Bat Survey Report

Lower Woodhouse Farm, Fernhill, Almondsbury, Bristol, BS32 4LU

Client	Mr Roper
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Document History

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1	03/11/2023	Issued to the client.

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The evidence in this document is based upon the field survey(s) detailed. Due to the changing nature of ecology the list of species present cannot be considered comprehensive and Smart Ecology cannot guarantee that other protected/notable species and habitats are not present.

The ecology of a site is constantly changing and therefore the information provided in this document is only relevant at the time of survey. **If it has been over 12 months since this survey was undertaken advice should be sought on whether an updated survey is necessary.**

The evidence which we have prepared and provided is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions.

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Non-Technical Summary

Purpose of Report	Smart Ecology was commissioned by Mr Roper to undertake bat surveys of two outbuildings at Lower Woodhouse Farm, Fernhill, Almondsbury, Bristol, BS32 4LU. This was to inform a planning application for the conversion of Building A to commercial use and conversion of Building B to residential use.
Methodology	Two dusk surveys and one dawn survey were carried out of Buildings A and B to determine the presence or likely absence of roosting bats in the buildings and to characterise any roosts found. DNA analysis of droppings and internal inspections of Building A were also carried out.
Survey Results	**Roosting Bats:** The surveys and DNA analysis have identified that the following roosts are present within the buildings: • Brown long-eared night feeding roost used by low numbers of bats within Building A (maximum of two bats). Roost site on roof support timbers in the eastern section the building. • Brown long-eared day roost used by low numbers of bats within Building A (maximum of four bats). Roost site between lath and plaster/bitumen felt and roof tiles, in wall cavities, or at wall tops. • Common pipistrelle day roost used by low numbers of bats (maximum of one bat). Roost site is a gap behind timber cladding on the south-eastern elevation. **Foraging and Commuting Bats:** Passes by common pipistrelles, long-eared bats, *Myotis* species bats, noctules, and serotines were recorded during the surveys.
Impact Assessment	**Roosting Bats:** The proposed works would destroy brown long-eared day and night/feeding roosts and a common pipistrelle day roost. Brown long-eared and common pipistrelle bats have a widespread distribution in southwest England and the roosts are assessed to be of site value. If bats were present at the time of works then bats could be killed or injured. **Foraging and Commuting Bats:** If additional external artificial lighting was installed on the site then commuting and foraging bats could be disturbed.
Required Actions	**Roosting Bats:** A European Protected Species (EPS) mitigation licence must be obtained from Natural England to permit the proposed works to the buildings to proceed. The licence can only be applied for after planning permission has been granted and any relevant ecological conditions have been discharged. The EPS mitigation licence will include full details of mitigation measures and must be prepared by a bat licensed ecologist. The risk of killing/injuring bats and loss of roosts will be mitigated by: • Pre-works inspection of the buildings and soft-strip of features where roosting bats could be present, and the use one-way excluders where necessary. • Ecological supervision of soft-strip. • Provision of compensatory roosts. **Foraging and Commuting Bats:**. To avoid impacts on foraging and commuting bats it is recommended that external artificial lights are not installed unless absolutely necessary. If external lighting is essential then it is recommended that the number of lights installed is kept to a minimum and that motion sensors on short-duration timers and high motion threshold are fitted.

Contents

1 Introduction

1.1 Background

1.1.1 Smart Ecology was commissioned by Mr Roper to undertake bat surveys of two outbuildings (referred to as Buildings A and B) at Lower Woodhouse Farm, Fernhill, Almondsbury, Bristol, BS32 4LU (central national grid reference ST 60960 85532). Refer to Figure 1, Section 7 for a location map.

1.1.2 This was to inform a planning application for the conversion of Building A to commercial use and conversion of Building B to residential use. See Appendix 1 for the proposed plans.

1.1.3 The requirement for bat surveys was identified by a Preliminary Roost Assessment undertaken in July 2023 which identified that both buildings had moderate suitability for roosting bats (Smart Ecology, 2023).

1.1.4 In accordance with the Bat Conservation Trusts (BCT) good practice guidelines (Collins, 2016) which were in force at the time that the preliminary survey was carried out it was recommended that one dusk survey and one dawn survey were undertaken to identify whether bat roosts were present in the buildings. As bat roosts were found to be present within both buildings during the dawn survey, a third survey was undertaken to enable the roost to be adequately characterised.

1.1.5 This report has been prepared by Robert Dunn, an ecologist at Smart Ecology and an associate member of the Chartered Institute of Ecology and Environmental Management (CIEEM), with reference to the BCT good practice guidelines (Collins, 2016) and BS42020 Biodiversity – a code of practice for planning and development (BSI, 2013).

1.2 Aims

1.2.1 The purpose of the surveys and report was to:

- Identify if bats were roosting within the buildings.
- Identify the numbers and species of any bats present and characterise roosts.
- Assess the impact of the proposed works on bats.
- Provide details of any necessary mitigation and licensing requirements.
- Provide details of opportunities for biodiversity enhancements.

2 Methodology

2.1 Personnel

2.1.1 The surveys were led by Rachel Barber, Robert Dunn and Joseph Wilkie, with assistance from Alison Affleck, Lucy Fieldhouse, Connie Fuller, Helen Saunders, Jake Garrod, Daniel Webb, Ben Baker, and Joseph Cole. See Table 2-1 for details of the surveyor's experience and qualifications.

Table 2-1: Surveyor information

Surveyor	Natural England Bat Survey Licences	Qualifications/Experience
Rachel Barber BSc, MSc, MCIEEM	Level 2 (2016-25176)	Eleven years' experience in ecological consultancy. MSc Ecology and Management of the Natural Environment (University of Bristol - Distinction). MSc Environmental Monitoring, Modelling and Management (Kings College, London - Distinction). BSc Geography (University of Southampton – 2:1).
Robert Dunn BSc, MSc, ACIEEM	Level 1 (2016-23966)	Nine years' experience in ecological consultancy. MSc Environmental Biology: Conservation and Resource Management (University of Swansea - Merit). BSc Biological Sciences with Environmental Resources (University of Warwick – 1st).
Joseph Wilkie BSc, CIEEM qualifying member	Level 1 (2021-54618)	Four years' experience in ecological consultancy. BSc Environmental Resource Management (University of Plymouth – 1st). Joseph has carried out professional bat surveys since 2019.
Alison Affleck BSc, MSc, CIEEM qualifying member	Level 1 (2022-10395)	MSc Applied Ecology (University of Gloucestershire). BSc Environmental Science (University of Lancaster). Alison has carried out professional bat surveys since 2019.
Ben Baker	-	Studying BSc Ecology and Environmental Science (University of Gloucester). Bat surveyor trained by Smart Ecology.
Connie Fuller BSc, MSc	-	MSc Water in a Changing World. BSc Environmental Geography. Bat surveyor trained by Smart Ecology.
Helen Saunders	-	PGDip in Biological Recording (Manchester Metropolitan University - Distinction). PGDip in Environmental Management with GIS (University of Ulster, Coleraine – Distinction). BSc Ecology and Environmental Studies (Open University). Freelance ecologist.
Jake Garrod BSc	-	BSc Geography (Durham University). Bat surveyor trained by Smart Ecology.

Surveyor	Natural England Bat Survey Licences	Qualifications/Experience
Joseph Cole BSc	-	BSc Wildlife Ecology and Conservation Science (University of the West of England). Freelance ecologist since 2022.
Lucy Fieldhouse BSc, MSc	-	MSc Marine Resource Development and Protection (Heriot-Watt University). BSc Geography (Aberystwyth University). Experienced bat surveyor trained by Smart Ecology. Lucy has carried out bat surveys since 2021.
Daniel Webb BSc	-	BSc Hons. Rural Land and Estate Management (Cirencester Royal Agricultural College). Freelance ecologist.

2.2 Dusk & Dawn Surveys

2.2.1 Two dusk surveys and one dawn survey were carried out of Buildings A and B. The surveys were carried out with reference to the good practice guidelines which were in force at the time (Collins, 2016).

2.2.2 The dusk surveys commenced 15 minutes before sunset and continued for 1.5 hours after sunset. The dawn survey commenced 1.5 hours before sunrise and finished 15 minutes after sunrise. The survey dates, timings, and weather conditions are provided in Table 2-2.

Table 2-2: Survey dates, timings, and weather conditions

Date	Sunset/ Sunrise	Start Time	Finish Time	Weather Conditions	
				Start	Finish
12/07/2023	21:25	21:10	22:55	Temp: 17°C Cloud Cover: 60% Beaufort scale: 3 Rain: None Humidity: 77%	Temp: 15°C Cloud Cover: 100% Beaufort scale: 3 Rain: None Humidity: 84%
22/08/2023	06:07	04:37	06:22	Temp: 16°C Cloud Cover: 90% Beaufort scale: 2 Rain: None Humidity: 90%	Temp: 17°C Cloud Cover: 60% Beaufort scale: 2 Rain: None Humidity: 89%
18/09/2023	19:18	19:03	20:48	Temp: 14°C Cloud Cover: 100% Beaufort scale: 4 Rain: None Humidity: 68%	Temp: 13°C Cloud Cover: 100% Beaufort scale: 4 Rain: Light shower Humidity: 70%

2.2.3 The surveyors were positioned to ensure that all potential access points and roost features were viewed; see Figure 2, Section 7 for a plan showing surveyor positions.

2.2.4 Bat activity was recorded using EM Touch and EM Touch 2 PRO detectors connected to iPhones, iPads, and Android tablets. Information recorded during the surveys included points of emergence and re-entry (if any), species, number of bats, flight direction and behaviour (e.g. commuting, foraging). A bat pass was defined as a series of calls separated by more than one second from another call or series of calls.

2.2.5 Sonogram recordings were analysed using Kaleidoscope software to confirm species against reference measurements. The parameters used for analysis of calls are provided in Appendix 2. Where possible bats were identified to species level. Bats within the genus *Myotis* are grouped together as it is difficult to accurately identify these bats to species level due to the overlap in call characteristics (Collins, 2016). In some habitats, particularly cluttered environments, the calls of common and soprano pipistrelle overlap and in this instance bats are recorded as *Pipistrellus* species, referring to common or soprano pipistrelle only. Additionally, the call characteristics of large bat species (noctule, Leisler's bat, and serotine) sometimes overlap, and where identification was unclear these are grouped. Any unclear sonograms are recorded as unknown bat species.

2.3 DNA Analysis

2.3.1 A sample of scattered bat droppings present on the floor and on top of stored items within the eastern part of the interior of Building A was taken on the 18th of September, following good practice guidance protocol for the collection of bat droppings for DNA analysis (Collins, 2016).

2.3.2 The sample of bat droppings was sent to EcoWarwicker Ecological Forensics at the University of Warwick for DNA analysis to confirm the species.

2.1 Building Inspections

2.1.1 Visual inspections of the interior of Building A were undertaken before the dusk emergence surveys and after the dawn re-entry survey to look for evidence of bats. The inspections involved an internal survey of the building using a high-powered torch (Clulite 1 million candle power) to look for the presence of, and evidence for, bats (e.g. carcasses, droppings, urine, grease marks, feeding remains, squeaking etc.)

2.2 Limitations

2.2.1 There were no limitations to the surveys, with all potential access points and roost features watched. Bat foraging and commuting activity was recorded during the surveys which showed that bats were active at the time of the surveys.

3 Results

3.1 Dusk Survey (12/07/2023)

3.1.1 **No bats emerged from or entered the buildings.**

3.1.2 Refer to Table 3-1 for a summary of bat foraging and commuting activity recorded during the survey.

Table 3-1: Bat foraging and commuting activity summary

Species	Time of Earliest Pass	Minutes After Sunset	Average Emergence Time and Range[1]	General Observations
Common pipistrelle	21:57	32	24.8 minutes after sunset (average). 6.9 – 42.7 minutes after sunset (range).	Many[2] passes were recorded during the survey, which were both heard and seen and heard but not seen. Some passes were recorded within the known emergence time for this species and are indicative of the possible presence of a nearby roost.
Long-eared species	22:01	36	**Grey long-eared:** 36 – 39 minutes after sunset (average). 20 – 52 minutes after sunset (range). **Brown long-eared:** 54 – 61.7 minutes after sunset (average). 29 – 94 minutes after sunset (range).	Few[2] passes were heard and seen of bats foraging around Building A. The passes were within the known emergence time for both long-eared bat species and are indicative of the possible presence of a nearby roost.
Noctule	21:47	22	0.2 minutes before sunset – 7 minutes after sunset (average). 16 minutes before sunset – 31 minutes after sunset (range).	Several[2] passes were heard but not seen during the survey. Passes were recorded within the known emergence time for this species and are indicative of the possible presence of a nearby roost.
Serotine	22:17	52	11.6 minutes after sunset (average). 3.9 – 19.3 minutes after sunset (range).	Several[2] passes were recorded during the survey, which were both heard and seen and heard but not seen. The timing of the earliest pass was outside of the known emergence time range for this species and is considered unlikely to be indicative of the presence of a nearby roost.

[1]Emergence time range based on data summarised in Andrews Ecology (2017).
[2]Few passes < 3, several passes 3- 10, many passes 10+.

3.2 Dawn Survey (22/08/2023)

Building A

3.2.1 **Two long-eared bats were seen foraging within the building before emerging from a window aperture on the south-eastern elevation; one bat emerged at 05:21 and the second bat emerged at 05:36. See Figure 3-1 for a photograph showing the emergence location.**

Figure 3-1: Long-eared bat emergence location Building A (red arrow)

Building B

3.2.2 **One common pipistrelle entered under timber cladding on the south-eastern elevation of the building at 05:40. See Figure 3-2 for a photograph showing the re-entry location.**

Figure 3-2: Common pipistrelle re-entry Building B (red arrow)

3.2.3 Refer to Table 3-2 for a summary of bat foraging and commuting activity recorded during the survey.

Table 3-2: Bat foraging and commuting activity summary

Species	Time of Latest Pass	Minutes Before Sunrise	Average Known Re-entry Time and Range for the Species[1]	General Observations
Common pipistrelle	05:44	23	177.7 minutes before sunrise (average). 289.5 - 66.1 before sunrise (range).	Many[2] passes were recorded during the survey, which were both heard and seen and heard but not seen. Bats were observed foraging and commuting around both buildings.
Long-eared bat	05:36	31	**Grey long-eared bat:** 140 minutes before sunrise (average). **Brown long-eared bat:** 82.6 minutes before sunrise (average). 91.9 – 73.5 minutes before sunrise (range).	Several[2] passes were recorded both heard but not seen and seen and heard. Two bats were seen flying within Building A and emerged shortly before sunrise, indicative of the presence of a nearby day roost.
Myotis species	04:49	78	Various.	Few[2] passes were recorded during the survey, which were of bats which were heard and seen foraging in the vicinity of Building A. The timing of the passes may be indicative of the presence of a nearby roost.
Noctule	05:58	9	No data.	Many[2] passes were recorded during the survey, which were all heard but not seen. Passes were recorded close to sunrise which may be indicative of the presence of a nearby roost.
Serotine	05:21	46	309 – 9 minutes before sunrise (range).	Several[2] passes were heard but not seen during the survey. The timing of the passes may be indicative of the presence of a nearby roost.

[1]Re-entry time range based on data summarised in Andrews Ecology (2017).
[2]Few passes < 3, several passes 3- 10, many passes 10+.

3.3 Dusk Survey (18/09/2023)

Building A

3.3.1 **A total of four long-eared bats emerged from a window aperture on the south-eastern elevation, with emergences at 19:43, 19:44, 19:47, and 20:00. See Figure 3-3 for a photograph showing the emergence location.**

Figure 3-3: Long-eared bat emergence location Building A (red arrow)

Building B

3.3.2 **No bats emerged from or entered the building.**

3.3.3 Refer to Table 3-3 for a summary of bat foraging and commuting activity recorded during the survey.

Table 3-3: Bat foraging and commuting activity summary

Species	Time of Earliest Pass	Minutes After Sunset	Average Emergence Time and Range[1]	General Observations
Common pipistrelle	19:44	26	24.8 minutes after sunset (average). 6.9 – 42.7 minutes after sunset (range).	Several[2] passes were recorded during the survey, all of which were heard but not seen. Passes were recorded within the known emergence time for this species, and are indicative of the possible presence of a nearby roost.

Species	Time of Earliest Pass	Minutes After Sunset	Average Emergence Time and Range[1]	General Observations
Long-eared species	19:43	25	**Grey long-eared:** 36 – 39 minutes after sunset (average). 20 – 52 minutes after sunset (range). **Brown long-eared:** 54 – 61.7 minutes after sunset (average). 29 – 94 minutes after sunset (range).	Several[2] passes were recorded during the survey, which were both heard but not seen and heard and seen. Passes were recorded within the known emergence time range for both long-eared bat species and bats were seen emerging from Building A.
Noctule	19:43	25	0.2 minutes before sunset – 7 minutes after sunset (average). 16 minutes before sunset – 31 minutes after sunset (range).	Few[2] passes were heard but not seen during the survey. Passes were recorded within the known emergence time for this species and are indicative of the possible presence of a nearby roost.

[1]Emergence time range based on data summarised in Andrews Ecology (2017).
[2]Few passes < 3, several passes 3- 10, many passes 10+.

3.4 DNA Analysis

3.4.1 Analysis of the sample of bat droppings taken from the eastern part of the interior of Building A confirmed that these had been deposited by brown long-eared bat(s). Refer to Appendix 3 for a letter confirming the results of the DNA analysis.

3.5 Building Inspections

3.5.1 Approximately 50 bat droppings, some of which appeared to be recent (dark and intact), and scattered butterfly and moth wings (indicative of bat feeding) were noted on the floor and on top of stored items approximately below the ridge in the eastern part of Building A during the building inspections.

4 Evaluation

4.1 Legislation and Planning Policy

4.1.1 All bat species and their roosts are protected by the Conservation of Habitats and Species Regulations 2017 (as amended) and the Wildlife and Countryside Act 1981 (as amended); see Table 4-1.

Table 4-1: Legal implications of legislation with regard to bats

Legislation	Legal Implications
Conservation of Habitats and Species Regulations 2017 (as amended)	It is illegal to: • Deliberately capture, injure or kill bats. • Deliberately disturb[1] bats. • Damage or destroy a breeding site or resting place[2].
Wildlife and Countryside Act 1981 (as amended) – sub-sections 9(4) b and c and 9(5) only	It is illegal to: • Intentionally or recklessly disturb bats while they are occupying a structure or place of shelter or protection[2]. • Intentionally or recklessly obstruct access to a structure or place of shelter or protection[2].

[1] Disturbance under the Conservation of Habitats and Species Regulations 2017 (as amended) is defined as impairing the ability of an animal to survive, breed, reproduce, rear or nurture their young, hibernate or migrate, or to significantly affect the local distribution or abundance of the species.

[2] Bat roosts are any structure or place used for breeding, shelter or protection and are protected even when bats are not present.

4.1.2 A EPS licence is required if works affect bats or their roosts. EPS licences are issued by Natural England only after the following three tests have been satisfied:

- The proposed works must be for the purpose of preserving public health or safety or other imperative reasons of overriding public interest.
- There is no satisfactory alternative to the proposed works.
- The proposed works will not be detrimental to the maintenance of the species concerned at a favourable conservation status in their natural range.

4.1.3 Additionally, barbastelle, Bechstein's bat, brown long-eared, greater horseshoe, lesser horseshoe, noctule, and soprano pipistrelle bats are designated as species of principal importance (priority species) under the Natural Environment and Rural Communities Act 2006. Section 40 of this Act places a duty on local planning authorities to '*have regard*' to conserving these species when determining planning applications.

4.1.4 Paragraph 174 of the National Planning Policy Framework (NPPF) 2023 states that planning decisions should protect sites of biodiversity value, minimise biodiversity impacts, and contribute to net biodiversity gains. Paragraph 180 states that planning permission should be refused if significant harm to biodiversity resulting from a development cannot be avoided, adequately mitigated, or, as a last resort, compensated for. The NPPF also emphasises the need to protect priority species.

4.2 Roost Characterisation

4.2.1 The surveys and DNA analysis have identified that the following roosts are present within the buildings:

- Brown long-eared night feeding roost used by low numbers of bats within Building A (maximum of two bats). Roost site on roof support timbers in the eastern section of the building. Brown long-eared bats have a widespread distribution in southwest England and the roost is assessed to be of site value (Reason and Wray, 2023).
- Brown long-eared day roost used by low numbers of bats within Building A (maximum of four bats). Roost site between lath and plaster/bitumen felt and roof tiles, in wall cavities, or at wall tops. Brown long-eared bats have a widespread distribution in southwest England and the roost is assessed to be of site value (Reason and Wray, 2023).
- Common pipistrelle day roosts used by low numbers of bats (maximum of one bat). Roost site is a gap behind timber cladding on the south-eastern elevation. Common pipistrelles are widespread in southwest England and the roost is assessed to be of site value (Reason and Wray, 2023).

4.3 Impact Assessment

Roosting Bats

4.3.1 Without mitigation, the proposed works would destroy a brown long-eared night feeding roost and day roost, and a common pipistrelle day roost. See Table 4-2 for an impact assessment.

Table 4-2: Impact assessment

Species and Roost Type	Value of Roost (from Table 3.2 in Reason and Wray, 2023)	Impact	Likely Significance Before Mitigation
Brown long-eared - night feeding roost (maximum of two bats)	Site	Roost will be lost due to the proposed conversion of the building.	Site
Brown long-eared - day roost (maximum of four bats)	Site	Roost will be lost due to the proposed conversion of the building.	Site
Common pipistrelle - day roost (maximum of one bat)	Site	Roost will be lost due to the proposed conversion of the building.	Site

4.3.2 Additionally, if bats were present at the time of works then bats could be killed or injured.

Foraging and Commuting Bats

4.3.3 Foraging and commuting passes by common pipistrelles, long-eared bats, *Myotis* species of bats, noctules, and serotines were recorded during the surveys.

4.3.4 If additional external artificial lighting was installed on the site then commuting and foraging bats could be disturbed.

5 Mitigation & Enhancements

5.1 Mitigation - Roosting Bats

EPS Licence

5.1.1 A EPS mitigation licence must be obtained from Natural England to permit the proposed works to Buildings A and B to proceed. No works that would impact upon bats accessing and using roosts within the buildings can proceed until a EPS licence has been obtained. The licence can only be applied for after planning permission has been granted and any relevant ecological conditions have been discharged. The licence will require detailed information on mitigation measures and must be prepared by a licensed bat ecologist. Natural England typically take up to 30 working days to process licence applications. **Licence applications require survey data from the most recent survey season, and so an application would need to be made by April 2024 to ensure that Natural England do not require one or more update dusk survey to be carried out.**

5.1.2 A summary of the mitigation measures which would be included within the EPS mitigation licence application are provided below. This mitigation will ensure that bats are protected and the favourable conservation status of the bat population is maintained.

Careful Working Methods

Timing

5.1.3 Brown long-eared bats often roost in buildings that they also use during the active period for roosting. Therefore, as a precautionary measure, works to Building A must be carried out during the bat active period (between May and September inclusive) to ensure that there is no potential for impacts on hibernating bats.

Installation of Bat Boxes

5.1.4 One improved crevice bat box (suitable for common pipistrelles) and one improved cavity bat box (suitable for brown long-eared bats) will be installed on trees or the exterior of a nearby building on or close to the site before works begin. The locations will be advised by the named ecologist or accredited agent when on-site. The bat boxes will be used to relocate any common pipistrelle or brown long-eared bats found during pre-works inspection of the buildings and during soft-strip, and will be retained in the long-term to provide a biodiversity enhancement. The bat boxes will be installed at least 3 m above ground level and facing either south, south-east or south-west so that they are exposed to sun for part of the day.

Toolbox Talk

5.1.5 The named ecologist or accredited agent will provide a Toolbox Talk to contractors before works commence to make contractors aware of the presence of bat roosts in the buildings, the legal protection afforded to bats, the careful working practices required, and what to do in the event that a bat is found.

Pre-Works Inspection

5.1.6 The interior of the buildings will be inspected by the named ecologist or accredited agent immediately prior to works commencing. If a brown long-eared or common pipistrelle bat is found and can be safely captured by hand it will be captured, placed in a muslin bag, and transferred to the pre-installed bat box.

5.1.7 If a brown long-eared or common pipistrelle bat is seen but cannot be safely captured, then a soft-strip approach will be implemented to dismantle the feature used for roosting. If soft-strip is not suitable/possible then the ecologist will place a standard one-way exclusion device over the entrance (see below).

Exclusion of Bats

5.1.8 If brown long-eared or common pipistrelle bats are found during the pre-works inspection in a crevice or cavity which cannot be safely dismantled using the soft-strip approach, or the absence of bats from any crevices or cavities cannot be conclusively determined, then the ecologist will install a standard one-way excluder. These excluders will be left in place for at least five nights of relatively warm and dry weather (not during periods of heavy rain/wind or if <8°C) and then removed. The crevices or cavities will then be re-inspected by the ecologist and if bats are absent, the crevice/cavity will be dismantled using a soft-strip approach (see below). If bats are still present then the excluders will be left in place for a further three nights.

Ecological Supervision of Soft-Strip

5.1.9 All areas with the potential for bats to be present (e.g. under roof tiles, behind timber cladding) will be carefully dismantled by contractors by hand under the supervision of the named ecologist or accredited agent. All material will be lifted vertically away, without using a sliding motion, and checked for the presence of bats. Any brown long-eared or common pipistrelle bats present will be captured by hand or hand-held net by the ecologist, placed in a muslin bag and relocated to the pre-installed bat boxes. All contractors will wear gloves when carrying out the soft-strip.

Compensatory Roost Provision

Brown Long-eared Day Roost

5.1.10 A dedicated bat loft will be provided within Building B for brown long-eared bats. The bat loft will be approximately 5.6 m wide, 7.9 m long and 1.9 m high.

5.1.11 A series of rough-sawn timber batons will be installed on the underside of rafters near the roof apex and further down the roof to provide a range of perches. A rough-sawn timber baton will also be installed under the ridge. Triangular sterling board partitions will be installed within the roof to provide a range of microclimates for roosting. All new timber used will be untreated and bitumen roofing felt (type 1F) or TLX BATSAFE breathable membrane will be used beneath roof tiles within the bat loft as bats can get entangled within breathable roofing membranes. Two Improved Cavity Bat Boxes will be fitted to the walls within the bat loft.

5.1.12 Two roof tile access tiles will be provided on the south-facing roof slope of Building B to permit bats access into the roof space; see Appendix 4. Gaps at least 100 mm wide and 20 mm high will be created in the bitumen roofing felt (type 1F) or TLX BATSAFE breathable membrane close to, but not immediately behind, the bat access tiles, so that bats can access the roof space.

5.1.13 A hatch into the bat loft will be provided to allow access into the roost for monitoring (as required) which will be locked and the key left with the owner. A permanent sign stating that the roof space is a bat roost and must not be entered without a licence will be put on the hatch.

Brown Long-eared Night Feeding Roost

5.1.14 A compensatory night/feeding roost will be erected to the south-east of Building A, close to a hedgerow; see Appendix 4 for a plan showing the location of the proposed night feeding roost structure. The structure will be at least 1.0 m wide, 2.0 m long and 2.5 m high to the roof apex. The entrance into the interior will be 750 mm wide and 500 mm high. To ensure that there is potential for bats to hang from the roof, rough sawn timber rafters will be installed as these provide greater purchase for bats to grip onto. A diagram showing the indicative specification of the night roost design is provided in Figure 5-1.

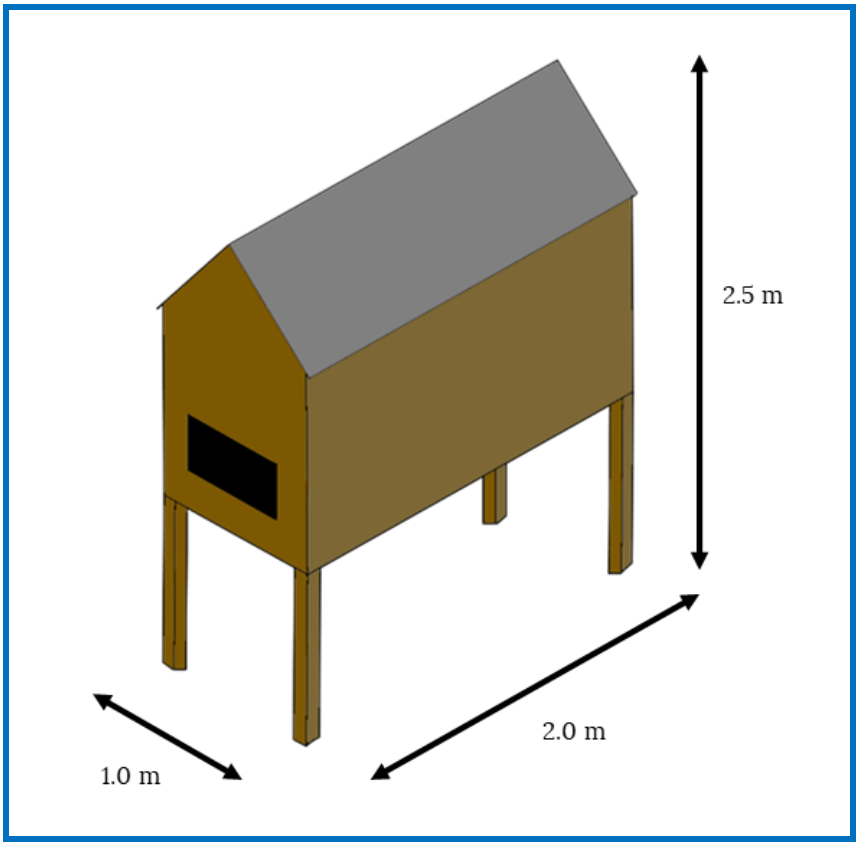

Figure 5-1: Indicative night roost specification

Common Pipistrelle Day Roost

5.1.15 One Vivara Pro Build-in Woodstone bat tube will be integrated into the south-eastern elevation of Building B; see Appendix 4.

5.2 Mitigation - Foraging & Commuting Bats

5.2.1 To avoid impacts on foraging and commuting bats it is recommended that additional external lighting is not installed unless absolutely essential. If external lighting is essential, then it is recommended that the number of lights installed is kept to a minimum and that warm-white (long wavelength, not UV) LED lights are used, and motion sensors on short-duration timers and high motion threshold are fitted (e.g. so that moths do not set them off).

5.3 Enhancements

5.3.1 The improved crevice bat box and improved cavity bat box which will be installed to relocate any bats found during the pre-works inspection of the buildings and soft-strip of roost features will be retained in the long-term to provide an enhancement for bats.

6 References

Andrews Ecology (2017). A *Review of Empirical Data in Respect of Emergence and Return Times Reported for the UK's 17 Native Bat Species*. Andrews Ecology, Bridgwater.

British Standards Institute (BSI) (2013). *BS4202 Biodiversity – A code of practice for planning and development*. BSI, London.

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

Reason, P.F. and Wray, S. (2023). *UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation and compensation for developments affecting bats*. Chartered Institute of Ecology and Environmental Management, Ampfield.

Russ, J. (2012). *British Bat Calls: A Guide to Species Identification*. Pelagic Publishing, Exeter.

Smart Ecology (2023). *Preliminary Bat Roost Assessment and Nesting Bird Survey Report, Woodhouse Farm, Fernhill, Almondsbury, Bristol, BS32 4LU*. Smart Ecology Ltd., Woolaston.

7 Figures

Figure 1 – Location Map

Figure 2 – Surveyor Positions Plan

Figure 1 - Location Map

Woodhouse Farm,
Fernhill,
Almondsbury,
Bristol,
BS32 4LU

Building A
Building B

Date:	24/07/2023
Drawn by:	Robert Dunn
Checked by:	Rachel Barber

Smart Ecology\Projects\2023\2023-044\GIS

smart ecology

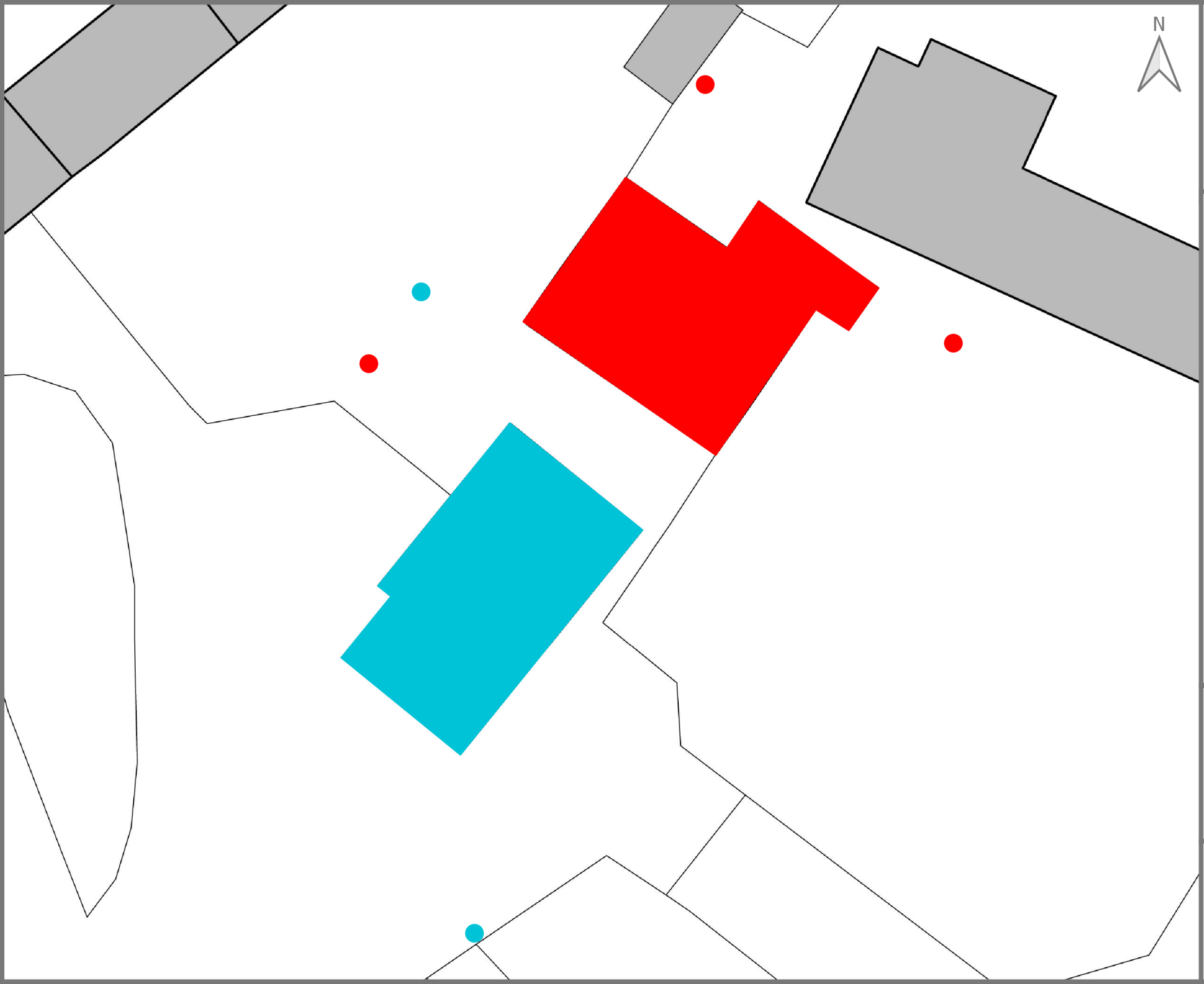

Figure 2 - Surveyor Positions Plan

Woodhouse Farm,
Fernhill,
Almondsbury,
Bristol,
BS32 4LU

Building A

Building B

Surveyors (Building A)

Surveyors (Building B)

Base plan supplied by the client

Date:	02/11/2023
Drawn by:	Robert Dunn
Checked by:	Vikki Neville

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smart ecology

Appendix 1 – Proposed Plans

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Proposed parking plan
Scale 1:200

DAVID JAMES design

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Well House, The Chipping, Wotton-under-Edge
Gloucestershire, GL12 7AD

T. 01453 843720 | W. david-james.co.uk | E. Design@david-james.co.uk

Project Title:

Lower Woodhouse Farm
- Proposed Plans

Client:

Mr Mark Roper

Address:

Lower Woodhouse Farm
Fernhill, Almondsbury,
Bristol, BS32 4LU

Revisions:

Ref.	Date.	Revision.
A	05.09.23	Revision to car parking

Drawing status:

PLANNING

NOTES:

The contractor is to check and verify all building and site dimensions, levels, services and sewer invert levels at connection points before work commences.

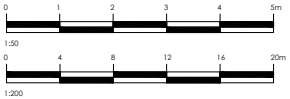
Use only figured dimensions and any discrepancies to be reported immediately to author.

This drawing is to be read with and checked against any structural or other specialist drawings.

The contractor is to comply in all respects with current Building Regulations and relevant British Standards / codes of practice whether specifically stated on this drawing or not.

Use of this drawing does not absolve the client from their responsibility under Health and Safety: Construction (Design and management) regulations 2015.

Scale Bars:



Bin and recycling store

Standard parking space
- 4.8 x 2.4m

Scales @ A1:
1:200

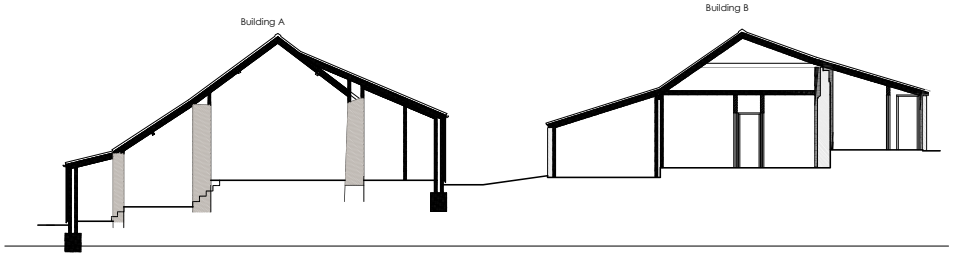
Drawn By:
IM

Date:
August 2023

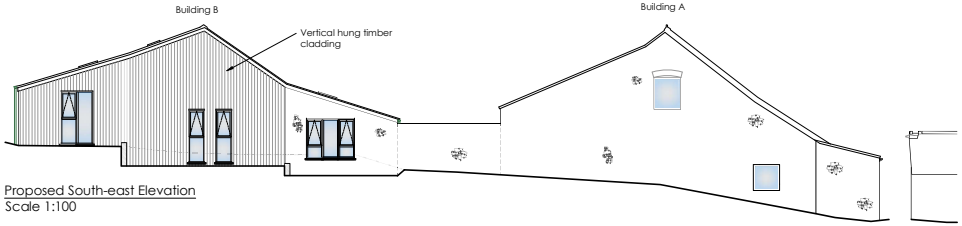
Rev:
A

Drawing No.

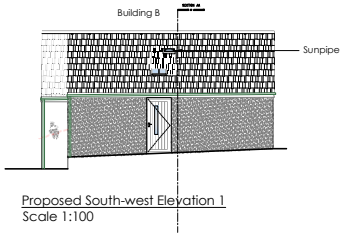
71632/01/105



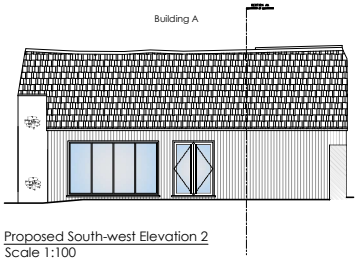
Section AA
Scale 1:100



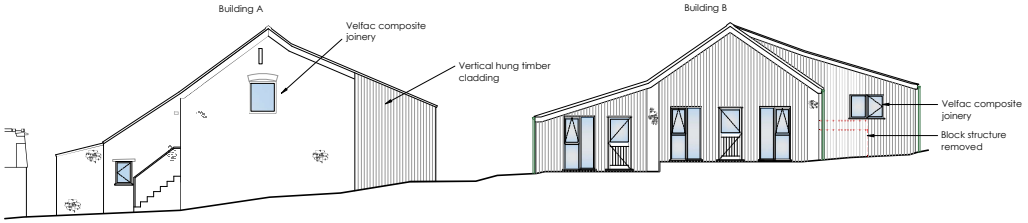
Proposed South-east Elevation
Scale 1:100



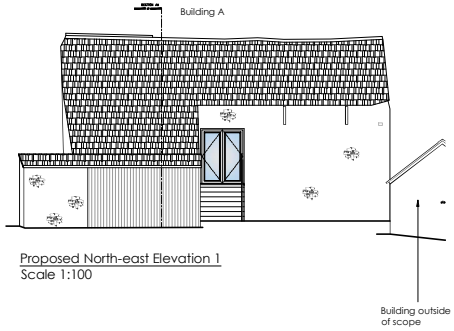
Proposed South-west Elevation 1
Scale 1:100



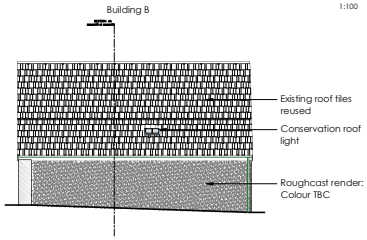
Proposed South-west Elevation 2
Scale 1:100



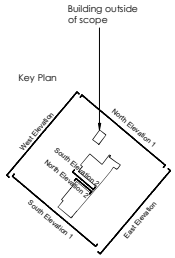
Proposed North-west Elevation
Scale 1:100



Proposed North-east Elevation 1
Scale 1:100



Proposed North-east Elevation 2
Scale 1:100



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Project Title:
Lower Woodhouse Farm
- Proposed Elevations

Client:
Mr Mark Roper

Address:
Lower Woodhouse Farm
Fernhill, Almondsbury,
Bristol, BS32 4LU

Revisions:

Ref.	Date.	Revision.
A	29.08.23	Minor revision to plot sheet

Drawing status:
PLANNING

NOTES:

The contractor is to check and verify all building and site dimensions, levels, services and sewer invert levels at connection points before work commences.

Use only figured dimensions and any discrepancies to be reported immediately to author.

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Scale Bars:

0 2 4 6 8 10m
1:100

Scales @ A1:
1:100

Drawn By:
ISM / IM

Date:
August 2023

Rev:
A

Drawing No.
71632/01/110

Appendix 2 – Sonogram Parameters

The peak frequency measurements used to differentiate between species are shown below. Where further analysis was required additional measurements (inter-pulse interval, call duration and minimum and maximum frequency) were also taken and compared to reference parameters cited in Russ (2012).

Species	Peak Frequency (kHz)		Notes
	Min	Max	
***Pipistrellus* species**			
Common pipistrelle	≥42	<49	
Soprano pipistrelle	≥ 52	-	
Nathusius' pipistrelle	35	≤41	
Common/Soprano pipistrelle	≥49	<52	
Nathusius'/Common pipistrelle	>41	<42	
Large bat species			
Noctule	≥17	≤26	Some calls below 20 kHz
Leisler's bat	>20	≤51	All calls above 20 kHz.
Serotine	≥26	≤42	

Appendix 3 – DNA Result Letter

WARWICK
THE UNIVERSITY OF WARWICK

EcoWarwicker
Ecological Forensics

9 October 23

Re: Identification Results for Joseph Wilkie, Smart Ecology Ltd

Job number 20256, received 25 September 2023
Sample labelled: 2023-044- Woodhouse Farm, Fernhill, Almondsbury, Bristol, BS32 4LU. 18/9/23
PCR amplification successful. DNA sequence:
ATGACCAACATTCGAAAGTCCCACCCTCTCATAAAAATTATCAATGACTCATTCATTG
ACTTACCTGCTCCCTCAAATATTTCATCATGATGAAACTTTGGATCTCTTCTAGGCATT
TGCC

Phylogenetic analysis identification: *Plecotus auritus*

Confirmed by maximum likelihood, maximum parsimony, bootstrap 100%.

Best regards,

Professor Robin Allaby

The results and conclusions in this report are based on an investigation of mtDNA sequence analysis. The results obtained have been reported with accuracy. The interpretation represents the most probable conclusion for the DNA sequence obtained rather than the sample provided given current levels of species data. It should be borne in mind that different circumstances might produce different results. Therefore, care must be taken with interpretation of the results especially if they are used as the basis for commercial recommendations.

Professor Robin Allaby

School of Life Sciences,
Gibbet Hill Campus,
University of Warwick,
Coventry CV4 7AL
Tel: 02476575059
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Email: r.g.allaby@warwick.ac.uk

Appendix 4 – Compensatory Roosts Plans

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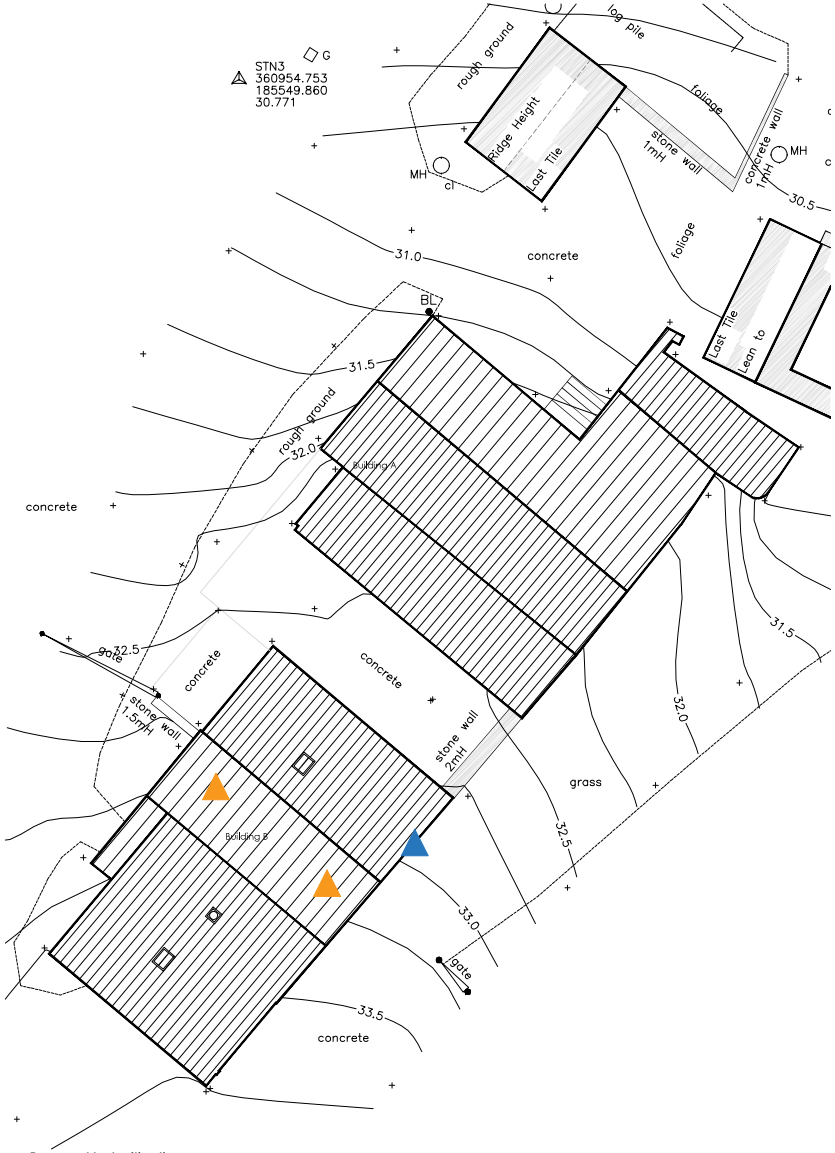

Proposed bat mitigation measures
Scale 1:100

Proposed bat mitigation measures
Scale 1:200

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Project Title:
Lower Woodhouse Farm
- Proposed bat mitigation

Client:
Mr Mark Roper

Address:
Lower Woodhouse Farm
Fernhill, Almondsbury,
Bristol, BS32 4LU

Revisions:
Ref. Date. Revision.
. . .

Drawing status:
PLANNING

NOTES:

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Scale Bars:

0 4 8 12 16 20m
1:200

0 2 4 6 8 10m
1:100

Long-eared Bat mitigation: day roost accessed by 2 No roof access tiles

Common Pipistrelle Bat mitigation: Vivara Pro build-in woodstone bat tube

Long-eared Bat mitigation: Cathdine night roost located by hedge line

Scales @ A1: 1:100 & 1:200
Drawn By: IM
Date: October 2023
Rev: .

Drawing No.
71632/01/150