18	Nathusius' pipistrelle	Commuting	1	Heard not seen – brief pass	
05:19	Nathusius' pipistrelle	Commuting	1	Heard not seen – 2 brief passes	
05:20	Nathusius' pipistrelle	Commuting	1	Brief pass	f
05:28	Nathusius' pipistrelle	Commuting	1	Heard not seen – brief pass	
05:29	Nathusius' pipistrelle	Foraging	1	Heard not seen – prolonged period of activity	
05:31	Nathusius' pipistrelle	Commuting	2	Heard not seen – pass .	
05:32	Leisler's bat	Commuting	1	Heard not seen.	

Time	Species	Activity	Count	Description	Key
05:38	Nathusius' pipistrelle	Foraging/Social calls	1	Very faint, heard not seen, carries on for about 6 minutes. Social call	
05:45	Nathusius' pipistrelle	Foraging/Social calls	1	Very faint, heard not seen, social call. About 1 minute in duration.	
05:51	Soprano pipistrelle	Commuting	1	Heard not seen – pass.	
05:54	Nathusius' pipistrelle	Foraging/Social calls	1	Heard not seen, faint social call.	
05:57	Nathusius' pipistrelle	Foraging/Social calls	1	Heard not seen, two different calls.	
05:58	Nathusius' pipistrelle	Foraging/Social calls	1	Heard not seen single pass.	
06:02	Soprano pipistrelle	Commuting	1	Heard not seen, brief pass.	
06:05	Soprano pipistrelle	Commuting/Foraging	1	Heard not seen, two brief passes. Foraging nearby.	
06:18	Nathusius' pipistrelle	Social calls	1	Heard not seen, faint social calls as heard earlier.	
13/09/2018 Dawn Alder tree at substation site					
Surveyor 1					
05:03	Nathusius' pipistrelle	Commuting/ Foraging	1	Passed by, heard not seen.	
05:08	Soprano pipistrelle	Commuting/ Foraging	1	Passed by, heard not seen.	
05:12	Soprano pipistrelle	Commuting	1	Very faint, not sure if recorded.	
05:31	Nathusius' pipistrelle	Commuting/ Foraging	1	Passed by.	
05:43	Nathusius' pipistrelle	Commuting/ Foraging	1	Faint heard not seen.	
05:45	Nathusius' pipistrelle	Commuting/ Foraging	1	Faint then closer.	
06:01	Soprano pipistrelle		1	Faint, heard not seen.	
06:08	Soprano pipistrelle	Commuting/ Foraging	1	Pass not close, heard not seen.	
Surveyor 2					
05:03	Nathusius' pipistrelle	Commuting	1	Heard not seen, one pass.	
05:07	Soprano pipistrelle	Commuting	1	Heard not seen, one pass.	
05:29	Nathusius' pipistrelle	Commuting	1	Heard not seen.	
05:32	Soprano pipistrelle	Commuting	1	Heard not seen, on other surveyor's side of treeline	

Time	Species	Activity	Count	Description	Key
05:36	Soprano pipistrelle	Commuting	1	Heard not seen, one pass.	
05:40	Nathusius' pipistrelle	Foraging/Commuting	1	Heard not seen, sounded like it flew around.	
05:44	Nathusius' pipistrelle	Commuting	1	Heard then saw a bat fly from east to west along field boundary.	a
05:45	Nathusius' pipistrelle	Commuting	1	Heard not seen.	
05:50	Nathusius' pipistrelle	Commuting	1	Heard not seen, quick pass.	
05:54	Soprano pipistrelle	Commuting	1	Heard not seen, one pass.	
06:06	Soprano pipistrelle	Commuting	1	Heard not seen, one pass.	

13/09/2018 Dusk Treeline east of T60

Surveyor 1					
20:05	Soprano pipistrelle	Emergence	1	No echolocation.	a
20:11	Soprano pipistrelle	Emergence	1	Heard sound before emergence.	b
20:18	Common pipistrelle	Commuting	1	Along hedgerow behind surveyor.	c
20:35	*Myotis* sp.	Commuting	1	Fast pass, heard not seen.	
20:47	Common pipistrelle	Commuting/ Foraging	1	Heard not seen, passed by.	
20:50	Soprano pipistrelle	Commuting	1	Faint pass.	
20:52	Soprano pipistrelle	Commuting	1	Faint pass.	
20:53	Soprano pipistrelle	Foraging/Social calling	1	Social call coming from tree roost.	
20:56	Soprano pipistrelle	Foraging/Social calling	1	Comes closer, flying and social calling.	
21:06	Soprano pipistrelle	Social calling		Social calls, no echolocation.	
21:09	Soprano pipistrelle	Social calling	1	Social calls and echolocation.	
21:12	Soprano pipistrelle	Social calling	2	Sounded more than one but faint.	
Surveyor 2					
20:04	Soprano pipistrelle	Emergence	1	Emerged high on ivy covered tree.	a
20:10	Soprano pipistrelle	Commuting	1	Heard not seen, faint echolocation.	
20:34	Common pipistrelle	Commuting	1	Heard not seen.	

Time	Species	Activity	Count	Description	Key
20:46	Common pipistrelle	Commuting	1	Heard not seen.	
20:49	Common pipistrelle	Commuting	1	Heard not seen.	
20:51	Soprano pipistrelle	Commuting	1	Heard not seen.	
20:53	Leisler's bat	Commuting	1	Flew overhead.	d
20:54	Leisler's bat	Social calls	1	Social calls.	
20:57	Leisler's bat	Social calls	1	Social calls at trees to north west.	
21:01	Soprano pipistrelle	Commuting/Social calls	1	Heard not seen.	
21:06	Soprano pipistrelle	Commuting/Social calls	1	Heard not seen.	
21:18	Common pipistrelle	Commuting	1	Heard not seen.	
21:20	Common pipistrelle	Commuting	1	Heard not seen.	