

# Emergence Re-Entry Bat Survey 152 Trew Mount Road

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# 1. Introduction

## 1.1 Background

AECOM was commissioned to conduct bat emergence/re-entry surveys on buildings at 152 Trew Mount Road, Dungannon. This property falls within the substation site of the proposed Tyrone Cavan Interconnector. The property comprises a house, garage and several outbuildings. The site was originally assessed for bat roost potential in 2009 but has not been subject to bat surveys. During 2015 activity surveys at known bat roosts within the substation site, a bat of the *Myotis* genus was recorded coming from the direction of 152 Trew Mount Road just minutes outside of mean emergence time for this species. *Myotis* species have not been frequently recorded in surveys to date anywhere on the site. Furthermore, a daytime assessment based on the revised Bat Conservation Guidelines (Collins 2016) issued in 2016) found that an emergence/re-entry survey would be prudent. The central Irish Grid Reference for the site is H8558858491 and the study area is shown in Figure 1.

## 1.2 Aims and objectives

The objectives of the emergence/re-entry surveys are to:

- Complete detailed emergence/re-entry surveys of potential roost sites during dawn and dusk;
- Identify any roost location;
- Identify and count the number and species of bats using any roost; and,
- Identify activity levels of bats at the site.

## 1.3 Quality assurance

This project has been completed in line with AECOM's Integrated Management System (IMS). Our IMS places great emphasis on professionalism, technical excellence, its quality as well as covering all aspects of environmental and Health and Safety management. All staff members are committed to establishing and maintaining our accreditation to the relevant international standards namely BS EN ISO 9001:2008 and 14001:2004 and BS OHSAS 18001:2007. In addition our IMS requires careful selection and monitoring of the performance of all sub consultants and contractors.

## 2. Legislation

### 2.1 Habitats Directive / Habitat Regulations

All bats in Northern Ireland are listed on Annex IV of the EC Habitats Directive (Council Directive 92/43/EEC). The Habitats Directive is transposed by the Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 (as amended), which provide national legislation for the protection of bats.

Under the regulations it is an offence to:

- a. Deliberately to capture, injure or kill a wild animal of a European protected species;
- b. Deliberately disturb such an animal while it is occupying a structure or place which it uses for shelter or protection;
- c. Deliberately disturb such an animal in such a way as to be likely to:
  - i. affect the local distribution or abundance of the species to which it belongs; or
  - ii. impair its ability to breed or reproduce, or rear or care for its young; or
  - iii. impair its ability to hibernate or migrate.
- d. Deliberately obstruct access to a breeding site or resting place of such an animal; or
- e. Damage or destroy a breeding site or resting place of such an animal.

### 2.2 Biodiversity policy

The Northern Ireland Biodiversity Strategy (2015) was developed to stop the loss of and enhance biodiversity. Part of the Strategy is a list of priority species, especially those that are rare, vulnerable or declining, selected based on their requirement of conservation programmes. The majority of species listed can be vulnerable to development and should be considered during planning applications. All bat species recorded in Northern Ireland appear on this list. Additionally, an all-Ireland species action plan was produced in 2008 and covers all bat species previously recorded in Northern Ireland. Bat species recorded in Northern Ireland are listed in Table 2.1.

**Table 2.1 Bat species occurring within Northern Ireland.**

Common name	Scientific name	Echolocation mean frequency of max energy (kHz)	Mean emergence time (minutes after sunset)*	Usual habitat type
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	55.5	32	Woodland edge and riparian
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	46.5	20	Woodland edge, parkland, and hedgerows
Nathusius' pipistrelle	<i>Pipistrellus nathusii</i>	40.7	20	Woodland edge and water
Daubenton's bat	<i>Myotis daubentonii</i>	47.8	84	Watercourses, lakes, pond, and riparian trees
Whiskered bat	<i>Myotis mystacinus</i>	50.0	32	Parks, meadows, woodland, and gardens
Natterer's bat	<i>Myotis nattereri</i>	48.9	75	Relatively dense woodland, also over water

Common name	Scientific name	Echolocation mean frequency of max energy (kHz)	Mean emergence time (minutes after sunset)*	Usual habitat type
Leisler's bat	<i>Nyctalus leisleri</i>	26.9	18	Above lakes, meadows, and parkland
Brown long-eared bat	<i>Plecotus auritus</i>	39.8	54	Dense habitats, woodland, parkland and gardens

\* Emergence times adapted from Jones, G. and Rydell, J. (1994) and Middleton *et al.* (2014).

## 2.3 Planning Policy Statements

Planning Policy Statements (PPS) set out the policies of the Department of the Environment on particular aspects of land-use planning and apply to the whole of Northern Ireland. Their contents must be taken into account in preparing development plans and are also material to individual planning applications and appeals. PPS 2 Natural Heritage (2013) sets out the Department's planning policies for the conservation, protection and enhancement of natural heritage, defined as "the diversity of our habitats, species, landscapes, and earth science features". In addition, it outlines the criteria that Planning NI employs when processing planning applications which might affect nature conservation interests, and to which developers should have regard when preparing proposals. This revised version outlines the importance that is now placed on Northern Ireland Priority Species and Habitats (Policy NH 5) within the planning process.

Policies within PPS2 that are applicable to bats are:

- Policy NH 2 Species Protected by Law (whereby planning permission will only be granted for a development proposal that is not likely to harm a European protected species); and
- Policy NH 5 Habitats, Species or Features of Natural Heritage Importance (whereby planning permission will only be granted for a development proposal which is not likely to result in the unacceptable adverse impact or damage to known priority species).

## 3. Methods

### 3.1 Bat roost potential

During daylight hours, all buildings were assessed from ground level for potential roost features. An external inspection of the structures was carried out. In the wider site, care was taken to note other features suitable for use by bats such as trees, flight lines and foraging areas. Bats can also roost in less obvious places such as under ivy, under loose tree bark and in bat or bird boxes in the vicinity of buildings.

External signs that bats are using a tree or a building as a roost site include:

- Suitable entry points in buildings/trees etc.;
- Bat droppings: black droppings, 5-10mm long that crumble to a fine dust when crushed and may be located on the ground or stuck to walls;
- Staining: Secretions from bat fur can cause oily brown stains in the vicinity of roost entrances;
- Urine stains below the entrance to the roost;
- Audible squeaking from within the roost site;
- Large roost sites may produce an odour; and,
- Flies around the entrance attracted by the smell of bat droppings.

The results were used to grade the buildings as having Negligible, Low, Moderate, or High or bat roosting potential in accordance with Bat Conservation Trust guidelines (Collins, 2016).

### 3.2 Field survey

Emergence and re-entry bat surveys were carried out following standard methodology in accordance with Northern Ireland Environment Agency (NIEA) Specific Requirements (NIEA, 2014) and recommendations and good practice as highlighted in Bat Surveys: Good Practice Guidelines (3rd Edition), produced by the Bat Conservation Trust (Collins, 2016).

Dusk emergence and pre-dawn re-entry surveys were conducted by experienced ecologists Dr. Paul Lynas, Dr. Eleanor Ballard, Conor Reid, Jenny Jones, and Magdalena Kraska, with additional assistance provided by Environmental Scientist Michael Gillespie. Four surveyors were present during any one survey event.

Following Collins (2016) dusk emergence surveys commence 15 minutes prior to sunset and end 1.5 to two hours after sunset (the latter if activity levels are high), whilst dawn re-entry surveys commence 1.5 to two hours before sunrise, ending at sunrise, or 15 minutes after, if bats are still active. To ensure robust survey, AECOM ecologists carried out all dusk and pre-dawn surveys for a minimum of two hours after sunset and two hours before sunrise respectively.

Surveyors positioned themselves with clear views of potential roosting locations prior to dusk / dawn (as appropriate). The buildings were watched carefully and once any bats emerged or re-entered, the surveyors could pinpoint the roost location, identifying and counting the number of bats emerging/re-entering, where light conditions permitted. Bat detectors were also employed as a means of recording bat echolocation calls and identifying the bat species present. Bat activity was also noted during emergence/re-entry surveys. Surveyors listened for bats using detectors and on hearing a bat, they made an attempt to identify species, flight direction, height, and bat behaviour.

### 3.3 Data collection and analysis

All surveys were digitally recorded. Equipment used for surveys included BatBox Duet ultrasonic detectors recording in frequency division onto Roland R-05 recorders and Zoom Handy H2 digital recorders, a Petterson D240x detector and BatBox Baton XD detectors recording in time expansion onto Roland R-05 recorders. Weather details were recorded using a standard thermometer and descriptions of other conditions were recorded subjectively.

All survey data was initially recorded onto survey maps in the field before being digitised and transferred into GIS information using MapInfo, prior to being transferred to a Computer Aided Design (CAD) system to enable high quality drawings to be produced. Data collected during surveys were stored and subsequently analysed using BatSound specialist software, to identify any bats not detected in the field by the surveyors and to confirm species identifications made in the field.

### 3.4 Limitations

NIEA bat specifications require that surveys are conducted between May – September, and advise that at least one of these should be conducted between June and July if buildings are on site. Collins (2016) recommends that emergence/re-entry survey for maternity or summer roosts be between May and August stating that “August is particularly good for maximum counts of both adults and juveniles”. For buildings of “Low roost suitability” surveys are recommended between May to August. It is also recommended that surveys are spaced at least two weeks apart. Additionally the Bat Conservation Trust (BCT) guidelines state that “an ecologist should use their professional judgement to design the most appropriate survey regime”.

In this instance, the survey effort is proportionate to the site and was guided by the experience of the lead bat surveyor. The surveys are in line with recognised guidance (Collins 2016). Whilst surveys were conducted toward the second half of the survey season, there was a period of six weeks between surveys and the early August survey should have been sufficient to identify a potential maternity roost, had such a colony been present, in the sub optimal structures.

No other constraints were identified on site to limit the findings of this report.

## 4. Results

### 4.1 Bat roost potential

Bat roost potential surveys were carried out on all existing buildings. No evidence of roosting bats was found during the bat roost potential assessment.

A summary of the evidence recorded in relation to the bat roost potential of buildings is presented in Table 4.1 to Table 4.3.

**Table 4.1 Summary of bat roost potential evidence.**

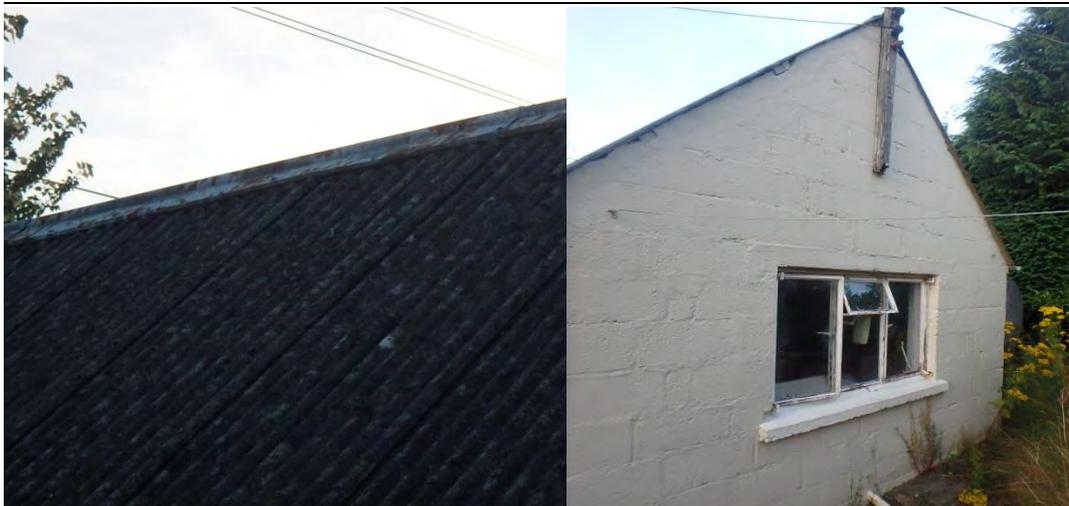
Building reference	Description	Potential roosting/access features	Bat evidence	Roost suitability rating
House	The house is a single storey, concrete rendered dwelling with a mostly pitched slate roof. The structure is of various ages. Evidence by the thickness of the walls in some places it is considered likely that at least part of the structure is pre 20 <sup>th</sup> Century. Approximately 25% of the roof to the back of the house is flat and felted, possibly comprising a relatively recent extension. PVC soffits and fascia boards are present, some with small gaps. The window frames are PVC and are well sealed and in good condition, as are the concrete sills. A house martin nest is located on the apex at the front of the house. An internal inspection was not conducted.	There are a number of potential access points within the roof, both under roof tiles and the fascia boards. However most of these gaps were covered in cobwebs.	Small number of bat droppings among bird droppings on window sill on western gable wall.	Moderate.





**Table 4.2 Summary of bat roost potential evidence.**

Building reference	Description	Potential roosting/access features	Bat evidence	Roost suitability rating
Garage	<p>The house is attached to the garage by a carport. The garage is a single storey, concrete rendered building with a pitched asbestos roof. The single glazed windows have wooden frames, some of which are rotting and have some gaps. They were not completely sealed or fitted. Several garage windows were open at the time of survey. The windows have concrete sills which are well sealed and in good condition. The garage door comprises double wooden doors which are rotting. The internal space was visible. There are no cavity walls and the ceiling has boards, potentially creating a void in the roof.</p>	<p>There are potential access features across the garage. There are gaps around the window frames and also at the double doors where there is rot. Windows left open also can provide access. However most of the gaps were covered in cobwebs.</p>	<p>No evidence identified despite potential access.</p>	<p>Low.</p>





**Table 4.3 Summary of bat roost potential evidence.**

Building reference	Description	Potential roosting/access features	Bat evidence	Roost suitability rating
Outbuildings	<p>There are three outbuildings to the back of the property. All are of concrete block construction with corrugated asbestos roofs. The roofs are a mixture of steeply pitched and flat. All of them are open structures. They have single glazed windows that were either left open at the time of survey or broken. Each building had ceiling boards on the inside, creating roof voids. These voids were visible and were considered unsuitable to host bat roosts due to the open nature of the voids. Numerous bird nests were noted within the buildings.</p>	<p>The structures are all completely open and would be fully accessible to bats. Some gaps exist in the brickwork of the buildings.</p>	<p>No evidence identified despite potential access points.</p>	Low





## 4.2 Survey coverage

Two dusk emergence and one pre-dawn re-entry survey were conducted throughout the site during suitable weather conditions for bat survey. One dusk survey and the pre-dawn survey were conducted within the same 24 hour period. During all surveys four surveyors were positioned around the buildings. This configuration allowed all parts of the existing buildings to be simultaneously monitored and surveyors to record the bats in the vicinity of the buildings. The positions of the surveyors are indicatively marked in Figure 1. Weather conditions and sunset/sunrise times are presented in Table 4.4.

**Table 4.4 Weather recorded during bat surveys.**

Time	Temperature (°C)	Cloud cover (%)	Wind description	Precipitation
<b>15.08.2016 (sunset 20:58)</b>				
Start: 20:45	12	90	Gentle breeze	N/A
End: 23:00	11	50	Gentle breeze	N/A
<b>26.09.2016 (sunrise 07:19)</b>				
Start: 5:19	9	90	Still	N/A
End: 07:20	8	100	Still	N/A
<b>26.09.2016 (sunset 19:15)</b>				
Start: 19:00	15	30	Still	N/A
End: 21:15	11	10	Still	N/A

### 4.3 Bat survey results

Two bat roosts entrances of three species were identified during surveys. Roost locations are indicatively marked on Figure 1.

During the August dusk survey a bat roost (RL01) was identified under the ridge tile on the western gable apex. Four Leisler's bats were observed emerging from this location Photograph 1a and 1b. The first bat did not echolocate and emerged 24 minutes after sunset. This falls around the median emergence time for the species, and the bat was observed to be large. The last bat emerged approximately one hour after sunset.

During the September dusk survey, three Leisler's bats were observed emerging from this roost. The first two bats emerged approximately 23 minutes after sunset. The third bat emerged approximately one hour after sunset. Additionally, a common pipistrelle was observed emerging approximately 47 minutes after sunset from the same exit point.

No bats were observed re-entering this roost during the September pre-dawn survey.

#### **Photograph 1a and 1b Location of bat roost exit point on western gable apex.**



A second roost (RL02) within the southern gable apex was identified during the August dusk survey (Photograph 2). Six bats were observed emerging from this roost. The first bat to emerge did not echolocate and emerged 39 minutes after sunset, around the median time for pipistrelle bats (Table 2.1). The following five bats emerged minutes later and were identified by detector as soprano pipistrelle. No other bats were observed emerging from this roost.

No bats were observed emerging from this roost during the September dusk survey, and no bats were observed re-entering during the September pre-dawn survey.

**Photograph 2 Location of bat roost exit point on southern gable apex.**



Bat activity was noted from all surveyor positions. A total of 219 passes were recorded across the three surveys (N.B. this does not necessarily equate to 219 individual bats. Due to the small size of the site, some passes may be duplicates and the same bat could have been detected by multiple surveyors). A full breakdown of activity is presented in Appendix A (Table A1). A summary is provided in Table 4.5. The main locations of bat activity are shown in Figure 1.

**Table 4.5 Bat species and their activity at 152 Trew Mount Road.**

Species	Total passes	Location and activity
Common pipistrelle	27	Recorded during the August and September dusk surveys, but not during the pre-dawn. Used the site predominantly for commuting but was also recorded foraging. One roosting bat observed.
Soprano pipistrelle	107	The most commonly encountered bat. Recorded during the August and September dusk surveys, but not during the pre-dawn. In addition to roosting within the house, this species used the site predominantly for commuting was also recorded foraging during dusk surveys. Social calls were detected during the September dusk survey.
Nathusius' pipistrelle	26	Recorded during the August dusk survey and the September pre-dawn. Primarily observed commuting across the site, though some foraging en route was recorded.
Leisler's bat	40	The second most encountered bat, recorded during the August and September dusk surveys, but not during the pre-dawn. In addition to roosting within the house, this species used the site predominantly for

commuting. Some social calls were detected during the September dusk survey.

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Unidentified Myotis	2	Two unidentified myotis bats were recorded during the September dusk survey. The passes were brief and therefore could not be identified to species level. Both bats commuted through the site.
Unidentified pipistrelle	17	These individuals were not identified to species level. This was either because the recorded calls were too faint to positively identify them, or because they were recorded alongside other bats and may have shifted their peak frequency to outside of their known average. One of these bats did not echolocate when emerging from a roost but were considered to be of the pipistrelle genus due to their size and emergence time.

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## 5. Discussion and Mitigation

### 5.1 Discussion of results

Bat emergence/re-entry surveys were conducted on all buildings at 152 Trew Mount Road during August and September 2016. Two roosts locations of at least three species were identified within the residential building within the site. Leisler's bat and one common pipistrelle were observed emerging from RL01 during both dusk surveys, but were not observed returning during the pre-dawn survey. Soprano pipistrelles and one unidentified pipistrelle were observed emerging from RL02 during the August dusk survey. No other emergence or re-entry was observed at this roost in September. It is considered likely that these roosts are small, transient roosts, used on an intermittent basis by a small number of non-breeding bats. These roosts will be lost as a result of the development.

Emerging bats leave the site and head immediately to the south and the west, while the majority of bat activity recorded were bats using the linear features to traverse the wider landscape.

### 5.2 Licence application

As these two roosts will require removal, a European Protected Species Licence must be applied for from NIEA (now known as Natural Environment Division (NED)). This licence must be in place before any activities commence to ensure that the works proceed in line with Northern Irish and EU legislation. Bat surveys are valid for up to one year from the date of the last survey. Therefore these surveys are valid until 26 September 2017. If the house is to be demolished after this date, then more bat surveys and an updated report will be required. Following Bat Conservation Trust advice, if bats are found during demolition, then works should stop immediately and the local Statutory Nature Conservation Organisation (i.e. NED) should be contacted.

### 5.3 Mitigation

Bats have previously been encountered on the substation site. There are now five confirmed roosts within the substation site: two identified in 2013, one identified in 2015, and two identified in 2016. The substation site has previously been assessed to have negligible conservation value, and the impact associated with the development of the substation is considered to be of low magnitude due to the amount of similar habitat in the surrounding areas.

Previously prescribed mitigation for bats for the substation area comprises:

- A dusk and dawn bat survey will be carried out at potential roosts immediately prior to demolition/felling. If bats are found, work will be suspended until consultation with NIEA.
- If bats are found after/during demolition / felling work must be stopped until consultation with NIEA.
- Felling of potential roosting trees will be carried out in the presence of a licensed bat worker following best practice guidelines.
- 8 new bat boxes provided to mitigate for loss of potential tree roosts.
- Hedgerow replacement to compensate for loss of foraging habitat.

To mitigate for the loss of these two newly identified roosts, a further two bat boxes should be erected within the vicinity of the site. The location of these bat boxes should be agreed with NED.

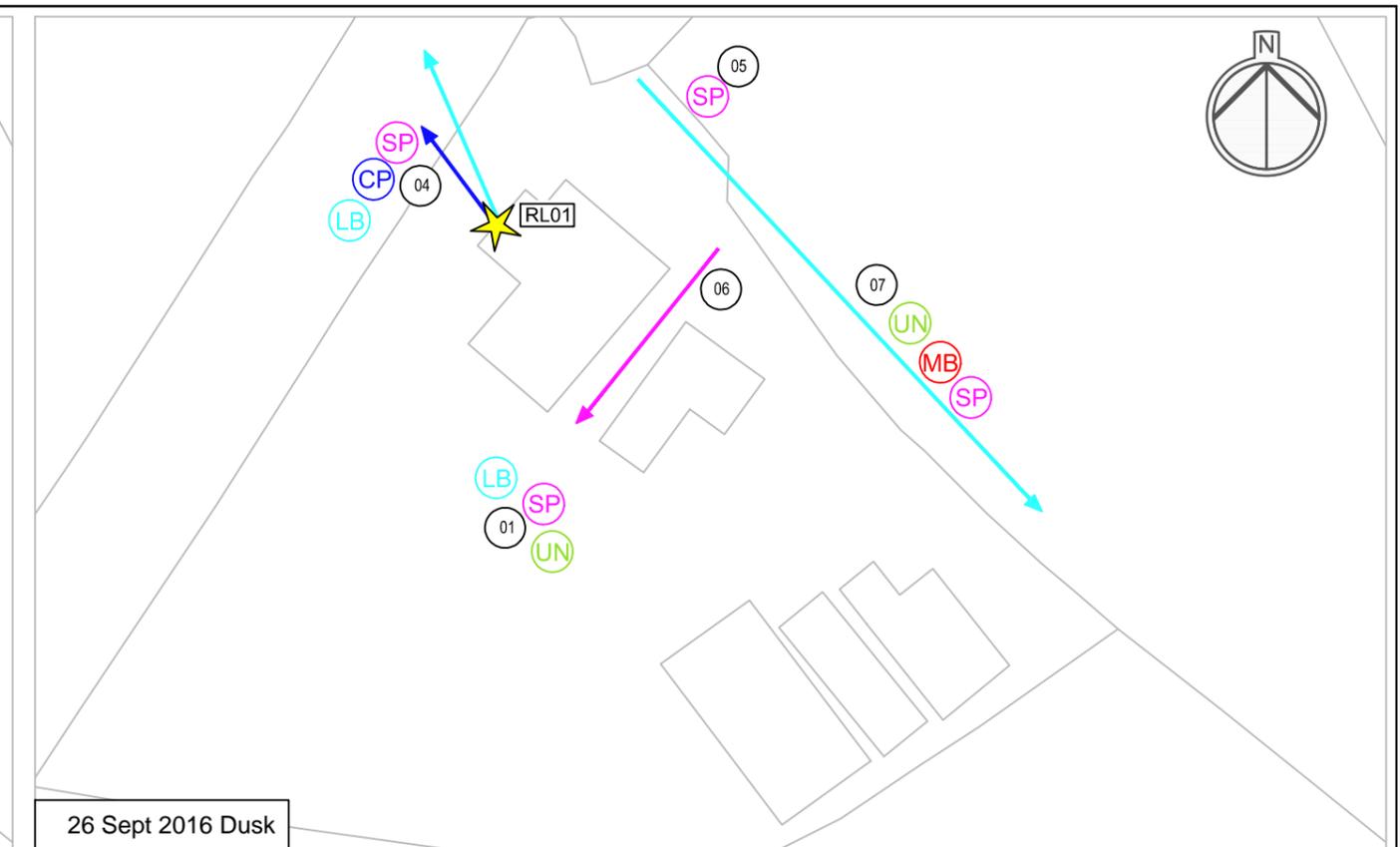
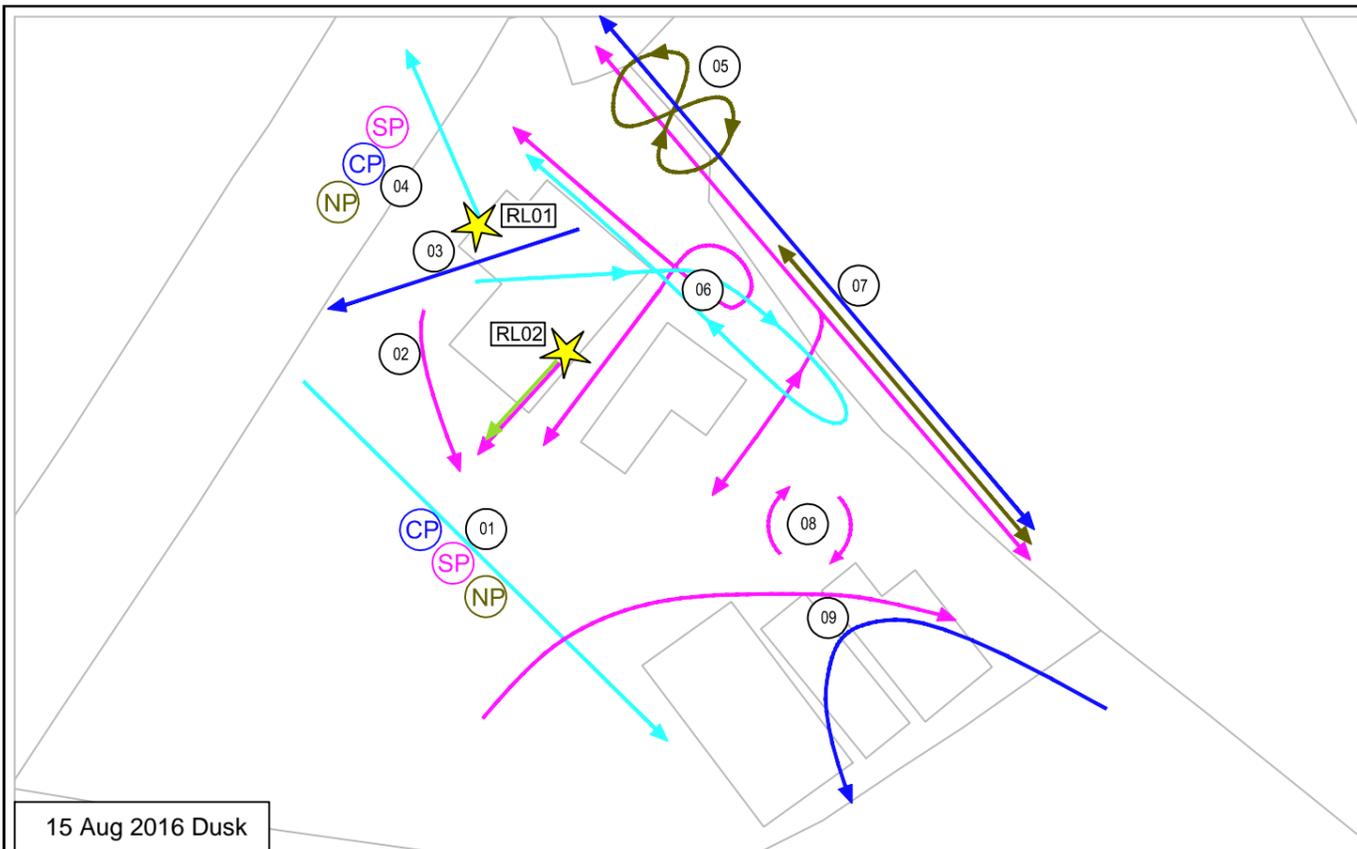
Bat boxes should be erected as soon as possible, prior to exclusion and works commencing on the site. Bat boxes should be positioned to face south, south east, or south west and at heights no less than 4m above ground level. Suitably experienced ecologists should oversee the installation of the boxes. All personnel should wear gloves to reduce transmission of human pheromones, which may reduce or delay uptake of boxes by bats. Bat boxes are available commercially from a variety of suitable outlets.

Additionally, due to the presence of numerous bird nests within the outbuildings and on the main house, it is advised these buildings should be demolished outside of the breeding season (October – February inclusive).

## 6. References

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## Figures



**KEY**

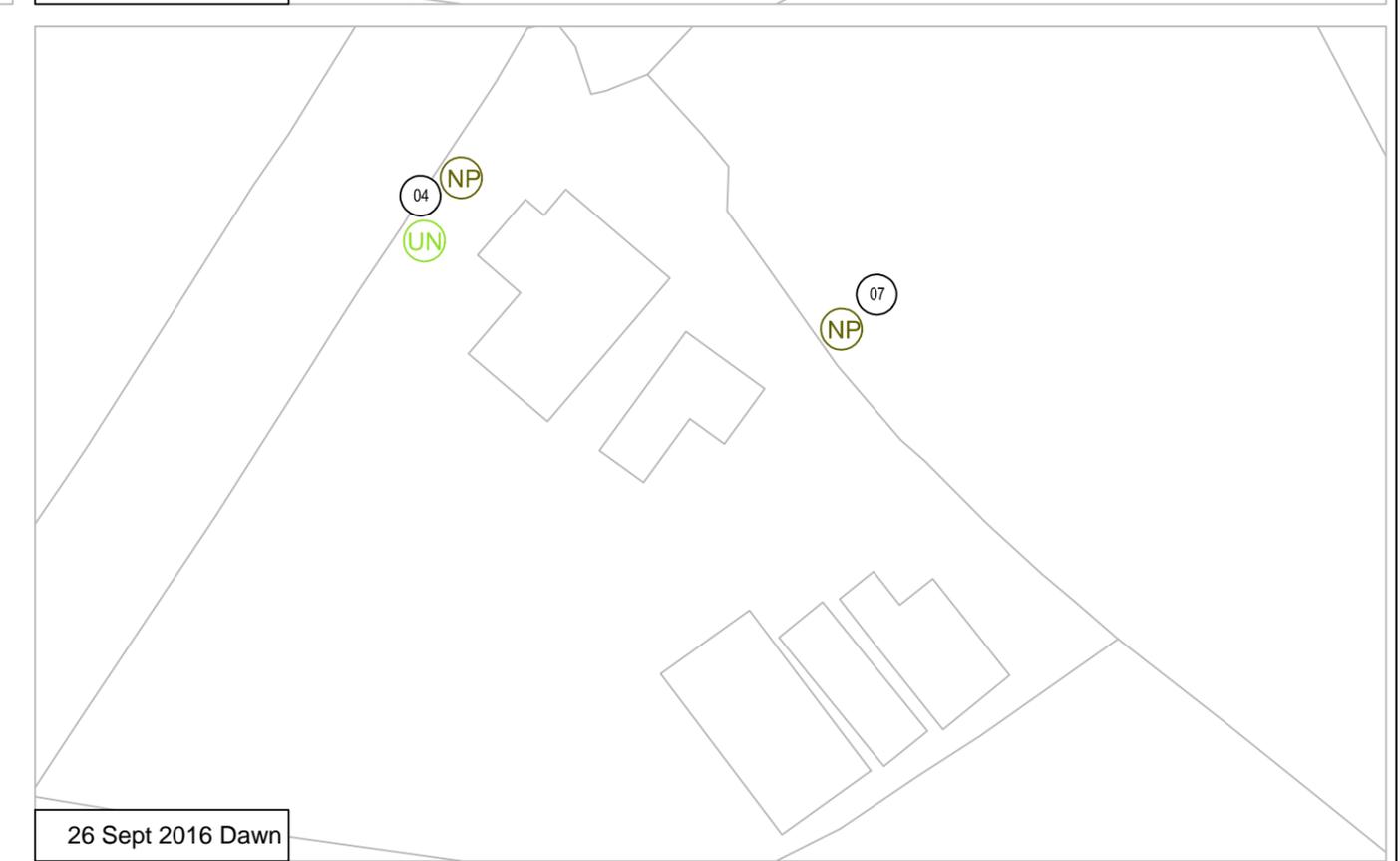
**BAT EVIDENCE:**

- Common Pipistrelle
- Soprano Pipistrelle
- Leisler's Bat
- Unspecified Pipistrelle
- Nathusius' Pipistrelle
- Myotis Bat

RL01 Bat Roost Location with Reference Number (number refers to the Report)

Bat heard not seen where flight direction was unknown (marked as colour that corresponds to appropriate bat species)

Bat Recording Location (number refers to table in the Report)



<p>Project Title</p> <p style="text-align: center;"><b>NS Interconnector</b></p>	<p>Drawing Title</p> <p style="text-align: center;"><b>Bat Survey Results</b> 15 August &amp; 26 September 2016</p>		<p>This document has been prepared in accordance with the scope of AECOM' appointment with its client and is subject to the terms of that appointment. AECOM accepts no liability for any use of this document other than by its client and only for the purposes for which it was prepared and provided. Only written dimensions shall be used. © AECOM Infrastructure &amp; Environment UK Limited</p>	<p>AECOM Infrastructure &amp; Environment UK Limited Beechill House Beechill Road Belfast BT8 7RP T: +44 (0)28 9070 5111 www.aecom.com</p> <p style="text-align: right;"><b>AECOM</b></p>
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## Appendix A Bat activity

**Table A1 Bat activity across all surveys at 152 Trew Mount Road.**

Date	Time	Species	Frequency (kHz)	Activity	Count	Location and notes	Location reference
15.08.2016	21:19:00	Leisler's bat	23	Commuting	1	Heard but not seen	1
15.08.2016	21:22:00	Leisler's bat		Emergence	1	Emerged from western gable apex. Didn't echolocate	RL01
15.08.2016	21:26:39	Leisler's bat	23	Commuting	1	At height from roadside to western boundary	1
15.08.2016	21:29:00	Leisler's bat	21	Commuting	1	Flying at height from road over western boundary	1
15.08.2016	21:30:09	Soprano pipistrelle	57	Commuting	1	Flew from eastern boundary to western side of barns	7
15.08.2016	21:34:00	Leisler's bat		Emergence	2	Emerged from western gable apex. Didn't echolocate	RL01
15.08.2016	21:35:40	Soprano pipistrelle	58	Commuting	1	Faintly heard but not seen	4
15.08.2016	21:37:00	Pipistrellus sp.		Emergence	1	Not echolocating, fast straight pass.	RL02
15.08.2016	21:37:45	Leisler's bat	23	Commuting	1	From western boundary to barns	1
15.08.2016	21:37:52	Soprano pipistrelle	56	Commuting	1	Flew above house from west, toward barn and then down driveway toward road	6
15.08.2016	21:37:57	Soprano pipistrelle	54	Commuting	2	From western boundary to barns	7
15.08.2016	21:38:00	Soprano pipistrelle	53	Emergence	3	Emergence, fast straight flight straight over fence to west	RL02
15.08.2016	21:38:45	Leisler's bat	23	Commuting	1	Flew from front of house, over house toward barns	6
15.08.2016	21:39:00	Soprano pipistrelle	58	Emergence	2	Emergence, fast straight flight straight over fence to west	RL02
15.08.2016	21:39:00	Leisler's bat	21	Commuting	1	Heard but not seen	6
15.08.2016	21:39:11	Leisler's bat	23	Commuting	1	Flew at height from western to northern boundary	6
15.08.2016	21:39:21	Leisler's bat	24	Commuting	1	Flew around back of garage and back down driveway toward road	6
15.08.2016	21:40:33	Soprano pipistrelle	58	Commuting	1	Flew from gate, across front of house and over western boundary	2
15.08.2016	21:41:30	Soprano pipistrelle	58	Foraging	3	From western boundary to barns, very quiet	9
15.08.2016	21:42:26	Soprano pipistrelle	58	Foraging	1	Flew along eastern boundary	7
15.08.2016	21:43:00	Soprano pipistrelle	57	Commuting	1	Flew from front of house to the west over fence	2
15.08.2016	21:43:23	Common pipistrelle	43	Commuting	1	Flew from eastern boundary to front of house	3

15.08.2016	21:44:00	Soprano pipistrelle	52	Commuting	1	Flew along eastern boundary	7
15.08.2016	21:44:50	Soprano pipistrelle	58	Commuting	1	Very faint, from western boundary to house and barn and then back across western boundary	7
15.08.2016	21:44:56	Soprano pipistrelle	54	Commuting and foraging	2	Chasing each other at front of house	7
15.08.2016	21:45:51	Soprano pipistrelle	54	Commuting	2	One flew from gate to western boundary, and other flew in front of house	7
15.08.2016	21:46:00	Common pipistrelle	43	Commuting	1	Flew from eastern side of house to road at front	3
15.08.2016	21:46:19	Soprano pipistrelle	58	Foraging	1	Flew around barns	8
15.08.2016	21:47:00	Soprano pipistrelle	53	Commuting	2	Flew from front of house to the west over fence	2
15.08.2016	21:47:19	Soprano pipistrelle	60	Commuting and foraging	1	Flew up the driveway toward barns	7
15.08.2016	21:47:37	Soprano pipistrelle	57	Commuting	1	Flew from gate along driveway to house and then back down	7
15.08.2016	21:47:47	Common pipistrelle	43	Commuting	1	Flew from behind barns and around	9
15.08.2016	21:48:46	Soprano pipistrelle	57	Commuting	1	Heard but not seen	4
15.08.2016	21:48:46	Soprano pipistrelle	56	Commuting	1	Flew northern hedgerow	7
15.08.2016	21:49:36	Soprano pipistrelle	59	Commuting	1	Along eastern boundary near barns	7
15.08.2016	21:51:02	Soprano pipistrelle	56	Commuting	1	Flew from gate toward barns	7
15.08.2016	21:52:28	Pipistrellus sp.	40	Commuting	1	Briefly heard but not seen	7
15.08.2016	21:52:39	Soprano pipistrelle	59	Commuting	1	Heard but not seen	7
15.08.2016	21:53:22	Soprano pipistrelle	55	Commuting	1	Heard but not seen	4
15.08.2016	21:54:09	Nathusius' pipistrelle	39	Commuting	1	Flew up the driveway toward barns	7
15.08.2016	21:55:15	Soprano pipistrelle	54	Commuting	1	Flew along driveway	7
15.08.2016	21:55:37	Nathusius' pipistrelle	39	Foraging	1	Foraging along driveway	5
15.08.2016	21:56:00	Nathusius' pipistrelle	38	Commuting	2	Heard but not seen	1
15.08.2016	21:56:43	Soprano pipistrelle	55	Foraging	2	One bat foraging in barn, one bat flew along driveway	7
15.08.2016	21:56:45	Soprano pipistrelle	55	Commuting	1	Flew from gate toward barns	7
15.08.2016	21:57:56	Soprano pipistrelle	55	Commuting	1	Flew from west between house and barn looped and flew back	6
15.08.2016	21:58:00	Leisler's bat	21	Commuting	1	Heard but not seen	1

15.08.2016	21:59:00	Soprano pipistrelle	54	Commuting	1	Flew between the house and garage and over fence to west	6
15.08.2016	22:01:00	Leisler's bat		Emergence	1	Emerged from western gable apex. Didn't echolocate	RL01
15.08.2016	22:01:22	Soprano pipistrelle	56	Commuting	1	Heard but not seen	4
15.08.2016	22:01:36	Soprano pipistrelle	53	Commuting	2	Flew along driveway	7
15.08.2016	22:01:49	Soprano pipistrelle	53	Commuting	1	Flew from gate toward barns	7
15.08.2016	22:05:31	Soprano pipistrelle	53	Foraging	1	Heard but not seen	7
15.08.2016	22:07:32	Soprano pipistrelle	51	Commuting	1	Heard but not seen	7
15.08.2016	22:08:57	Soprano pipistrelle	53	Commuting	1	Heard but not seen	7
15.08.2016	22:09:00	Soprano pipistrelle	54	Commuting	1	Heard but not seen	1
15.08.2016	22:09:09	Common pipistrelle	42	Commuting	1	Flew from gate towards back of house then flew to western boundary	7
15.08.2016	22:09:36	Soprano pipistrelle	57	Commuting	1	Flew along driveway	7
15.08.2016	22:10:37	Common pipistrelle	49	Commuting	1	Heard but not seen	4
15.08.2016	22:10:52	Soprano pipistrelle	56	Commuting	1	Heard but not seen	7
15.08.2016	22:12:18	Nathusius' pipistrelle	39	Commuting	1	Very faintly heard but not seen	5
15.08.2016	22:13:00	Nathusius' pipistrelle	38	Commuting	1	Very faintly heard but not seen	1
15.08.2016	22:13:20	Common pipistrelle	48	Commuting	1	Heard but not seen	4
15.08.2016	22:14:07	Soprano pipistrelle	57	Foraging	1	Heard but not seen	7
15.08.2016	22:14:18	Soprano pipistrelle	58	Commuting	1	Heard but not seen	7
15.08.2016	22:14:30	Soprano pipistrelle	52	Commuting	1	Heard but not seen	7
15.08.2016	22:15:33	Soprano pipistrelle	58	Commuting	1	Flying up and down driveway	7
15.08.2016	22:17:03	Soprano pipistrelle	52	Commuting	1	Heard but not seen	4
15.08.2016	22:18:22	Common pipistrelle	48	Commuting	1	Heard but not seen	7
15.08.2016	22:19:14	Nathusius' pipistrelle	37	Commuting	1	Heard but not seen	7
15.08.2016	22:19:32	Pipistrellus sp.	50	Commuting	1	Briefly heard but not seen	7
15.08.2016	22:19:59	Soprano pipistrelle	52	Foraging	1	Foraging along driveway and hedgerow	7
15.08.2016	22:20:00	Pipistrellus sp.	50	Commuting	1	Heard but not seen	4

15.08.2016	22:20:34	Common pipistrelle	44	Commuting	1	Heard but not seen	7
15.08.2016	22:20:42	Common pipistrelle	46	Commuting	1	Heard but not seen	7
15.08.2016	22:20:56	Nathusius' pipistrelle	38	Commuting	1	Very faintly heard but not seen	7
15.08.2016	22:21:00	Common pipistrelle	45	Foraging	1	Heard but not seen	1
15.08.2016	22:21:22	Pipistrellus sp.	50	Commuting	1	Briefly heard but not seen	7
15.08.2016	22:21:59	Common pipistrelle	45	Commuting	1	Heard but not seen	7
15.08.2016	22:22:00	Common pipistrelle	45	Foraging	1	Very faintly heard but not seen	1
15.08.2016	22:22:53	Pipistrellus sp.	50	Commuting	1	Very faintly heard but not seen	7
15.08.2016	22:25:49	Soprano pipistrelle	52	Commuting	1	Heard but not seen	4
15.08.2016	22:26:43	Soprano pipistrelle	53	Commuting	1	With CR at front of house	7
15.08.2016	22:29:00	Soprano pipistrelle	52	Foraging	1	Heard but not seen, quick pass	1
15.08.2016	22:30:18	Soprano pipistrelle	53	Commuting	1	Heard but not seen	7
15.08.2016	22:30:57	Soprano pipistrelle	52	Commuting	1	Heard but not seen	7
15.08.2016	22:31:21	Common pipistrelle	48	Commuting	1	Heard but not seen	4
15.08.2016	22:32:14	Soprano pipistrelle	52	Commuting	1	Heard but not seen	7
15.08.2016	22:33:10	Leisler's bat	21	Commuting	1	Heard but not seen	1
15.08.2016	22:33:16	Nathusius' pipistrelle	38	Commuting	1	Heard but not seen	4
15.08.2016	22:33:54	Nathusius' pipistrelle	39	Commuting	1	Heard but not seen	7
15.08.2016	22:34:21	Nathusius' pipistrelle	39	Commuting	1	Heard but not seen	7
15.08.2016	22:34:22	Common pipistrelle	49	Commuting	1	Faintly heard but not seen	7
15.08.2016	22:35:24	Soprano pipistrelle	53	Commuting	1	Heard but not seen	7
15.08.2016	22:35:46	Soprano pipistrelle	53	Commuting	1	Heard but not seen	7
15.08.2016	22:36:00	Soprano pipistrelle	52	Commuting	1	Heard but not seen, quick pass	1
15.08.2016	22:37:00	Nathusius' pipistrelle	38	Commuting	1	Heard but not seen, quick pass	1
15.08.2016	22:37:20	Soprano pipistrelle	55	Commuting	1	Heard but not seen	7
15.08.2016	22:37:22	Soprano pipistrelle	55	Commuting	1	Heard but not seen	7

15.08.2016	22:37:33	Soprano pipistrelle	57	Commuting	1	Heard but not seen	7
15.08.2016	22:38:00	Soprano pipistrelle	53	Commuting	1	Heard but not seen	1
15.08.2016	22:39:26	Nathusius' pipistrelle	38	Commuting	1	Heard but not seen	7
15.08.2016	22:39:38	Nathusius' pipistrelle	38	Commuting	1	Heard but not seen	7
15.08.2016	22:39:45	Soprano pipistrelle	53	Commuting	1	Heard but not seen	7
15.08.2016	22:39:59	Leisler's bat	24	Commuting	1	Faintly heard but not seen	6
15.08.2016	22:40:33	Soprano pipistrelle	53	Commuting	1	Heard but not seen	7
15.08.2016	22:40:44	Pipistrellus sp.	50	Commuting	1	Faintly heard but not seen	7
15.08.2016	22:40:45	Soprano pipistrelle	57	Commuting	1	Heard but not seen	7
15.08.2016	22:41:55	Soprano pipistrelle	56	Commuting	1	Heard but not seen	7
15.08.2016	22:42:00	Soprano pipistrelle	51	Commuting	1	Heard but not seen	6
15.08.2016	22:42:54	Soprano pipistrelle	53	Commuting	1	Heard but not seen	6
15.08.2016	22:43:00	Soprano pipistrelle	53	Commuting	1	Heard but not seen	6
15.08.2016	22:44:00	Soprano pipistrelle	52	Commuting	1	Heard but not seen	7
15.08.2016	22:44:16	Soprano pipistrelle	55	Commuting	1	Heard but not seen	7
15.08.2016	22:44:26	Nathusius' pipistrelle	39	Commuting	1	Heard but not seen	4
15.08.2016	22:44:42	Soprano pipistrelle	51	Commuting	1	Heard but not seen	7
15.08.2016	22:45:00	Pipistrellus sp.	50	Commuting	1	Very faintly heard but not seen	1
15.08.2016	22:46:10	Nathusius' pipistrelle	39	Commuting	1	Heard but not seen	7
15.08.2016	22:46:43	Nathusius' pipistrelle	38	Commuting	1	Along northern boundary	7
15.08.2016	22:46:56	Nathusius' pipistrelle	38	Commuting	1	Heard but not seen	7
15.08.2016	22:47:00	Soprano pipistrelle	53	Commuting	2	Heard but not seen	1
15.08.2016	22:47:00	Nathusius' pipistrelle	38	Commuting	1	Heard but not seen	1
15.08.2016	22:47:22	Soprano pipistrelle	53	Commuting	1	Heard but not seen	
15.08.2016	22:48:24	Nathusius' pipistrelle	39	Commuting	1	Heard but not seen	7
15.08.2016	22:48:43	Common pipistrelle	48	Commuting	1	Heard but not seen	4

15.08.2016	22:50:10	Common pipistrelle	48	Commuting	1	Heard but not seen	7
15.08.2016	22:50:12	Soprano pipistrelle	54	Commuting	1	Heard but not seen	7
15.08.2016	22:50:37	Common pipistrelle	48	Commuting	1	Heard but not seen	4
15.08.2016	22:51:09	Soprano pipistrelle	53	Commuting	1	Heard but not seen	7
15.08.2016	22:51:12	Soprano pipistrelle	53	Commuting	1	Heard but not seen	7
15.08.2016	22:51:16	Leisler's bat	23	Commuting	1	Heard but not seen	1
15.08.2016	22:51:43	Soprano pipistrelle	55	Commuting	1	Heard but not seen	7
15.08.2016	22:51:49	Soprano pipistrelle	52	Commuting	1	Heard but not seen	7
15.08.2016	22:52:19	Nathusius' pipistrelle	39	Commuting	1	Heard but not seen	7
15.08.2016	22:52:53	Soprano pipistrelle	53	Commuting	1	Heard but not seen	7
15.08.2016	22:53:00	Common pipistrelle	48	Commuting	1	Very faintly heard but not seen	1
15.08.2016	22:53:00	Soprano pipistrelle	55	Commuting	1	Very faintly heard but not seen	1
15.08.2016	22:53:56	Soprano pipistrelle	52	Commuting	1	Heard but not seen	7
15.08.2016	22:54:14	Soprano pipistrelle	53	Commuting	1	Heard but not seen	7
15.08.2016	22:54:34	Leisler's bat	28	Commuting	1	Heard but not seen	1
15.08.2016	22:55:38	Soprano pipistrelle	52	Commuting	1	Heard but not seen	7
15.08.2016	22:55:46	Leisler's bat	28	Commuting	1	Heard but not seen	1
15.08.2016	22:55:50	Pipistrellus sp.	50	Commuting	1	Faintly heard but not seen	4
15.08.2016	22:57:00	Soprano pipistrelle	52	Commuting	1	Heard but not seen	1
15.08.2016	22:58:00	Leisler's bat	25	Commuting	1	Heard but not seen	1
15.08.2016	22:59:00	Pipistrellus sp.	51	Commuting	1	Very faintly heard but not seen	1
26.09.2016	06:04:54	Nathusius' pipistrelle	39	Foraging	1	Heard not seen	
26.09.2016	06:07:55	Nathusius' pipistrelle	39	Foraging	1	Heard not seen	
26.09.2016	06:13:40	Pipistrellus sp.		Commuting	1	Very faintly heard not seen	
26.09.2016	05:14:00	Nathusius' pipistrelle	39	Commuting	1	Very briefly heard not seen	
26.09.2016	06:17:12	Nathusius' pipistrelle	40	Commuting	1	Very briefly heard not seen	

26.09.2016	06:22:06	Nathusius' pipistrelle	40	Commuting	1	Heard not seen	
26.09.2016	19:37:34	Pipistrellus sp.		Commuting	1	Very faintly heard	7
26.09.2016	19:38:16	Leisler's bat	30	Emergence	1		RL01
26.09.2016	19:38:30	Leisler's bat	22	Emergence	1		RL01
26.09.2016	19:39:00	Leisler's bat	23	Commuting	1	Briefly heard not seen	1
26.09.2016	19:40:25	Leisler's bat	27	Commuting	1	Heard not seen	7
26.09.2016	19:41:48	Leisler's bat	21	Commuting	1	HNS	4
26.09.2016	19:48:46	Leisler's bat	22	Commuting	1	HNS	4
26.09.2016	19:49:13	Soprano pipistrelle	58	Commuting	1	Heard not seen	8
26.09.2016	19:52:52	Soprano pipistrelle	58	Commuting	1	From east to west past back of house	6
26.09.2016	20:00:04	Pipistrellus sp.	50	Commuting	1	HNS	4
26.09.2016	20:02:28	Common pipistrelle	46	Emergence	1		RL01
26.09.2016	20:02:35	Leisler's bat	27	Commuting	1	Very faintly heard not seen	4
26.09.2016	20:02:42	Leisler's bat	25	Commuting	1	Heard not seen	
26.09.2016	20:03:00	Leisler's bat	20	Commuting	1	Heard not seen	1
26.09.2016	20:03:06	Pipistrellus sp.		Social calls		HNS	4
26.09.2016	20:04:38	Leisler's bat	27	Commuting	1	HNS	4
26.09.2016	20:04:41	Leisler's bat	22	Commuting	1	Heard not seen	7
26.09.2016	20:05:00	Leisler's bat	24	Commuting	1	Heard not seen	7
26.09.2016	20:05:52	Leisler's bat	25	Commuting	1	Along eastern boundary	7
26.09.2016	20:09:37	Myotis sp.		Commuting	1	Flew toward road from outbuildings	7
26.09.2016	20:11:00	Leisler's bat	24	Commuting	1	HNS	4
26.09.2016	20:11:01	Leisler's bat	22	Commuting	1	HNS	4
26.09.2016	20:12:13	Myotis sp.		Commuting	1	Heard not seen	7
26.09.2016	20:12:19	Pipistrellus sp.	50	Commuting	1	Heard not seen	7
26.09.2016	20:12:51	Leisler's bat	23	Commuting	1	Heard not seen	7
26.09.2016	20:13:51	Leisler's bat	23	Commuting	1	HNS	4

26.09.2016	20:14:00	Leisler's bat	22	Commuting	1		1
26.09.2016	20:16:13	Leisler's bat	24	Commuting	1	Heard not seen	RL01
26.09.2016	20:16:58		30	Emergence	1		RL01
26.09.2016	20:17:00	Leisler's bat		Social calls		Heard not seen	1
26.09.2016	20:20:11	Soprano pipistrelle	54	Foraging	1	HNS	4
26.09.2016	20:23:21	Soprano pipistrelle	56	Commuting, social calls	1	HNS	4
26.09.2016	20:24:00	Soprano pipistrelle	55	Commuting, social calls	1	Heard not seen	1
26.09.2016	20:25:01	Pipistrellus sp.		Social calls	1	Heard not seen	7
26.09.2016	20:31:55	Pipistrellus sp.	50	Commuting	1	Heard not seen	7
26.09.2016	20:34:00	Soprano pipistrelle	54	Commuting, social calls	1	Heard not seen	1
26.09.2016	20:34:33	Soprano pipistrelle	55	Commuting, social calls	1	HNS	4
26.09.2016	20:37:00	Soprano pipistrelle	58	Commuting	1	Briefly heard not seen	1
26.09.2016	20:46:57	Leisler's bat	23	Commuting	1	HNS	4
26.09.2016	20:51:05	Leisler's bat	29	Commuting	1	Very briefly heard not seen	4
26.09.2016	20:54:53	Soprano pipistrelle	54	Commuting, social calls	1	Heard not seen	7
26.09.2016	20:58:27	Common pipistrelle	48	Commuting	1	HNS	4
26.09.2016	21:02:14	Soprano pipistrelle	52	Commuting	1	Heard not seen	7
26.09.2016	21:04:00	Pipistrellus sp.	50	Commuting	1	Faintly heard not seen	1
26.09.2016	21:04:00	Soprano pipistrelle	58	Foraging	1	Heard not seen	1
26.09.2016	21:04:11	Soprano pipistrelle	58	Foraging	1	HNS	5
26.09.2016	21:05:26	Soprano pipistrelle	52	Commuting	1	Heard not seen	5
26.09.2016	21:06:02	Soprano pipistrelle	58	Commuting	1	Heard not seen	5
26.09.2016	21:12:12	Soprano pipistrelle	59	Commuting, social calls	1	HNS	4
26.09.2016	21:13:03	Common pipistrelle	46	Commuting	1	Faintly heard not seen	4
26.09.2016	21:13:40	Common pipistrelle	46	Commuting	1	Faintly heard not seen	4
26.09.2016	21:14:00	Pipistrellus sp.		Social calls		Heard not seen	1
26.09.2016	21:14:36	Common	46	Commuting	1	Faintly heard not seen	4

		pipistrelle					
26.09.2016	21:15:17	Common pipistrelle	47	Commuting	1	Faintly heard not seen	4
26.09.2016	21:15:53	Common pipistrelle	46	Commuting	1	Faintly heard not seen	4
26.09.2016	21:16:15	Common pipistrelle	45	Commuting	1	Faintly heard not seen	4
26.09.2016	21:16:44	Common pipistrelle	45	Commuting	1	Faintly heard not seen	4

