



Stack House, Church Road, Woodborough,
Wiltshire, SN9 5PH

Dusk Emergence Surveys for Bats



May 2026

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The results of the survey and assessment work undertaken by All Ecology are representative at the time of surveying.

Every endeavour has been made to identify the presence of protected species on site, where this falls within the agreed scope of works.

The flora and fauna detailed within this report are those noted during the field survey and from anecdotal evidence. It should not be viewed as a complete list of flora and fauna species that may frequent or exist on site at other times of the year.

Up to date standard methodologies have been used, which are accepted by Natural England and other statutory conservation bodies. No responsibility will be accepted where these methodologies fail to identify all species on-site.

All Ecology cannot take responsibility where Government, national bodies or industry subsequently modify standards.

All Ecology cannot accept responsibility for data collected from third parties.

Reference to sections or particular paragraphs of this document taken out of context may lead to misrepresentation.

Summary

In July 2025, All Ecology was commissioned to undertake Dusk Emergence Surveys for bats on an annex with garage at Stack House, Church Road, Woodborough, Wiltshire, SN9 5PH.

The annex is the subject of a planning application for a single storey extension on the north elevation.

A previous inspection of the building found two dark roof voids that provide day roosting opportunities for bats and evidence of bats was found in the form of droppings. The gaps along the top of the concrete block walls, cavity walls and gaps behind the exterior cladding also provide opportunities for roosting bats with bat droppings found on the walls dividing the garage from the two roof voids. The small voids between the roof/ridge tiles and roof lining also provide roosting opportunities for bats. The building is classified as having known roosts with high potential for other roosting bats to use other roosting features listed.

The dusk emergence surveys found three Soprano Pipistrelle day roosts within the building. Proposals are limited to an extension on the north gable end where no active bat roosts are present. The three Soprano Pipistrelle day roosts will be retained and an EPS licence will not be required but as only historical evidence of roosting bats was found around the north gable end, confirmed to be Common Pipistrelle through DNA analysis. A licensed ecologist should be present to oversee the removal of materials from the north elevation.

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1.0 Introduction

Background

- 1.1 In July 2025, All Ecology was commissioned to undertake Dusk Emergence Surveys for bats on an annex with garage at Stack House, Church Road, Woodborough, Wiltshire, SN9 5PH
- 1.2 The annex is the subject of a planning application for a single storey extension on the north elevation.
- 1.3 A previous inspection of the building found two dark roof voids that provide day roosting opportunities for bats and evidence of bats was found in the form of droppings. The gaps along the top of the concrete block walls, cavity walls and gaps behind the exterior cladding also provide opportunities for roosting bats with bat droppings found on the walls dividing the garage from the two roof voids. The small voids between the roof/ridge tiles and roof lining also provide roosting opportunities for bats. The building is classified as having known roosts with high potential for other roosting bats to use other roosting features listed.
- 1.4 In accordance with the Bat Surveys for Professional Ecologists Good Practice Guidelines 4th Edition (Collins, 2023), where a building has evidence of roosting bats or deemed high potential for bats, the building should be subject to three dusk emergences survey between May – September inclusive with at least two of the surveys occurring between May – August inclusive, to identify species, characterise the roost and determine if any other bat roosts are present within the building.

Objectives and Aim

- 1.5 The main objectives and aim of the survey were to establish the following:
 - Presence/absence of bat roosts.
 - Status of roosts if present.
 - Whether a European Protected Species (EPS) licence is required to ensure legal compliance.
 - Which type of mitigation measures would need to be employed.

Site Location

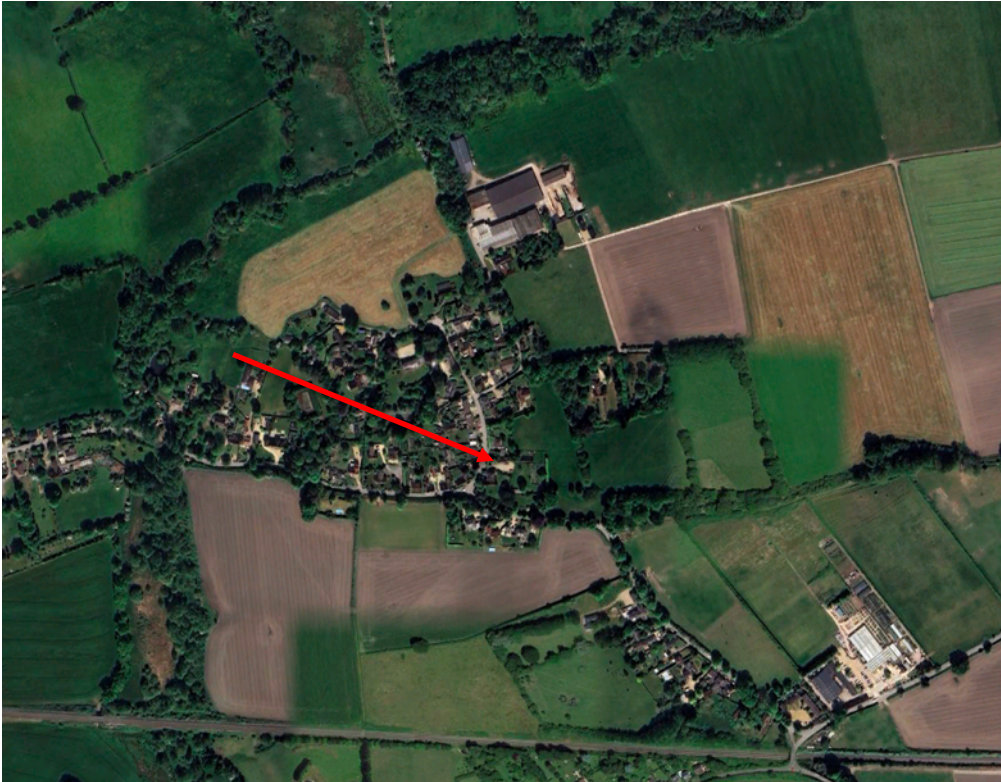


Figure 1: Site location plan.

Aerial View



Figure 2: Aerial view of the site.

2.0 Legislation and Status

Bats

- 2.1 All species of bat are listed on Schedule 5 of The Wildlife and Countryside Act (1981) and as such receive protection under Section 9 of this Act. This has been amended several times, most recently by the Countryside and Rights of Way Act 2000, which added 'or recklessly' to Section 9(4) (a) and (b). In summary, it is a criminal offence to:
- Intentionally kill, injure or take a wild bat.
 - Be in possession of, or control, any live or dead wild bat or part of, or anything derived from a wild bat.
 - Intentionally or recklessly damage, destroy or obstruct access to any place that a wild bat uses for shelter or protection.
 - Intentionally or recklessly disturb any wild bat whilst it is occupying a structure or place that it uses for shelter or protection.
 - Transport for sale or exchange, or offer for sale or exchange, a live or dead bat or any part of a bat.
- 2.2 The Conservation of Habitats and Species Regulations 2010, consolidate all the various amendments made to the Conservation (Natural Habitats, &c.) Regulations 1994, in respect of England and Wales. It is an offence to possess, sell or offer or transport for sale any European species of bat or any part derived from such a species. These Regulations also remove the 'incidental result defence'. In other words, it is no longer a defence to show that the killing, capture or disturbance of a species covered by the Regulations or the destruction or damage of their breeding sites or resting places was the incidental and unavoidable result of a lawful activity. Natural England can grant European Protected Species (EPS) licenses in respect of development to permit activities that would otherwise be unlawful.
- 2.3 Under Section 40 of the Natural Environment and Rural Communities Act (2006) public bodies, including Local and Regional Planning Authorities have a duty to 'have regard' to the conservation of biodiversity in England when carrying out their normal functions, which includes consideration of planning applications. In compliance with Section 41 of the Act, the Secretary of State has published a list of species considered to be of principal importance for conserving biodiversity in England. This is known as The England Biodiversity List, all of which make up the UK BAP Priority Species. This list forms the basis of the UK Biodiversity Framework, and in England, Biodiversity 2020: A strategy for England's wildlife and ecosystem services (Defra, 2011). Regional Planning Bodies and Local Planning Authorities will use it to identify the species that should be afforded priority when applying the requirements of the National Planning Policy Framework (NPPF) to maintain, restore and enhance species and habitats.
- 2.4 Seven bat species are NERC Priority Species (JNCC, 2007). These are:
- Barbastelle *Barbastella barbastellus*
 - Bechstein's *Myotis bechsteinii*
 - Noctule *Nyctalus noctula*

- Soprano Pipistrelle *Pipistrellus pygmaeus*
 - Brown Long-eared *Plecotus auritus*
 - Greater Horseshoe *Rhinolophus ferrumequinum*
 - Lesser Horseshoe *Rhinolophus hipposideros*
- 2.5 Greater Horseshoe, Lesser Horseshoe, Barbastelle and Bechstein's, are afforded greater protection under European legislation, being listed under Annex II of the EC Habitats Directive which lists species whose conservation requires the designation of Special Areas of Conservation (SACs).

3.0 Methodology

Personnel

- 3.1 The survey was carried out by Laura Dent BSc Hons MCIEEM, an ecologist with over 10 years' experience working as a consultant who holds a Class 2 Bat Licence (all species, all counties, Class Licence Registration No. 2017-32855-CLS-CLS) and experienced bat surveyors. The work was overseen by James Godbeer BSc Hons MCIEEM, an ecologist with over 18 years' experience working as a consultant. James has extensive experience of managing environmental contracts, and particular experience in surveying, assessment and mitigation for rare and protected species. He has considerable knowledge of the development and planning process including Ecological Impact Assessments, sustainable ecological design and he has completed ecology chapters of Environmental Statements. James holds a number of protected species licences including bats (all species, all counties, Class Licence Registration No. 2015-12313-CLS-CLS), and Great Crested Newts (Class Licence Registration No. 2019-44282-CLS-CLS). He has successfully obtained European Protected Species mitigation licences for a number of bat species including Lesser Horseshoe, Greater Horseshoe, Serotine, Brown Long-eared, Common Pipistrelle and Natterer's bats, for a number of roost types including maternity and hibernation sites.

Dusk Emergence Surveys

- 3.2 The building was subject to dusk emergence surveys on the 13th August, 1st September and 22nd September 2025. In order to adequately cover the building, four surveyor positions were used.
- 3.3 In accordance with Bat Conservation Trust – Bat Surveys for Professional Ecologists: Good Practice Guidelines. 4th Ed (Collins, 2023), dusk surveys should begin 15 minutes before sunrise and continue for 1.5 – 2 hours after sunset with the survey start time adjusted on subsequent surveys or a repeat of the survey should bats already be in flight at 15 minutes before sunset. The dusk survey therefore began 30 minutes before sunset to avoid the risk of having to repeat the survey as species such as pipistrelles will often emerge well before sunset.

Bat Dropping DNA Analysis

- 3.4 Bat droppings collected from within the roof void on the 30th April 2026 were sent off to SureScreen Scientifics for DNA analysis to identify the droppings to species level.

Equipment

- 3.5 Surveyors were equipped with Echo Meter Touch 2 Pro bat detectors. Registrations are recorded on the devices and notes made on species recorded, behaviour, time of registration, location and direction of flight where possible, including incidental observations from surrounding habitats. Canon XA40 and XA60 video cameras used in infrared mode with additional infrared lights to assist with the survey.

Assessment

- 3.6 The surveyed building has been evaluated to assess which of the following categories it falls into, if any (Mitchell-Jones, 2004 & Collins, 2016):

- **Transitional roost** (April-September/October) - On waking from hibernation or in the period prior to hibernation, bats search for roosts in which they stay for only a few days or on some occasions several weeks. These transitional roosts can be occupied by a few individuals or occasionally small groups. The transitional roosts used prior to hibernation are generally cool and thus may allow bats to reduce their energy requirements before going into hibernation.
- **Maternity roost** (May-August) - Breeding females gather together around the beginning of May to form nursery colonies. During this period gestation begins with births typically occurring between June and July. The females and their young remain within the maternity roost until the young are weaned and independent (late July-August). These roosts tend to break up between August and September. Adult males are rarely found within these colonies. However, the adult males of long-eared bats, Daubenton's, Natterer's, and horseshoe bats can be found roosting within maternity colonies with their numbers increasing throughout the active season.
- **Satellite roost** (May-August) - Breeding females may have alternative roost sites in close proximity to the main nursery colony. These are referred to as 'satellite roosts'. The numbers of bats using these roosts can vary greatly, from a few individuals, to small groups.
- **Mating roost** (September-November) - All British bats are polygynous i.e. males mate with several females. Mating generally takes place from late summer and can continue through the winter. A number of different mating strategies are used by bats, though males of some species establish mating roosts, whereby they defend territory and display/call to females to mate.
- **Hibernation roost** (October-March) - Depending on the weather and food availability, bats tend to move to hibernation sites from October. Hibernation roosts can vary greatly in terms of the number of individuals and the diversity of species that occupy them. However, they tend to have a constant cool temperature and high humidity, which allows the bats to use less energy regulating their temperature. Bats will wake occasionally during hibernation to drink and feed.
- **Night roost** (March-November) - Bats may use roosts other than traditional day roosting sites to rest in during the night. These roosts vary in their conservation significance. Night roosts may be used by a single individual on occasion or they could be used regularly by the whole colony. Studies have shown that night roosts may be of particular importance to some species i.e. the Lesser Horseshoe, providing key resting places within core foraging areas.
- **Day roost** (March-November) - These roosts are used during the day to rest in. Males of most British species spend the summer roosting alone or in small groups with other males in such roosts. Bats may regularly use a number of day roosts, switching between them on a daily basis, though conversely they may occupy the same roosting site for several weeks.
- **Feeding roost** (May-November) - These roosts can be occupied by a single animal or a few individuals throughout the active season. They vary in their significance as they may be used by the whole colony or just a few individuals to feed, to shelter from the weather or to rest temporarily. Feeding roosts are often used by long-eared and horseshoe species.

- **Other considerations, Swarming sites** - Swarming takes place between August and November, whereby large numbers of bats from several species gather, generally around caves and mines. They are often dominated by the *Myotis* species and appear to be important mating sites with some bats travelling several kilometres to reach these areas. A proportion of the bats that travel to these sites will remain to hibernate.

Limitations

- 3.7 There were no limitations to carrying out the dusk emergence survey in accordance with the Bat Conservation Trust – Bat Surveys for Professional Ecologists: Good Practice Guidelines. 4th Ed (Collins, 2023).
- 3.8 The surveys only provide a 'snapshot' of the bat activity associated with the building and immediate surroundings and although the absence of a maternity roost can be determined with a high level of confidence as well as other roost types at the time of the surveys, it is possible that bats could roost at other times of the year.

4.0 Results

Dusk Emergence Surveys

Roost 1 – Soprano Pipistrelle day roost

- 4.1 During the first dusk emergence survey a Soprano Pipistrelle emerged from a gap at the eaves on the southwest corner of the main annex roof. This emerged at seven minutes after sunset before flying south. This roost was not recorded in sue during the other dusk surveys.

Table 1. Roost 1 – Soprano Pipistrelle Emergence Counts

Date	No. of Emerging Bats	Time of First Emergence after/before Sunset (minutes)	Time of Last Emergence after/before Sunset (minutes)
13/08/25 (dusk)	1	7 minutes after	-
01/09/25 (dusk)	0	-	-
22/09/25 (dusk)	0	-	-



Photograph 1: Roost 1 exit location.



Photograph 2: Roost 1 exit location.

Roost 2 – Soprano Pipistrelle day roost

- 4.2 During the first dusk emergence survey a Soprano Pipistrelle emerged from one of the open garage doors at 22 minutes after sunset before flying east. This will have likely emerged from a gap along the top of the blockwork from either the east elevation garage wall or the wall dividing the garage from the annex roof void. This roost exit was not recorded in use during the remaining two surveys.



Photograph 3: Roost 2 exit location.

Table 2. Roost 2 – Soprano Pipistrelle Emergence Counts

Date	No. of Emerging Bats	Time of First Emergence after/before Sunset (minutes)	Time of Last Emergence after/before Sunset (minutes)
13/08/25 (dusk)	1	22 minutes after	-
01/09/25 (dusk)	0	-	-
22/09/25 (dusk)	0	-	-

Roost 3 – Soprano Pipistrelle day roost

- 4.3 During the first dusk emergence survey, a Soprano Pipistrelle emerged from a gap in the garage west gable end cladding, at the apex of the gable end. This bat emerged at 26 minutes after sunset before flying northeast. During the second dusk emergence survey a Soprano Pipistrelle was seen emerging from the same gap at 24 minutes after sunset before flying north. During the third dusk emergence survey a Soprano Pipistrelle emerged from the same gap at 24 minutes after sunset before flying north.



Photograph 4: Roost 3 location.

Table 3. Roost 3 – Soprano Pipistrelle Emergence Counts

Date	No. of Emerging Bats	Time of First Emergence after/before Sunset (minutes)	Time of Last Emergence after/before Sunset (minutes)
13/08/25 (dusk)	1	26 minutes after	-
01/09/25 (dusk)	1	24 minutes after	-
22/09/25 (dusk)	1	24 minutes after	-

Other activity

- 4.4 The majority of activity on site consisted of foraging Soprano and Common Pipistrelle bats. During the first dusk survey two Serotine passes were recorded and three Brown Long-eared bat passes were also heard. During the second dusk emergence survey, bat activity was similar to the first with most activity consisting of Common and Soprano Pipistrell foraging with a small number of Noctule, Serotine and Brown Long-eared passes also recorded. During the third dusk survey, activity was generally lower on site than previously with a small number of Soprano Pipistrelle passes recorded, two Noctule passes and one Brown Long-eared pass recorded.

Table 4. Weather conditions and sunset/sunrise times.

Date	Temperature (°C)	Sunset/Sunrise Times	Wind	Cloud Cover (%)
13/08/25 (dusk)	20	20:33	None	100
01/09/25 (dusk)	14	19:53	Light	100
22/09/25 (dusk)	10	19:07	None	0

Bat Dropping DNA Analysis

- 4.5 The results of the eDNA analysis of droppings from within the roof void confirmed them to be those of Common Pipistrelle.

5.0 Evaluation

Dusk Emergence Surveys

- 5.1 The dusk emergence surveys recorded three Soprano Pipistrelle day roosts within the building.
- 5.2 Roost 1 was located at a gap at the eaves on the southwest corner of the annex roof and was recorded in use on one occasion by a maximum of one bat. A Soprano Pipistrelle was recorded emerging from one of the open garage doors and this will have likely emerged from a gap along the top of the blockwork from either the east elevation garage wall or the wall dividing the garage from the annex roof void. This roost was only recorded in use during one of the surveys so a specific location of the roost could not be determined. Roost 3 was located in a gap in the garage west gable end cladding, at the apex of the gable end. This roost was recorded in use during all three of the dusk surveys, by a maximum of one bat. Pipistrelle bats are the most common species of bat in the UK with widespread distributions and roosting in a wide range of habitats and building types (BCT, 2010). These have been classified as day roosts and this type of roost, used by a common species can be classified as being of low conservation significance (Mitchell-Jones, 2004).
- 5.3 Previous inspection of the building found scattered bat droppings throughout the annex roof void and a small number of bat droppings on the roof void blockwork of the north gable end. No bats were seen emerging from the north elevation gaps at the eaves, gaps at the top and bottom of the roof valleys or from the gap in the east section ridge mortar. DNA analysis of these droppings confirmed them to be those of Common Pipistrelle. This species was not recorded roosting during the surveys and as no fresh droppings were present these areas of roof have been categorised as having historical evidence of roosting bats.
- 5.4 Any potential for hibernation would appear to be low given the likely significant temperature changes in the roof spaces over the winter months and lack of any areas that would be well insulated against external changes in temperature. However, the presence of hibernating bats cannot be ruled out, especially due to the presence of Soprano Pipistrelles which are known to hibernate in relatively exposed places to take advantage of warmer winter days to forage.
- 5.5 Other activity on site consisted of foraging Soprano and Common Pipistrelles with a smaller number of Serotine, Brown Long-eared bat and Noctule passes.

6.0 Impacts and Recommendations

Impacts

- 6.1 The annex is the subject of a planning application for a single storey extension on the north elevation.
- 6.2 In the **absence** of mitigation, the following impacts and potential impacts with regard to bats have been identified:
- Extension to the north gable end; no roosts identified within this area of works. Roosts 1 -3 will be retained and not impacted by proposed works provided the existing gable end blockwork is retained.
 - Extension to the north gable end where evidence of Common Pipistrelle bats was found but no roosts found during the dusk emergence surveys, resulting in the modification of a historical roost. Low impact.
 - Possibility of the disturbance of other bat roosts used by bats at other times of the year than those recorded during the surveys, with potential for injury or cause to make them fly during the day making them vulnerable to predation. High impact at a site level.
 - Temporary/permanent disruption of areas of bat foraging habitat on site and the immediate surroundings through potential increase/changes in external lighting. Low impact to local bat populations.

Further Surveys

- 6.3 No further surveys are required at this time. Sufficient surveys have been carried out to satisfy the recommended survey effort, which has established the presence/absence of roosts, characterise roosts present. No further analysis of the historical droppings is recommended as the outcome would not affect the mitigation; this particular area would remain available for future roosting. Repeat surveys would not be required unless the proposals are delayed by one year or more.

Legal Compliance

- 6.4 The Wildlife and Countryside Act 1981 as amended by The CROW Act 2000 and The Conservation of Habitats and Species Regulations 2010 makes it illegal to recklessly damage, destroy or obstruct access to any place that a wild bat uses for shelter or protection, whether the bat is occupying the shelter at the time or not. The destruction of bat roosts is usually only possible under a European Protected Species (EPS) Licence, which will require adequate compensation/mitigation.
- 6.5 European Protected Species (EPS) Licences to permit the above for the purposes of development must be obtained from Natural England. To gain a licence the scheme must have been issued with detailed planning permission and must not result in a loss of conservation status of the species concerned. Proposed extension to the north gable end will not impact the three Soprano Pipistrelle day roosts and provided works are undertaken in line with precautionary methods of working, an EPS licence will not be required to permit these works.

Mitigation

Timing of Works

- 6.6 A formal timetable of works is yet to be devised.
- 6.7 The extension to the north gable end will not directly impact the three Common Pipistrelle roosts and no restrictions on timing of works are required.
- 6.8 Natural England guidance state if a building has any potential for hibernating bats then works should not occur over the winter months. The building is not regarded as being optimal for hibernation but some bats may remain over winter. To take into the possibility of discovering any hibernating bats, works that could expose these bats e.g. removal of roof materials, will not take place on days where the temperatures do not rise above 5 (°C).

Pre-works Checks and Precautionary Methods of Working

- 6.9 Works will consist of an extension to the north gable end; the following precautionary methods of working. As there is evidence of previous use by bats in around the north gable end blockwork, a licensed ecologist will undertake a pre-works inspection and be present to oversee the stripping of any cladding, roof, eaves and roof lining materials. During works, materials would be carefully removed by hand, turned over and inspected before being passed down. If any bats are found during this process, works will cease and the licensed ecologist will determine how best to proceed, including stopping works to gain a, EPS licence, if required. A bat box will be installed on the nearby Horse-chestnut tree in the north garden; in case any bats need to be moved out of immediate danger.
- 6.10 The ecologist will brief contractors who will be advised to adhere to the following procedures in the event that any other bats are found during works once the supervised works have been completed:
- If the roost is still in the structure and bats are not injured, stop work and contact a licensed ecologist. If help is not available, allow bats to fly out of harm's way.
 - If material containing a roost has been removed, the roost is not exposed and the bats are not injured, temporarily seal and isolate the roost, stop work and seek advice from a licensed ecologist. If advice is not readily available, re-open it and allow bats to relocate of their own accord.
 - If the roost has been exposed, and especially if bats have been injured, stop work, collect bats in a secure box or bag (using a glove) and contact a licensed ecologist

Habitat Creation

- 6.11 As the three Soprano Pipistrelle roosts and exit points will be retained no new habitat creation is required. All existing gaps at the eaves and gaps in ridge and valley mortar must be retained throughout the building.
- 6.12 The new extension provides an opportunity to enhance the site for roosting bats by incorporating a new bat box in the north gable end of the building. A bat box such as the Vivara Pro Build-in WoodStone Bat Box* will be installed within the gable end. Bat boxes could also be installed on

the mature tree within the garden, at a minimum height of 2 – 3 m above ground level, such as the Eco Kent Bat Box.

* An alternative roosting feature may be if approved by the appointed ecologist.

Habitat/site Management and Maintenance

- 6.13 The proposed works will result in the loss of a small area of amenity lawn in the north garden with the majority of the garden to be retained. The gardens on site will continue to provide bat foraging and commuting habitat similar to that which currently exists.

Lighting

- 6.14 The building supports three Soprano Pipistrelle day roosts but the site was also found to be used by foraging Brown Long-eared bats, which is a species more sensitive to lighting. In order for the retained bat roosts and the surrounding habitats to continue to be used by these species the impact of new lighting will need to be considered. A suitable lighting strategy should be designed to ensure impacts to bats are minimised. Where lighting is required, measures to limit the potential for impacts should include the use of lighting only where absolutely necessary utilising highly directional warm white (2700 K) LED lamps, an example being down spots at 2.5 m high using warm white (2700 K) 8W LED lamps, 550 lumens, 35 degree beam angle. These could be individually activated by PIR sensors on a 1 minute cut-off to further reduce the impacts. These will assist in lighting only the areas where lighting is required and minimising light spill either directly or through reflected light.

Population monitoring, roost usage etc.

- 6.15 No monitoring of the Soprano Pipistrelle day roosts, which are day roosts of common species, has been proposed due to the status of the roosts and the corresponding requirements for monitoring defined in the Bat Mitigation Guidelines (2004).

Mechanism for ensuring delivery of post-development works

- 6.16 No post-development works are proposed. The three Soprano Pipistrelle roosts will be retained within the building; however, the responsibility for the long-term maintenance of the roosts would be responsibility of the owners and be associated with the general maintenance of the building.

7.0 References

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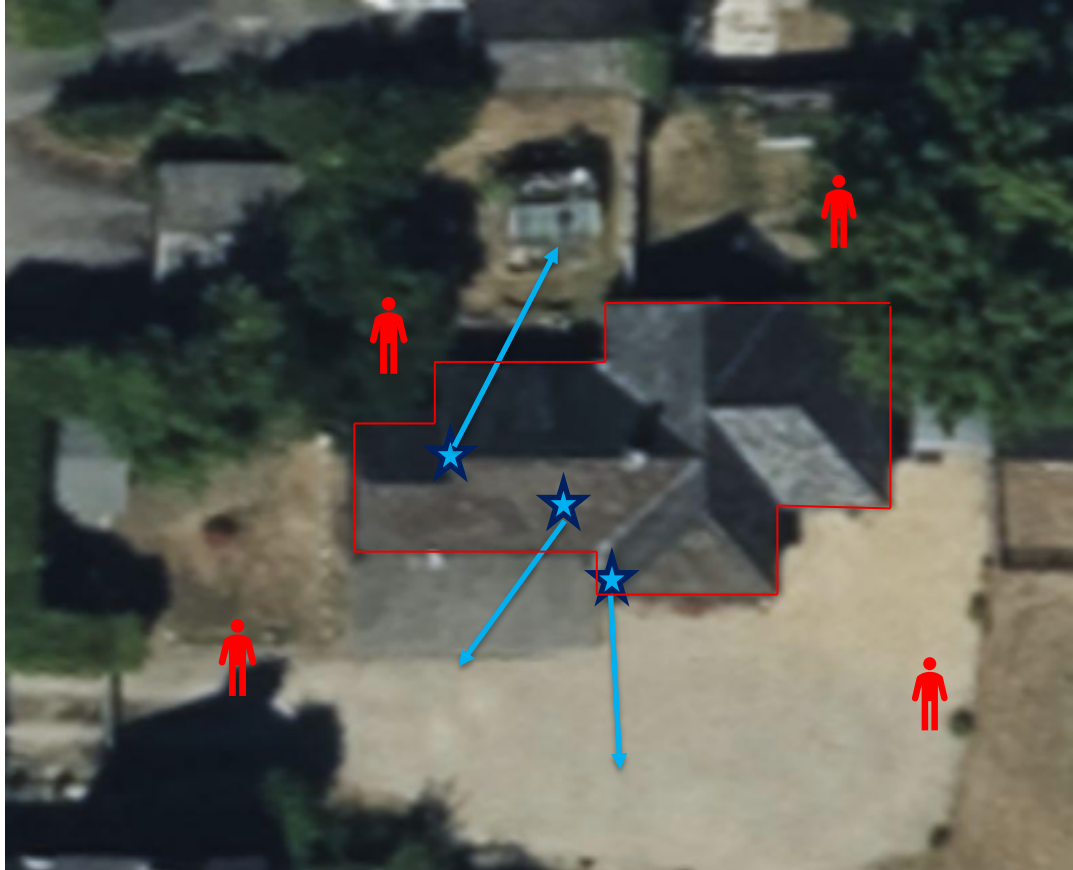
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8.0 Plans

Plan 1 – Survey Results



Key

Surveyed building



Surveyor position



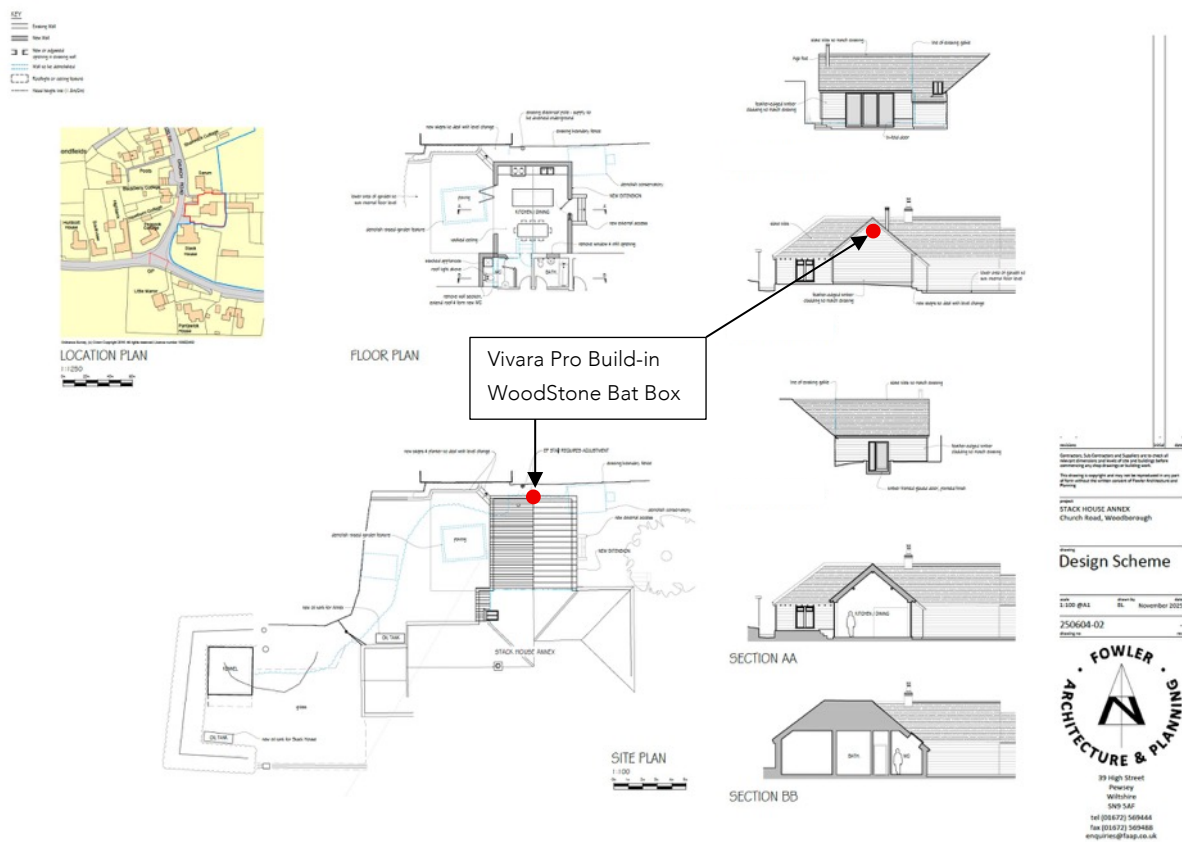
Soprano Pipistrelle day roost (retained)



Soprano Pipistrelle emergence



Plan 2 – Enhancement for bats



9.0 Appendix 1

DNA Analysis of Bat Droppings

Folio No: 1046-2026
Purchase Order: 25113
Contact: All Ecology Ltd
Issue Date: 12.05.2026
Received Date: 30.04.2026



Biological Sample Analysis

Summary

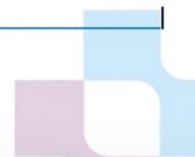
Most biological materials (tissue, feces, hair, blood, etc.) contain small amounts of DNA from the organism of which it originated. Using molecular methods such as PCR (polymerase chain reaction) and DNA sequencing, SureScreen Scientifics are able to analyze an unknown sample to determine which species the sample originates from our methods are optimized for the detection of species including bats (over 92% of bat species worldwide can be identified including all 18 UK bat species), mammals; bees, wasps & hornets; birds; fish; plants (from roots, leaves, stem and even dried wood) and many more species.

Results

Lab ID	Site Name	OS Reference	Sample Type	Species Name	Match(%)
B26 0289	Stack House 2		Bat Dropping	Common pipistrelle (Pipistrellus pipistrellus)	99.47
Genetic Sequence TTGGAACTGACTAGTTCCACTAATAATTGGAGCCCTGACATGGCATTTCCTCGTATAAATAATATAAGTTTCTGAC TCCTACCTCCTTCTTTTCTACTACTACTAGCCTCGTCTATAGTAGAAGCGGGAGCGGGTACAGGCTGAACAGTCTA CCCCCTCTAGCAGGAAACCTTGNCATGCAGGAGAAGTCTCGGAAACCTAGC					

Matters affecting result: none
Reported by: Chelsea Warner

Approved by: Chelsea Warner



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Methodology

Once samples have arrived in the laboratory, the DNA is isolated using a commercial DNA extraction kit. Using PCR, DNA (if present within the sample) is amplified using universal molecular markers designed to amplify a short fragment of the DNA of the target species group (i.e. mammal, fish, arthropod, reptile, plant etc.). If amplification is successful, the resulting DNA sequence is revealed using a process known as Sanger Sequencing in order to obtain the genetic sequence of the mitochondrial gene within the sample. The sequence results are aligned against a library of known reference sequences using bioinformatics software, which enables us to determine which species the DNA sequence from the sample matches with, informing the species identity and sequence similarity (match %).

If the initial analysis is unsuccessful, the entire process is repeated up to two additional times with a fresh reserve sample (if available) in order to obtain a species identification. If no DNA is detected after three attempts, then we can be confident that any further analysis of the sample will likely also fail to result in species identification.

Interpretation of Results

Sample Type:	The sample you send to us can come from a variety of sources. Fecal, dropping, urine, hair, blood, carcass (skin, flesh, bone), gamete, plant matter or unknown biological material all contain DNA that we can test for in order to identify the species of origin.
Genetic Sequence:	The unique DNA sequence obtained from the sample.
Match (%):	How closely matched the DNA sequence from your sample is to the sequences within our reference database. This can be interpreted as a score of result accuracy, with the maximum score of 100% indicating an exact match of the sample to the indicated species' reference sequence. Lower scores (80-99%) indicate some variation between the sample and reference sequence, likely due to natural variation between individual genetic sequences and/or systematic variations generated through the sequencing process. Scores below 80% similarity should be interpreted with care and can indicate part degraded or part contaminated samples.
Inconclusive Result:	Degraded sample: DNA is degraded and we are unable to determine species identification due to degradation of sample DNA. This can happen either before sample collection (old samples, exposure to UV etc.) or after sample collection if stored for long periods before analysis or not handled correctly. Inhibited/contaminated sample: We are unable to determine species identity due to contamination or the suspected presence of large quantities of PCR inhibitors. Contamination sources can originate from other species which could have come into contact with the samples, or human contamination during sample collection.
Alternative Result:	Sometimes, for targets such as bat dropping analysis, other mammalian species such as rodents are detected. We find this to be a common occurrence as some bat droppings can be similar in appearance to rodent droppings. Although sometimes unexpected, repeat analyses in these cases would likely return the same results.