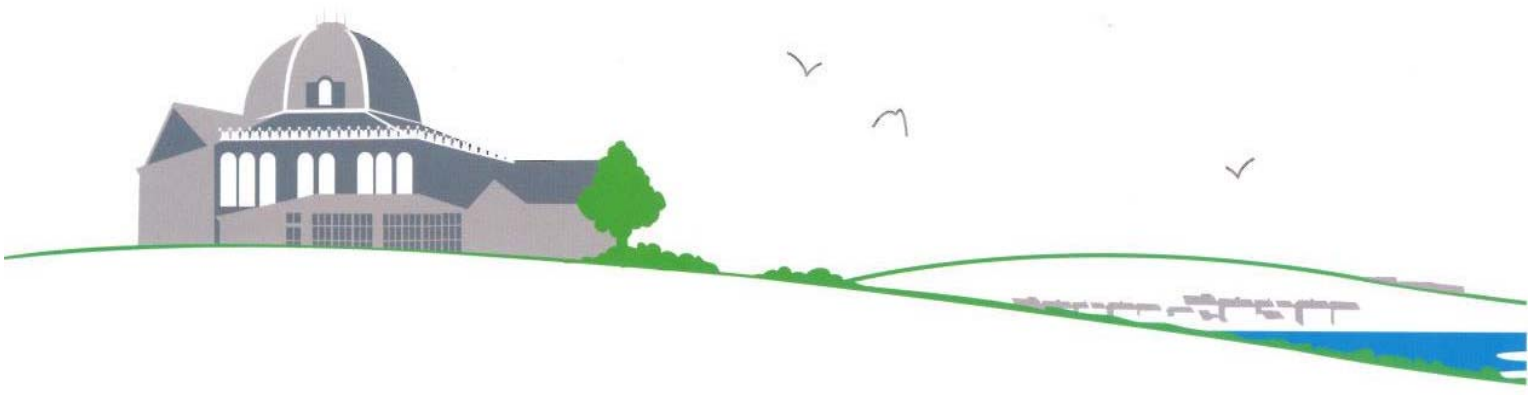
Penny Anderson Associates Ltd
CONSULTANT ECOLOGISTS

JAMES DARWENT ARCHITECTURE LTD

SUNART, ECCLES ROAD, WHALEY BRIDGE

BAT EMERGENCE AND RE-ENTRY SURVEY



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BAT EMERGENCE AND RE-ENTRY SURVEY

Penny Anderson Associates Limited
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August 2017

This project has been undertaken in accordance with PAA policies and procedures on quality assurance.

Signed:_____

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1. INTRODUCTION

Background

1.1 Penny Anderson Associates Ltd (PAA) was commissioned by James Darwent Architecture Ltd, on behalf of Mr and Mrs Evatt, to investigate potential usage by roosting bats of a house known as Sunart (hereafter referred to as 'the site').

1.2 A daytime inspection was carried out in May 2017 (reported separately (PAA 2017)) and the house was assessed as having high potential for use by roosting bats. As a follow up to that initial assessment, dusk emergence/dawn re-entry surveys were recommended, and that work is the subject of this report.

Site Description

1.3 The site is situated on Eccles Road, approximately 0.9km to the south east of the main urban area of Whaley Bridge. It is set within a garden with several mature trees and is surrounded on all sides by agricultural land, predominantly grassland, with dry stone walls along field boundaries and scattered broad-leaved trees.

Bat Biology

1.4 There are 17 species of native bats known to be resident (i.e. breed) in the British Isles. British bats feed entirely on insects and have developed a complex sonar system, known as echolocation, which enables them to find prey and navigate around their environment at night.

1.5 Habitat requirements vary widely, both on an individual and species level, although certain features, such as woodland, parkland, traditional pasture, marshes and areas of freshwater, are often focal points for foraging, as insects are plentiful in these areas (Mitchell-Jones 2004). Bats use linear features, such as rivers, hedgerows, roads and woodland edges, as landmarks in order to commute from one location to another (Schofield and Mitchell-Jones 2003).

1.6 Bats utilise different roosts at different times of the year. Between late October and March, bats hibernate; this requires an unexposed roost with a stable temperature, typically a cave, cellar or tunnel. Around March, the bats emerge and gradually move to their summer roosts, typically within man-made structures or suitable crevices in trees. During the spring and summer period female bats gather together at maternity roosts to give birth and rear their young. Most births occur between late June and mid-July, with the young able to fly within three to five weeks (Altringham 2003; Waters and Warren 2003). By the end of August, most of the young bats are independent and the colony begins to break up (Schofield and Mitchell-Jones 2003). Mating takes place between August and December, either at the winter hibernation site or at autumn breeding sites. The numbers of bats utilising these roosts can vary from single bats to hundreds of bats in a nursery colony or hibernation site (Altringham 2003).

Legislative Context

1.7 All wild species of bat are protected under the Wildlife and Countryside Act (WCA) 1981, which has also been amended by later legislation, including the Countryside and Rights of Way (CRoW) Act 2000 and this legislation is applicable to England and Wales.

1.8 Bat species are also listed under Annexes IIa and IVa of the EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora, also known as the 'Habitats Directive'.

Inclusion on Annex IVa means they are consequently identified as European Protected Species (EPS) and protected under the Conservation of Habitats and Species Regulations 2010.

1.9 Under this legislation it is an offence to kill or injure a bat, disturb a bat whilst it is roosting, and obstruct, damage or destroy a breeding site or resting place, whether the animal is in occupation or not. There are additional offences relating to possession, control and sale of a live or dead bat or part of such an animal.

1.10 In addition, seven native British bat species including the soprano pipistrelle (*Pipistrellus pygmaeus*) and the brown long-eared bat (*Plecotus auritus*), that are frequently found in buildings, are listed as a 'Priority Species' under the 2011 biodiversity strategy for England, Biodiversity 2020: A strategy for England's wildlife and ecosystem services, under the 2012 UK Post-2010 UK Biodiversity Framework. These Priority Species are also referred to as 'species of principal importance' for the conservation of biodiversity in England and Wales within Section 74 of the CRoW Act 2000, and Sections 41 (England) and 42 (Wales) of the Natural Environment and Rural Communities (NERC) Act 2006.

1.11 Section 11 of the National Planning Policy Framework (NPPF) states that the planning system should contribute to and enhance the natural and local environment by minimising impacts on biodiversity and providing net gains in biodiversity where possible. The NPPF also includes the requirement to contribute to the Government's commitment to halt the overall decline in biodiversity and to promote the reservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species populations, linked to national and local targets. Reference is made to Circular 06/2005 Biodiversity and Geological Conservation - Statutory Obligations and Their Impact within the Planning System in respect of statutory obligations for biodiversity and geodiversity conservation.

1.12 Local authorities in England are required to ensure that where significant harm resulting from development cannot be avoided (through locating on alternative sites with less harmful impacts), adequately mitigated or, as a last resort, compensated for, planning permission is refused. The commitment to preserving, restoring or enhancing biodiversity is further emphasised for England and Wales in Section 40 of the NERC Act 2006.

2. METHODS

Overview

2.1 Survey methodology followed current good practice guidelines published by The Bat Conservation Trust (Collins 2016) and all visits were undertaken within the appropriate season on nights with weather conditions considered to be suitable for bat survey.

2.2 The survey visits were led by licensed bat ecologists Helen Hamilton[1] MCIEEM[2] and Hazel Robson[3] MCIEEM. Both have extensive experience of bat surveys and therefore are appropriately qualified for this type of survey based on the CIEEM competency framework (CIEEM 2013). The survey team also included ecologists Victoria Burton ACIEEM[4] and Caroline Boffey and assistant ecologists Sam Hubbard, Rob Lamb and Rachel Whitaker, with four surveyors present for each visit.

Dusk Emergence/Dawn Re-entry Surveys

2.3 A total of two dusk emergence and one dawn re-entry surveys were carried out to confirm presence/likely absence of roosting bats and to highlight roost entrances and enable bat roost characterisation where roosts were confirmed.

2.4 Each survey lasted for approximately two hours, with emergence surveys commencing approximately 15 minutes prior to sunset and re-entry surveys concluding at approximately 15 minutes after sunrise to take in the most likely periods when bats would be observed at a roost site.

2.5 Surveyors were positioned at vantage points on each side of the building to observe any bats entering or exiting potential roost features. Each surveyor was equipped with a Batbox Duet bat detector to aid detection in the field and an Anabat SD1 to record bat calls and enable sonogram analysis to confirm identification of any species found to be roosting.

2.6 Weather conditions were recorded at the start and end of each survey. Temperature and humidity were measured using a hygro-thermometer (810-190 www.etiltd.com). Wind was estimated using the Beaufort Wind Force Scale, ranging from 0 calm to 5 moderate breeze (NB while the scale extends to force 12 hurricane, 6 or higher would be unsuitable conditions for survey). Cloud cover was estimated using the standard meteorological scale of oktas (eighths), where 0/8 is a completely clear sky and 8/8 is completely overcast.

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[1] *Natural England class licence registration number 2015-15940-CLS-CLS, survey level 2 (WML-CL18)*

[2] *Full member of Chartered Institute of Ecology and Environmental Management*

[3] *Natural England class licence registration number 2015-10504-CLS-CLS, survey level 2 (WML-CL18)*

[4] *Associate member of Chartered Institute of Ecology and Environmental Management*

2.7 An SM2 automated bat detector was placed within the loft above the original part of the house (where a bat dropping had been found during the daytime inspection) to monitor for calls of any bats flying inside. The detector was left *in situ* for a week during late June 2017.

Data Analysis

2.8 Recorded bat calls from each of the survey visits were analysed using specialist sound analysis software Analook W. Based on parameters such as peak frequency and call duration, each call was assigned to a particular bat species.

Limitations

2.9 Visual observation of bat activity is constrained by light levels. While surveyors may be able to see bats silhouetted against the sky, individuals flying against a background of dark buildings or trees are much more difficult to spot. The use of bat detectors to hear echolocation calls helps to ensure that activity is not missed; however, in low light conditions it is not always possible to ascertain details such as direction of flight.

2.10 Bat detectors have a range of approximately 20m. Some species such as noctule (*Nyctalus noctula*) have very loud echolocation calls that can travel over long distances, and therefore may be detected at greater range, whilst others such as brown long-eared bats typically have very quiet calls that may only be detected at fairly close range. The apparent absence of echolocation calls can be a useful identification feature in itself for this species and therefore this is not considered to be a constraint to the project.

2.11 The survey techniques, equipment and timings are consistent with current standards for bat survey (Collins 2016) and the site was fully accessible on each site visit, therefore the results are considered to provide a robust picture of bat activity at the site.

3. RESULTS

Overview

3.1 The survey results have confirmed that the house is used for roosting by three species of bats:

- Brown long-eared;
- Common pipistrelle (*Pipistrellus pipistrellus*); and
- Soprano pipistrelle.
- Sonograms illustrating the calls of bats seen entering or exiting roost are provided in Appendix 1. The locations of the roosts are highlighted on Figure 1 and photographs are provided in Appendix 2. The survey dates, times and weather conditions are presented in Table 1 below and more detailed descriptions of the results for each of the survey visits are provided under the individual sub-headings that follow.

Table 1 Dates and Weather Conditions of Emergence and Re-entry Surveys

Date	Survey Type	Start Time	Sunrise/ Sunset	End Time	Weather
21/06/2017	Dusk	2125	2142	2325	Dry and calm, temperature 25ºC dropping to 21ºC by the end. Relative humidity 56% increasing to 88%. Cloud cover 5/8 and clearing by the end of the survey.
07/07/2017	Dawn	0310	0450	0500	Dry and calm, temperature 15ºC dropping to 14ºC by the end. Relative humidity 62% throughout. Cloud cover 8/8 throughout. (Temperature on the preceding evening was well above 10ºC).
24/07/2017	Dusk	2100	2115	2235	Dry and calm, temperature 14.2ºC dropping to 11.6ºC by the end. Relative humidity 78% increasing to 99%. Cloud cover 8/8 reducing to 7/8 by the end.

Dusk Emergence Survey: 21st June 2017

3.2 At between approximately 20 and 30 minutes after sunset a total of four common pipistrelle bats were seen emerging from roosts beneath roof slates and ridge tiles, each bat from a separate roost feature.

3.3 A single common pipistrelle bat was also seen emerging from beneath the coping stones at the top of the wall on the small outbuilding at approximately 25 minutes after sunset.

3.4 Common pipistrelle bats were seen and heard frequently throughout the rest of the survey, foraging around the house and garden, with a maximum of two individuals seen together at any one time.

3.5 Brown long-eared bats were seen and heard from approximately 45 minutes after sunset and then occasionally during the remainder of the survey. None were observed emerging from roost but also these bats were not seen to have commuted into the site from elsewhere. A maximum of one individual was seen at any one time.

3.6 In summary, the following roost activity was observed:

- Five common pipistrelle bats using four separate roost features on the southern elevation of the house and 1 feature on the potting shed wall.

Dawn Re-entry Survey: 7th July 2017

3.7 Common pipistrelle and brown long-eared bats were seen and heard frequently during the survey, foraging in and around the garden.

3.8 At approximately 45 minutes before sunrise a brown long-eared bat was seen flying around and up to the dormer window on the western elevation before entering roost behind the bargeboard.

3.9 At approximately 40 minutes before sunrise a single bat was seen to enter roost at the top right of the gable end on the southern elevation. The bat entered directly with no sustained flying round the roost entrance beforehand and no echolocation calls were detected.

3.10 At approximately 35 minutes before sunset a common pipistrelle bat flying around and up to the bottom left corner of the gable end on the southern elevation before entering roost behind the barge board. No further bat activity was detected after this time.

3.11 In summary, the following roost activity was observed:

- One brown long-eared bat using a roost feature on western elevation;
- One unidentified bat using a roost feature on southern gable end; and
- One common pipistrelle bat using a different feature on the southern gable end.

Dusk Emergence Survey: 24th July 2017

3.12 A single soprano pipistrelle bat was seen to emerge from behind the bargeboards near the apex of the southern gable end at sunset, before commuting away to the south west.

3.13 At approximately 12 minutes after sunset two common pipistrelle bats emerged from beneath the ridge tiles of the same gable.

3.14 Common pipistrelle bats were frequently seen and heard foraging around the house and garden throughout the survey, with a maximum of two individuals seen together at any one time. Soprano pipistrelle bats were recorded occasionally.

3.15 At approximately 35 minutes after sunset a single brown long-eared bat was seen to emerge from behind the bargeboard of the dormer window on the western elevation. Brown long-eared bats were seen and heard occasionally throughout the remainder of the survey, with a maximum of one individual seen at any one time.

3.16 In summary, the following roost activity was observed:

- One brown long-eared bat using a roost feature on western elevation;
- One soprano pipistrelle bat using a roost feature on southern gable end; and
- Two common pipistrelle bats using a roost feature under ridge tiles on the southern gable end.

4. EVALUATION

Bat Roosting Activity

4.1 The survey results have confirmed that the house is used as a roost site by small numbers of brown long-eared, common pipistrelle and soprano pipistrelle bats, with individuals using a number of different features on the structure. Observations indicated that brown long-eared bats were faithful to a single roost feature on the western elevation, although there was some evidence from the earlier daytime inspection (PAA 2017) of this species also having accessed the loft above the older section of the house. Soprano pipistrelle bats appeared faithful to a single feature on the southern gable end, whilst common pipistrelle bats used various different features on each of the surveys.

4.2 Brown long-eared maternity roosts[5] are typically formed of 10 to 30 individuals whilst average numbers for common pipistrelle and soprano pipistrelle maternity roosts are higher, with approximately 75 and 200 individuals respectively (BCT 2010a,b,c). Males of each species typically roost individually, or in small groups in day roosts[6], and this is most consistent with the activity observed at the site. Based on the relatively small number of individuals seen at the site and the varied use of a number of different roost features, the site is considered to be used as:

- **Day roost** for **1 brown long-eared bat**;
- **Day roost** for **5 common pipistrelle bats;** and
- **Day roost** for **1 soprano pipistrelle bat**.

4.3 Each of these species is relatively common and widespread in England and also considered 'common' by Wray *et al*. 2010, although brown long-eared and soprano pipistrelle bats are listed as a Species of Principal Importance under the NERC Act. The population of brown long-eared is considered to have been stable since 1999 and the populations of common and soprano pipistrelle bats are considered to have increased over the same period (BCT 2017a,b,c).

4.4 Day roosts of common and widespread species are considered to be of relatively low conservation significance (Mitchell-Jones 2004).

Predicted Impacts on Roosting Bats

4.5 The proposals include extensive modification of the roof of the house, involving complete removal of the existing roof structure. New vaulted ceilings to some of the first floor rooms will replace the existing roof voids and the dormer window on the western elevation will not be reinstated. External features such as existing bargeboards will be replaced.

4.6 Works to the potting shed such as re-pointing of external walls will result in loss of the crevice feature beneath coping stones atop the wall.

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[5] *Maternity roost – where female bats give birth and raise their young to independence.*

[6] *Day roost – a place where individual bats, or small groups of males, rest or shelter in the day but are rarely found by night in the summer.*

4.7 Based on the survey data available, in the absence of any mitigation or compensation, the proposed refurbishment of the site presents the following potential impacts, all of which would be an offence under current wildlife legislation:

- Disturbance of one brown long-eared bat using one day roost;
- Disturbance of five common pipistrelle bats using six day roosts;
- Disturbance of one soprano pipistrelle bat using one day roost;
- Destruction of all of day roosts identified for each species; and
- Risk of harm to individual bats.

4.8 Appropriate mitigation and avoidance measures will need to be implemented to avoid harm to bats and to offset the loss of roost habitat, see Section 5 for more detailed recommendations.

5. RECOMMENDATIONS

5.1 In line with current good practice, if development has not begun within two years of this report the site should be reassessed to investigate bats' usage of the site and confirm the location and nature of any roosting activity at that time.

5.2 Based on the current survey results and proposals for the site, the following recommendations are made.

Licence Application

5.3 Upon receipt of planning consent, a licence application to Natural England will be required. A standard licence application typically takes at least 30 days for Natural England to process and requires the completion of several documents:

- Application form (providing details of the site, applicant and named ecologist);
- Method statement (providing a detailed description of predicted impacts and mitigation strategy); and
- Work schedule (setting out the timescale for the proposed work).

5.4 Based on the roosts being of relatively low conservation status the site may meet the criteria for inclusion in the Bat Low Impact Class Licence Scheme, which typically has a much faster turn-around time from Natural England but permits a significantly shorter period of licensable works. The work schedule will need to be considered to determine the most appropriate means of licensing at this site.

Mitigation Strategy

5.5 A mitigation strategy will be required to avoid or compensate for impacts on roosting bats, and the following points will need to be considered:

- Provision of alternative roost habitat for brown long-eared, common pipistrelle and soprano pipistrelle bats to offset the loss of the existing day roosts;
- Measures to avoid causing harm to individual bats during the course of the works; and
- Sensitive lighting that minimises impacts on bats post-development.

5.6 Following advice in the Bat Mitigation Guidelines (Mitchell-Jones 2004), day roosts of common species do not require any restrictions on timing of works, although it is good practice to avoid carrying out destructive searches on days with very poor weather conditions so that bats are not exposed to conditions that may compromise their welfare.

5.7 In line with Natural England's current licensing policies, post-development monitoring of roosts is unlikely to be required at this site.

5.8 With suitable mitigation measures in place it is anticipated that there would be no detriment to the favourable conservation status of local bat populations. Further details on different aspects of the proposed mitigation strategy are provided below.

Provision of Roost Habitat

5.9 The extensive roof works will result in all of the existing bat roost features being lost, therefore roost habitat suitable for brown long-eared, common pipistrelle and soprano pipistrelle bats will need to be provided.

5.10 Using the existing roost features as a guide, the following is proposed:

- Bat boxes on nearby buildings and/or trees to provide construction phase roost habitat;
- Reinstatement of several crevice features (beneath ridge tiles and behind bargeboards on gable ends); and
- Creation of an access point at the apex of the new gable end on the western elevation for brown long-eared bats to enter a new roof void at this side of the building.

5.11 NB. Under Natural England's current licensing policies, a scheme comprising bat boxes would provide adequate compensation for the bat species and type of roosts observed at the site to date. Following discussions with the client and their architect about what they would like to achieve with this project, the proposed features will be suitable for day roosting, but also will be able to accommodate greater numbers of bats than are currently using the site, providing a future opportunity for maternity roost for any of the three bat species present. Natural England is likely to categorise the new features on the building as enhancement measures rather than essential mitigation.

Avoiding Harm to Bats

5.12 Appropriate mitigation/avoidance measures will be required to avoid injury to any bats during the course of the works.

5.13 Breathable roofing membranes (BRMs) must not be used in any areas where bats would have access. BRMs present a significant risk of harm to bats as over time their claws will pull tiny threads in the membrane and cause them to become entangled, resulting in their entrapment and subsequent death. This damage to the membrane also can also reduce its effectiveness and shortens its useful lifespan (Waring *et al.* 2012). The only roof lining fabric currently considered safe for use in bat roosts is Type 1F bitumen felt.

5.14 The full scope of measures to be employed during the course of the works, taking into account the exact work schedule, will be confirmed within the licence application to Natural England; however, it is anticipated that some or all of the following will be required:

- Toolbox talk to contractors to brief them on the presence of bats, the locations of confirmed roost features, the requirements of the Natural England licence and implications of non-compliance with that document;
- Careful destructive search/soft strip of ridge tiles, roof slates and bargeboards under supervision of licensed bat ecologist (any bats encountered to be moved by the ecologist to a safe location elsewhere on site);
- In the event that bats are encountered by contractors when the ecologist is not on site, works in that area must cease immediately and must not resume until further advice has been sought from the ecologist;

- Licensed bat ecologist to be 'on call' to attend site in the event that bats are encountered at any other point during the works; and

- Supervision and/or inspection of new features by licensed bat ecologist to ensure that they are fit for purpose.

Lighting

5.15 Bats are nocturnal and adapted to forage in low-light conditions. Whilst some species can be fairly tolerate of artificial illumination, brown long-eared bats in particular are fairly sensitive to this type of disturbance therefore potential impacts on bats must be considered for any new lighting associated with the proposals.

- Lamps must directed where they are needed to avoid unnecessary light spillage;

- Consider the use of timers and/or motion sensors to limit periods of illumination to essential times only;

- Avoids illumination of roost entrances as this may deter bats from using them; and

- Lighting should also be minimised on trees around the garden to maintain their value as foraging and commuting habitat for bats;

5.16 Also refer to the Bat Conservation Trust's publication on lighting for further guidance on suitable specifications (BCT 2007).

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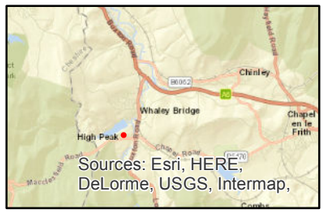
7. ABBREVIATIONS

BAP	Biodiversity Action Plan
BRM	Breathable Roofing Membrane
CRoW	Countryside and Rights of Way
EPS	European Protected Species
EU	European Union
NERC	Natural Environment and Rural Communities
NPPF	National Planning Policy Framework
PAA	Penny Anderson Associates Ltd
WCA	Wildlife and Countryside Act

FIGURES



Legend

Feature

- Brown long eared bat day roost
- Common pipistrelle bat day roost
- Soprano pipistrelle bat day roost
- Loft where bat droppings were discovered

N

British National Grid
Projection: Transverse Mercator
False Easting: 400000.000000
False Northing: -100000.000000
Central Meridian: -2.000000
Scale Factor: 0.999601
Latitude Of Origin: 49.000000

ISO A3

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Discipline: Ecology

Title:

EXISTING BAT ROOST FEATURES

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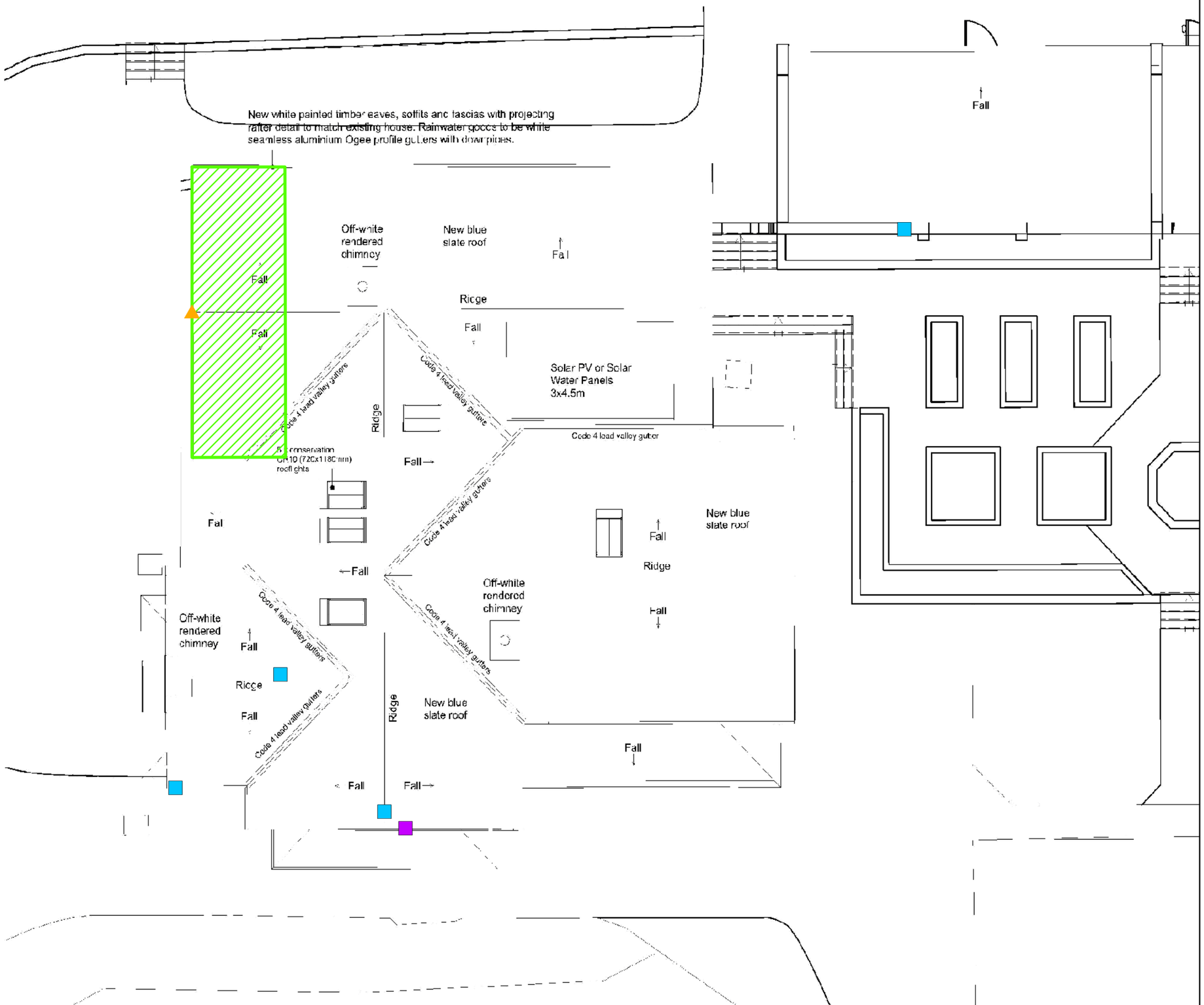

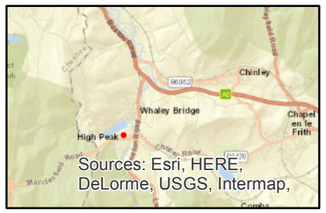

Legend

- Access into roof void for brown long-eared bats
- Crevice feature for common pipistrelle bats
- Crevice feature for soprano pipistrelle bats
- Roof void

N

British National Grid
Projection: Transverse Mercator
False Easting: 400000.000000
False Northing: -100000.000000
Central Meridian: -2.000000
Scale Factor: 0.999601
Latitude Of Origin: 49.000000

ISO A3

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Project Name: Sunart

Discipline: Ecology

Title:

PROPOSED BAT ROOST FEATURES

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Not to scale	Figure 2	
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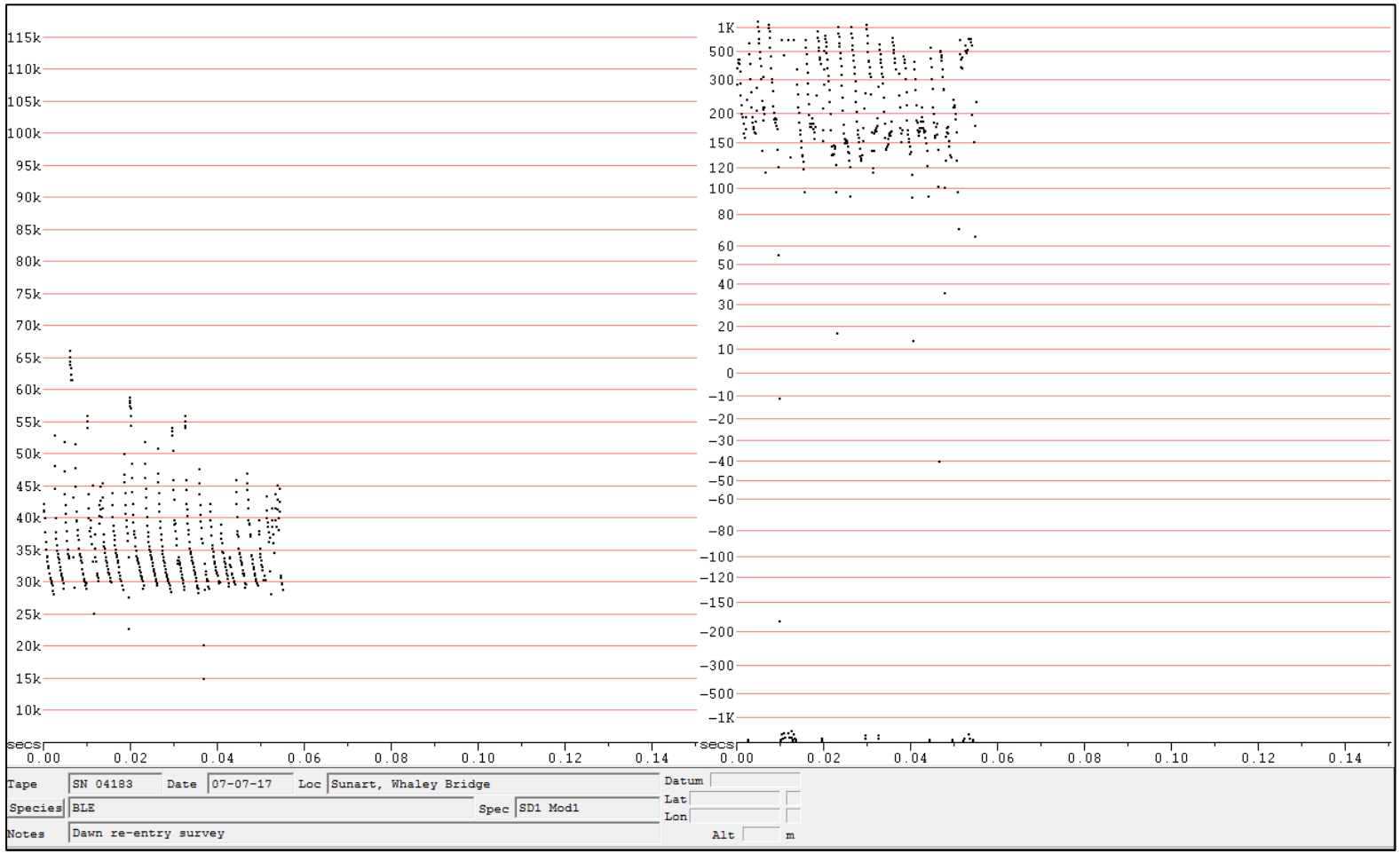
PAA Ref. G:\TIBS01_TibStreetPhase1		Revision: 1.0

APPENDICES

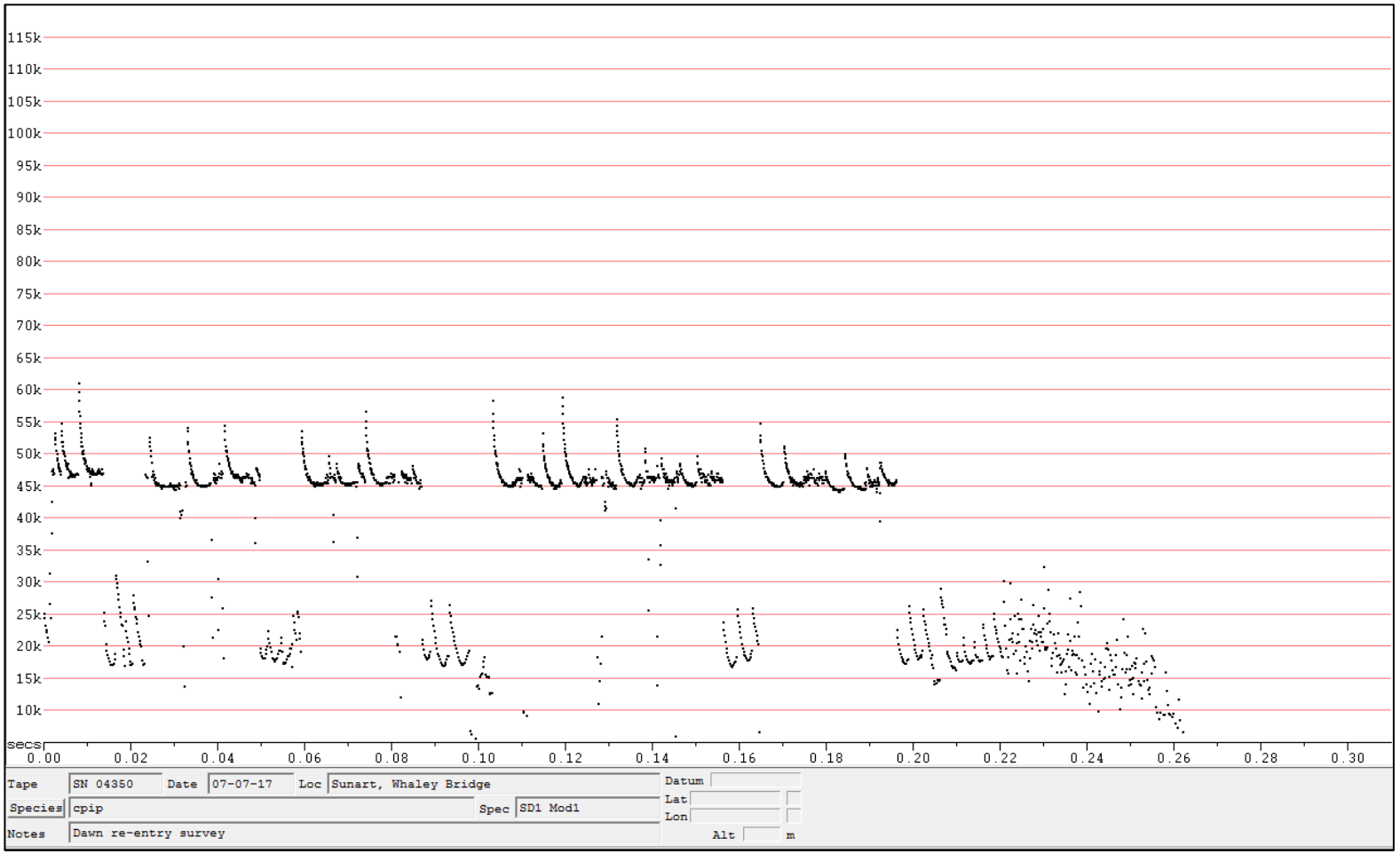
APPENDIX 1

Sonograms

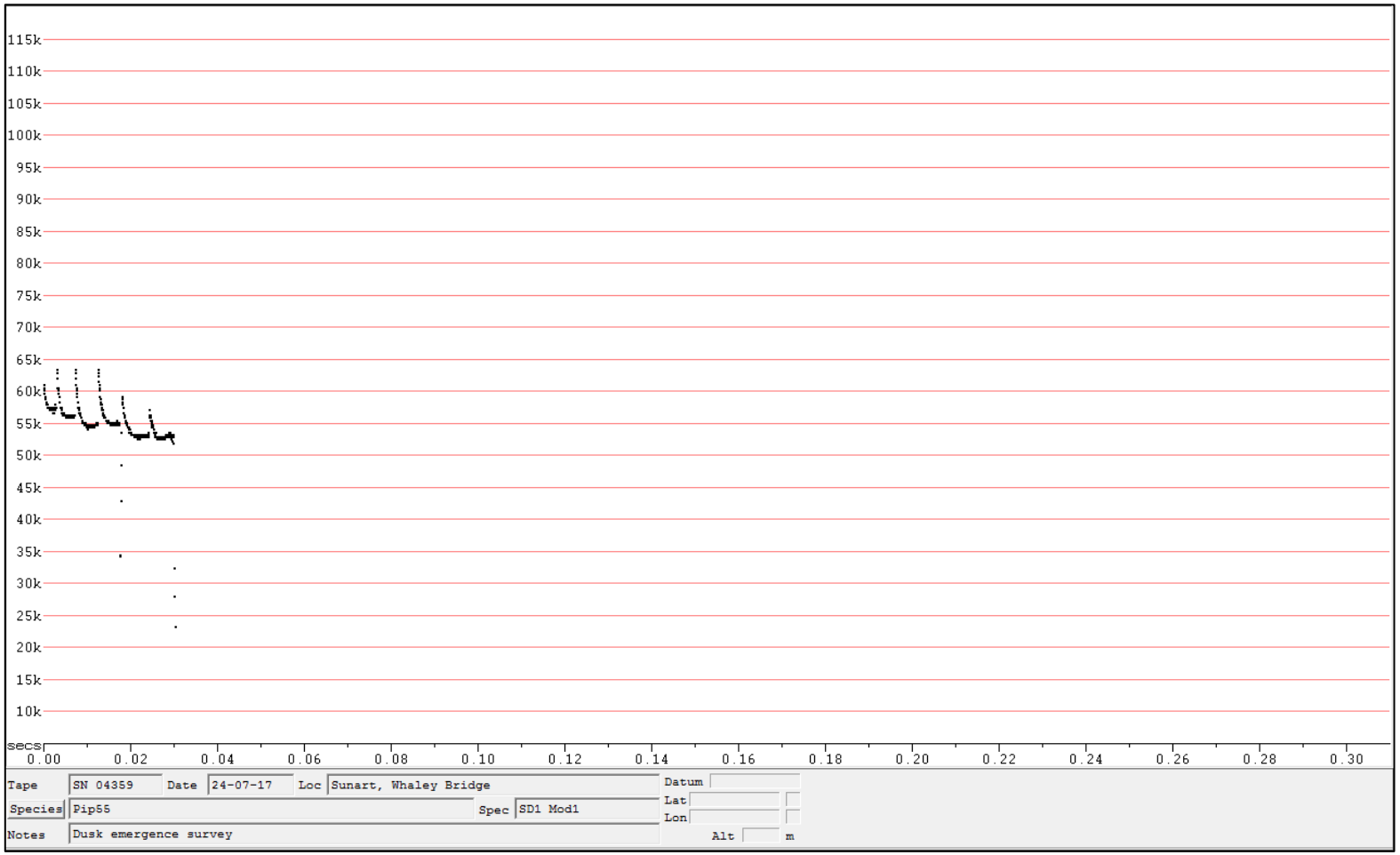
Sonogram 1: Echolocation calls of brown long-eared bat seen entering roost behind bargeboard on dormer window.
Recorded by Anabat SD1 and analysed using Analook (view: F7 compressed, frequency and slope).



Sonogram 2: Echolocation and social calls of common pipistrelle bats, seen entering and emerging from roost in various different locations on the house.
Recorded by Anabat SD1 and analysed using Analook (view: F7 compressed, frequency only).



Sonogram 3: Echolocation calls of soprano pipistrelle bat, seen emerging from roost on southern gable end of house.
Recorded by Anabat SD1 and analysed using Analook (view: F7 compressed, frequency only).



APPENDIX 2

Site Photographs

Plate 1

Day roost used by common pipistrelle beneath coping stone atop wall of potting shed.

Plate 2

Roost entrance underneath coping stone (western side of wall).

Plate 3

Day roosts used by common pipistrelle bats in crevices between roof slates and ridge tiles and behind bargeboard on southern gable.

Plate 4

Roost entrance behind the bargeboard at southern gable end.

Plate 5

Roost entrance via gap beneath ridge tile on southern gable.

Plate 6

Day roost used by brown long-eared bats, entrance behind bargeboard on the dormer window.

Plate 7

Day roost used by soprano pipistrelle behind the bargeboard at the southern gable end.

Plate 8

Roost entrance behind bargeboard.

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