



The Ecology Co-op

ENVIRONMENTAL CONSULTANTS

Building B, Lords Wood Barns, Petworth, GU28 9BS

Tel: 01798 861 800 - E-Mail: info@ecologyco-op.co.uk - Web: www.ecologyco-op.co.uk

Bat Survey Report

Site Name

Ragstone

Issue Date

16th August 2023

Client

Mr Mark Ayton

Author

Nik Neale

Project No: P5339

The Ecology Co-operation Ltd

Registered Office: Greens Court, West Street, Midhurst, West Sussex, GU29 9NQ

Company number: 8905527





Document Control

Issue No	Author	Reviewer	Issue Date	Additions/alterations	Notes
Original	Nik Neale BSc	Kate Priestman, MCIEEM, CEnv	16 th August	N/A	

Conditions of Use

This report has been prepared by The Ecology Co-operation Ltd, with all reasonable skill, care and diligence within the terms of the Contract with the client. This report only becomes the property of the client once payment for it has been received in full.

We disclaim responsibility to the client and others in respect of any matters outside the scope of the above.

This report is confidential to the client, and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.

About the Author

This report has been prepared by Nik Neale, an Assistant Ecologist at The Ecology Co-op. He has been involved with, and managed various bat emergence and activity surveys, bat scopings, and bat scoping reports. As a Qualifying member of the Chartered Institute for Ecology and Environmental Management (CIEEM) he is bound by their code of professional conduct.

About the Reviewer

This report has been reviewed by Kate Priestman, who is a Principal Ecologist with over twenty years' experience. Kate has undertaken bat survey work and reporting, and prepared European Protected Species licences for numerous schemes. As a Full member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and a Chartered Environmentalist (CEnv), she is bound by CIEEM's code of professional conduct.



Report Summary

Purpose	The Ecology Co-op was commissioned by Mark Ayton to undertake three bat emergence surveys at Ragstone, further to a proposal to partially demolish the main residential dwelling and construct a new replacement detached residential dwelling.
Context	The site currently comprises a large double storey residential house and a detached garage. A previous PEA survey of the site identified bat potential associated with crevices identified under loose hanging tiles, displaced roof tiles and gaps around the eaves of both the main house and the detached garage. Based on the above assessment and in line with Bat Conservation Trust Guidelines, three bat emergence survey visits were carried out between 9 th May and 6 th July 2023 to determine the presence of roosting bats and evaluate the conservation importance of the site for bats. The purpose of this survey work was to provide advice to inform a planning application/European Protected Species (EPS) licence application for the partial demolition of the existing residential dwelling and the construction of a new replacement detached residential dwelling.
Key findings	Common pipistrelle <i>Pipistrellus pipistrellus</i> bats were the most frequently observed bats during the survey visits. Soprano pipistrelle <i>Pipistrellus pygmaeus</i> , and <i>Myotis</i> sp. have also been recorded as using the site for commuting purposes. Common pipistrelle bats were recorded emerging from around the bay window at the front of the house (eastern aspect), as well as from the roof tiles (south-western aspect), and from loose tiles on the garage. Emergences were recorded on all three surveys, including the presence of a common pipistrelle bat maternity roost on the first survey, with a total of 23 bats identified emerging from a single roost location.
Interpretation	The surveys indicate that a small number of common pipistrelles use the property as a roost site, the surrounding grounds are used as foraging habitat.
Recommendations	As the proposed development involves the partial demolition of the existing residential building, the destruction of the roost features used by bats cannot be avoided, and in the absence of mitigation, this could potentially result in harm to individual bats. Therefore, a European Protected Species (EPS) licence will be required for the development to legally proceed. Based on the results of the survey, this development will be eligible for adding to the 'bat mitigation class licence' issued by Natural England and held by certain qualified bat ecologists.



CONTENTS PAGE

1	INTRODUCTION	1
1.1	Background	1
1.2	Purpose of the Report	1
2	LEGAL PROTECTION	1
3	METHODOLOGY	2
3.1	Limitations to Emergence Surveys	3
4	RESULTS	4
4.1	Bat Emergence Surveys	4
4.1.1	<i>Survey Conditions</i>	4
4.1.2	<i>Bat Emergence Results</i>	4
•	<i>9th May 2023</i>	5
•	<i>30th May 2023</i>	5
•	<i>6th July 2023</i>	5
5	IMPACT ASSESSMENT AND MITIGATION RECOMMENDATIONS	5
5.1	Interpretation of Findings	5
5.2	Potential Impacts	6
5.3	Outline Mitigation Measures	6
5.4	Conclusions	7
	APPENDIX 1 – LEGISLATION AND POLICY	8
	APPENDIX 2 – EMERGENCE SURVEY RESULTS	9
	APPENDIX 3 – EXAMPLES OF BESPOKE BAT ROOSTING FEATURES	11
	APPENDIX 4 – REDUCING IMPACTS OF ARTIFICIAL LIGHT	12



1 INTRODUCTION

1.1 Background

The owners of Ragstone intend to submit a planning application for a proposed partial demolition of the main residential dwelling and the construction of a new replacement detached residential dwelling, with associated hard and soft landscaping.

The full address for the site is Knatts Valley, Sevenoaks, Kent TN15 6YE. The central National Grid Reference for this site is TQ 55615 62908.

The Ecology Co-op undertook a bat scoping and Preliminary Ecological Appraisal (PEA) assessment of the existing buildings in September 2022 during which several features were identified that were suitable to support roosting bats including crevices identified under loose hanging tiles, displaced roof tiles and gaps around the eaves of both the main house and the detached garage. The roof void in the main residential building has been confirmed as a bat roost through the identification of droppings¹.

Overall, the buildings were assessed as having high potential to support crevice dwelling bats and in accordance with current best practice guidelines², a minimum of three emergence surveys were recommended to determine the presence of roosting bats and evaluate the conservation importance of the site for bats. At the time of writing, the final development plans are the construction of a replacement dwelling, plans for the current house and garage were unavailable to comment upon which area/s of the building/s would be impacted upon.

1.2 Purpose of the Report

In accordance with recommendations, bat emergence surveys were carried out by The Ecology Co-op between 9th May and 6th July 2023 led by Dan Bennett, a Full member of the Chartered Institute of Ecology and Environmental Management and licensed bat surveyor (class licence level 2: 2016-27499-CLS-CLS).

The purpose of this survey work was to determine presence of roosting bats and where necessary prescribe further surveys and/or appropriate mitigation advice to inform the planning application for the proposed development at the site.

These surveys and report were carried out at the request of Mark Ayton.

2 LEGAL PROTECTION

Details of legislation and legal protection afforded to all species of British bats are given in Appendix 1.

The results of this survey will be used to determine the need for an appropriate mitigation strategy to ensure compliance with UK and EU wildlife legislation.

¹ The Ecology Co-op (2022) Preliminary Ecological Appraisal - Ragstone, Knatts Valley, Sevenoaks, Kent.

² Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). Bat Conservation Trust, London.



3 METHODOLOGY

Three emergence surveys were undertaken on the 9th May, 30th May and 6th July 2023, using the methodology set out in the best practice guidelines prepared by the Bat Conservation Trust.

The surveys focused upon both buildings. The southern and western elevations of the house had features provided by lifted hanging tiles, damaged roof tiles, and raised lead flashing. The eastern elevation of the house had features provided by missing ridge tiles and crevice spaces near the eaves by the timber panels. The northern elevation of the house had features provided by lifted roof tiles and missing ridge tiles.

The garage has timber shiplap boards to the north, south, and west, providing crevice spaces under the eaves of the northern and southern gable ends. Roof tiles are lifted in areas providing crevice spaces.

Surveyor coverage for each survey is illustrated in Figure 1. From these positions, surveyors could see all features potentially suitable for roosting bats that were identified during the initial bat scoping survey.

The surveyors recorded any bat activity on or around the potential roosting entry/exit features identified during the scoping survey, using full spectrum handheld bat detectors to identify species through call frequencies. The bat calls were logged and recorded as sonograms for later confirmation of species where necessary.

The following equipment was used to support this survey:

- 5 x Echometer Touch 2/Pro detectors with Apple/Samsung recording devices
- 1 x Sony AX53 night vision camera, paired with a Nightfox XB10 IR spotlight torch with a focussed beam
- 1 x Canon XA20 night vision camera, paired with a Nightfox XB10 IR spotlight torch with a focussed beam
- 2 x infra-red flood lamps.

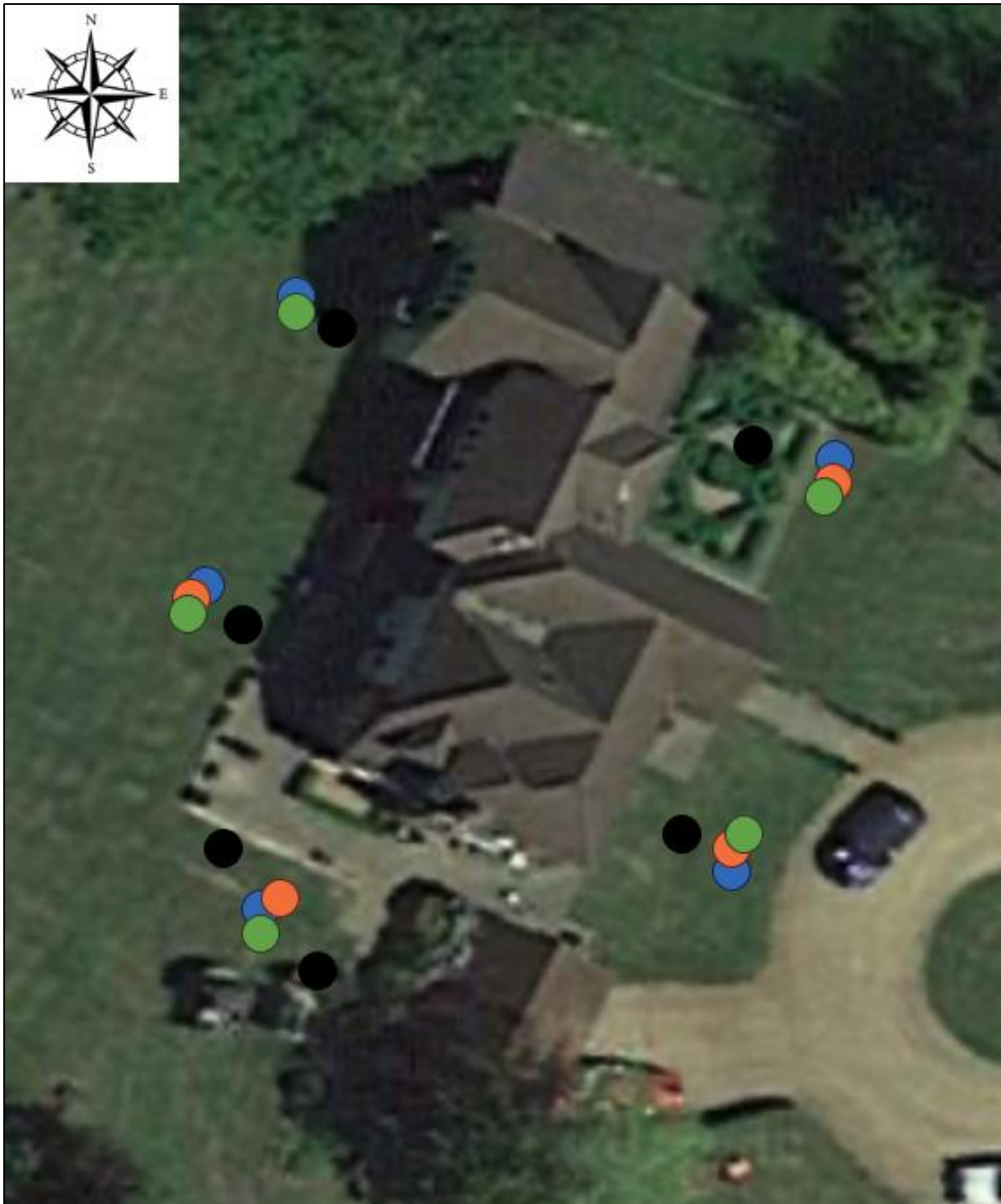


Figure 1. An aerial image of the site, showing the positions of surveyors for 9th May (blue dots), 30th May (orange dots), and 6th July (green dots). Night-vision cameras positioning also shown, two cameras with per survey with positioning changing between give points shown (black dots). Images produced courtesy of Google maps (map data ©2023 Google).

3.1 Limitations to Emergence Surveys

In accordance with best practice guidelines, each survey visit was undertaken during the peak period in bat activity and during good weather conditions. The results presented here are therefore considered to be an



accurate representation of the general use of the property by roosting bats.

Nevertheless, bats can use roosting features intermittently throughout the year and may be present in larger or smaller numbers depending on their breeding cycle, weather conditions, and in response to disturbance. These surveys record the emergence of bats at the time of the survey visits and therefore only provide a snapshot of bat roosting activity at the site at that time. Bats may be present at other times and the results should therefore be viewed with caution.

The first survey on 9th May was preceded by light rain, conditions improved from sunset and were clear for the remainder of the survey. The survey on 30th May had some windy conditions throughout, and activity was noted as lower than the first survey, this is likely to be because bats would be utilising more sheltered areas such as adjacent woodland and so they were not detected as frequently by surveyors. The abovementioned weather conditions may have affected the robustness of the second survey, however, the first and third survey and infra-red camera footage throughout all surveys provides confirmation of roosts on the main house. Radio contact was maintained throughout each survey between the surveyors, this ensured that bats were not counted twice, and emergences were noted only once.

4 RESULTS

4.1 Bat Emergence Surveys

4.1.1 Survey Conditions

The dates, times, weather conditions, temperatures and personnel for each survey visit are presented in Table 1 below:

Table 1. Details of surveys undertaken, timings weather conditions and personnel.

Date	Survey start time/end time	Temp. degrees centigrade, weather conditions throughout survey	Surveyors
9 th May 2023	Start time: 20:04 Sunset: 20:34 End time: 22:04	Max/min temp: 11–16°C. 100% cloud cover with light breeze (BF1), light rain showers at start but clearing after sunset.	Dan Bennett Rebecca Mortensen Nik Neale Federico Ghittoni Bella Friar
30 th May 2023	Start time: 20:33 Sunset: 20:03 End time: 23:33	Max/min temp: 11–14°C. 100% cloud cover with light breeze (BF2), dry.	Dan Bennett Rebecca Mortensen Nik Neale Xenia Snowman
6 th July 2023	Start time: 20:46 Sunset: 21:16 End time: 23:16	Max/min temp: 15–17°C. 5% cloud cover and still (BF0), dry.	Dan Bennett Rebecca Mortensen Nik Neale Rachael Cohen Bella Friar

4.1.2 Bat Emergence Results

The following descriptions summarise bat activity and emergence from the building for each survey visit. A



detailed table of results is presented in Appendix 2.

- **9th May 2023**

Common pipistrelle activity *Pipistrellus pipistrellus* was recorded throughout the survey across the house. Singular passes were recorded from soprano pipistrelle *Pipistrellus pygmaeus* and *Myotis sp.* Light rain was recorded prior to sunset, with mild conditions throughout the survey.

A total of twenty-four (minimum) common pipistrelle emergences were identified from the main house, and the garage. 23 emergences were recorded from the front of the house on the eastern elevation near the bay window around the wooden boarding, as well as the ridge tiles, and hanging tiles (see Figure 2). One emergence was recorded from the weatherboarding near the middle window on the garage southern elevation.

- **30th May 2023**

Low common pipistrelle activity was recorded throughout the survey across the house. Lots of the bats recorded were commuting from the woodland adjacent to the property and the gardens surrounding the property with brief passes or foraging for a short period of time. Singular passes were recorded from soprano pipistrelle and *Myotis sp.* Fairly windy and cold conditions, bats are likely to be utilising more sheltered areas during these weather conditions so could have been foraging in adjacent woodland areas.

A total of two common pipistrelle bat emergences were identified from the main house. Two emerging bats were recorded from the front of the house at seven minutes and nineteen minutes after sunset. Both bats were emerging from the hanging tiles on the right-hand side of the front window of the south-eastern elevation.

- **6th July 2023**

Common pipistrelle activity was recorded throughout the survey across the house. A pass was recorded from a *Nyctalus sp.* Weather conditions were mild throughout the survey.

A total of three common pipistrelle bat emergences were identified from the main house. One emergence of one bat was recorded from the hanging tiles on the south-eastern elevation at one minute before sunset. One emergence of one bat was recorded from the weatherboarding on the north-eastern elevation near the bay window at five minutes past sunset. One emergence of one bat was recorded from the gable end of the exposed timber at the north-western elevation at twenty-four minutes past sunset.

5 IMPACT ASSESSMENT AND MITIGATION RECOMMENDATIONS

5.1 Interpretation of Findings

Results from the three emergence surveys at Ragstone suggest the presence of multiple roost locations within both the main house and the garage. The Preliminary Ecological Appraisal that was carried out in October 2022 found evidence of a BLE roost within the roof void of the main residential dwelling, this internal roost void is associated with the left hand side of the bay window on the eastern elevation. The garage does not have a loft void as this space had been converted into living space. These roosts could be temporary night roosts, utilised by bats to emerge at dusk to feed.



5.2 Potential Impacts

At the time of writing, the final development plans are the construction of a replacement dwelling. Potential impacts could disturb roosting features such as loose, and missing tiles. This could cause destruction to a roost and even risk injuring or killing bats that are roosting. Any potential developments would need to consider a sensitive lighting scheme to cause limited disturbance to roosting bats.

The surveys have demonstrated that the property supports one common pipistrelle satellite maternity roost associated with the emergences around the bay window, one common pipistrelle day roost supporting two bats associated with the hanging tiles at the front of the house, and one common pipistrelle roost associated with the weather boarding on the southern elevation of the garage.

ABrown long-eared roost was identified during the PEA, but no emergences of BLE were noted during the surveys. This could be assumed to be a transitory roost or an occasional day roost.

5.3 Outline Mitigation Measures

As the proposed development involves the partial demolition of the existing residential building, the destruction of the roost features used by bats cannot be avoided and, in the absence of mitigation, this could potentially result in harm to individual bats. Therefore, a European Protected Species (EPS) licence will be required for the development to legally proceed.

As part of the licence application, a mitigation method statement will need to be prepared to demonstrate that the favourable conservation status of bats will be maintained through the life of the project. The possible measures that would be required to safeguard bats and achieve this are outlined below:

- Preparatory works – ‘soft strip’

All hanging/roof tiles should be carefully hand stripped one by one from the walls under the direct supervision of a licenced bat ecologist. Any bats found shall be gently captured and placed into bat boxes that have been secured to trees surrounding the site in advance.

- Timing

The hand stripping of tiles should be undertaken in the period between mid-March and the end of October to avoid disturbing bats that could be in hibernation. As no maternity roosts have been identified during the surveys of this property, avoiding the breeding period (May–August inclusive) is not considered necessary.

- Replacement roost site

The detailed design of the new building should incorporate integral bespoke bat roosting features. Purpose-built structures are commercially available, some recommended examples of which are shown in Appendix 3.

- Artificial lighting

The use of artificial lighting inappropriately can result in significant disturbance to bats. The detailed design should include a lighting scheme that minimises these impacts by following the Bat Conservation Trust’s guidance on lighting, reproduced in Appendix 4 of this report.



5.4 Conclusions

Surveys have indicated that the buildings are used as roost sites for the common pipistrelle bat *Pipistrellus pipistrellus*, the proposed development will impact on small numbers of common and widespread bat species and in the absence of mitigation is not considered significant to bat conservation beyond local level. The proposed mitigation measures outlined above will ensure that individual bats will not be harmed during the construction, and that alternative roosting opportunities are provided after completion. The applicants are confident that the three tests under Regulation 53 (2) (e) can be satisfied and an EPS licence can be obtained. As such, the planning authority can be satisfied that securing this mitigation and EPS licence under reserved matters will ensure that its duty to comply with the Conservation of Habitats and Species Regulations (2017) as amended, will have been fully met.

Should you need any further advice on the information provided above, please do not hesitate to contact The Ecology Co-op.



APPENDIX 1 – LEGISLATION AND POLICY

All species of British bat are fully protected under the Wildlife and Countryside Act 1981 as amended through inclusion in Schedule V. All bat species in the UK are also included in Schedule II of the Habitats Regulations 2010 which transpose Annex II of the Council Directive 92/43/EEC 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora (“EC Habitats Directive”) which defines European protected species of animals.

Bat species are afforded further protection by the Natural Environment and Rural Communities Act 2006.

Under the above legislation it is an offence to:

- kill, injure or take an individual;
- possess any part of an individual either alive or dead;
- intentionally or recklessly damage, destroy or obstruct access to any place or structure used by these species for shelter, rest, protection or breeding;
- intentionally or recklessly disturb these species whilst using any place of shelter or protection; or
- deliberate disturbance in such a way as to be likely to impair their ability to:
 - survive, to breed or reproduce, or to rear or nurture their young; or
 - in the case of animals of a hibernating or migratory species, to hibernate or migrate; or
 - to affect significantly the local distribution or abundance of the species to which they belong;
- keep (possess), transport, sell or exchange, or offer for sale or exchange, any live or dead bat, or any part of, or anything derived from a bat.

It is also an offence to set and use articles capable of catching, injuring or killing bats (for example a trap or poison), or knowingly cause or permit such an action. In the case all species of British bat there is also protection under Schedule 6 of The Wildlife and Countryside Act 1981 (as amended) relating specifically to trapping and direct pursuit of these species.

The Habitats Directive and Habitats Regulations provide for the derogation from these prohibitions for specific reasons provided certain conditions are met. An EPS licensing regime allows operations that would otherwise be unlawful acts to be carried out lawfully. In England, Natural England is the licensing Authority and, in order to grant a license, ensures that three statutory conditions (sometimes referred to as the ‘three derogation tests’) are met:

- a licence can be granted for the purposes of “preserving public health or safety or for other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment” (Regulation 53 (2) (e));
- a licence can only be granted if “there are no satisfactory alternatives” to the proposed action;
- a licence shall not be granted unless the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

A bat roost is defined as “any structure or place, which any wild bat uses for shelter or protection.” Bats tend to re-use the same roosts; therefore, legal opinion is guided by recent case law precedents, that a roost is protected whether or not the bats are present at the time. This can include all summer roosts, used for breeding, resting or sheltering and all winter roosts used for hibernating.



APPENDIX 2 – EMERGENCE SURVEY RESULTS

Table 1. Results of bat emergence survey visit 1: 9th May 2023. CP=common pipistrelle; SP=soprano pipistrelle; NOC=noctule bat; MYO=small *Myotis* spp. Number in parenthesis refers to number of bats above one individual.

Time	Species	Bat heard (H)/seen (S)	Activity (number)	Location/direction
20.20	CP	H	Pass	North-eastern elevation
20.48-21.52	CP	H/S (not all)	Pass, foraging	Constant foraging between these times.
20.50	CP	H/S	Emergence	Boarding near the middle window on the garage southern elevation.
20.47-21.42	CP	H/S (not all)	Emergence 23 bats	From eastern elevation (see Figure 2).
20.53-21.14	CP	H/S	Foraging	Constant foraging on the western elevation between these times.
21.39	MYO	H	Pass	Rear garden



Figure 2. bat emergences from the eastern elevation during the first survey on 9th May. Red arrow two bats, blue arrow three bats, orange arrow 1 bat, green arrow 10 bats, yellow arrow 7 bats.

Table 2: Results of emergence survey visit 2: 30th May 2023

Time	Species	Bat seen/heard	Activity (number)	Location/direction
21.00	CP	H	Commuting	South-eastern elevation.
21.10	CP	H/S	Emergence	South-eastern elevation from the hanging tiles under front window.
21.22	CP	H/S	Emergence	South-eastern elevation from the hanging tiles under front window.
22.00	Myo	H	Commuting	South-eastern elevation from the hanging tiles under front window.
21.13-22.23	CP	H/S	Pass, foraging	Infrequent passes and foraging between these times at the north-eastern elevation.



21.12-22.49	CP	H	Pass, foraging	Infrequent passes and foraging between these times at the garage.
-------------	----	---	----------------	---

Table 3: Results of bat emergence survey visit 3: 6th July 2023

Time	Species	Bat seen/heard	Activity (number)	Location/direction
21.15	CP	S	Emergence	South-eastern elevation from below dormer window at front of house.
21.18	CP	S	Emergence	South-eastern elevation from below dormer window at front of house.
21.25-22.27	CP	H/S	Pass, foraging	Passes and foraging between these times on the eastern elevation.
21.37	CP	S	Emergence	Gable end of the exposed tiles on the north-western elevation.
22.45	Noc	H	Pass	
21.33-23.08	CP	H/S	Foraging	Continuous foraging between these times from the western elevation.
22.03-23.12	CP	H/S	Foraging	Continuous foraging between these times around the garage on the south-western aspect.



APPENDIX 3 – EXAMPLES OF BESPOKE BAT ROOSTING FEATURES



Figure 1. Left to right, the 2F, 2FN and the 1FS bat boxes produced by Schwegler. These and other brands are available at many on-line wildlife stores. These are constructed of ‘woodcrete’ (a mixture of cement and woodchip) and are designed to be durable and replicate the stable thermal properties of trees and buildings. They may be attached to trees or buildings.



Figure 2. Examples of integral bespoke bat roosting features that may be incorporated into buildings during construction/renovation. From left to right: an example of bat access tile into loft space; the 2FR bat tube; and an example of 2FR bat tubes installed into a house wall in a series of three. Other brands and designs are available.



APPENDIX 4 – REDUCING IMPACTS OF ARTIFICIAL LIGHT

Bright external lighting can have a detrimental impact upon foraging and commuting bat flight paths, but more importantly can also cause bats to remain in their roosts for longer. Artificial lighting can also cause significant impacts to other nocturnal species, most notably moths and other nocturnal insects. It can also result in disruption of the circadian rhythms of birds, reducing their fitness.

Guidelines issued by the Bat Conservation Trust³ should be referred to when designing the lighting scheme. Note that lighting designs in very sensitive areas should be created with consultation from an ecologist and using up-to-date bat activity data where possible. The guidance contains techniques that can be used on all sites, whether a small domestic project or larger mixed-use, commercial or infrastructure development. This includes the following measures:

Avoid lighting key habitats and features altogether

There is no legal duty requiring any place to be lit. British Standards and other policy documents allow for deviation from their own guidance where there are significant ecological/environmental reasons for doing so. It is acknowledged that in certain situations lighting is critical in maintaining safety, such as some industrial sites with 24-hour operation; however, in the public realm, while lighting can increase the perception of safety and security, measurable benefits can be subjective. Consequently, lighting design should be flexible and be able to fully consider the presence of protected species.

Apply mitigation methods to reduce lighting to agreed limits in other sensitive locations – lighting design considerations

Where bat habitats and features are considered to be of lower importance or sensitivity to illumination, the need to provide lighting may outweigh the needs of bats. Consequently, a balance between a reduced lighting level appropriate to the ecological importance of each feature and species, and the lighting objectives for that area will need to be achieved. The following are techniques which have been successfully used on projects and are often used in combination for best results:

- dark buffers, illuminance limits and zonation;
- sensitive site configuration, whereby the location, orientation and height of newly built structures and hard standing can have a considerable impact on light spill;
- consideration of the design of the light and fittings, whereby the spread of light is minimised ensuring that only the task area is lit. Flat cut-off lanterns or accessories should be used to shield or direct light to where it is required. Consideration should be given to the height of lighting columns. It should be noted that a lower mounting height is not always better. A lower mounting height can create more light-spill or require more columns. Column height should be carefully considered to balance task and mitigation measures. Consider no lighting solutions where possible such as white lining, good signage, and LED cat's eyes. For example, light only high-risk stretches of roads, such as crossings and junctions, allowing headlights to provide any necessary illumination at other times;
- screening, whereby light spill can be successfully screened through soft landscaping and the installation of walls, fences and bunding;
- glazing treatments, whereby glazing should be restricted or redesigned wherever the ecologist and lighting professional determine there is a likely significant effect upon key bat habitat and features;
- creation of alternative valuable bat habitat on site, whereby additional or alternative bat flightpaths, commuting habitat or foraging habitat could result in appropriate compensation for any such habitat being lost

³ Bat Conservation Trust and Institute for Lighting Professionals (2018) Guidance note 8. Bats and Artificial Lighting. <https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/>



to the development;

- dimming and part-night lighting. Depending on the pattern of bat activity across the key features identified on site it may be appropriate for an element of on-site lighting to be controlled either diurnally, seasonally or according to human activity. A control management system can be used to dim (typically to 25% or less) or turn off groups of lights when not in use.

Demonstrate compliance with illuminance limits and buffers

- *Design and pre-planning phase*; it may be necessary to demonstrate that the proposed lighting will comply with any agreed light-limitation or screening measures set as a result of your ecologist's recommendations and evaluation. This is especially likely to be requested if planning permission is required.
- *Baseline and post-completion light monitoring surveys*; baseline, pre-development lighting surveys may be useful where existing on or off-site lighting is suspected to be acting on key habitats and features and so may prevent the agreed or modelled illuminance limits being achieved.
- *Post-construction/operational phase compliance-checking*; as a condition of planning, post-completion lighting surveys by a suitably qualified person should be undertaken and a report produced for the local planning authority to confirm compliance. Any form of non-compliance must be clearly reported, and remedial measures outlined. Ongoing monitoring may be necessary, especially for systems with automated lighting/dimming or physical screening solutions.

Lighting Fixture Specifications

The Bat Conservation Trust recommends the following specifications for lighting on developments to prevent disturbance:

- Lighting spectra: peak wavelength >550nm
- Colour temperature: <2700K (warm)
- Reduction in light intensity
- Minimal UV emitted
- Upward light ratio of 0% and good optical control

Further reading:

Buglife (2011) A review of the impact of artificial light on invertebrates.

Royal Commission on Environmental Pollution (2009) Artificial light in the environment. HMSO, London. Available at: <https://www.gov.uk/government/publications/artificial-light-in-the-environment>

Rich, C., Longcore, T., Eds. (2005) Ecological Consequences of Artificial Night Lighting. Island Press. ISBN 9781559631297.

CPRE (2014) Shedding Light: A survey of local authority approaches to lighting in England. Available at: <http://www.cpre.org.uk/resources/countryside/dark-skies/item/3608-shedding-light>

Planning Practice Guidance guidance (2014) When is light pollution relevant to planning? Available at: <https://www.gov.uk/guidance/light-pollution>

Institution of Lighting Professionals (2021) Guidance Notes for the Reduction of Obtrusive Light GN01:2011.



Available at: <https://www.theilp.org.uk/resources/free-resources/>

Voigt, C.C., Azam, C., Dekker, J., Ferguson, J., Fritze, M., Gazaryan, S., Hölker, F., Jones, G., Leader, N., Lewanzik, D. and Limpens, H., 2018. *Guidelines for consideration of bats in lighting projects*. Unep/Eurobats.

Available at:

https://cdn.bats.org.uk/uploads/pdf/Resources/EUROBATSGuidelines8_lightpollution.pdf?v=1542109376