B E R N W O O D E C O L O G Y

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All Hallows Church

Upper Dean

Bedfordshire

Bats in Churches: Bat Management Plan

DEFRA

28th October 2021

DEFRA-BiC-21.DEFRA13 (Issue 1)

Proud to be:

Hensmans Farm, Nearton End, Swanbourne, Buckinghamshire, MK17 0SL

Limitations

Ecological assessments can only assess a site at a particular time. This evidence can be used to draw conclusions as to the likely presence or absence of species (animals and plants), population size, use of the site by animals; it is neither definitive nor complete.

Any survey is a snapshot in time and should not be regarded as a complete study. Seasonality and weather conditions may also affect survey results.

The preparation of mitigation strategies, consultation exercise and submission of any licence applications cannot be relied upon until approved [licensed] in writing by third parties. Allowance must be made for both programme and financial change to projects as a result of application failure, amendment or refusal.

Every effort has been taken to provide an accurate assessment of the situation pertaining to this site and information available at the time of the preparation of this report, but no liability can be assumed for omissions, or subsequent changes to design and development.

Surveys have been based on anticipated work resulting from instruction and information supplied at the time of request. Additional works should be anticipated as surveys and proposals for the site progress.

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No responsibility will be accepted for changes or alterations made to this report following submission to Bernwood Ecology client.

Bernwood Ecology, its employees and associates reserve the right to report on any incidents or actions [deliberate or reckless] that result in a breach of licence conditions or are in contravention of existing legislation.

Quality Assurance

Version 1. 28th October 2021
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Executive Summary

Bernwood Ecology have undertaken bat emergence and re-entry surveys at All Hallows Church, Upper Dean, to inform and find practical solutions to encourage co-existence between the church communities and the roosting bats through the preparation of a management plan.

Through the process, options for interventions based on scale of impacts resulting from the bats to the church and viability have been presented to the church community, the church architect and the Bats in Churches Project for discussion and refinement.

This church was not subject to the Light Touch Surveys as part of the early engagement for the Bats in Churches Project. The Bedfordshire Bat Group records indicate that five daytime inspections were carried out between 1988-2019. Droppings found were consistent with pipistrelle and brown long-eared bat at every visit, with probable sporadic Natterer's bat and a record of barbastelle. Bernwood Ecology undertook a building inspection before each bat emergence survey in 2021, identifying pipistrelle droppings and confirming brown long-eared bat presence through DNA sequencing of sampled droppings.

Three dusk emergence and one dawn re-entry survey of the church were conducted by Bernwood Ecology in 2021 to further study the bat roost(s) at the church and inform options for interventions to mitigate the impacts of bats and long-term management measures. The surveys identified the primary bat access points located by overstorey lead rainspouts on the southern aspect of the nave together with roosting points in the nave and south aisle.

Nine options based on low-, moderate- and high-cost interventions are presented, and their long-term viability for solving the issues are assessed:

- Option 1: The use of covers/voiles on pews
- Option 2: Baffle/Catch boards at primary roosting locations
- Option 3: Small-scale temporary sails below south aisle (soprano pipistrelle) roost
- Option 4: Boxing-in the south aisle rainspout to create a bat box
- Option 5: Boxing-in the timber beam in the nave to create a bat box
- Option 6: Small-scale temporary sails below south aisle (brown long-eared) roost
- Option 7: Creation of two bat boxes above the chapels
- Option 8: Enhancement of the clocktower for bats
- Option 9: Creation of a bat box behind the clocktower

Of the nine options, only Option 1 and 2 present low-cost interventions that will potentially reduce the impact of bats on the church and church community, with a low impact on the architectural interest and a minor to moderate impact on the visual character of the church. Option 2 will not reduce the general distribution of bat droppings and urine resulting from dusk emergence or dawn swarming activity.

Option 3 and 6 present novel and untested interventions that would be subject to a separate design competition run by the Bats in Churches Project, in which it is hoped that a more generic low-cost and flexible solution to resolving, or at a minimum reducing, the conflict between bats and church communities which could be applied to other churches.

The remaining options may be looked at either individually or in combination but carry higher financial costs with uncertainty that they will deliver the community's desired outcome of entirely removing the bat impact. They do however offer opportunities to reduce the overall impact of bats while maintaining the bats' Favourable Conservation Status.

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Bedfordshire Bat Group:	Carol Baber
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	Bob Cornes
Bats in Churches Engagement Officer:	Honor Gay
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1. Introduction and Objectives

1.1 Bernwood Ecology were instructed by DEFRA on 27th April 2021 to work with All Hallows Church, Upper Dean, Bedfordshire, PE28 0LL (TL 04679 67643) to prepare a bat management plan including undertaking four bat emergence and re-entry surveys as part of the Bats in Churches (BiC) project (Appendices 1 & 2).

1.2 All Hallows church is located in the village of Upper Dean which stands near a tributary of the River Ivel and is within a conservation area.

1.3 The Grade I listed church is mainly of 14th and 15th century construction, notable for its carpentry, stonework, and other medieval and later furnishings. The church consists of a nave and chancel flanked to the north and south by aisles and chapels, respectively. There is a porch to the south, and a clocktower to the west with four bells. After a long period of disrepair in the 19th century, the church underwent gradual restoration works in the 20th century.

1.4 The BiC project is a unique partnership between Natural England, the Church of England, the Bat Conservation Trust, the Churches Conservation Trust, and Historic England that was created to address the issues of bats (droppings, hygiene, damage to monuments and church fabric, etc.) in churches while continuing to protect their roosts.

1.5 The project seeks to safeguard the future of protected bat roosts sheltered in England's churches, whilst reducing the negative impact on the fabric of these historic buildings and the people who use them.

- Church Mission
- Heritage
- Historic Fabric
- Ecology
- Community

1.6 The aims of the emergence and re-entry surveys are to ascertain where bats are using the building for roosting, determine entry/exit points, and classify the roost(s) through identification of species, numbers, and usage. Building inspections were undertaken prior to each emergence survey to ascertain where bats are using the building for roosting, actual and potential roost entry/exit points, and the species, roost type and roost size will be estimated if bats, or evidence of bats, is found.

Previous Ecological Surveys

1.7 The Bedfordshire Bat Group has conducted five daytime inspections of the church since 1988 (1988, 2004, 2009, 2012, and 2019). Findings include pipistrelle *Pipistrellus*

sp. and brown long-eared bat *Plecotus auritus* bat droppings at every visit, with probable Natterer's bat *Myotis nattereri* droppings found in 2004, 2009, and 2019 and potential barbastelle droppings in 2009.

1.8 The church was not subject to Light Touch Surveys in 2017 at the earlier stages of the BiC project.

2. Legal Protection

2.1 The finding of this report represents the professional opinion of qualified ecologists and does not constitute professional legal advice. The client may wish to seek professional legal interpretation of the relevant wildlife legislation cited in this report.

2.2 The following information is a simplified summary of the legislation and the full text of the Wildlife & Countryside Act 1981 (as amended) (WCA 1981), the Conservation of Habitats and Species Regulations 2017 (2017 Regulations) and other legislation together with current published guidelines should be consulted.

European Protected Species

2.3 It is understood that 2017 Regulations will be further amended due to the departure of the UK from the EU on 31st January 2020. From that date the provisions in The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 will apply (see https://www.legislation.gov.uk/uksi/2019/579/contents/made). Existing protection for habitats and species including standards and assessment procedures will remain as they have been prior to the UK leaving the EU.

2.4 The 2017 Regulations and The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 should be read together until further clarification or changes are made available by the UK Government or legal case law.

2.5 All European Protected Species (EPS; great crested newts, bats, otter, white clawed crayfish, hazel dormice, etc.) are protected under the 2017 Regulations and the WCA 1981. It is an offence under section 41 of the 2017 Regulations to:

- deliberately capture, injure or kill any wild animal of a EPS;
- deliberately disturb a EPS (including in particular any disturbance which is likely to impair their ability to survive, breed or reproduce, rear or nurture their young; or to hibernate or migrate; or which affects significantly the local distribution or abundance of the species);
- deliberately take or destroy the eggs of a EPS;
- damage or destroy a breeding site or resting place of a EPS; or,

- possess, control, transport, sell or exchange, or offer for sale or exchange, any live or dead wild animal of a EPS, or any part of, or anything derived from a EPS.

2.6 Section 9(4) (b) and (c) of the WCA 1981 makes it an offence to:

- intentionally or recklessly disturb a EPS while it is occupying a structure or place which it uses for shelter or protection; or,
- intentionally or recklessly obstruct access to any structure or place which any EPS uses for shelter or protection.

2.7 In order for otherwise illegal acts to proceed lawfully, an appropriate licence must be sought under the 2017 Regulations and WCA 1981. Licences are currently determined by Natural England and must include an appropriate mitigation and monitoring scheme to secure the "favourable conservation status" of the species in the local area.

Wild Birds

2.8 Wild birds are protected under the WCA 1981. The basic principle of the Act is that all wild birds, their nests and eggs are protected by law and some rarer species are afforded special protection. Wild birds are defined as those resident in or visitors to Great Britain, in a wild state (does not include poultry or game bird). Section 1(1) of the WCA 1981 states that it is an offence to intentionally or recklessly:

- kill, injure or take any wild bird;
- take, damage or destroy the nest of any wild bird while that nest is in use or being built; or
- take or destroy an egg of any wild bird.

2.9 Section 1(2) of the WCA 1981 states that it is an offence to possess or control any live or dead wild bird or any part of or anything derived from a wild bird or an egg or part of an egg of a wild bird.

2.10 It is an offence under section 1(5) of the WCA 1981 to intentionally or recklessly:

- disturb any wild bird included in schedule 1 while it is building a nest or is in, on or near a nest containing eggs or young; or,
- disturb dependent young of such a bird.

3. Survey Methodology

Building Inspections

3.1 The objectives of the building inspections are to undertake a daytime inspection of the structure to assess where there are actual or potential bat roosts present by searching for evidence of bat use and assessing the suitability of the structure to

support bat roosts. If evidence of bats is found, the assessment searches for evidence to indicate:

- which species are present;
- an indicative roost size;
- roost access point(s).

3.2 The building inspections were carried out by C. Damant MCIEEM (bat survey class licence levels 3 & 4 surveyor: 2015-12601-CLS-CLS/ 2015-12602-CLS-CLS); E. Dickins, MSc. MCIEEM (bat survey class licence levels 3 & 4 surveyor: 2016-27135-CLS-CLS/ 2016-27136-CLS-CLS) and J. Sowden, MSc. ACIEEM (bat survey class licence level 2 surveyor: 2016-24351-CLS-CLS), following the WML-CL32 licence requirements and the Bat Conservation Trust (BCT) Good Practice Guidelines (Collins, 2016) (Table 1). The church was systematically searched internally and externally before each emergence survey for evidence indicating the presence of roosting bats (live and dead bats, staining at potential roost entry points, feeding remains, droppings and urine marks).

3.3 Equipment available for use during the inspections included ladders, high-powered torches, binoculars, digital camera, and sample jars (for collecting droppings for subsequent DNA analysis if required).

Bat Emergence and Re-entry Surveys

3.4 Three dusk bat emergence and one dawn re-entry surveys were undertaken on 13th May, 22 – 23rd June, and 11th August 2021 (Table 1). The survey was carried out by C. Damant; E. Dickins; J. Sowden; S. Sanchez, MSc. Qualifying CIEEM Member; Z. Paraskevopoulou, MBiol. Qualifying CIEEM Member; T. Gearing, MRes.; and J. Damant, BSc.; in conjunction with Bedfordshire Bat Group volunteers, in line with the WML-CL32 licence requirements and best practice guidelines (e.g., Jones, 2004; Natural England, 2015; and Collins, 2016). Surveyors were positioned to cover all potential roost entry/ exit points (internally and externally) to determine bat use.

3.5 Surveys were conducted with Anabat Walkabout full spectrum handheld detectors, Echometer Touch 2 Pro full spectrum handheld detectors, and Pettersson 240X time expansion handheld detectors recording to Tascam digital audio recorders. The surveys were supported by Pettersson D500X and AudioMoth remote bat detectors. Details of the remote bat detector settings used are included (Tables 2 & 3). Night-shot video cameras Canon XA20, Canon XA30 Sony HDR SR5, and a SANNCE 4CH 1080N Security Camera System, 1TB HDD+ 10.1" LCD Screen Monitor Built-in, 4X 2.0MP Outdoor CCTV Cameras System (with up to four cameras) paired with infrared lights, in addition to a Pulsar Helion thermal imaging scope and a FLIR Scion OTM266 thermal monocular camera, were used.

Table 1. Bat activity survey details.

Date	Start Time	End Time	Sunset/ Sunrise	Surveyor Initials	Weather Conditions
19/05/2021	20:31	22:44	20:52	CD, JS, SS, TG, JD	11.8°C - 7.2°C, wet from day's rain, 75% cloud cover, largely still (BS0-1)
15/06/2021	21:10	23:00	21:25	CD, ED, SS, TG, ZP	21.5°C - 19.8°C, dry, 20% cloud cover, largely still (BS0-1)
16/06/2021	03:09	04:54	04:39	CD, ED, SS, TG, ZP	14.4°C -16.2°C, wet (dewy), 15% cloud cover, largely still (BS0-)
02/08/2021	20:37	22:22	20:52	CD, ED, JS, TG, ZP	14°C, rainy in the day, 100% cloud cover, largely still (BS0-1)

Table 2. Pettersson D500X settings.

Settings	Standard (User 0)
Sample frequency	500
Pre trigger	Off
Record length	3
High pass filter	Yes
Auto record	Yes
Trigger sense	Very high
Input gain	45
Trigger level	36
Interval	5
Relative timers	
On/Off	-00:30/+00:30
Batteries	4 x AA 1.5v Alkaline

Table 3. AudioMoth settings.

Settings	Standard (User 0)
Firmware	AudioMoth-Firmware-Basic (1.4.2)
Time zone	UTC+1
Sample rate (Hz)	256000
Gain	High
Sleep duration (s)	5
Recording duration (s)	55
Active recording periods	1
Recording period 1	19:00 - 21:00 (UTC) (May vary depending on sunset & sunrise times together with survey objectives)
Filter	None
Amplitude threshold	None
Enable LED	True
Enable low-voltage cut-off	True
Enable battery level indication	True

Biosafety and Biosecurity

3.6 All fieldwork is undertaken in line with the current government and professional (CIEEM, BCT, IUCN, etc.) COVID-19 guidelines at the time, maintaining physical distancing between surveyors, clients, and members of the public as appropriate.

3.7 Hygiene and biosecurity measures set out with Bernwood Ecology's COVID-19 Risk Plan are strictly adhered to, including regular thorough handwashing where possible and, where not, regular use of an appropriate viricidal hand sanitiser.

Data Analysis

3.8 All sonograms recorded using handheld bat detectors were analysed with BatSound (version 3.3), then manually verified by Bernwood Ecology to confirm identification.

3.9 All recordings from D500X remote bat detectors were analysed using BatClassify and Sonobat (Version 4) for Audio Moths. Bat Classify is an automated call extraction and identification software by University of Leeds (Scott 2014; Scott & Altringham, 2014). The software analyses the recordings and returns a 'probability of occurrence' value (0-1) for each species (barbastelle *Barbastella barbastellus*, alcathoe *Myotis alcathoe*, Bechstein's bat *M. bechsteinii*, whiskered/ Brandt's bat *M. mystacinus/ M. brandtii*,

Daubenton's bat *M. daubentonii*, Natterer's bat *M. nattereri*, brown long-eared bat *Plecotus auritus*, lesser *Rhinolophus hipposideros* and greater *Rhinolophus ferrumequinum* horseshoe, common *Pipistrellus pipistrellus* and soprano *P. pygmaeus* pipistrelle and large species of bats termed 'NSL' [noctule *Nyctalus noctula*, serotine *Eptesicus serotinus*, Leisler's bat *N. leisleri*]) to be present within a call sequence. The values highest to 1 indicate a higher likelihood of a species present within a call sequence. The presence of other species, including Nathusius's pipistrelle *P. nathusii*, are not considered by the software.

3.10 Scott & Altringham (2014) recommend a standard threshold of acceptance of ≥0.9 for all species. Bernwood Ecology have undertaken a number of verification exercises of sonograms and compared these to BatClassify, resulting in the following observations:

- Barbastelle results ≥0.8 are accurate, but as this is generally an under-recorded species, verification of any records is always undertaken.
- Results for *Myotis* bats are occasionally above the recommended 0.9 threshold, possibly due to the similarities between call characteristics of bats within this genus. Bernwood Ecology found that *Myotis* sp. calls ≥0.5 were reliably emitted by a *Myotis* bat, but identification beyond genus to species was difficult, if not impossible. For this reason, the *Myotis* bats have been grouped and a threshold of ≥0.5 applied; however, this may result in the double-counting of *Myotis* and caution is advised when drawing conclusions on the abundance of this genus within a set of recordings.
- 'NSL', common and soprano pipistrelle results appear to be accurate above ≥0.9.
- Brown long-eared bats are rarely recorded using remote bat detectors, even where high numbers of brown long-eared bats are known, resulting in an underrepresentation of this species on most sites. Verification of brown long-eared bat calls >0.5 are mostly accurate but verification is required.
- Greater and lesser horseshoe bats have not been positively recorded at any sites where Bernwood Ecology has surveyed; therefore, the recommended threshold of ≥0.9 has been applied.

Roost Count

3.11 Roost emergence and re-entry count data has been entered into the Count Bat roost analysis application, created by the Mammal Society. This is a web-based tool that compares roost count data with a national database, looking at features such as structure type, time of year and breeding allocation, to provide national context regarding the size of roost. This new application has associated constraints, including

sample size and survey effort bias, so some factors cannot be accurately assessed (Count Bat, https://www.mammal.org.uk/countbat/).

Scientific Consultation

3.12 In agreement with Conservation Evidence, Bernwood Ecology, as Evidence Champions, will:

- ensure that, where possible, the mitigation work is designed around a scientifically testable approach, observing the Conservation Evidence approach to critical assessment, study design, analysis and reporting;
- build into project planning processes and reports a requirement for ecologists to check the Conservation Evidence website for relevant evidence, and describe the findings in the report; and,
- where possible, publish results reporting on any tests of conservation interventions whether successful or otherwise in agreement with the client in the Conservation Evidence journal and other peer-reviewed journals.

4. Survey Constraints and Limitations

Safe Access

4.1 Part or all the site may be considered to be inaccessible following an assessment of risk and therefore the survey may be constrained. Risks that may limit the survey effort include structurally unsafe structure(s) (including roof joists), confined spaces and dangerous egress and ingress points, asbestos, sharps, livestock, and hostilities from members of the public. Details of any access constraints are provided within the results of the report.

Digital Mapping

4.2 Every effort is made to ensure mapping accuracy; however, the exact locations of features should not be relied upon.

Mobile Species

4.3 Bats are a highly mobile species and move throughout a landscape often using multiple roost sites (depending on the species). Bats may be found in any suitable roosting cavity or void at any time of the year.

5. Survey Results

Building Inspections

5.1 There are no roof voids present in the church. The timbers inside the nave, aisles and chancel are all exposed, with sarking boards evident. All roofs are leaded, including the porch. There are no eaves as roofs are closed off within stone crenelations. A stone spire sits atop the clocktower.

5.2 Evidence of bats can be seen across most of the church internally, with accumulations of bat droppings seen under a central truss within the nave and within the west end of the south aisle (around the kitchenette area). The first level of the clocktower was found to have small amounts of pipistrelle-type droppings, as well as in the gap where the clock mechanism fits into the wall. No obvious accumulations of bat droppings were seen externally during the inspections, though bat dropping were clearly seen around a central rainspout on the southern elevation leading off from the nave roof when access to the external roof of the south aisle was secured during the bat emergence and re-entry surveys.

5.3 Two bat droppings samples were sent for DNA analysis to confirm species through sequencing, one from the kitchenette in the south aisle, and one from the western end of the nave. Both samples were found to belong to brown long-eared bat.

5.4 A summary plan of the building inspection findings can be found in Appendix 3.

Figure 1. Western elevation of the church, showing clocktower and spire, and the north aisle, with the nave centrally.

Figure 2. Western elevation of the church showing the tower and spire, and the south aisle and porch, with the nave centrally.

Figure 3. Internal view if the timber structure of the nave. The primary pipistrelle roosting location is highlighted (red).

Figure 4. Closer view of the intricately carved truss end where pipistrelle have a primary roosting location.

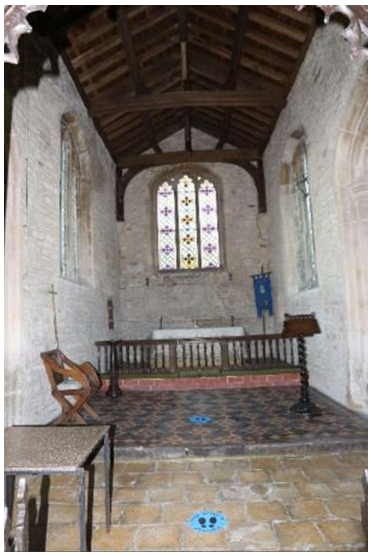

Figure 5. Internal view of the chancel, showing timber structure.

Figure 6. Internal view of the south aisle, looking westwards with the kitchenette in the background. The secondary pipistrelle roosting location is highlighted (red).

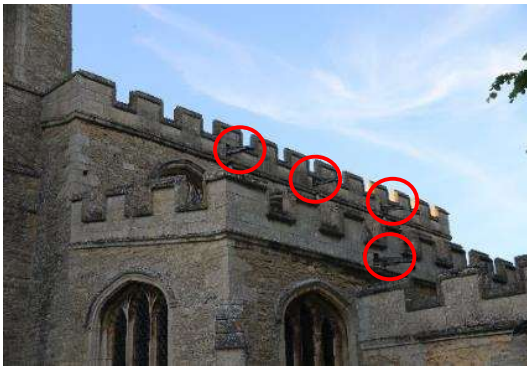

Figure 6. South aisle showing rainspouts from the nave roof and south aisle roof (highlighted).

Figure 7. Rainspout from the nave roof where the primary pipistrelle roost access point is.

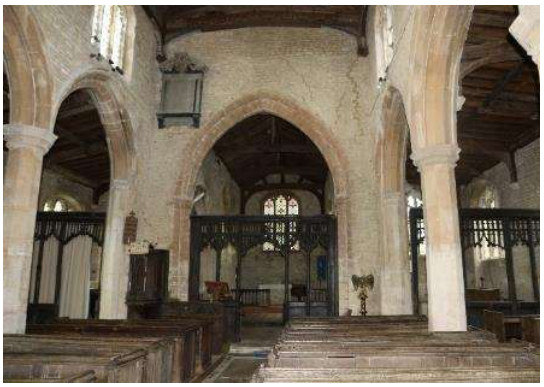

Figure 8. Nave, looking eastwards, with the north aisle left, and the south aisle right.

Figure 9. The western end of the north aisle.

Bat Emergence and Re-entry Surveys

5.5 Survey conditions were suitable for the dusk surveys to be considered valid under the WML-CL32 requirements and the BCT Good Practice Guidelines (Collins, 2016) and surveyor positions provided adequate coverage of all aspects of the church, assisted with high-quality technology (infrared cameras and thermal imaging scopes). The emergence and re-entry surveys were able to determine bat use with a high degree of confidence.

5.6 Pipistrelle bats were identified to be the dominant species roosting in the church, with high numbers of soprano pipistrelles and small numbers of common pipistrelles detected. Pipistrelle bats are using a rainspout on the south side of the nave roof to

access the church as their primary access point (Figure 7), which corresponds internally to a space on the southern side of the nave where most of the colony was recorded roosting behind a central truss end (Figures 3 & 4). Individual bats were also observed using other points along the same truss, including under the ridge line, as well as other trusses and timbers in the nave. An estimated 70 bats were seen emerging on the first survey, 187 on the second survey, and 237+ on the fourth survey. Two dead juvenile soprano pipistrelles were found on a table in kitchenette area (western end of the south aisle) on the fourth survey, and a significant increase in the quantity of bat droppings in this area was also noted. Two bats were seen emerging from this area of the south aisle, but this is likely to be a significant underestimate of the total number of bats using this roosting location at the time. Individual common pipistrelles were observed emerging from behind the clockface of the tower and stonework of the tower as well.

5.7 Two brown long-eared bats were seen emerging into the church from behind the easternmost truss in the nave, and another from the central truss in the nave during the second survey. Brown long-eared bats were predominantly observed on the third (re-entry) and fourth (emergence) surveys, with a peak count of 15+ bats re-entering a cavity in the timbers in the south aisle to roost during the third survey. It is likely the number of bats was underestimated on this occasion due to the late discovery of the roosting location. During the fourth survey, brown long-eared bats were seen repeatedly alighting and flying away from south aisle timbers that lead over the top of the porch, before apparently leaving the church. This late observation has likely caused an underestimation of the numbers of bats and did not allow for the identification of a definitive corresponding external bat access point. A rainspout from the south aisle roof seems a likely bat access point from where one bat may possibly have emerged. It is possible that brown long-eared bats also use the same rainspout on the nave as soprano pipistrelles. The brown long-eared bat colony appear to move around the church frequently as no bats were seen to leave the roosting location in the south aisle on the fourth survey. The poor detection rate of this species in the church is likely to be due to their absent/quiet echolocation, which is easily overshadowed by the quantity (and therefore the volume) of the pipistrelle calls, in combination with other factors such as the height of the nave ceiling and complex timber structure of the church. It also remains possible that the brown long-eared bat colony are using structures other than the church for roosting, such as neighbouring properties and nearby trees.

5.8 Details of the emergence survey can be found in Table 4, a plan of summarised bat activity in Appendix 4. A roost location summary plan is in Appendix 5.

5.9 The remote bat detectors recorded a total of 1976 positive bat recordings across all surveys: 990 were from external detectors, and 986 were from internal detectors. Soprano pipistrelles were the most frequently recorded species, with detectors recording peak activity under the nave rainspout, inside the nave, and at the north western corner of the church. Common pipistrelles were most frequently recorded in the centre of the nave and under the nave rainspout. Brown long-eared bat recordings peaked from inside the western end of the south aisle. Two barbastelle bat calls were recorded at 01:30 and 01:41 in the morning, between the second (emergence) and third (re-entry) surveys, by a detector placed in the south aisle kitchenette. It remains possible this represents a single bat. A small number of recordings of *Myotis* bats were also made internally during the dusk and dawn survey (Table 5; Appendix 6). It must be noted that the recordings are simply counted against the survey events; the dusk/dawn surveys will cause data to be skewed as detectors recorded continuously from dusk until dawn.

5.10 Roost emergence count data from the first (n = 70), second (n = 187), and fourth (n = 237) emergence surveys for *Pipistrellus* sp. were amalgamated for the Mammal Society's Count Bat database, owing to the shared primary access point into the church through the nave rainspout. The result of the analysis indicates that All Hallows Church supports a roost of high conservation significance for *Pipistrellus* sp., indicated by the roost featuring within the upper quartile ranges (q3 & q4); however, the low numbers of records in the database limit the interpretation of some results (Table 6, Appendix 7). The conservation significance increases post maternity where population recruitment (the addition of the season's young to the colony) is considered.

5.11 Similarly, roost emergence count data from the third (n = 15) and fourth (n = 8) emergence surveys for brown long-eared bat were also input to the Mammal Society's Count Bat database. The result of the analysis indicates that All Hallows Church supports at a roost of low conservation significance based on the roost featuring within the lower quartile ranges (q1 & q2). However, little weighting can be placed on the interpretation of these results due to the constraints associated with late roost discovery, probable underestimation of brown long-eared bats, and the low numbers of records in the database (Table 7, Appendix 7).

5.12 The church provides bird nesting opportunities within the roof structure including at the eaves and in the tower. No obvious signs of active or inactive nests were seen during the surveys.

Table 4. Summary of bat emergence survey results.

Time	Species	Description of activity
Survey 1: 19th May 2021. Sunset: 20:52.		
20:48	Unknown	Roost chattering heard principally in the centre of the nave, with some chatter possibly from west end of south aisle.
20:52-21:27	Unknown	**Emergence** into the church of six bats from the central truss end in the nave
20:58-21:10	Common pipistrelle	**Possible emergence** from the south east corner of the tower, **emergence** of one bat from behind the clockface. Foraging activity of three bats seen flying over the south east corner of the church and one bat east to west on either side of the tower.
21:12-22:10	Soprano pipistrelle	**Emergence** of ~70 bats from a rainspout of the nave roof. Several bats seen flying inside the church.
21:33-22:38	Common pipistrelle	**Emergence** of one bat from behind the clockface. Commuting activity consisted of east to west on either side of the tower and occasionally distant social calls.
21:37, 21:43	Brown long-eared bat	**Emergence** of two bats from the truss end of the easternmost truss of the nave, and of one bat from behind the central truss of the nave.
22:02 -22:05, 22:09	*Myotis* bat	Passes heard from the eastern and north western surveyor positions outside the church.
Survey 2: 15th June 2021. Sunset: 21:25.		
21:42	*Unknown*	Roost chattering heard in the centre of the nave.
21:46, 21:50	Soprano pipistrelle	**Emergence** of one bat from nave and one from the chancel.
21:50	Unknown	Roost chattering in centre of the nave.
21:50-22:07	Noctule	Several bats seen in flight outside of the eastern side of the church.

Table 4. Continued.

Time	Species	Description of activity
21:53- 22:58	Pipistrelle	**Emergence** of 187 bats from the nave rainspout. One bat emerged internally into the church from the truss in the nave closest to the tower. Common pipistrelle foraging activity recorded in the trees north west of the church and to the east of the church.
21:53, 22:11	*Myotis* bat (Natterer's)	**Emergence** of two bats, probably one from within the nave, and probably one from within the chancel.
22:09	Unknown	**Possible emergence** from the rainspout directly above the porch.
22:11	Soprano pipistrelle	**Emergence** of unquantified number of bats from the central truss and timbers in the nave.
22:32	Common pipistrelle	**Likely entry** above the third window (into a rainspout?) on the north aisle.
22:35	Brown long-eared bat	Pass heard from the north western surveyor position.
22:36	Unknown	Single bat in flight foraging around the tower.
Survey 3: 16th June 2021. Sunrise: 4:39.		
02:56, 03:18- 03:29	Common pipistrelle	Two bats seen flying in the nave. High levels of foraging activity were recorded north of the church, particularly in the trees north west of the church.
03:00-03:42	Soprano pipistrelle	**Entry** into the centre of the truss. Bats seen flying in the nave. Bats observed in flight externally north of the church.
03:06	Pipistrelle	**Entry** into the purlins and rafters between trusses in the nave.
03:33	Noctule	Activity externally north west of the church particularly around trees.
03.40	Soprano pipistrelle	Bats present inside the church; social calls heard
04.00 – 04.10	Brown long-eared bat	**Entry** of 15+ bats into timber cavity in the south aisle.

Table 4. Continued.

Time	Species	Description of activity
Survey 4: 2nd August 2021. Sunset: 20:52.		
20:10-20:50	Pipistrelle	**Emergence** of at least two soprano bats from the western end of the south aisle and emergence of bats from truss and timbers inside the nave. Emergence of at least 237+ bats from the nave rainspout.
21:14-21:46	Common pipistrelle	Several passes seen outside the church with constant foraging activity observed in the trees north west of the church.
20:57	Unknown	Non-echolocating bat seen commuting outside the south aisle.
21:03-21:46	Soprano pipistrelle	Commuting activity around the tower and constant foraging north west of the church recorded.
21:29	Unknown	Bat seen passing over the north aisle.
21:30	Brown long-eared bat	One bat seen in flight from the western end of the nave towards the south aisle.
21:40, 21:57	Brown long-eared bat	**Entry** into the timbers above the porch which seems to correspond with a rainspout.

Table 5. Summary of remote bat detecting results by species, genus, or group.

Species	Summary
Barbastelle	p
Myotis species	There were ten recordings made; nine from remote detectors placed internally on the dusk and dawn combined survey. It is not possible to give certainty of the species of *Myotis* recorded based on audio recordings alone, but sonograms suggest that Natterer's bat was present. Seven calls were recorded within an eight-minute period; the 8th recording followed twelve minutes later, and the 9th call followed another seven minutes afterwards.
'NSL' group	There were a small number of recordings made from detectors placed outside the church. These bats were not associated with the church structure and were from high passes overhead.
Brown long-eared bat	There were few recordings made from bat detectors placed externally to the church; of note are three recordings from an AudioMoth placed directly outside the nave rainspout on the dusk/ dawn survey. Internally, there are 54 recordings, with the peak activity recorded in the western end of the south aisle on the dusk/ dawn survey.
Common pipistrelle	A frequently recorded species. Seventy-six recordings were made from detectors placed externally, with peak recordings made under the nave rainspout on the dusk/ dawn survey and from the north west of the church between the tower and the north aisle on 19th May 2021. Ninety-two recordings were made from detectors placed internally, with the peak activity recorded within the nave on the dusk/ dawn survey.
Soprano pipistrelle	The most frequently recorded species, with 879 recordings made from detectors placed externally, and 828 recordings made from detectors placed internally. External recordings peaked under the nave rainspout and north western corner between the tower and north aisle on the dusk/ dawn survey. Internal recordings peaked inside the nave on 2nd August 2021.

Table 6. Roost emergence/re-entry count data - amalgamated *Pipistrellus* sp. data.

Date	Survey Type	Peak Count at All Hallows Church	Comparison with All Database Peak Count Records (*n* = 570)	Comparison will All Pre-Maternity Peak Count Records (*n* = 544)	Comparison with All Post-Maternity Peak Count Records (n = 133)	Comparison with Pre-Maternity Peak Count Records within a Church (n = 9)	Comparison with Post-Maternity Peak Count Records within a Church (n = 2)
19/05/2021	Dusk	70	61st percentile	61st percentile	-	77th percentile	-
15/06/2021	Dusk	187	89th percentile	90th percentile	-	90th percentile	-
02/08/2021	Dusk	237	93rd percentile	-	96th percentile	-	99th percentile

Table 7. Roost emergence/re-entry count data - brown long-eared bat data.

Date	Survey Type	Peak Count at All Hallows Church	Comparison with All Database Peak Count Records (*n* = 205)	Comparison will All Pre-Maternity Peak Count Records (*n* = 203)	Comparison with All Post-Maternity Peak Count Records (n = 94)	Comparison with Pre-Maternity Peak Count Records within a Church (n = 16)	Comparison with Post-Maternity Peak Count Records within a Church (n = 6)
16/06/2021	Dawn	15	37th percentile	37th percentile	-	36th percentile	
02/08/2021	Dusk	8	21st percentile	-	19th percentile	-	27th percentile

NOTE: Percentiles are interpreted as the percent of the database records that fall below the recorded peak count (e.g., being in the 61st percentile indicates that All Hallows Church has a roost count that is larger than 61% of the pipistrelle records in the database).

Where the number of records from the database (indicated by n) is low, the results have limited power of interpretation (e.g., where there are two records for bats, it is not possible to ascertain whether the peak count at All Hallows Church is sizeable or not, because there are only two records with which to compare).

6. Statement of Significance

Archaeological, Architectural and Historical

6.1 All Hallows Church is of high archaeological, architectural and historical significance. The Grade I listed building is mainly of 14th and 15th century construction, notable for the extent and quality of its carpentry and other furnishings of note dating from the Middle Ages.

6.2 The carved stonework in the church (e.g., gargoyles, piscine, holy water stoup, etc.), the carved timber roofs of the aisle and nave, and the timber screens in front of the chancel and chapels all form part of the medieval fabric of the church and their survival carries high significance. The almost complete set of late-medieval benches in the nave and aisles are also unusual in their survival.

6.3 The spire was repaired in 1843 and stained glass windows were placed in the chancel in 1854 and 1857, when the tile floor of the chancel may also have been installed. Beyond this (apart from the stripping of the widespread internal plaster), the building escaped Victorian over-restoration. Indeed, it appears to have passed through a period of neglect, having been described by Archdeacon Frederick Bathurst in 1873 as in 'a wretched state' and in 1888 as 'still in bad repair'. The Victoria County History for Bedfordshire (1912) recorded that '*for want of money the whole is slowly falling to decay, the walls bare of plaster and green with damp from leaking roofs, and the beautiful carvings of the roofs threatening to fall. The mediaeval seats remain, in great part much in need of repair, and the floors are broken and uneven, patched with rough stone, in places showing the ground beneath*'. However, repairs to the chancel, north aisle and north chapel were put in hand in that year, and from 1916, a more comprehensive but gradual (still incomplete in 1925) programme of repairs took place under the direction of Sidney Inskip Ladds, architect of Huntingdon and Ely Diocesan Surveyors. The church was listed in 1964, and today is listed Grade I. It forms part of the Stodden Churches group of parishes, named after the ancient Hundred of that name.

6.4 The written Statement of Significance produced for the Bats in Churches Project states that the church was *'closed for two or three months in the summer of 2019, since the activity of bats was making parish worship impossible'*, inhibiting the use of the church and aspirations for more social purposes.

6.5 Full details of the historical and architectural importance of the church can be found within the Statement of Significance.

Bats

6.6 All bat species, their breeding sites and resting places are fully protected by law as European Protected Species due to their numbers declining dramatically. This decline is attributed to the long-term loss of roost sites through damage, destruction and/or disturbance, together with the loss of foraging habitat through landscape change. Additional impacts are associated with loss of connectivity (flight lines) and increases in artificial lighting.

6.7 A total of five bat species have been recorded using the interior and exterior of the church: roosting soprano pipistrelle and common pipistrelle in a mixed roost (peak count 237+), roosting brown long-eared bat (peak count 15+), roosting Natterer's bat (peak count two) and barbastelle (not seen but briefly recorded between the dusk/dawn surveys by remote bat detectors).

6.8 The general conservation status of the church for bats, based on the analysis of the 2021 survey data, the use of the Mammal Society's Count Bat database and *A review of the population and conservation status of British mammals* (Matthews, 2018) is:

- Mixed pipistrelle – Peak count 237+: maternity roost; of high conservation significance. IUCN Least Concern. The Mammal Society's Count Bat report would suggest, based on the 2021 survey results, that the mixed pipistrelle roost at All Hallows is of high conservation status when appropriately compared to the available national data.
- Brown long-eared bat – Peak count 15+: probable maternity roost; of moderate conservation significance. IUCN Least Concern. The Mammal Society's Count Bat report would suggest, based on the 2021 survey results, that the brown long-eared bat roost at All Hallows is of low/moderate conservation status when appropriately compared to the available national data; however, the late discovery of the roost does not provide confidence in this assessment as the count is likely to be below the actual roost size. A precautionary moderate conservation status is advised.
- Natterer's bat – Peak count: two; likely day roosting. IUCN Least Concern.
- Barbastelle – Two recordings possibly indicating a single bat recorded inside church on one occasion: of conservation significance. Potential to be day roosting (e.g., individual males or non-breeding females). IUCN Near Threatened.

7. Outline Proposals

Methodology

7.1 The intervention development through the presentation of proportional options is based on impact level and associated costs. Church communities can consider the merit of each option on its own or in combination with another. To assist with this

approach, an assessment matrix is generated for each proposed option, where each option is categorised and the impact on individual receptors is assessed (Table 8). Additional assessment tables may be required should more than one option be brought forward, allowing a cumulative assessment of interventions.

7.2 For all interventions, consideration was given to addressing the need, its likelihood of success against cost (capital and maintenance) and viability (longevity of success). Interventions are broadly categorised in terms of anticipated costs (see Appendix 8) together with impacts on the receptors, i.e., ecological (bat), historical, architectural, social and visual:

- Low Impact intervention
  - Where costs are anticipated to be <£5,000 and result in low or negligible impacts for all receptors.
  - Examples may include the use of covers, voiles, off-the-peg bat boxes, or a small number of baffles/catch-boards, where impacts on bat roost can be avoided. Timing of installation must avoid impacts at sensitive times when bats are likely to be present, i.e., peak maternity and hibernation periods.
  - Survey requirements: likely to need Light Touch Surveys only as no European Protected Species licence requirements (no impacts on bats or roosts) and no post-intervention monitoring are anticipated. Though, consideration may need to be given to surveys being undertaken through volunteer engagement i.e., local bat groups.

- Moderate Impact Intervention
  - Where costs are anticipated to be between £5,000 - £20,000 and result in moderate impacts on one or more receptors.
  - Low impact interventions affecting common species of bats and/ or their roosts of low conservation significance. European Protected Species licences may be required supported by detailed surveys and post-intervention monitoring surveys.
  - Examples include more complex use of baffles/catch boards, small-scale bespoke boxing-in of eaves, heated bat boxes, enhancement of towers or similar
  - Small scale scaffolding/ scaffold towers may be required.
  - Faculty consents likely to be required.
  - Subject to separate design development, the use of small-scale sails may be included in this category

- High Impact Interventions
  - Where costs are anticipated to be >£20,000 and result in high impacts on one or more receptors.
  - Complex sites and structures where detailed bespoke design is required.
  - Where working at height requires complex scaffolding.
  - High-cost mitigation i.e., two or more boxed-in eaves, bespoke heated bat boxes, false/new ceilings, etc.
  - Innovative design approaches including new/false ceilings, broad use of sails.
  - Faculty consents will be required together with European Protected Species licensing for moderate or high conservation significant roosts, as well as three or more years' post-intervention monitoring.

7.3 Where more than one bat species is present, each species is assessed separately due to their individual requirements, as interventions for one species may conflict with another. The requirements for a crevice-dwelling species, e.g., soprano pipistrelle, can be very different to those for species that prefer larger open spaces, e.g., brown long-eared bat.

Cost Evaluation

7.4 To aid the church community's decision-making process and assist with future plans for taking forward potential solutions to resolve issues related to bats and churches, estimated costs, based on the BiC expenditure summaries are provided (Appendix 9).

7.5 Options are considered and first presented in isolation to each other and later combined (for example purposes) to give an indication of multiple option costs.

7.6 Please note that over the period of the initial phases of the BiC Project, several issues have been identified including:

- Brexit and/ or the COVID-19 pandemic, resulting in increased costs and limited material and labour availability.
- In the unique and frequently experimental approach to delivering solutions under the project, some solutions are untested and may need additional follow-up work to secure positive results.
- Existing bat surveys have a short period of validity before they need updating or repeating.
- The condition of the churches varies, additional architectural work may be required.

Intervention Options

7.7 Five intervention options have been considered and put forward to the church community including church architect for consideration and discussion. Full details of each option are included in Appendices 10-18.

Option 1: Cover pews and use voiles

7.8 This intervention aims to protect pews and monuments by covering with linen cloth covers and voiles. Fabric and linen to be used rather than plastic sheeting to allow woodwork and masonry/stone to breathe and reduce condensation build-up that otherwise would result in damage. This option would be maintained by weekly cleaning during the peak summer activity period when bat droppings, staining and/or smell is obvious.

7.9 This is a low-cost intervention with moderate visual and historic impacts expected, but with no impact on bats.

7.10 While the costs of the scheme are anticipated to be relatively low, the effectiveness will be limited as it is reliant on the church community to accept and manage the accumulation of faecal matter and urine during the peak summer bat activity period.

Option 2: Baffles/ Catch boards at primary roosting locations

7.11 This intervention aims to collect bat droppings at concentration points and reduce unsightly accumulations. The use of cat litter would reduce the dampness and smell in these areas, and ongoing maintenance would require monthly cleaning during the peak summer activity period when bat droppings are at their worst.

7.12 This low-cost intervention is expected to have moderate visual and historical impacts, and no ecological impacts.

7.13 The effectiveness of this option is limited as it is reliant on bats continuing to use specific locations to roost. Furthermore, it will not reduce the spread of general faecal matter in other areas of the church including urine staining. Where the population of bats remains small, this may be acceptable; but should numbers or diversity of bats increase, this option may have limited success.

Option 3: Small-scale temporary sails below south aisle roost (soprano pipistrelle)

7.14 This intervention looks to collect and control bat droppings and reduce impacts of bat faeces and urine in community and kitchenette areas that are below the main soprano pipistrelle bat roosting location. Ongoing maintenance would require monthly cleaning during the peak summer activity period when bat droppings are obvious.

7.15 The cost of this option remains unknown and subject to a separate design competition run by the BiC Project that allows for the development of a generic approach to separating the impacts of bats (faeces and urine) from historical monuments and people. It is likely to be a moderate-cost intervention, with moderate visual and historical impacts and low ecological impact.

7.16 While the costs of the scheme are not known it is anticipated that this may become a generic lower-cost option for some churches and be fairly effective. It will not reduce the spread of general faecal matter and urine from bats flying around the main body of the church. Where the population of bats remains small, this may be acceptable; but should numbers or diversity of bats increase, this option may have limited success.

Option 4: Box in the south aisle rainspout and create bat box

7.17 This intervention aims to control bats accessing inside the church and provide alternative artificial roost structure. A new discreet sealed bat box is proposed, subject to architectural issues with leadwork, masonry and timber beams. Once created, the bats can continue to the existing bat access point in the rainspout.

7.18 This option will need to be combined with Option 6 or 7 to maintain bat access and roost opportunities for brown long-eared bats. The sealed bat box could also be combined with Option 5.

7.19 This high-cost option will combine the costs of bat surveys, licensing, architectural support and bespoke design solutions, and high contract costs including scaffolding. Further costs will be incurred due to combinations including Options 5, 6, and 7.

7.20 Given the multiple species roost, impacts are anticipated to have a high viability/success risk together with post-intervention monitoring cost.

Option 5: Box in the timber beam in the nave and create bat box

7.21 This intervention aims to control bats accessing the internal areas of the church and provide an alternative artificial roost structure inside the beam in the nave. Boxing-in the beam would result in a new discreet sealed bat box, subject to any architectural issues with leadwork, masonry and timber beams. Once created the bats can continue to the existing bat access points.

7.22 This option will need to be combined with Option 6 or 7 to maintain bat access and roost opportunities for brown long-eared bats. The sealed bat box could be combined with Option 4 to allow bats to access the internal sealed timber beam providing sufficient roosting opportunities for the multiple species using the church, including soprano and common pipistrelle and Natterer's bat.

7.23 This high-cost option will combine the costs of bat surveys, licensing, architectural support and bespoke design solutions, and high contract costs including scaffolding. Further costs will be incurred due to combinations including Options 4, 6, and 7.

7.24 Given the multiple species roost, impacts are anticipated to have a high viability/success risk together with post-intervention monitoring cost.

Option 6: Small-scale temporary sails below south aisle roost (brown long-eared bat)

7.25 This intervention looks to install temporary sails during the summer months only to control bat droppings below the main roosting locations within the church. Ongoing maintenance would require monthly cleaning during the peak summer activity period when bat droppings are obvious.

7.26 The cost of this option remains unknown and subject to a separate design competition run by the BiC Project that allows for the development of a generic approach to separating the impacts of bats (faeces and urine) from historical monuments and people. It is likely to be a moderate-cost intervention, with moderate visual and historical impacts and low ecological impact.

7.27 While the costs of the scheme are not known it is anticipated that this may become a generic lower-cost option for some churches and be fairly effective. It will not reduce the spread of general faecal matter and urine from bats flying around the main body of the church. Where the population of bats remains small, this may be acceptable; but should numbers or diversity of bats increase, this option may have limited success.

Option 7: Creation of two bat boxes above chapels

7.28 This option aims to create two new discreet sealed bat boxes above each chapel, together with new external bat access points. The creation of new access points will need to allow a habituation period of at least a one-year, to allow the bats discover these new points while still using the existing points. This remains a high-risk strategy as it requires a degree of discovery and learning prior to decommissioning an existing access point.

7.29 The sealed bat box could be used in combination with acoustic deterrents to encourage a change in behaviour and reduce the internal impacts of large numbers of bats in flight.

7.30 This high-cost option will combine the costs of bat surveys, licensing, architectural support and bespoke design solutions, and high contract costs including scaffolding.

7.31 Bats will need to discover the new access points during a habituation period of a least one peak activity period. Evidence of bat access points being used will be required to determine success. High costs that are likely, particularly for surveys and licensing; the viability of this option needs careful consideration.

Option 8: Enhancement of clocktower for bats

7.32 This option aims to enhance the clocktower to improve roosting opportunities for bats (may not be appropriate where bell ringing is a regular activity) by closing the windows with baffle boards and incorporating small bat access points to create a dark

void space with stabilized temperatures (reduced draft from prevailing winds). This option may form part of an overall mitigation strategy.

7.33 This is a low-impact scheme where generic boarding is used behind existing bell window screens and/or louvres.

7.34 This option is of unknown effectiveness with potential to provide alternative roost points for bats in underutilised space away from people. Potential impacts on any bells present are considered minor.

Option 9: Bat box behind the clocktower

7.35 This intervention aims to provide localised alternative artificial roost point for pipistrelle bats.

7.36 This is a moderate-cost intervention subject to any significant architectural or historical constraints.

7.37 In isolation, this option is not viable. It is only likely to be of low enhancement value and must be used in combination with additional high-impact options.

Table 8. Impact assessment matrix.

General Assessment Guide

Positive						Negative
3	2	1	0	-1	-2	-3
Positive impact improving conditions for receptor						Negative impact to receptor

Option 1: Cover pews and use voiles

Receptor	Bat Populations			Heritage Assets	Architectural	Social	Visual
Intervention Scale	Soprano & common pipistrelle	Brown long-eared bat	Natterer's bat				
Low Impact Intervention	0	0	0	0	0	-1	-2
Moderate Impact Intervention							
High Impact Intervention							

Option 2: Baffle/ Catch boards at primary roosting locations

Receptor	Bat Populations			Heritage Assets	Architectural	Social	Visual
Intervention Scale	Soprano & common pipistrelle	Brown long-eared bat	Natterer's bat				
Low Impact Intervention	0	0	0	0	0	1	-1
Moderate Impact Intervention							
High Impact Intervention							

Option 3: Small scale temporary sails below south aisle roost (kitchenette area)

Receptor	Bat Populations			Heritage Assets	Architectural	Social	Visual
Intervention Scale	Soprano & common pipistrelle	Brown long-eared bat	Natterer's bat				
Low Impact Intervention							
Moderate Impact Intervention	0	0	0	0	0	3	-1
High Impact Intervention							

Option 4: Box-in south aisle rainspout and create bat box

Receptor	Bat Populations			Heritage Assets	Architectural	Social	Visual
Intervention Scale	Soprano & common pipistrelle	Brown long-eared bat	Natterer's bat				
Low Impact Intervention							
Moderate Impact Intervention	0	-3	-2	-1	-1	3	0
High Impact Intervention							

Option 5: Box in nave timber to create sealed bat box

Receptor	Bat Populations			Heritage Assets	Architectural	Social	Visual
Intervention Scale	Soprano & common pipistrelle	Brown long-eared bat	Natterer's bat				
Low Impact Intervention							
Moderate Impact Intervention	0	-3	-1	-1	0	3	0
High Impact Intervention							

Option 6 Small scale temporary sails below south aisle (brown long-eared bat)

Receptor	Bat Populations			Heritage Assets	Architectural	Social	Visual
Intervention Scale	Soprano & common pipistrelle	Brown long-eared bat	Natterer's bat				
Low Impact Intervention							
Moderate Impact Intervention	0	0	0	0	0	2	-1
High Impact Intervention							

Option 7: Artificial bat box North and South Aisle chapel roofs

Receptor	Bat Populations			Heritage Assets	Architectural	Social	Visual
Intervention Scale	Soprano & common pipistrelle	Brown long-eared bat	Natterer's bat				
Low Impact Intervention							
Moderate Impact Intervention							
High Impact Intervention	1	0	1	-1	-1	2	0

Option 8: Enhancement of clocktower for bats

Receptor	Bat Populations			Heritage Assets	Architectural	Social	Visual
Intervention Scale	Soprano & common pipistrelle	Brown long-eared bat	Natterer's bat				
Low Impact Intervention							
Moderate Impact Intervention	1	1	1	-1	-1	1	0
High Impact Intervention							

Option 9: Create bat box behind clocktower

Receptor	Bat Populations			Heritage Assets	Architectural	Social	Visual
Intervention Scale	Soprano & common pipistrelle	Brown long-eared bat	Natterer's bat				
Low Impact Intervention							
Moderate Impact Intervention	1	0	0	0	0	1	0
High Impact Intervention							

8. Consultation Methodology

8.1 The All Hallows PCC members and appointed architect have been consulted throughout the 2021 survey period including inception meeting on 21st April 2021 and presentation of summary results and initial concept for interventions presented at an online meeting on 25th August and 11th October 2021.

9. Consultation Constraints and Limitations

9.1 The current COVID-19 pandemic has limited more conventional opportunities for onsite face-to-face meetings which would otherwise involve a more personal interaction of ideas and the iterative collaborative process.

10. Consultation Results

10.1 General feedback from consultation meetings online indicated a preference for low-cost/impact interventions, with inclination for simple transferable solutions with potential to be tailored and used across a range of churches where the impact of bats is affecting the use of the church, including aspirations for more social purposes.

11. Advice

11.1 The ecological mitigation hierarchy must be followed by all elements of the project, from design, to construction, to end use, to ensure there is a net gain to biodiversity on site and the favourable conservation status of protected species is maintained. The mitigation hierarchy follows:

- *Avoid*: avoid impacts on biodiversity.
- *Minimise*: minimise impacts that cannot be completely avoided, through alternations to design, use, scale, location, timing of phases, etc.
- *Mitigate and compensate*: undertake works which will have an impact by implementing safeguarding measures, such as using an Ecological Clerk of Works (ECoW) where there are risks to bats. Provide compensation to replace habitats that have been lost as a consequence of proposals.
- *Enhance*: Provide additional habitats and features for bats to ensure biodiversity net gain.

11.2 The selection of appropriate intervention options will need to be considered both individually and in combination, where appropriate, to ensure that the FCS of individual species of bats can be met, including their Continued Ecological Functionality (CEF).

11.3 When considering the ecological mitigation hierarchy, consideration must be given to addressing the need for any intervention (Imperative Reasons of Overriding Public Interest and No Satisfactory Alternative), its likelihood of success against the costs,

and its viability. Through this approach, alternative options for interventions will be considered and used to justify any proposals to church community, statutory authorities and external consultees that may be required throughout the process of securing support and consents.

11.4 Where possible, any interventions that address the needs of and avoid impacts on bats and their roosts should be favoured, particularly where they can reduce the burden of European Protected Species licensing and associated costs including further surveys, complex mitigation strategies, compensation and post-intervention monitoring surveys.

11.5 Where a European Protected Species licence is required, authorised actions must not be detrimental to the maintenance of the FCS in the natural range of populations of the species concerned. Post-intervention monitoring will be required to ensure that the FCS has been maintained; if it has not, remedial action will be required.

12. Conclusion

12.1 The surveys conducted at All Hallows Church, Upper Dean, have identified several bat species roosting within the main body of the church.

12.2 The following species of bats have been confirmed using the church:

- Pipistrelle – Peak count 237+: maternity roost; of high conservation significance.
- Brown long-eared bat – Peak count 15+: probable maternity roost; of moderate conservation significance.
- Natterer's bats – Peak count two: likely day roosting.
- Barbastelle – Two recordings possibly indicating a single bat recorded inside church on one occasion; of conservation significance.

12.3 The nine intervention options based on low, moderate and high impact/cost interventions are presented. These represent a range of ideas developed in consultation with PCC Members and the church architect. The decision to implement one, or a combination of the intervention options will require careful consideration of the ecological, financial, architectural and visual impacts.

12.4 Any intervention is likely to require refinement in order to:

- assess and develop a detailed design;
- understand the physical character and constraints of the building, and its architectural and historical fabric;
- take account changes in species present and roost status; and,
- ensure its effectiveness and the maintenance of FCS of roosting bats.

Age of the Survey Data

12.5 Bats are highly mobile species and can change their roosting behaviour between and within years. Surveys are only valid for short periods of time and will need updating in future years if interventions are brought forward to implementation stage.

13. References and Further Reading

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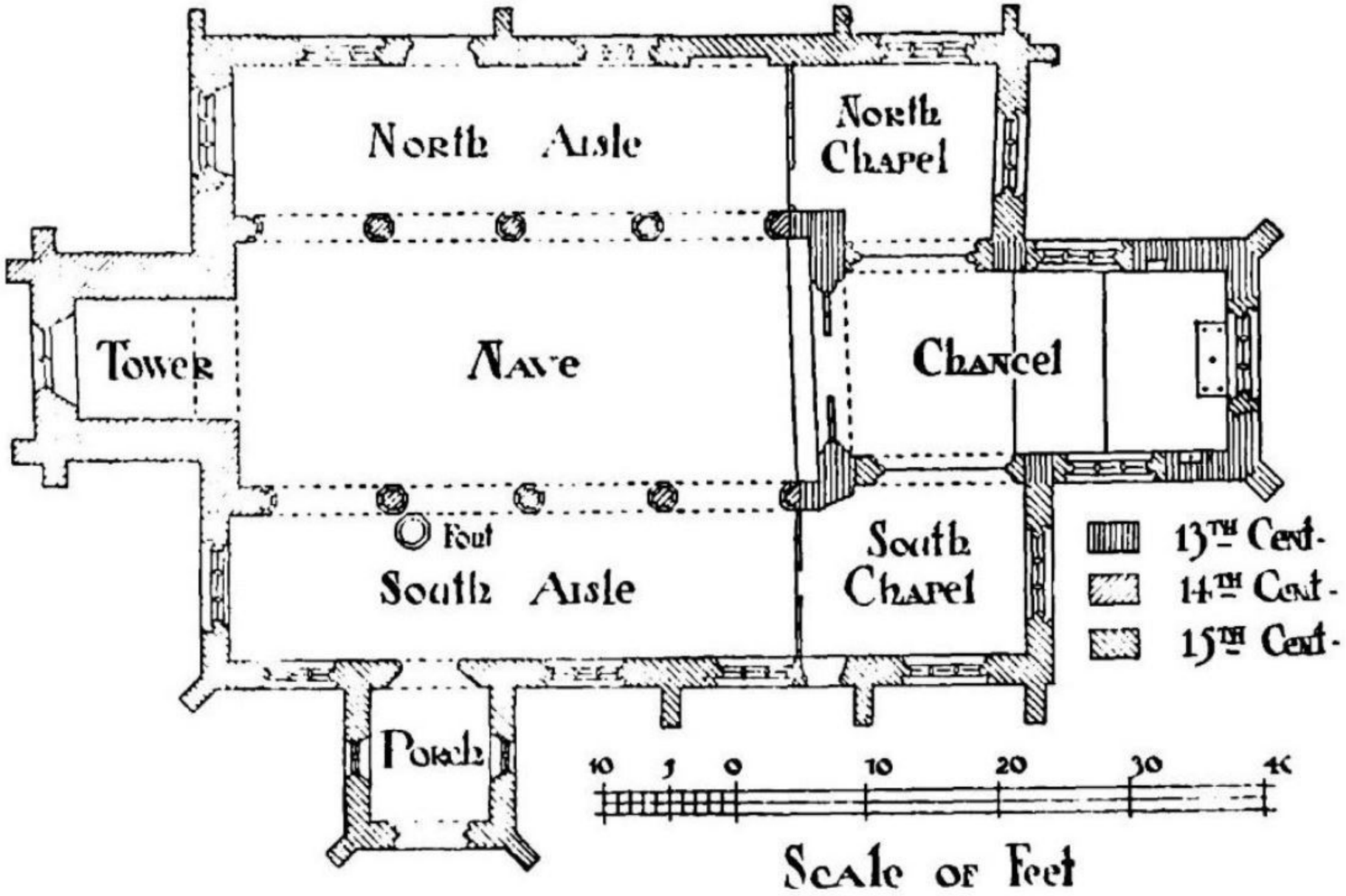
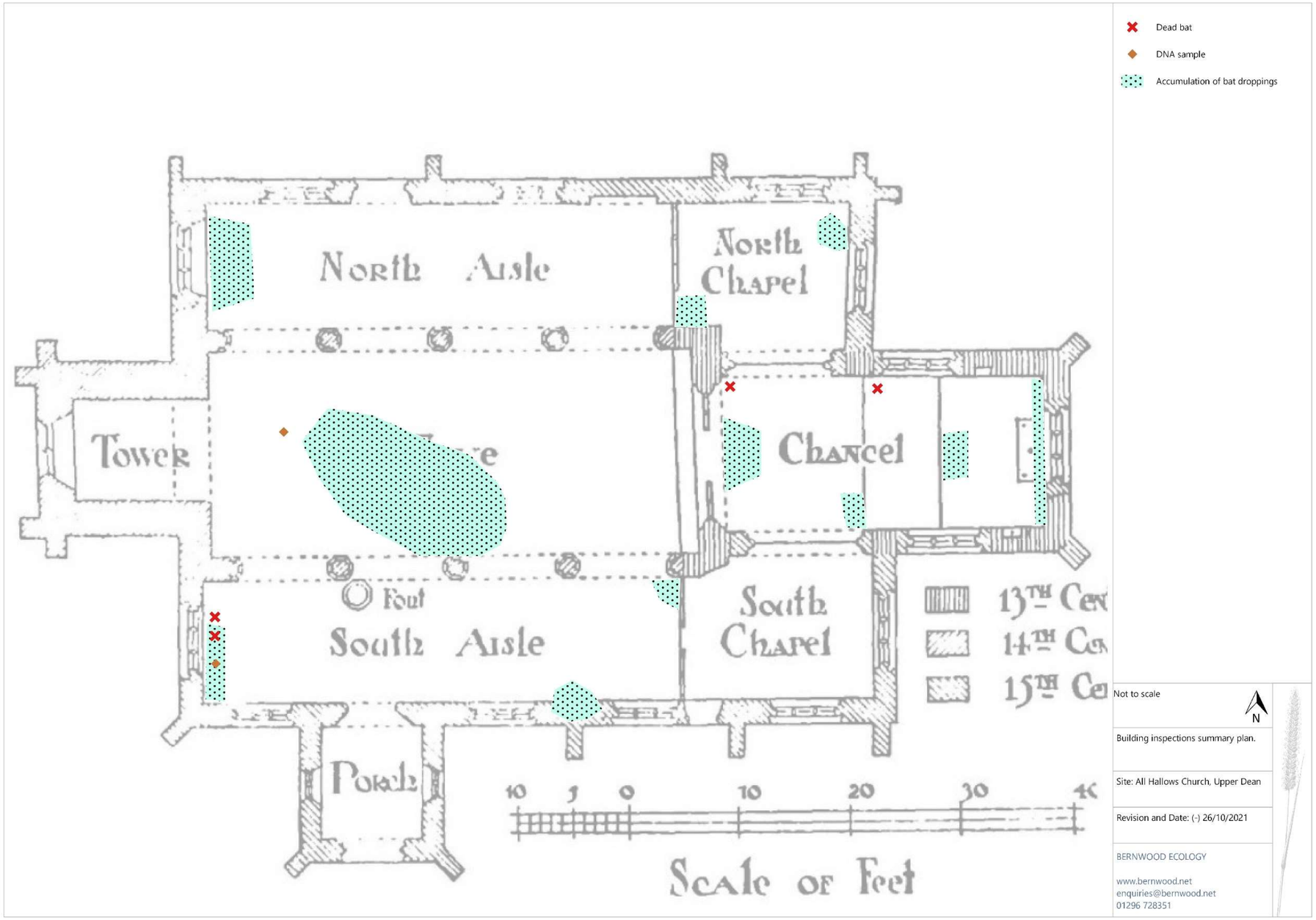
Zeale, M. R., Bennitt, E., Newson, S. E., Packman, C., Browne, W. J., Harris, S., Jones, G. and Stone, E. L. (2016). Mitigating the impact of bats in historic churches: the response of Natterer's bats *Myotis nattereri* to artificial roosts and deterrence. PLoS ONE 11(1):e0146782. DOI: 10.1371/journal.pone.0146782.

Appendix 1. Site location in relation to surrounding landscape.

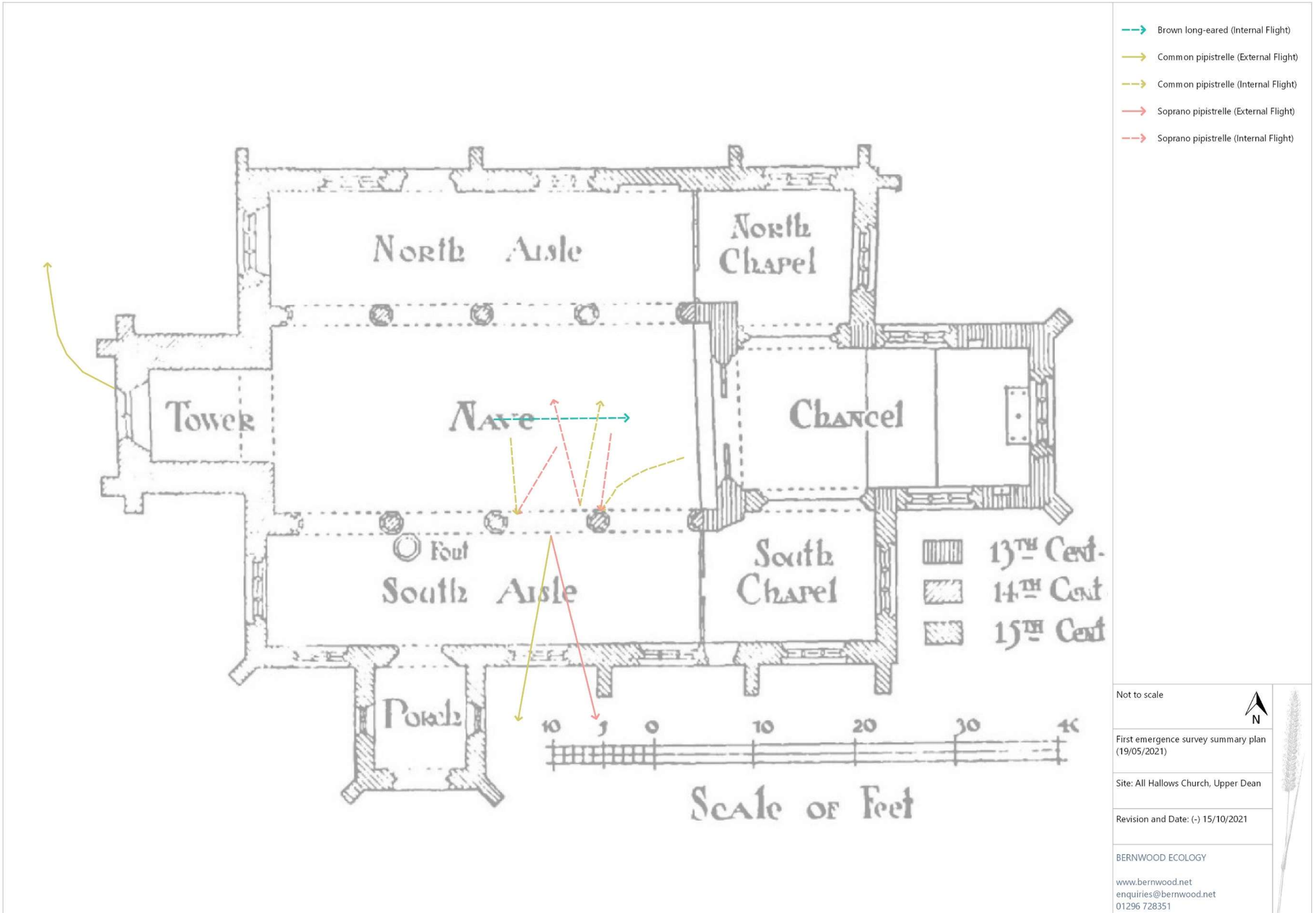
Appendix 2. Existing site layout.

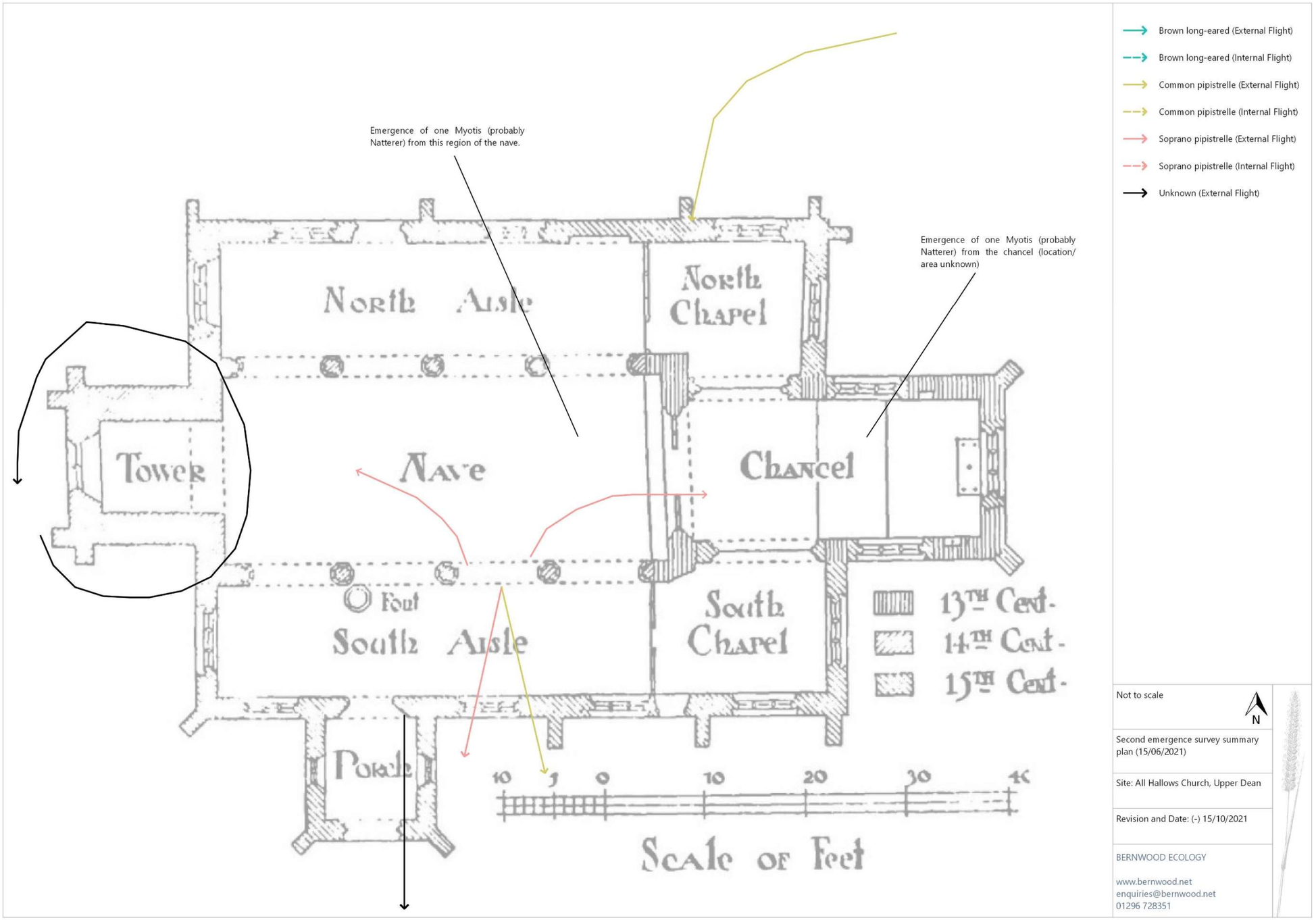


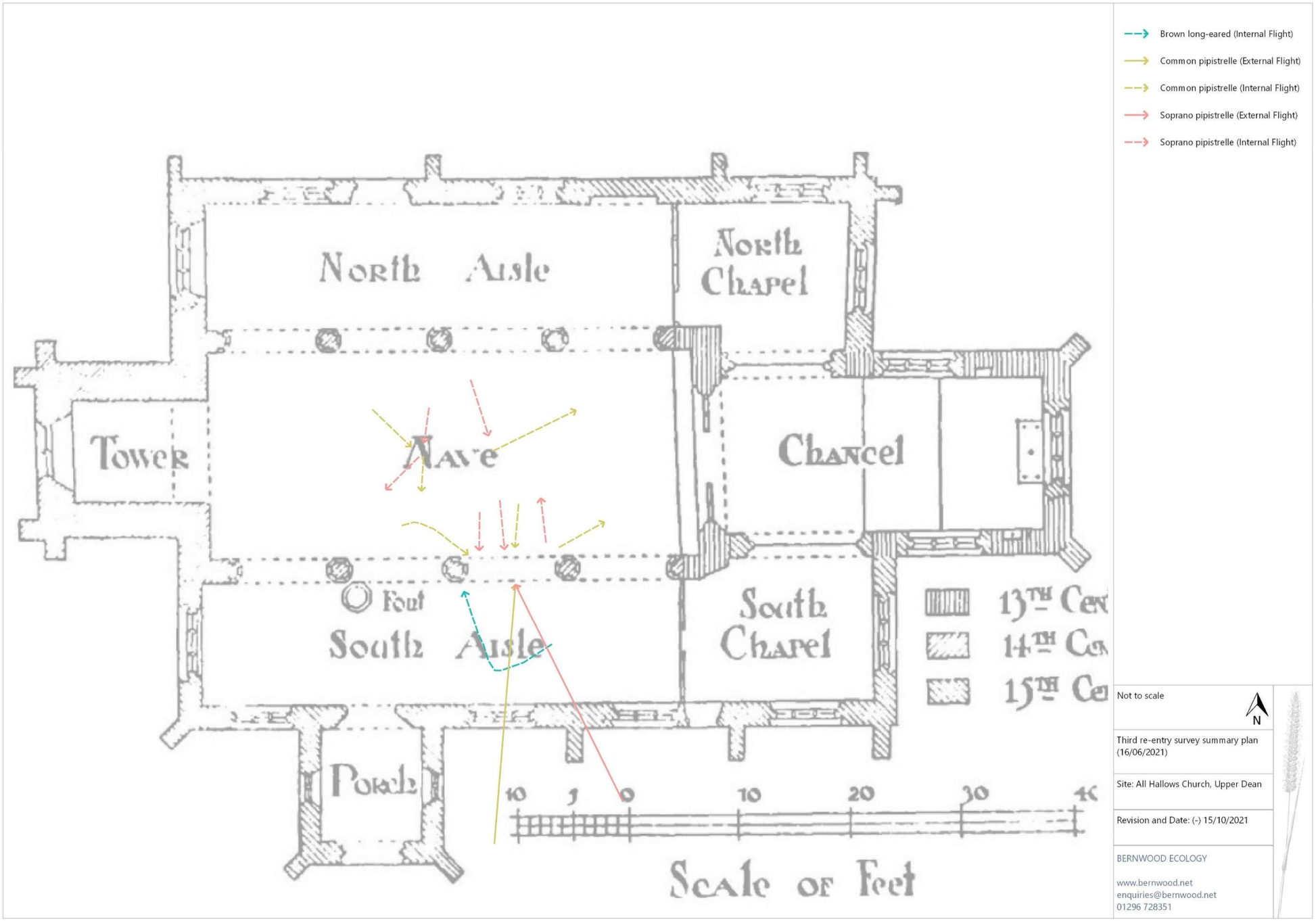
Appendix 3. Summary plan of building inspection results.

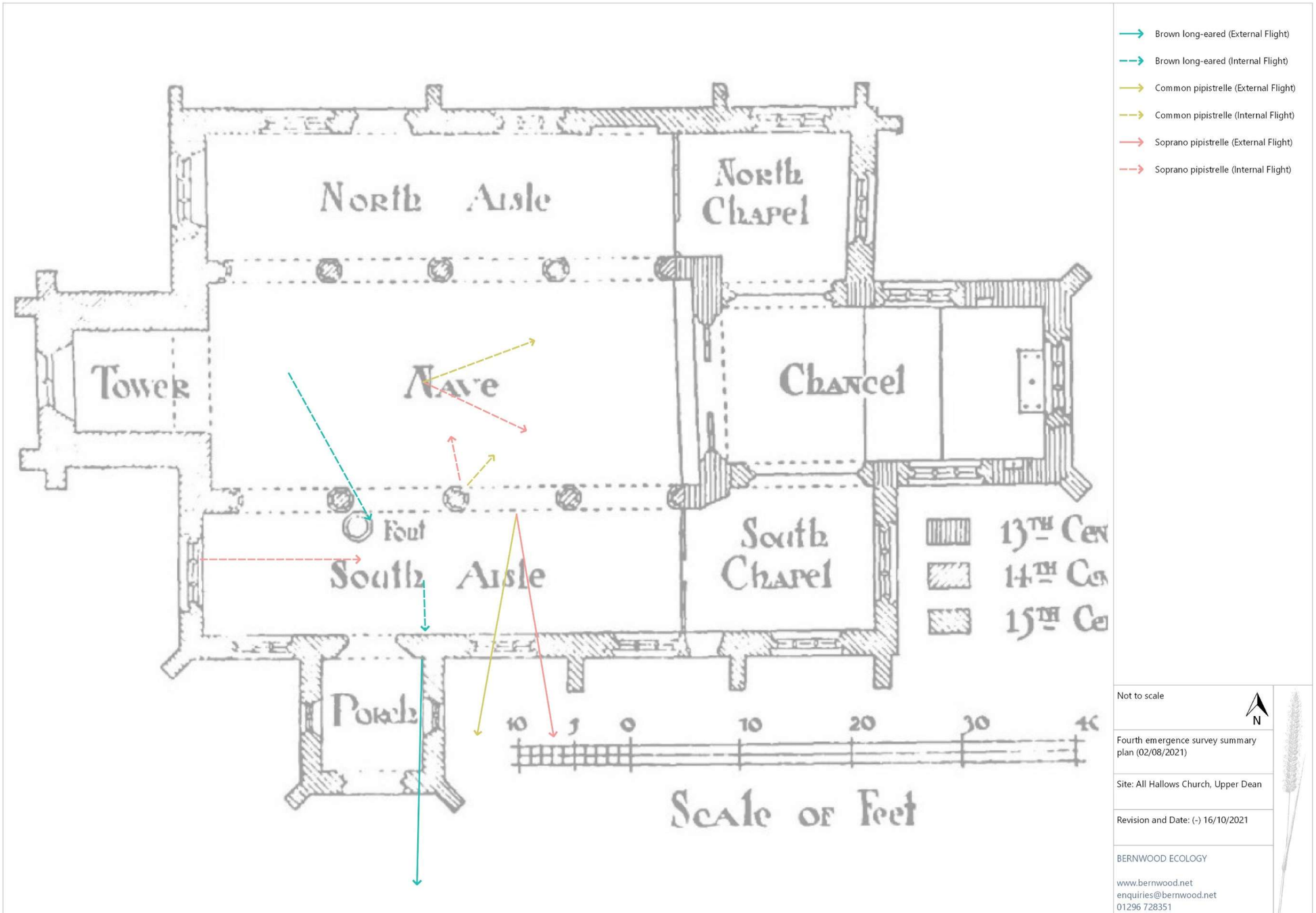


Appendix 4. Bat emergence and re-entry survey summary plans.

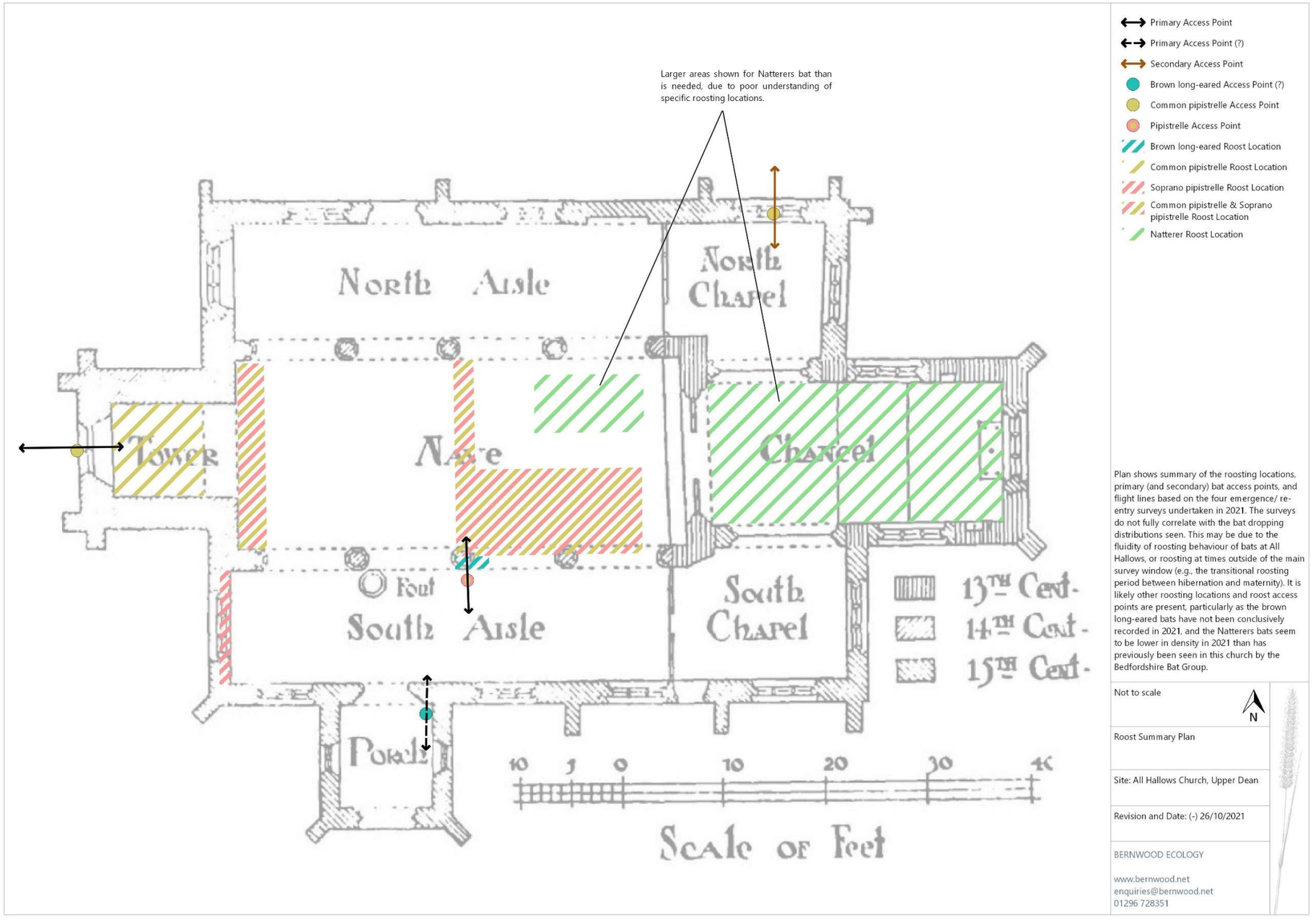



Emergence of one Myotis (probably Natterer) from this region of the nave.
Emergence of one Myotis (probably Natterer) from the chancel (location/ area unknown)
North Aisle
North Chapel
Tower
Nave
Chancel
Font
South Aisle
South Chapel
Porch
13TH Cent.
14TH Cent.
15TH Cent.
10 5 0 10 20 30 40
Scale of Feet
Brown long-eared (External Flight)
Brown long-eared (Internal Flight)
Common pipistrelle (External Flight)
Common pipistrelle (Internal Flight)
Soprano pipistrelle (External Flight)
Soprano pipistrelle (Internal Flight)
Unknown (External Flight)
Not to scale
N
Second emergence survey summary plan (15/06/2021)
Site: All Hallows Church, Upper Dean
Revision and Date: (-) 15/10/2021
BERNWOOD ECOLOGY
www.bernwood.net
enquiries@bernwood.net
01296 728351


Brown long-eared (Internal Flight)
Common pipistrelle (External Flight)
Common pipistrelle (Internal Flight)
Soprano pipistrelle (External Flight)
Soprano pipistrelle (Internal Flight)
North Aisle
North Chapel
Tower
Nave
Chancel
Font
South Aisle
South Chapel
Porch
13TH Cen
14TH Ce
15TH Ce
10 5 0 10 20 30 40
Scale of Feet
Not to scale
N
Third re-entry survey summary plan (16/06/2021)
Site: All Hallows Church, Upper Dean
Revision and Date: (-) 15/10/2021
BERNWOOD ECOLOGY
www.bernwood.net
enquiries@bernwood.net
01296 728351


North Aisle
North Chapel
Tower
Nave
Chancel
Font
South Aisle
South Chapel
Porch
13TH Cen
14TH Cen
15TH Ce
10 5 0 10 20 30 40
Scale of Feet
Brown long-eared (External Flight)
Brown long-eared (Internal Flight)
Common pipistrelle (External Flight)
Common pipistrelle (Internal Flight)
Soprano pipistrelle (External Flight)
Soprano pipistrelle (Internal Flight)
Not to scale
N
Fourth emergence survey summary plan (02/08/2021)
Site: All Hallows Church, Upper Dean
Revision and Date: (-) 16/10/2021
BERNWOOD ECOLOGY
www.bernwood.net
enquiries@bernwood.net
01296 728351

Appendix 5. Roost location summary plan.



Appendix 6. Summary of remote bat detector recordings.

The quantity of recordings does not necessarily indicate levels of bat activity, as other noises may also be recorded. Most calls (barbastelle, *Myotis* sp., 'NSL' and long-eared bat) verified for accuracy.

					Barbastelle	*Myotis* sp.	'NSL'	Long-eared bat	Common pipistrelle	Soprano pipistrelle
Location	ID	Recording period	No. of recordings	Detection probability	>0.8	>0.5	>0.9	>0.5	>0.9	>0.9
South west between the tower and the south aisle (exterior)	D500X 888	19/05/21 20:13 to 19/05/21 22:53	57	No. of calls	0	0	0	0	9	12
North west between the tower and the north aisle (exterior)	D500X 895	19/05/21 20:31 to 19/05/21 23:00	88	No. of calls	0	0	0	0	23	1
South eastern corner of the south chapel (exterior)	D500X 1025	19/05/21 20:29 to 19/05/21 22:45	48	No. of calls	0	0	0	0	0	0
North eastern corner between north chapel and chancel (exterior)	D500X 894	19/05/21 20:39 to 19/05/21 22:49	42	No. of calls	0	1	0	0	9	2
Far western corner of the south aisle (interior)	D500X 888	15/06/21 20:55 to 16/06/21 05:03	249	No. of calls	0	0	0	27	20	33
Centre of the nave (interior)	D500X 1025	15/06/21 to 16/06/21 (time setting incorrect on detector)	130	No. of calls	0	9	0	4	53	16
South aisle west end (interior)	AM01	15/06/21 22:00 to 16/06/21 05:00	838	No of calls	2	0	0	15	9	220
Under nave rainspout (exterior)	AM08	15/06/21 22:00 to 16/06/21 05:00	1591	No of calls	0	0	6	3	29	577
Western side of the south aisle (interior)	D500X 888	02/08/2021 20:08-02/08/2021 22:34	188	No. of calls	0	0	0	0	1	88
North western corner of church (exterior)	D500X 894	02/08/2021 20:23-02/08/2021 22:28	390	No. of calls	0	0	21	4	6	287
Altar (interior)	D500X 895	02/08/2021 20:23 to 02/08/2021 22:23	194	No. of calls	0	0	0	4	3	184
Nave (interior)	D500X 1025	02/08/2021 20:25 to 02/08/2021 22:28	389	No. of calls	0	0	0	4	6	287

Appendix 7. Count Bat roost analysis reports comparing observed roost count size to national database.

*Survey 1 (*Pipistrellus *sp.):*

Count Bat

Site Name: All Hallows Church

Author: Chris Damant

2021-10-18 07:01:30

Your save selection for this data was: This is a new record, please save to database

Summary

A total count of **70 *Pipistrellus spp.*** were found at a **Church** roost on **19/05/2021** in **Bedfordshire, England East & North East, England**

Section 1: Roost Count Data

This section uses the roost count of each ***Pipistrellus spp.*** record in the database. If the same location was recorded more than once, the highest total count for each year was taken and then the median across those years was used. This is the same for the subsets of breeding and structure type data.

The subset takes into account the breeding times:

- If you selected "Prebreeding" in the Assignment column, your data will be compared to counts from May and June
- If you selected "Postbreeding" in the Assignment column, your data will be compared to counts from July and August.

Boxplots are used to visualise data. For all boxplots in the report:

- The lower box line is the lower quartile, the bottom 25% of data lie below this line
- The top line of the box is the upper quartile, the top 25% of data lie above this line
- The median is the horizontal black line within the box
- Black dots are outliers
- The red dot shows your roost count

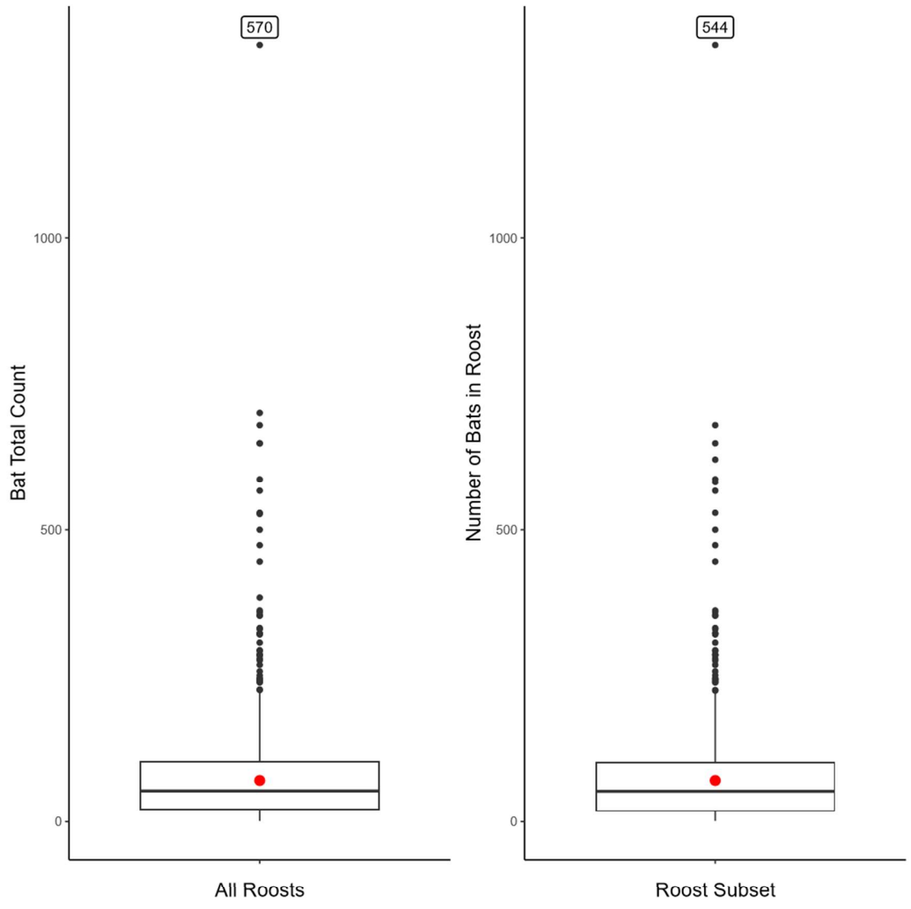


Figure 1: A boxplot of where your roost count sits in relation to all those in the database (left) and a subset based on Assignment (right) Your data is shown as the red dot.

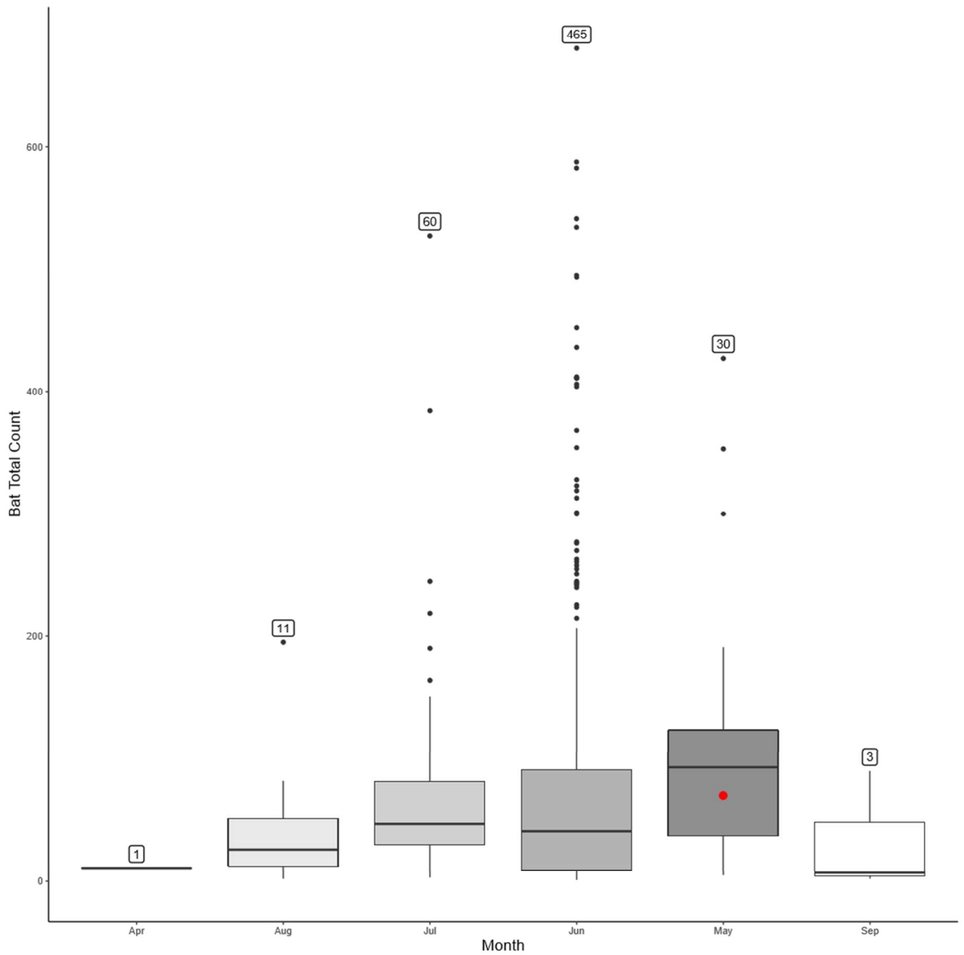


Figure 2: A boxplot showing total count of bats in roosts per month across all years. Your roost is shown as the red dot.The numbers above the boxplots represent the sample size used from the database.

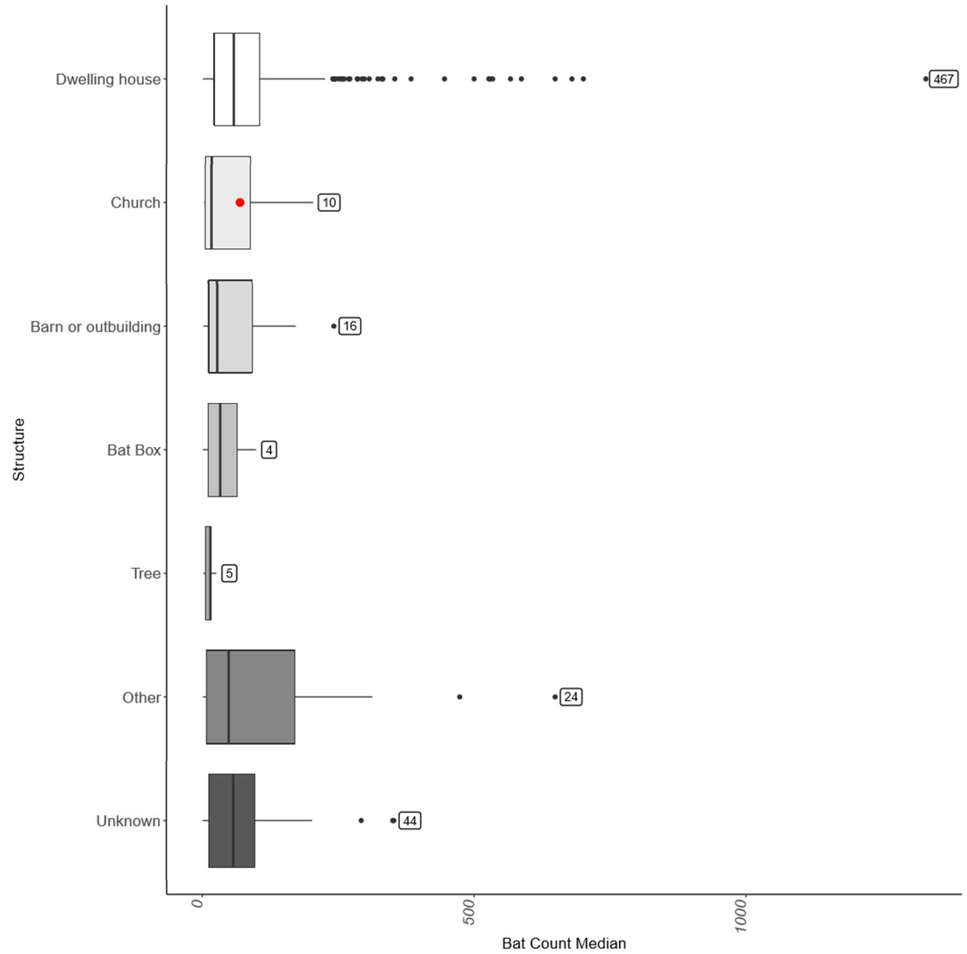


Figure 3: Boxplots of median bat counts in roosts split by structure type of the roost for all roosts in database. Your roost is shown as a red dot. Please note that counts tend to become more variable earlier and later in the season. The numbers alongside the boxplots represent the sample size used from the database.

Section 2: Percentiles Analysis

This analysis looks at the relative size of the ***Pipistrellus spp.*** roost you recorded. We take your total count of *Pipistrellus spp.* at the roost recorded and compare this to values in our reference database. We tell you what percentile your data falls at, and therefore what the relative size of that roost is.

The number of *Pipistrellus spp.* in a roost is ranked based on where it sits in relation to all other roosts in the database.

- low (0-19th percentile)
- low/moderate (20-39th percentile)
- moderate (40-59th percentile)
- moderate/high (60-79th percentile)
- high (80-94th percentile)
- exceptional (95th+ percentile)

Please note that although percentiles are a useful guideline, they are not definitive and it is up to the user to interpret their ecological value.

All data: Your roost is the **60th percentile** when compared to the **570 *Pipistrellus spp.*** roosts in the dataset. This means your roost is ranked as having a **moderate/high** number of *Pipistrellus spp.*.

Roost subset: This takes into account breeding times in the same way that the subset of Figure 1 does.

Your roost is the **61th percentile** when compared to the **544 *Pipistrellus spp.*** roosts in the dataset. This means your roost is ranked as having a **moderate/high** number of *Pipistrellus spp.*.

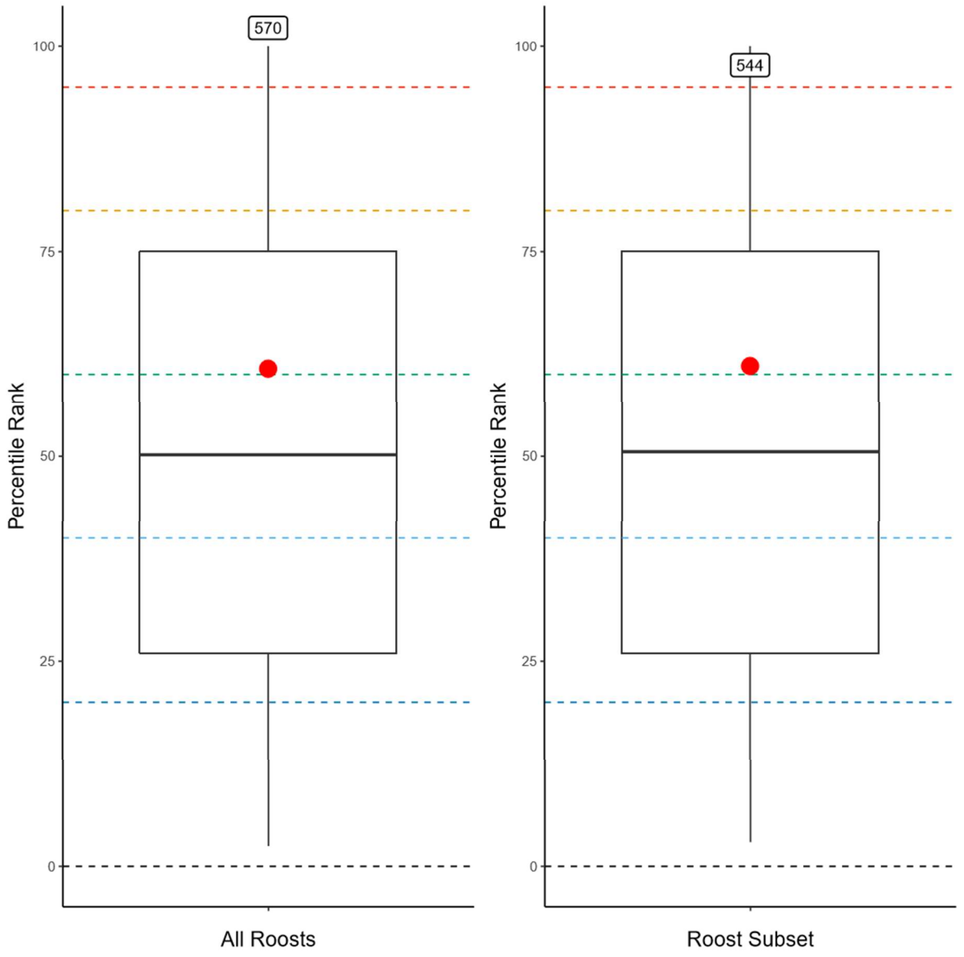


Figure 4: A boxplots showing where your data lies in relation to all other roost data (left) and in relation to a subset of data based on the Assignment you gave your data. Values are the percentile values. The 20th, 40th, 60th, 80th and 95th percentiles are marked by dashed lines. Database sample size is shown above each boxplot.

Section 3: Results filtered by Structure Type

The following section has subsetted data based on Structure Type. In this section your record has only been compared to roosts with the same structure as yours, as well as the same species. Your geographic and time filters will also still apply in this section. Graphs are provided for All Data and also a subset based on whether allocated to the Pre or Post breeding category.

All data: Your roost is the **60th percentile** when compared to the **570 *Pipistrellus spp.*** roosts in the dataset. This means your roost is ranked as having a **moderate/high** number of *Pipistrellus spp.*.

Roost subset: This takes into account breeding times in the same way that the subset of Figure 1 does.

Your roost is the **61th percentile** when compared to the **544 *Pipistrellus spp.*** roosts in the dataset. This means your roost is ranked as having a **moderate/high** number of *Pipistrellus spp.*.

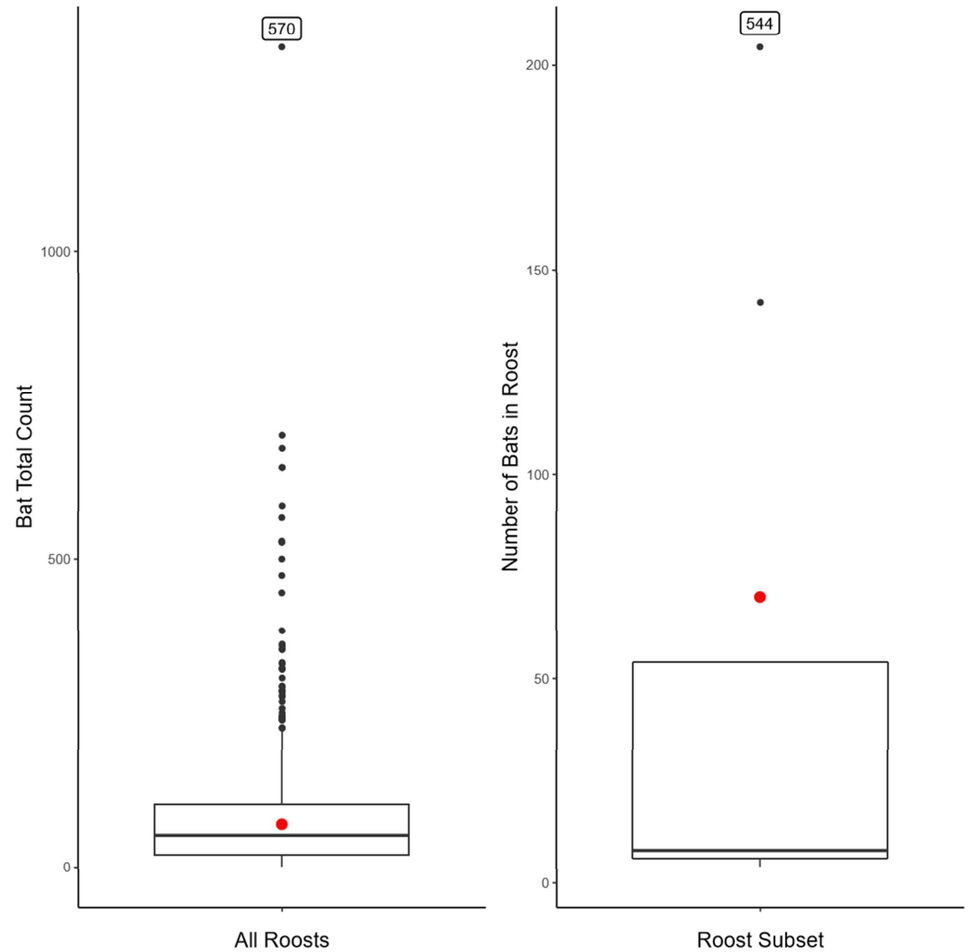


Figure 5: A boxplot of where your roost count sits in relation to all those in the database (left) and a subset based on Assignment (right) of the same structure type. Your data is shown as the red dot.

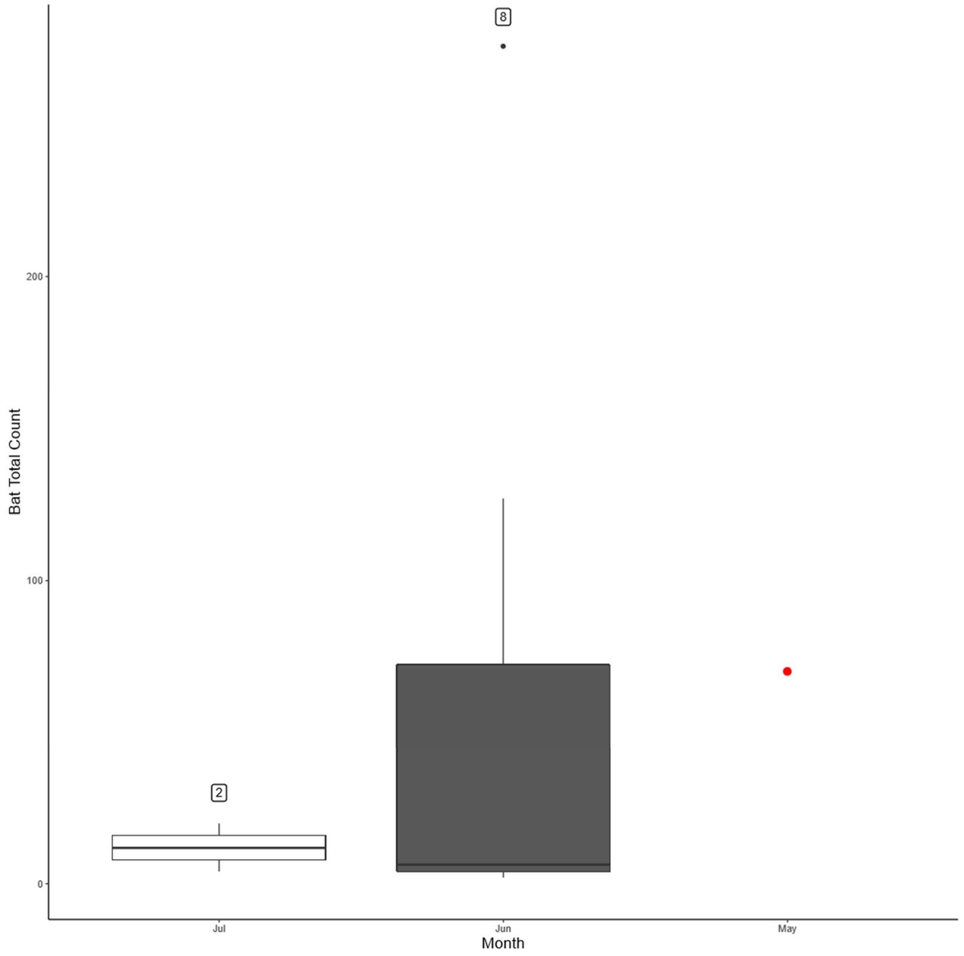


Figure 6: A boxplot showing total count of bats in roosts per month across all years for your roost's Structure Type. Your roost is shown as the red dot.

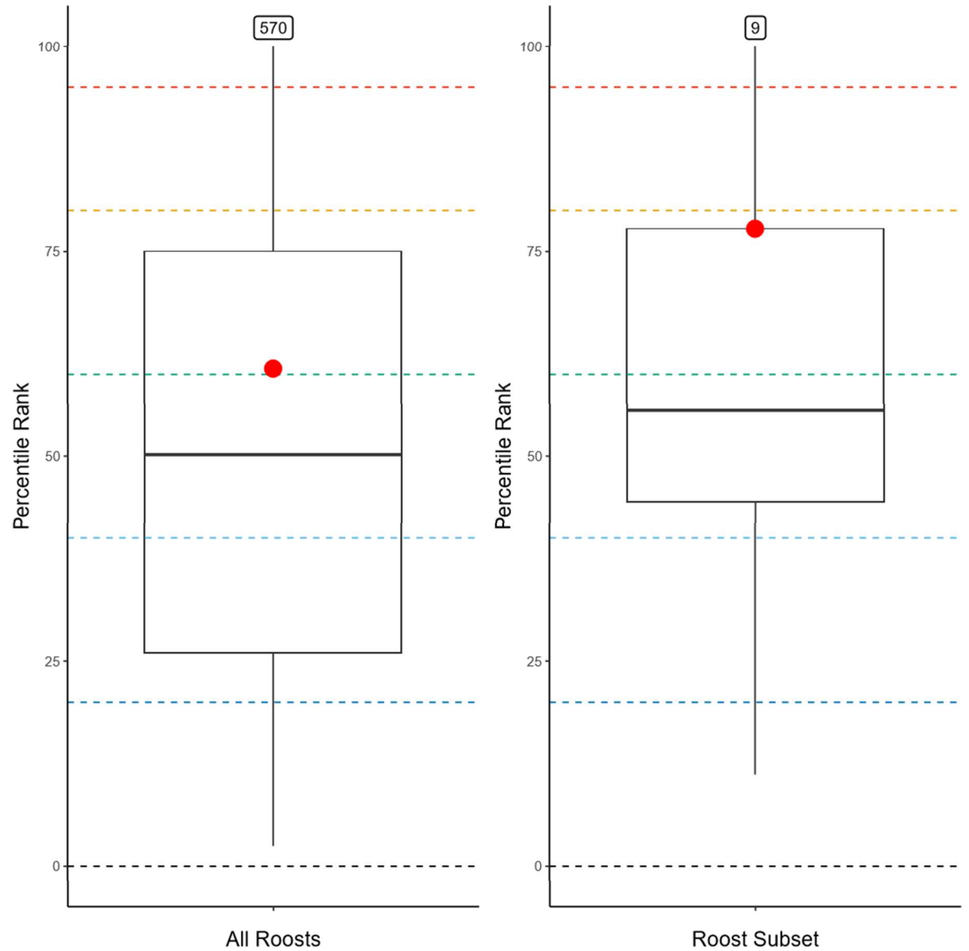


Figure 7: A boxplot showing where your data lies in relation to all other roost data (left) and a boxplot showing where your data lies in relation to a subset of data based on the Assignment you gave your data. Values are the percentile values. The 20th, 40th, 60th, 80th and 95th percentiles are marked by dashed lines. The numbers above the boxplots represent the sample size used for the database

*Survey 2 (*Pipistrellus *sp.):*

Count Bat

Site Name: All Hallows Church

Author: Chris Damant

2021-10-18 07:04:56

Your save selection for this data was: This is a new record, please save to database

Summary

A total count of **187 *Pipistrellus spp.*** were found at a **Church** roost on **15/06/2021** in **Bedfordshire, England East & North East, England**

Section 1: Roost Count Data

This section uses the roost count of each ***Pipistrellus spp.*** record in the database. If the same location was recorded more than once, the highest total count for each year was taken and then the median across those years was used. This is the same for the subsets of breeding and structure type data.

The subset takes into account the breeding times:

- If you selected "Prebreeding" in the Assignment column, your data will be compared to counts from May and June
- If you selected "Postbreeding" in the Assignment column, your data will be compared to counts from July and August.

Boxplots are used to visualise data. For all boxplots in the report:

- The lower box line is the lower quartile, the bottom 25% of data lie below this line
- The top line of the box is the upper quartile, the top 25% of data lie above this line
- The median is the horizontal black line within the box
- Black dots are outliers
- The red dot shows your roost count

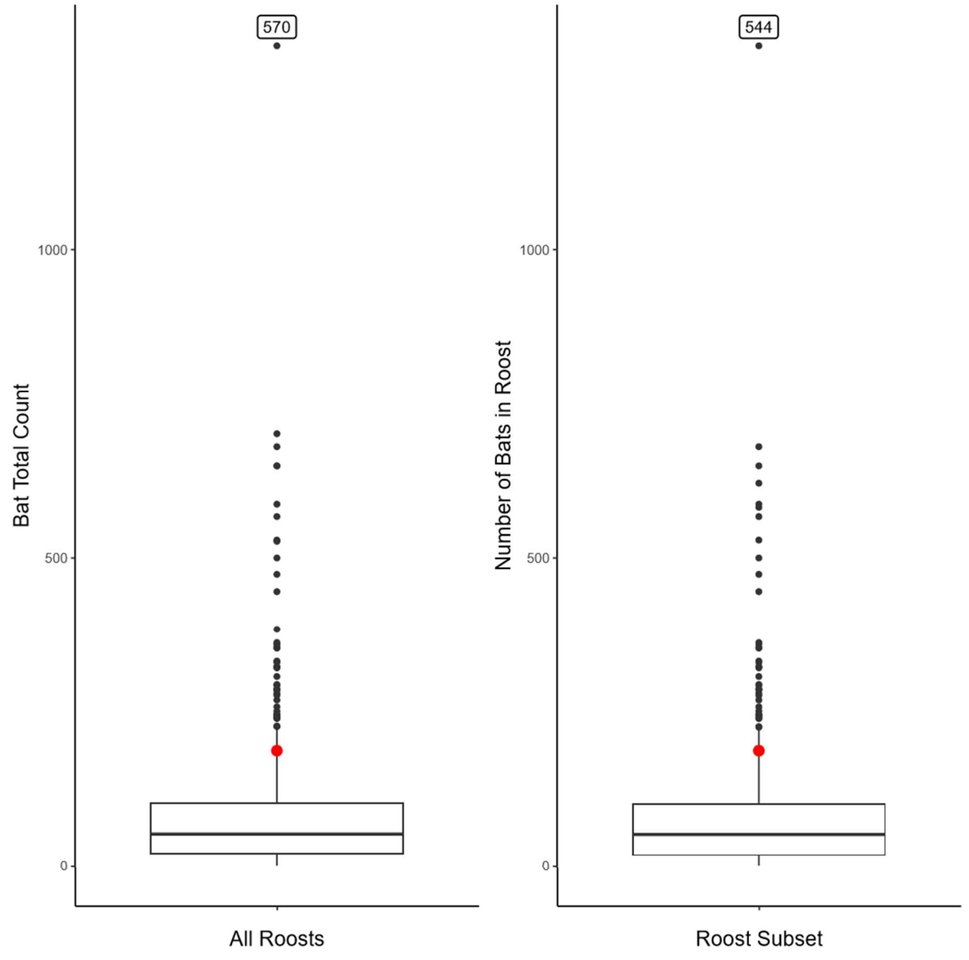


Figure 1: A boxplot of where your roost count sits in relation to all those in the database (left) and a subset based on Assignment (right) Your data is shown as the red dot.

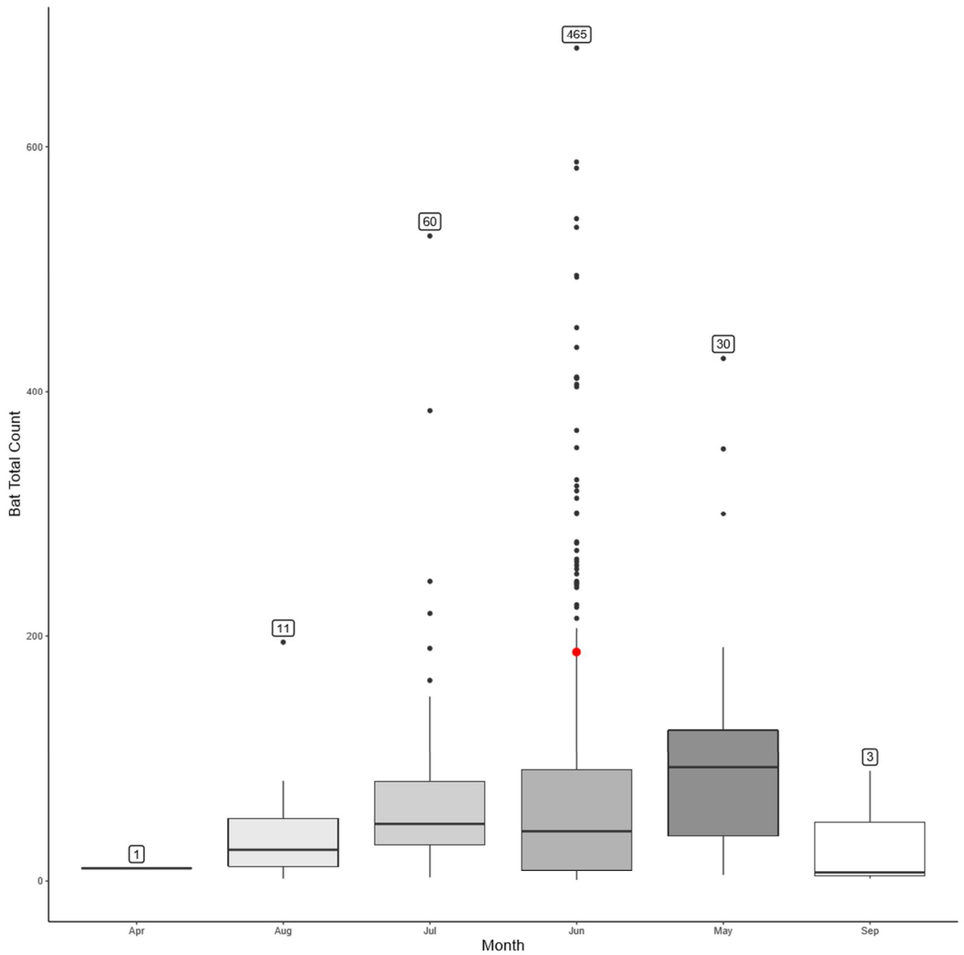


Figure 2: A boxplot showing total count of bats in roosts per month across all years. Your roost is shown as the red dot.The numbers above the boxplots represent the sample size used from the database.

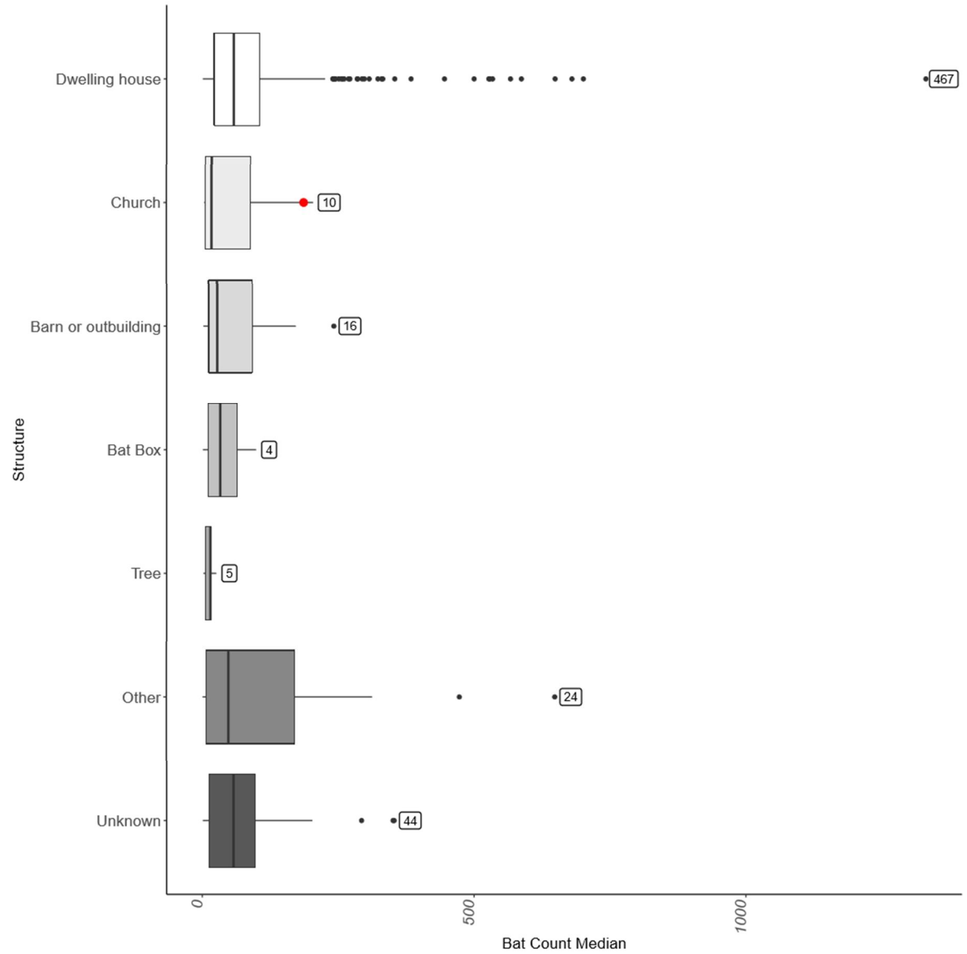


Figure 3: Boxplots of median bat counts in roosts split by structure type of the roost for all roosts in database. Your roost is shown as a red dot. Please note that counts tend to become more variable earlier and later in the season. The numbers alongside the boxplots represent the sample size used from the database.

Section 2: Percentiles Analysis

This analysis looks at the relative size of the ***Pipistrellus spp.*** roost you recorded. We take your total count of *Pipistrellus spp.* at the roost recorded and compare this to values in our reference database. We tell you what percentile your data falls at, and therefore what the relative size of that roost is.

The number of *Pipistrellus spp.* in a roost is ranked based on where it sits in relation to all other roosts in the database.

- low (0-19th percentile)
- low/moderate (20-39th percentile)
- moderate (40-59th percentile)
- moderate/high (60-79th percentile)
- high (80-94th percentile)
- exceptional (95th+ percentile)

Please note that although percentiles are a useful guideline, they are not definitive and it is up to the user to interpret their ecological value.

All data: Your roost is the **89th percentile** when compared to the **570 *Pipistrellus spp.*** roosts in the dataset. This means your roost is ranked as having a **high** number of *Pipistrellus spp.*.

Roost subset: This takes into account breeding times in the same way that the subset of Figure 1 does.

Your roost is the **90th percentile** when compared to the **544 *Pipistrellus spp.*** roosts in the dataset. This means your roost is ranked as having a **high** number of *Pipistrellus spp.*.

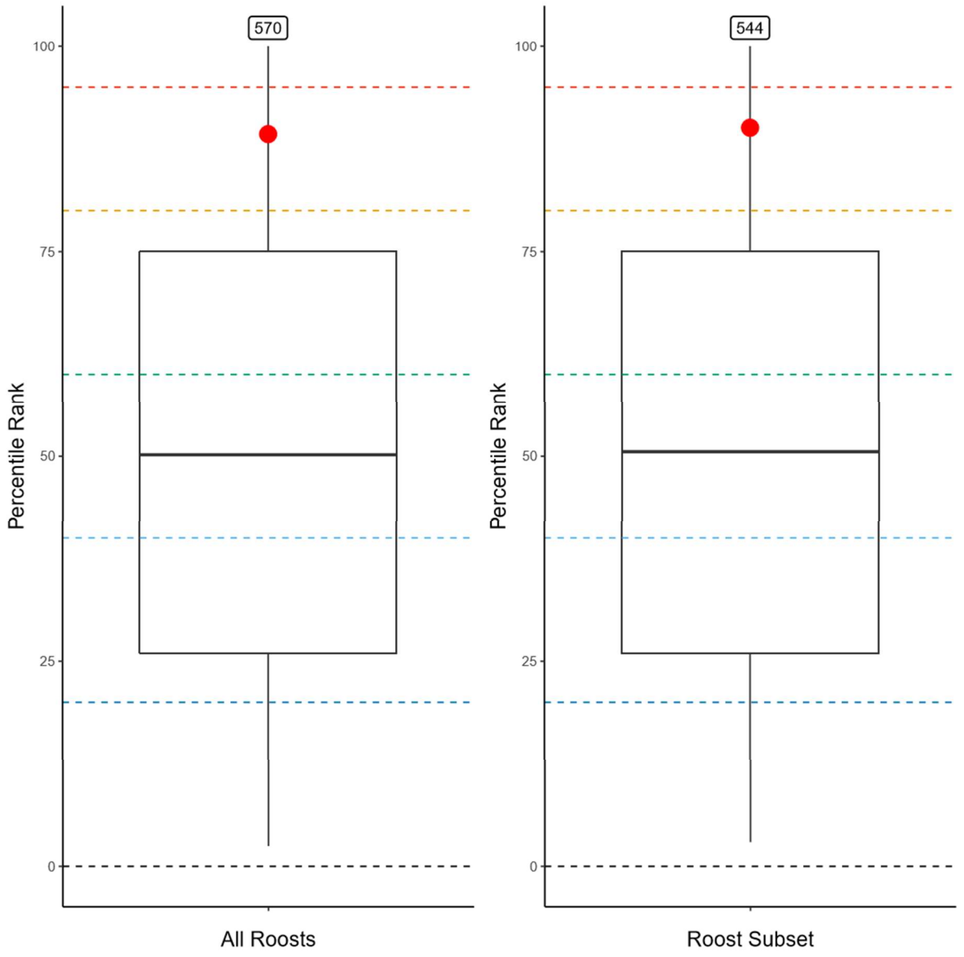


Figure 4: A boxplots showing where your data lies in relation to all other roost data (left) and in relation to a subset of data based on the Assignment you gave your data. Values are the percentile values. The 20th, 40th, 60th, 80th and 95th percentiles are marked by dashed lines. Database sample size is shown above each boxplot.

Section 3: Results filtered by Structure Type

The following section has subsetted data based on Structure Type. In this section your record has only been compared to roosts with the same structure as yours, as well as the same species. Your geographic and time filters will also still apply in this section. Graphs are provided for All Data and also a subset based on whether allocated to the Pre or Post breeding category.

All data: Your roost is the **89th percentile** when compared to the **570 *Pipistrellus spp.*** roosts in the dataset. This means your roost is ranked as having a **high** number of *Pipistrellus spp.*.

Roost subset: This takes into account breeding times in the same way that the subset of Figure 1 does.

Your roost is the **90th percentile** when compared to the **544 *Pipistrellus spp.*** roosts in the dataset. This means your roost is ranked as having a **exceptional** number of *Pipistrellus spp.*.

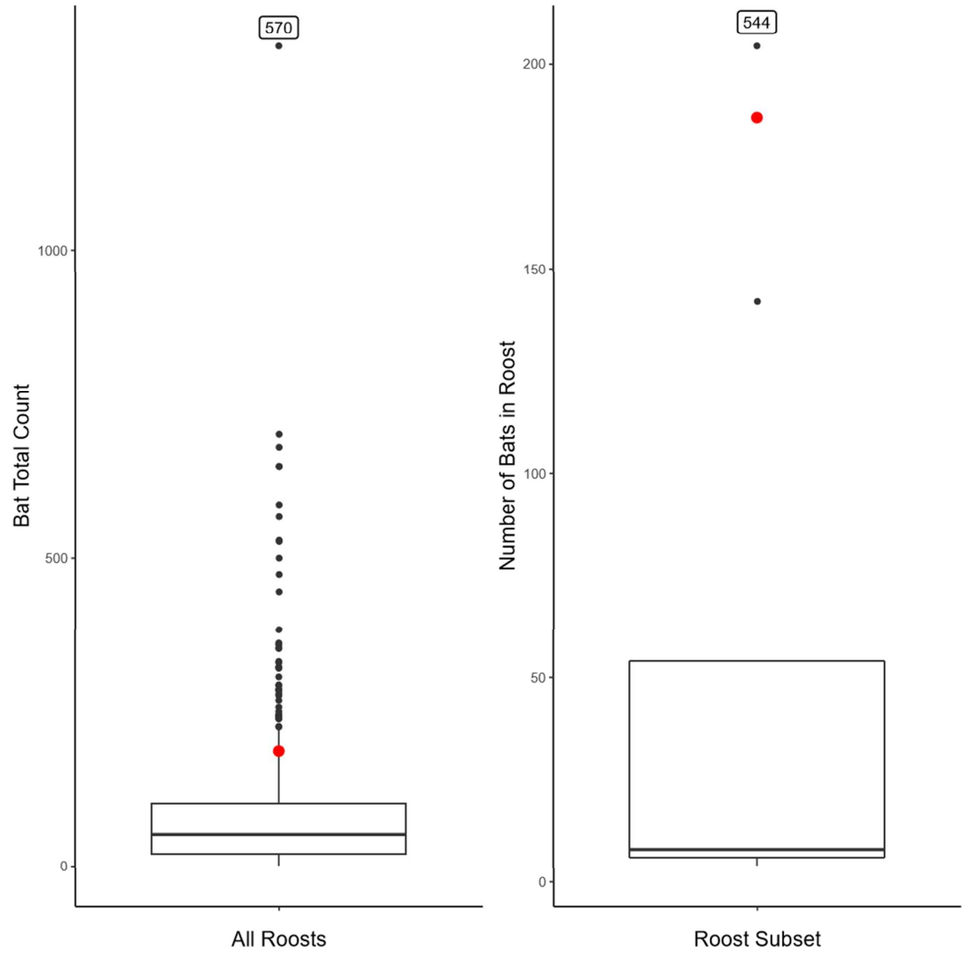


Figure 5: A boxplot of where your roost count sits in relation to all those in the database (left) and a subset based on Assignment (right) of the same structure type. Your data is shown as the red dot.

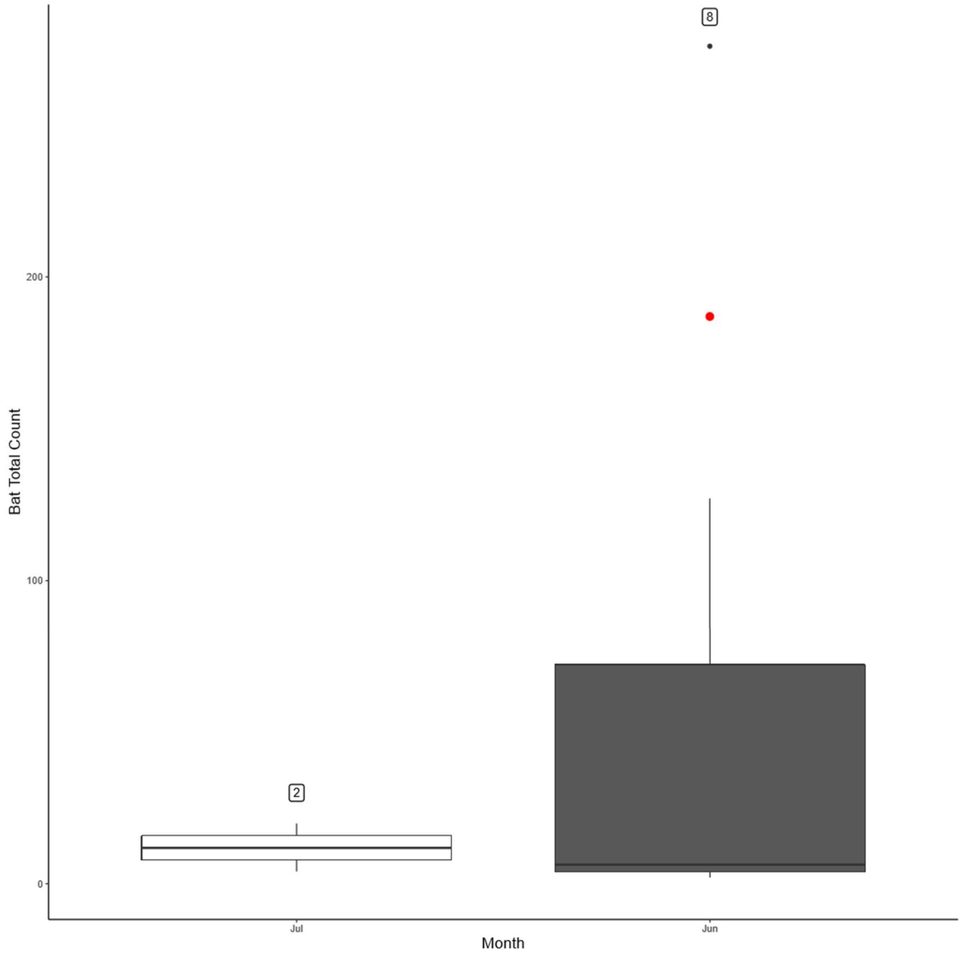


Figure 6: A boxplot showing total count of bats in roosts per month across all years for your roost's Structure Type. Your roost is shown as the red dot.

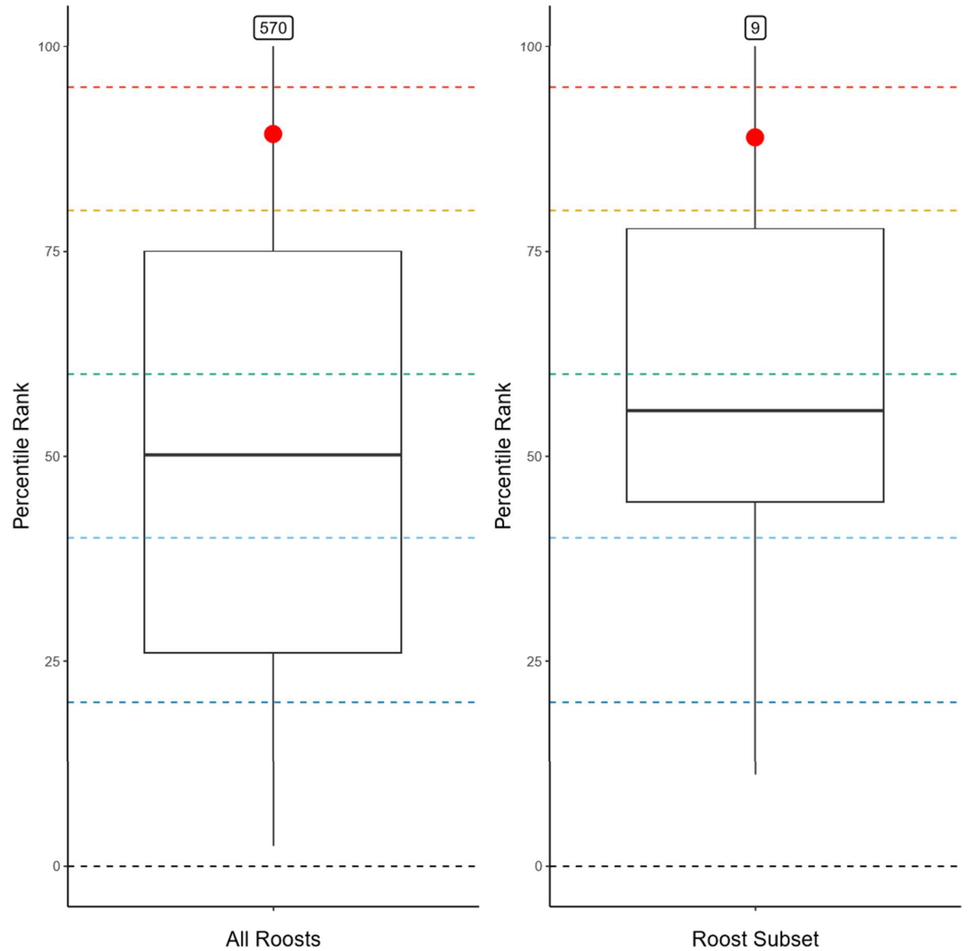


Figure 7: A boxplot showing where your data lies in relation to all other roost data (left) and a boxplot showing where your data lies in relation to a subset of data based on the Assignment you gave your data. Values are the percentile values. The 20th, 40th, 60th, 80th and 95th percentiles are marked by dashed lines. The numbers above the boxplots represent the sample size used for the database

Survey 3 (brown long-eared bat):

Count Bat

Site Name: All Hallows Church

Author: Chris Damant

2021-10-18 07:13:30

Your save selection for this data was: This is a new record, please save to database

Summary

A total count of **15** ***Plecotus auritus*** were found at a **Church** roost on **16/06/2021** in **Bedfordshire, England East & North East, England**

Section 1: Roost Count Data

This section uses the roost count of each ***Plecotus auritus*** record in the database. If the same location was recorded more than once, the highest total count for each year was taken and then the median across those years was used. This is the same for the subsets of breeding and structure type data.

The subset takes into account the breeding times:

- If you selected "Prebreeding" in the Assignment column, your data will be compared to counts from May and June
- If you selected "Postbreeding" in the Assignment column, your data will be compared to counts from July and August.

Boxplots are used to visualise data. For all boxplots in the report:

- The lower box line is the lower quartile, the bottom 25% of data lie below this line
- The top line of the box is the upper quartile, the top 25% of data lie above this line
- The median is the horizontal black line within the box
- Black dots are outliers
- The red dot shows your roost count

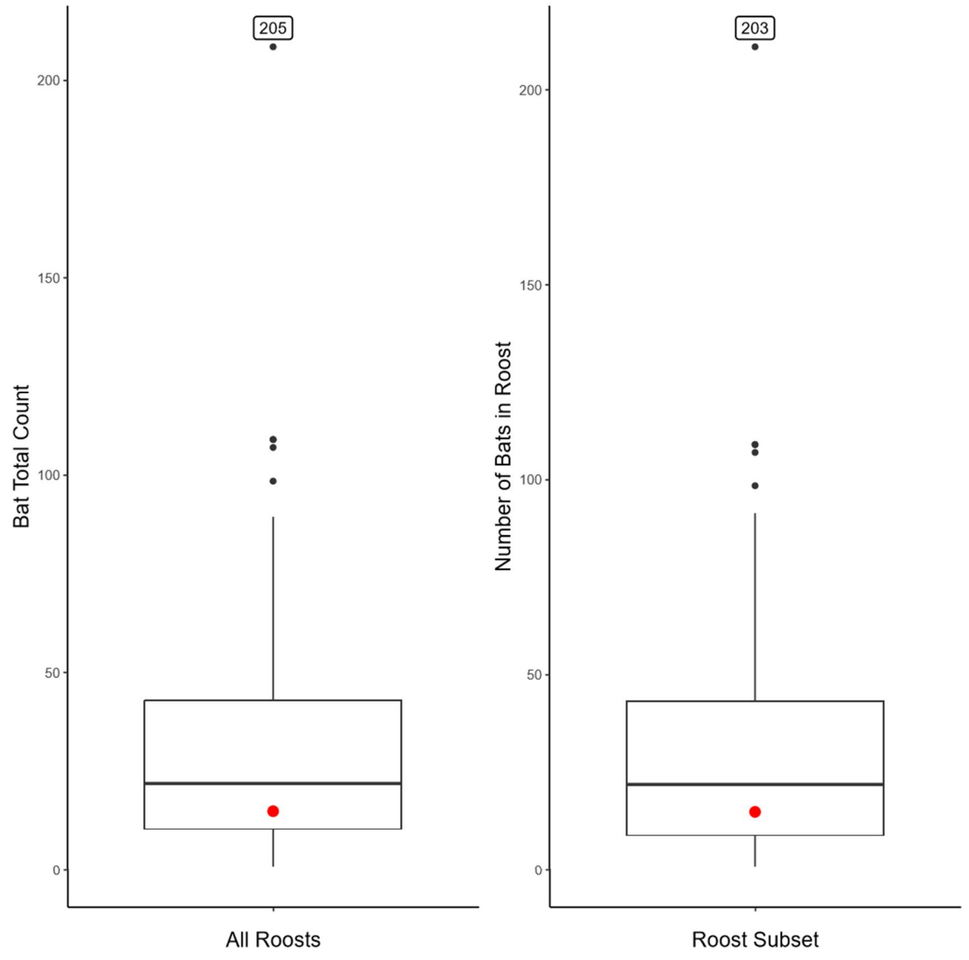


Figure 1: A boxplot of where your roost count sits in relation to all those in the database (left) and a subset based on Assignment (right) Your data is shown as the red dot.

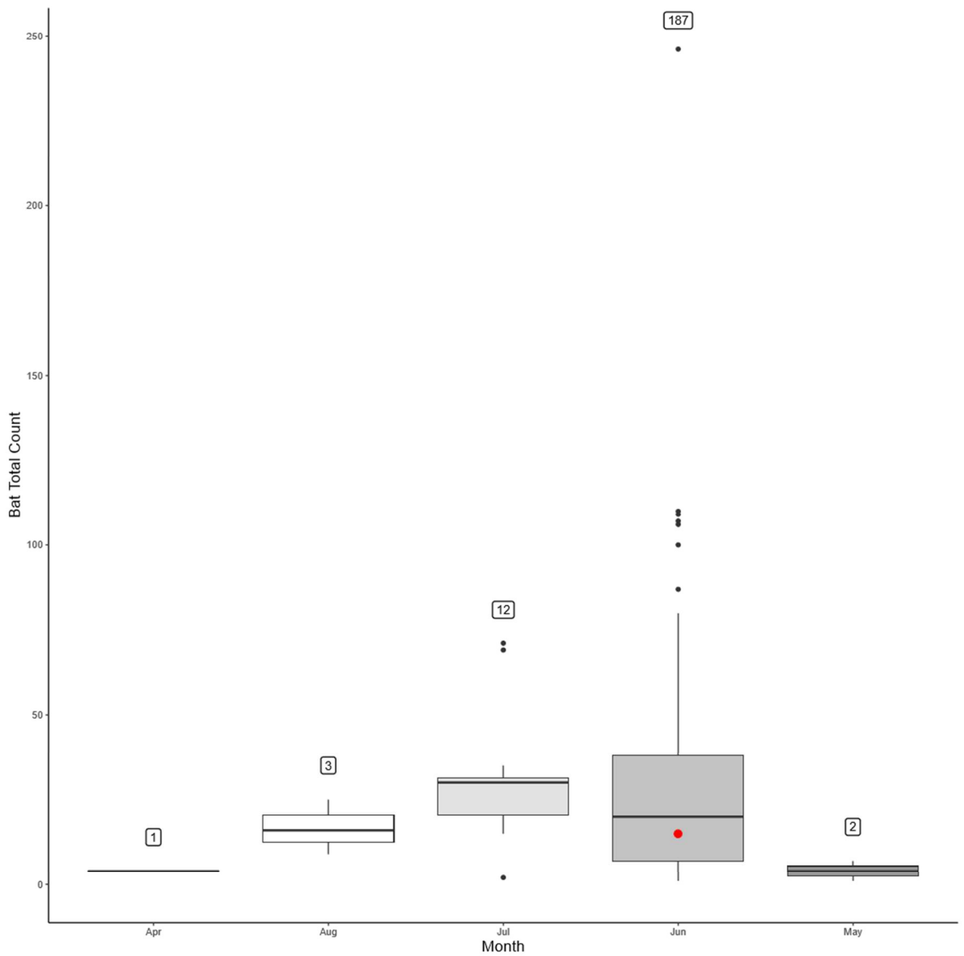


Figure 2: A boxplot showing total count of bats in roosts per month across all years. Your roost is shown as the red dot.The numbers above the boxplots represent the sample size used from the database.

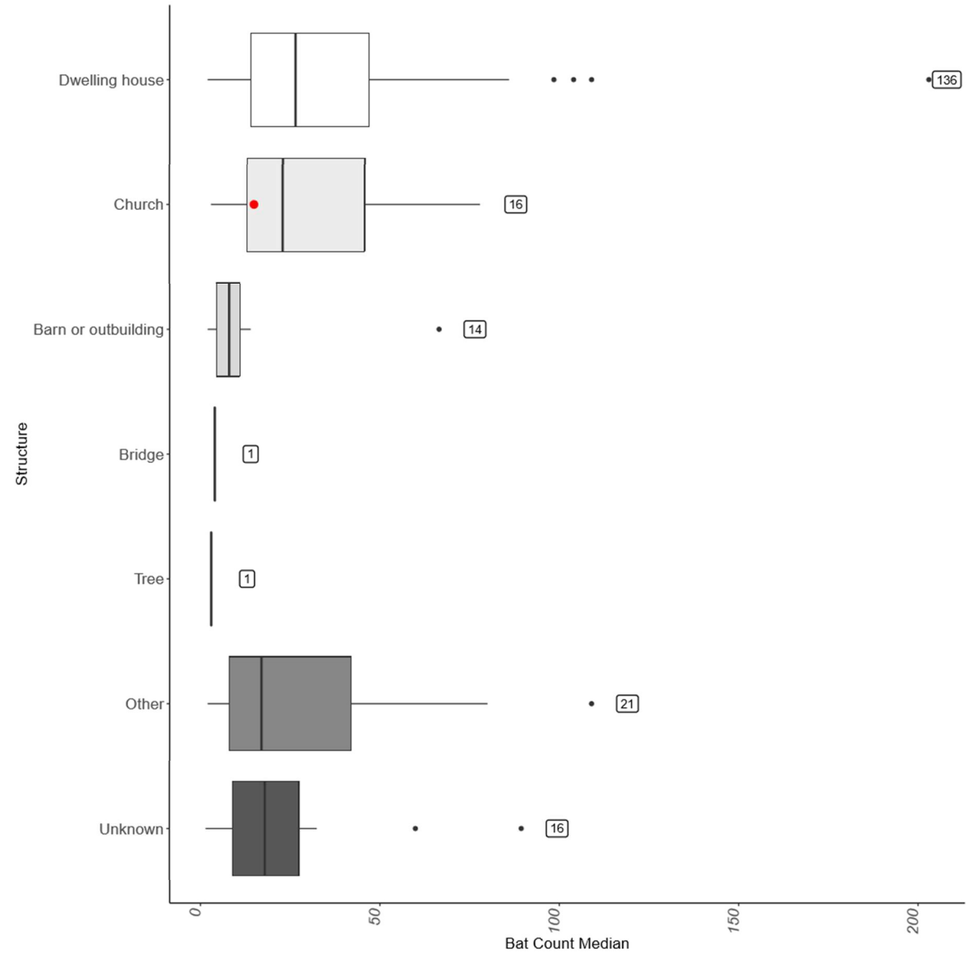


Figure 3: Boxplots of median bat counts in roosts split by structure type of the roost for all roosts in database. Your roost is shown as a red dot. Please note that counts tend to become more variable earlier and later in the season. The numbers alongside the boxplots represent the sample size used from the database.

Section 2: Percentiles Analysis

This analysis looks at the relative size of the ***Plecotus auritus*** roost you recorded. We take your total count of *Plecotus auritus* at the roost recorded and compare this to values in our reference database. We tell you what percentile your data falls at, and therefore what the relative size of that roost is.

The number of *Plecotus auritus* in a roost is ranked based on where it sits in relation to all other roosts in the database.

- low (0-19th percentile)
- low/moderate (20-39th percentile)
- moderate (40-59th percentile)
- moderate/high (60-79th percentile)
- high (80-94th percentile)
- exceptional (95th+ percentile)

Please note that although percentiles are a useful guideline, they are not definitive and it is up to the user to interpret their ecological value.

All data: Your roost is the **37th percentile** when compared to the **205 *Plecotus auritus*** roosts in the dataset. This means your roost is ranked as having a **low/moderate** number of *Plecotus auritus*.

Roost subset: This takes into account breeding times in the same way that the subset of Figure 1 does.

Your roost is the **37th percentile** when compared to the **203 *Plecotus auritus*** roosts in the dataset. This means your roost is ranked as having a **low/moderate** number of *Plecotus auritus*.

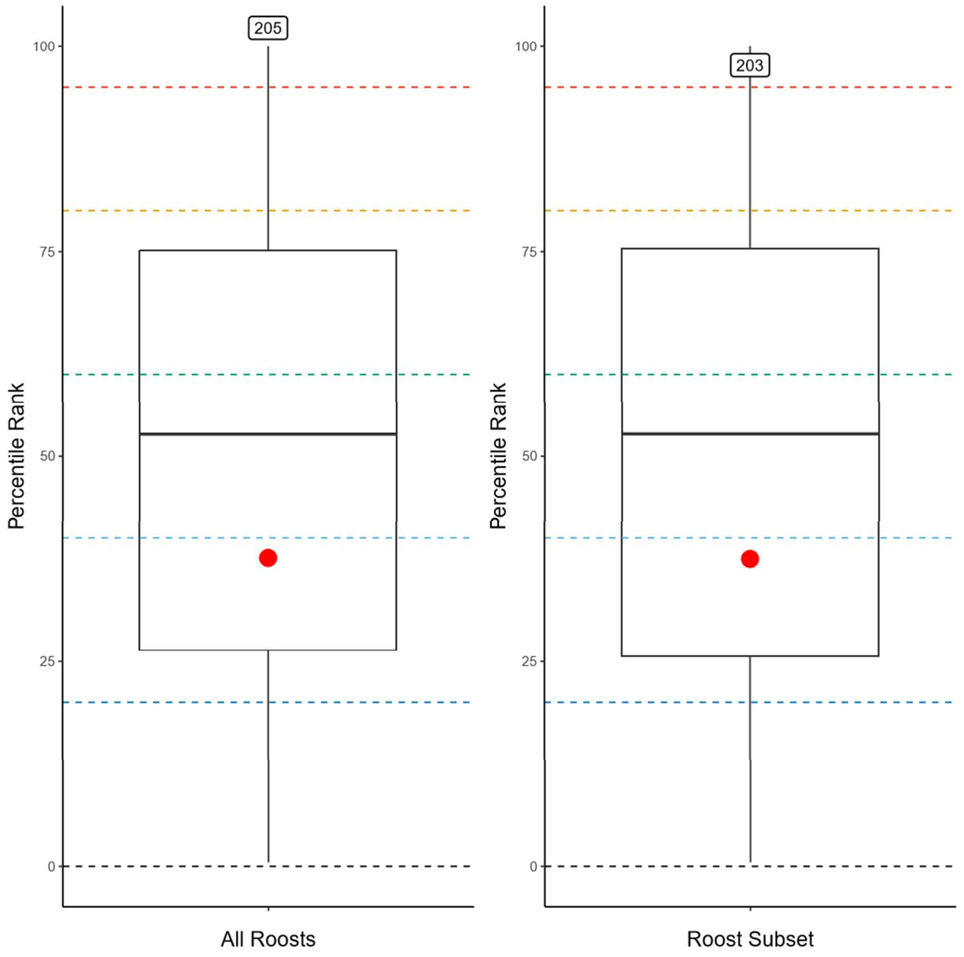


Figure 4: A boxplots showing where your data lies in relation to all other roost data (left) and in relation to a subset of data based on the Assignment you gave your data. Values are the percentile values. The 20th, 40th, 60th, 80th and 95th percentiles are marked by dashed lines. Database sample size is shown above each boxplot.

Section 3: Results filtered by Structure Type

The following section has subsetted data based on Structure Type. In this section your record has only been compared to roosts with the same structure as yours, as well as the same species. Your geographic and time filters will also still apply in this section. Graphs are provided for All Data and also a subset based on whether allocated to the Pre or Post breeding category.

All data: Your roost is the **37th percentile** when compared to the **205 *Plecotus auritus*** roosts in the dataset. This means your roost is ranked as having a **low/moderate** number of *Plecotus auritus*.

Roost subset: This takes into account breeding times in the same way that the subset of Figure 1 does.

Your roost is the **37th percentile** when compared to the **203 *Plecotus auritus*** roosts in the dataset. This means your roost is ranked as having a **low/moderate** number of *Plecotus auritus*.

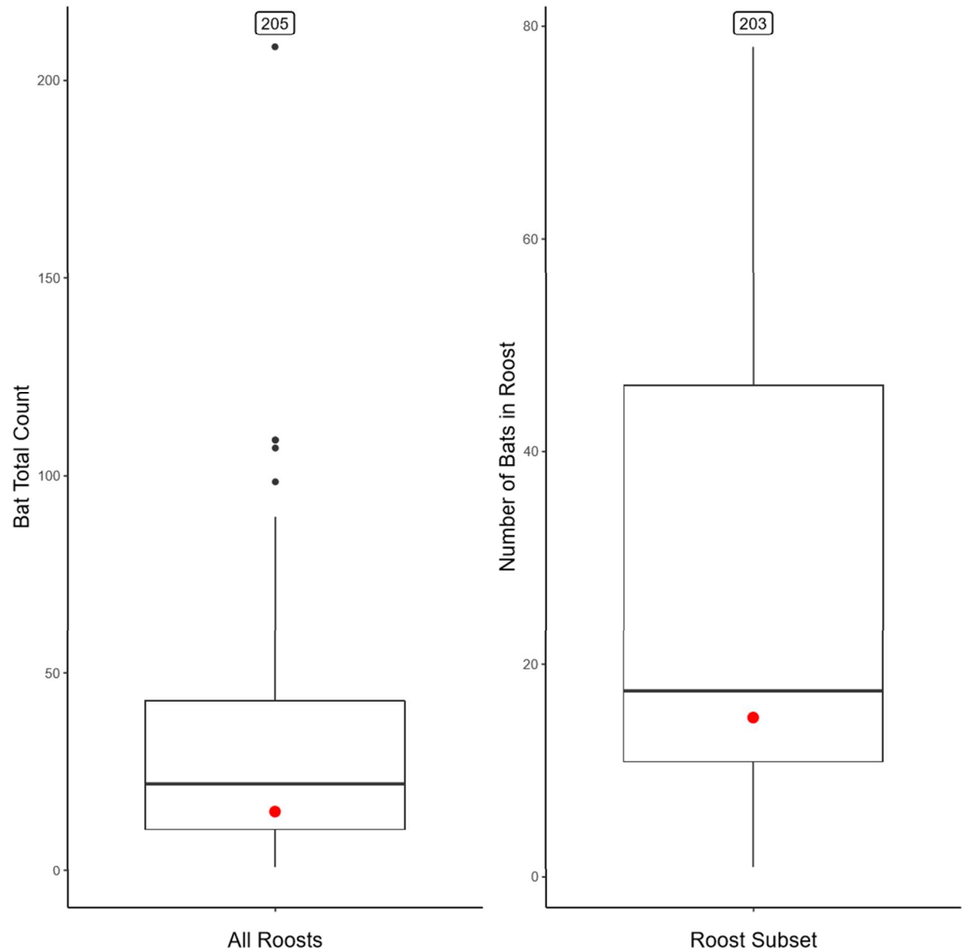


Figure 5: A boxplot of where your roost count sits in relation to all those in the database (left) and a subset based on Assignment (right) of the same structure type. Your data is shown as the red dot.

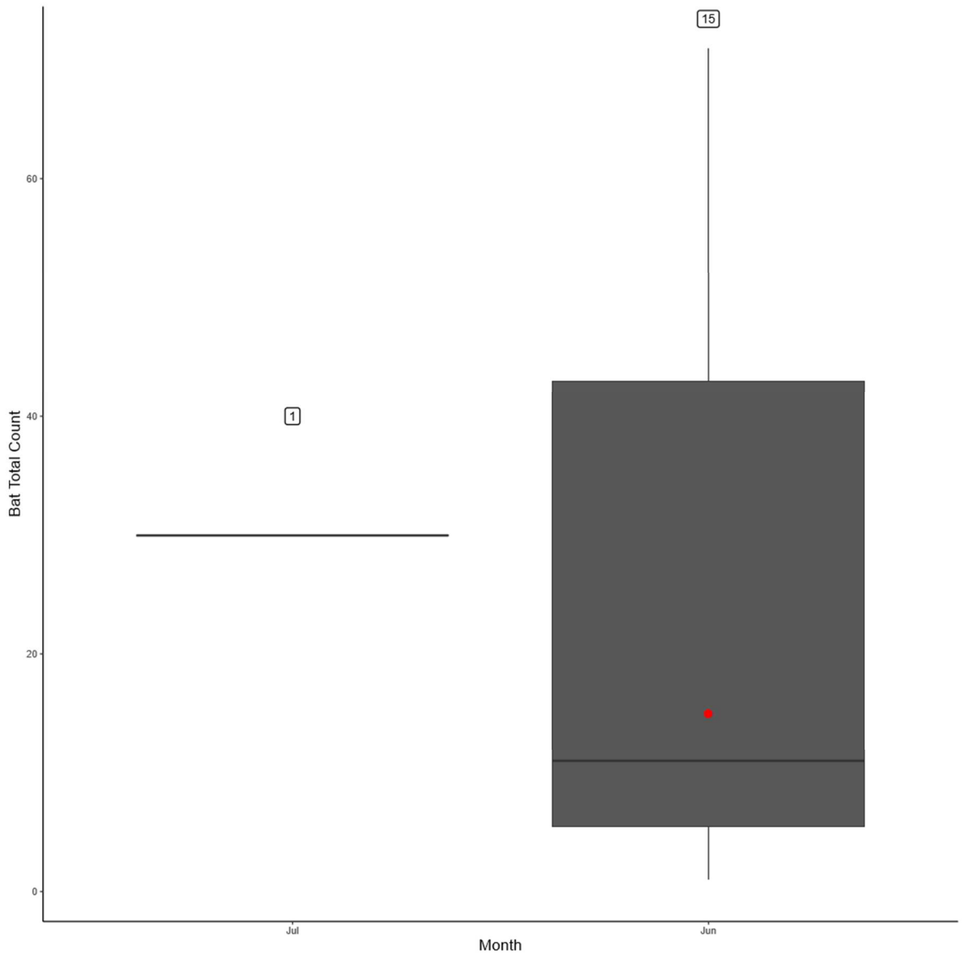


Figure 6: A boxplot showing total count of bats in roosts per month across all years for your roost's Structure Type. Your roost is shown as the red dot.

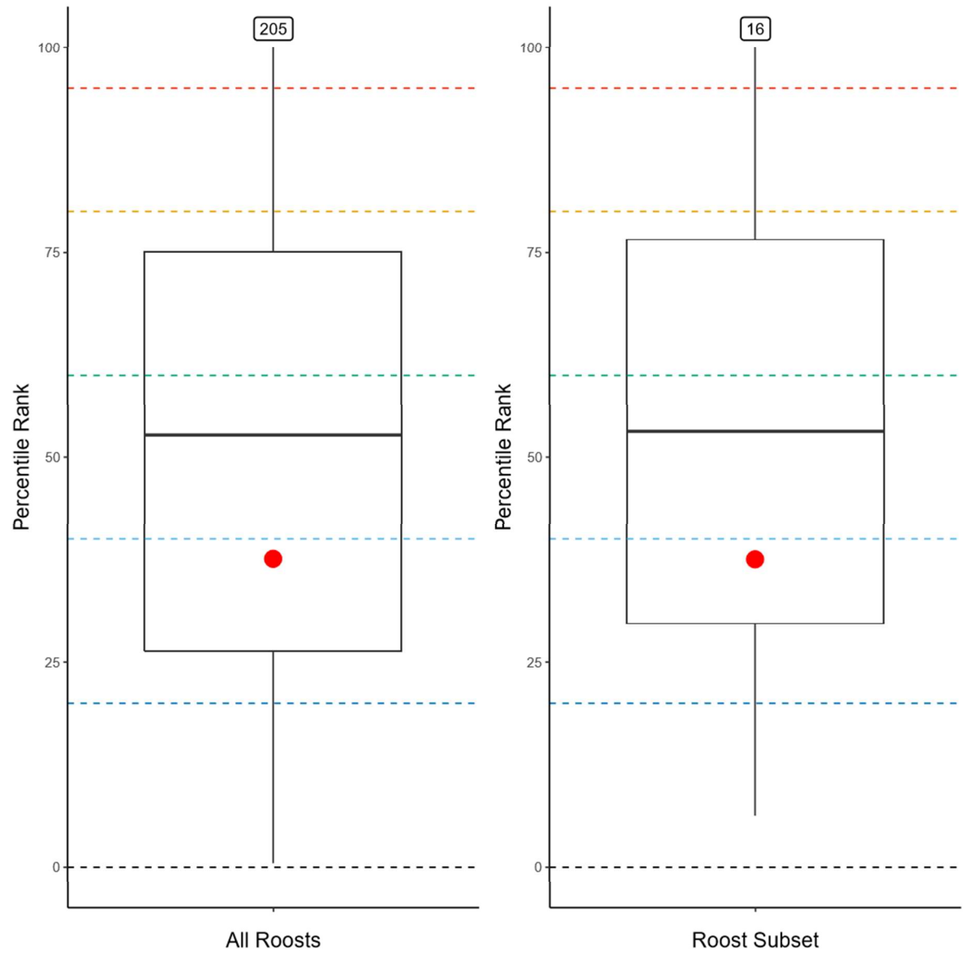


Figure 7: A boxplot showing where your data lies in relation to all other roost data (left) and a boxplot showing where your data lies in relation to a subset of data based on the Assignment you gave your data. Values are the percentile values. The 20th, 40th, 60th, 80th and 95th percentiles are marked by dashed lines. The numbers above the boxplots represent the sample size used for the database

Survey 4 (brown long-eared bat):

Count Bat

Site Name: All Hallows Church

Author: Chris Damant

2021-10-18 07:17:29

Your save selection for this data was: This is a new record, please save to database

Summary

A total count of **8** ***Plecotus auritus*** were found at a **Church** roost on **02/08/2021** in **Bedfordshire, England East & North East, England**

Section 1: Roost Count Data

This section uses the roost count of each ***Plecotus auritus*** record in the database. If the same location was recorded more than once, the highest total count for each year was taken and then the median across those years was used. This is the same for the subsets of breeding and structure type data.

The subset takes into account the breeding times:

- If you selected "Prebreeding" in the Assignment column, your data will be compared to counts from May and June
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Boxplots are used to visualise data. For all boxplots in the report:

- The lower box line is the lower quartile, the bottom 25% of data lie below this line
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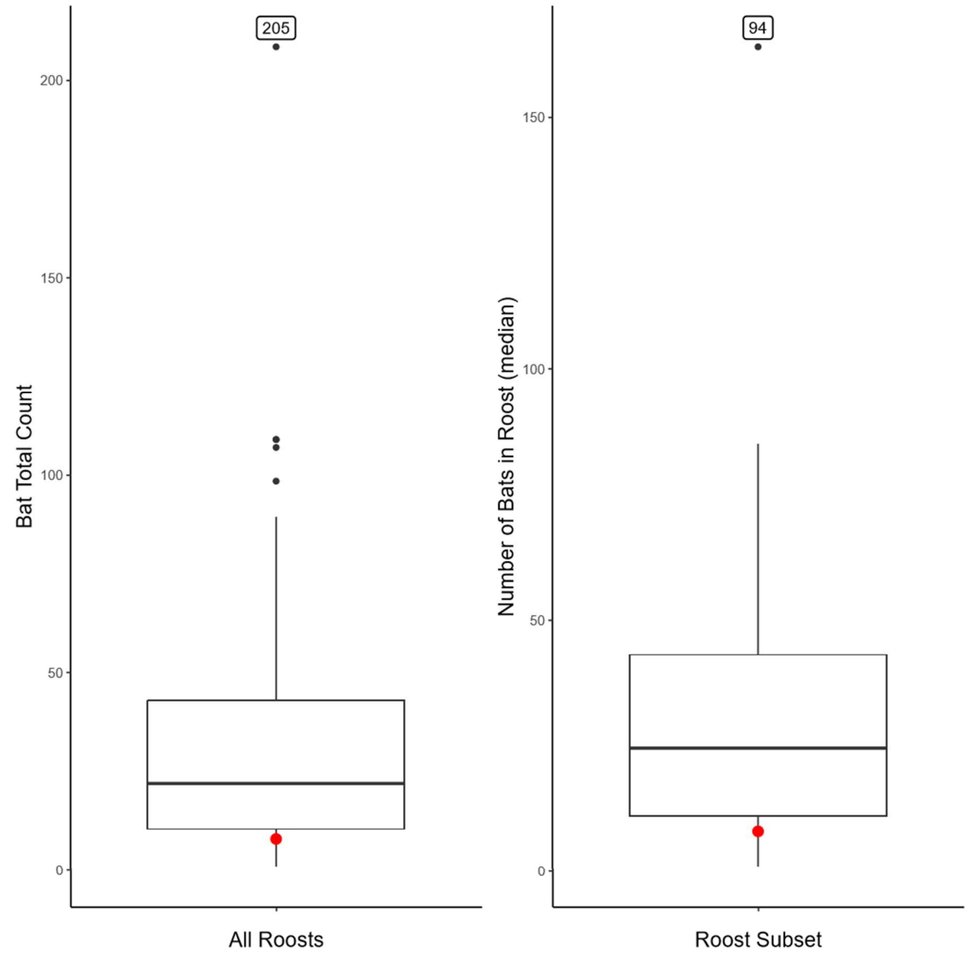

Figure 1: A boxplot of where your roost count sits in relation to all those in the database (left) and a subset based on Assignment (right) Your data is shown as the red dot.

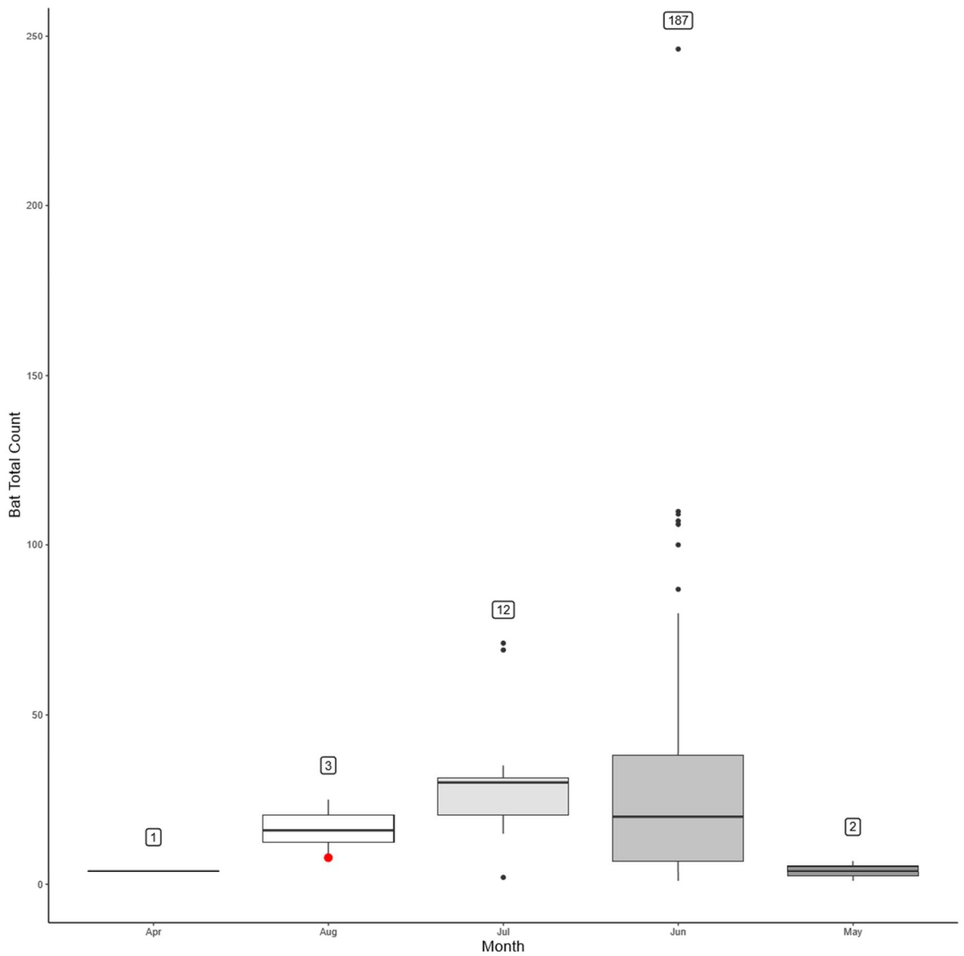

Figure 2: A boxplot showing total count of bats in roosts per month across all years. Your roost is shown as the red dot.The numbers above the boxplots represent the sample size used from the database.

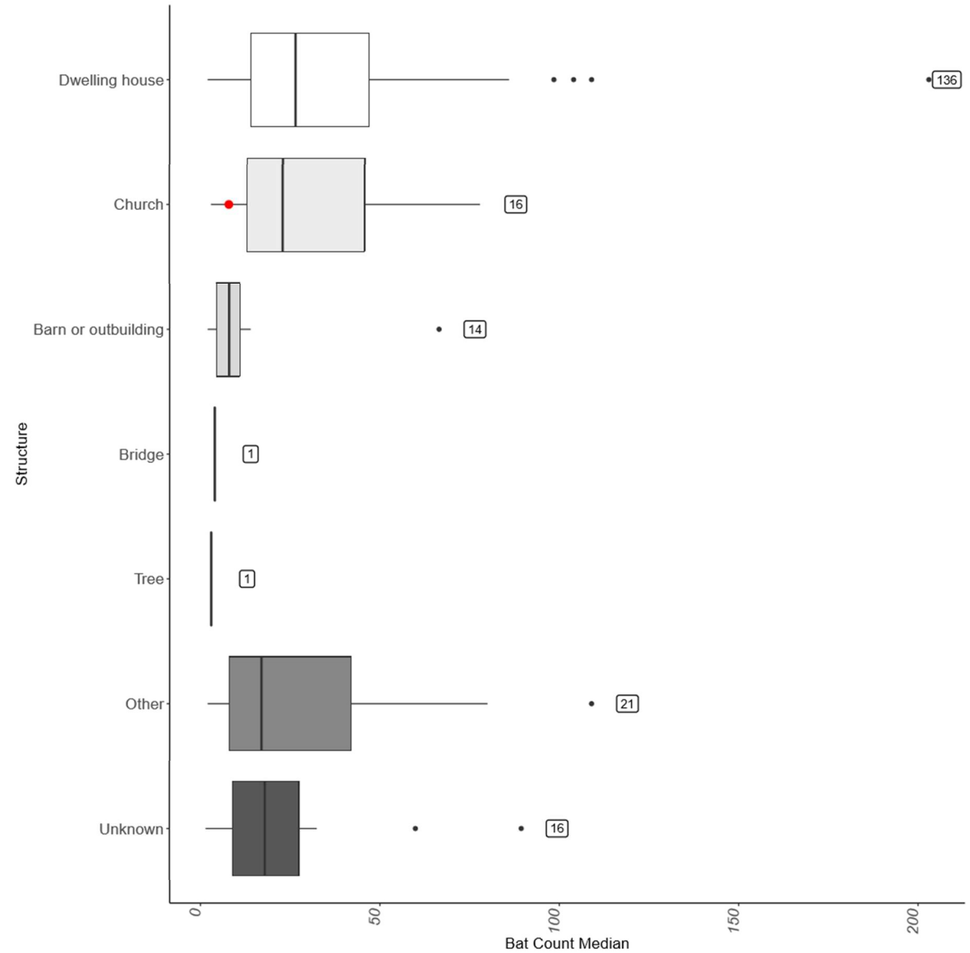

Figure 3: Boxplots of median bat counts in roosts split by structure type of the roost for all roosts in database. Your roost is shown as a red dot. Please note that counts tend to become more variable earlier and later in the season. The numbers alongside the boxplots represent the sample size used from the database.

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This analysis looks at the relative size of the ***Plecotus auritus*** roost you recorded. We take your total count of *Plecotus auritus* at the roost recorded and compare this to values in our reference database. We tell you what percentile your data falls at, and therefore what the relative size of that roost is.

The number of *Plecotus auritus* in a roost is ranked based on where it sits in relation to all other roosts in the database.

- low (0-19th percentile)
- low/moderate (20-39th percentile)
- moderate (40-59th percentile)
- moderate/high (60-79th percentile)
- high (80-94th percentile)
- exceptional (95th+ percentile)

Please note that although percentiles are a useful guideline, they are not definitive and it is up to the user to interpret their ecological value.

All data: Your roost is the **21th percentile** when compared to the **205 *Plecotus auritus*** roosts in the dataset. This means your roost is ranked as having a **low/moderate** number of *Plecotus auritus*.

Roost subset: This takes into account breeding times in the same way that the subset of Figure 1 does.

Your roost is the **19th percentile** when compared to the **94 *Plecotus auritus*** roosts in the dataset. This means your roost is ranked as having a **low** number of *Plecotus auritus*.

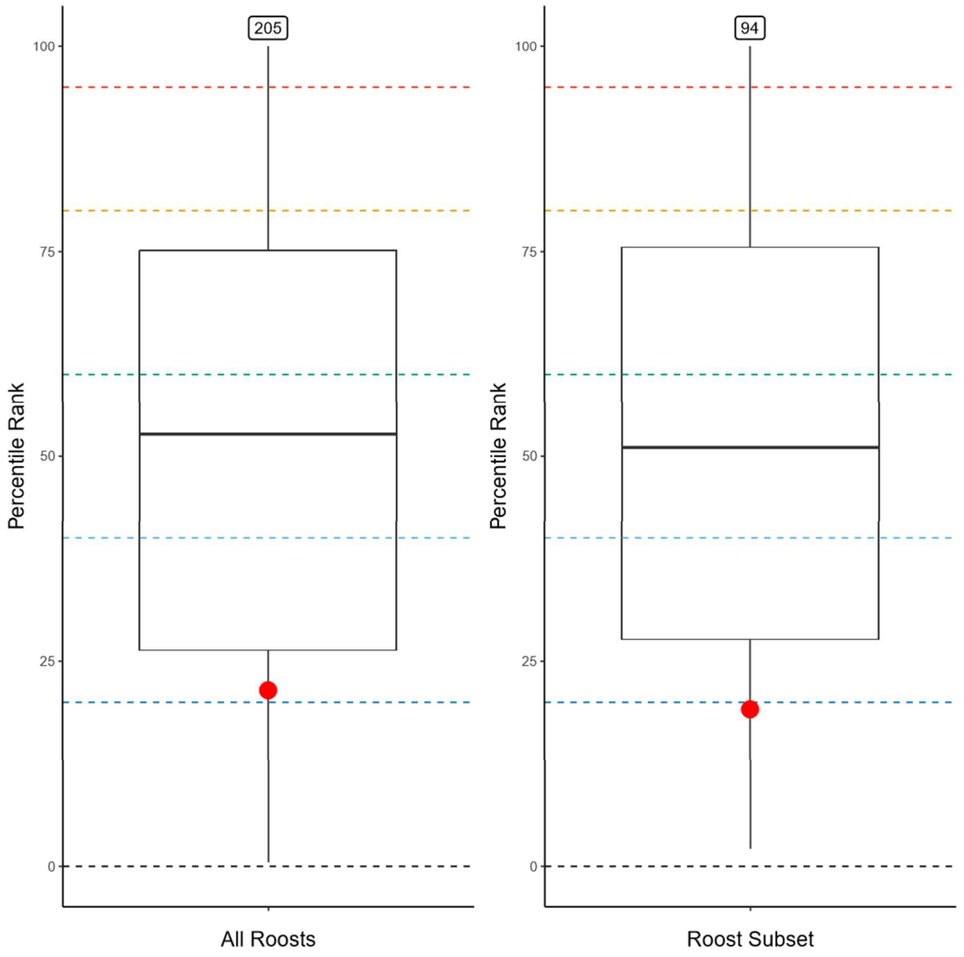


Figure 4: A boxplots showing where your data lies in relation to all other roost data (left) and in relation to a subset of data based on the Assignment you gave your data. Values are the percentile values. The 20th, 40th, 60th, 80th and 95th percentiles are marked by dashed lines. Database sample size is shown above each boxplot.

Section 3: Results filtered by Structure Type

The following section has subsetted data based on Structure Type. In this section your record has only been compared to roosts with the same structure as yours, as well as the same species. Your geographic and time filters will also still apply in this section. Graphs are provided for All Data and also a subset based on whether allocated to the Pre or Post breeding category.

All data: Your roost is the **21th percentile** when compared to the **205 *Plecotus auritus*** roosts in the dataset. This means your roost is ranked as having a **low/moderate** number of *Plecotus auritus*.

Roost subset: This takes into account breeding times in the same way that the subset of Figure 1 does.

Your roost is the **19th percentile** when compared to the **94 *Plecotus auritus*** roosts in the dataset. This means your roost is ranked as having a **low/moderate** number of *Plecotus auritus*.

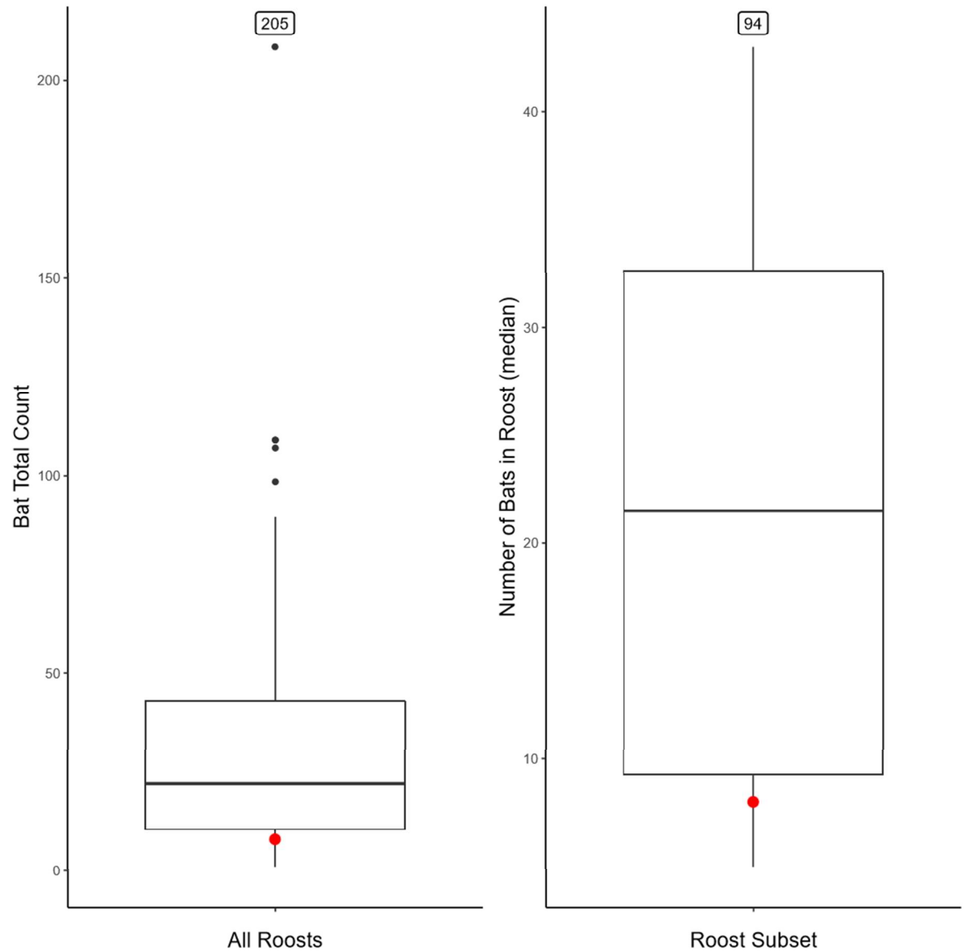


Figure 5: A boxplot of where your roost count sits in relation to all those in the database (left) and a subset based on Assignment (right) of the same structure type. Your data is shown as the red dot.

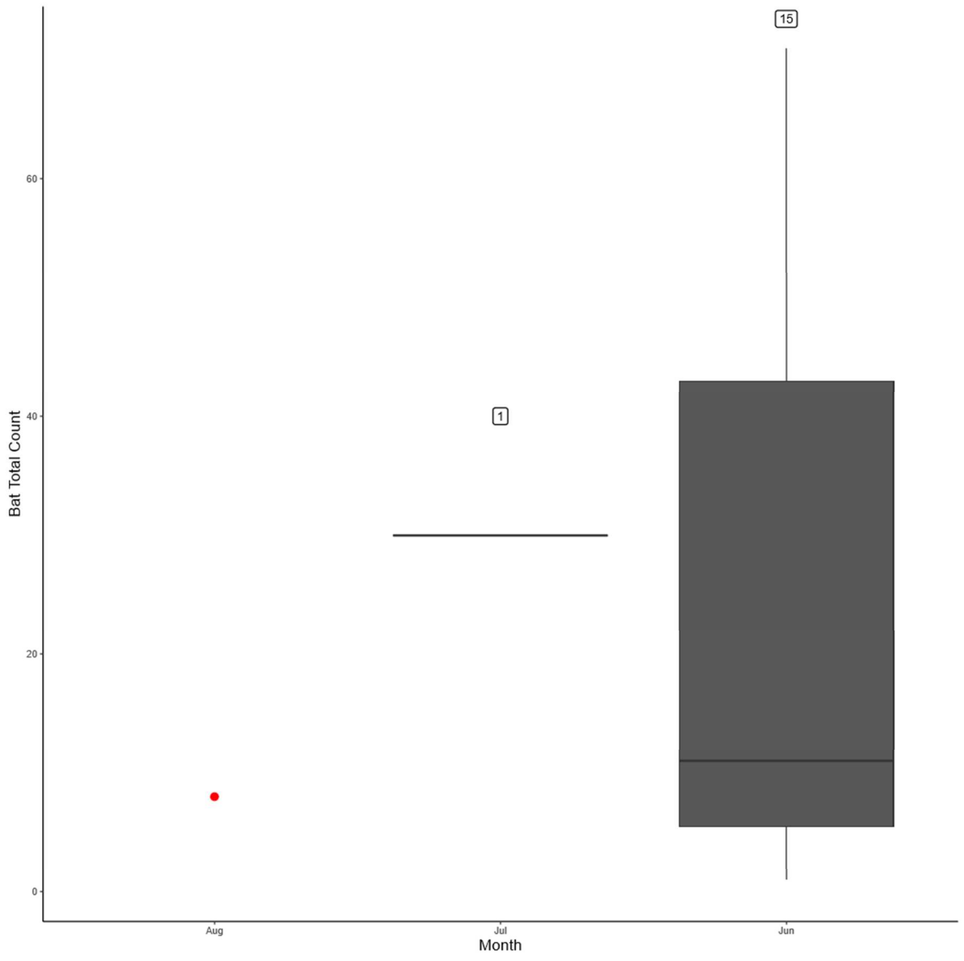
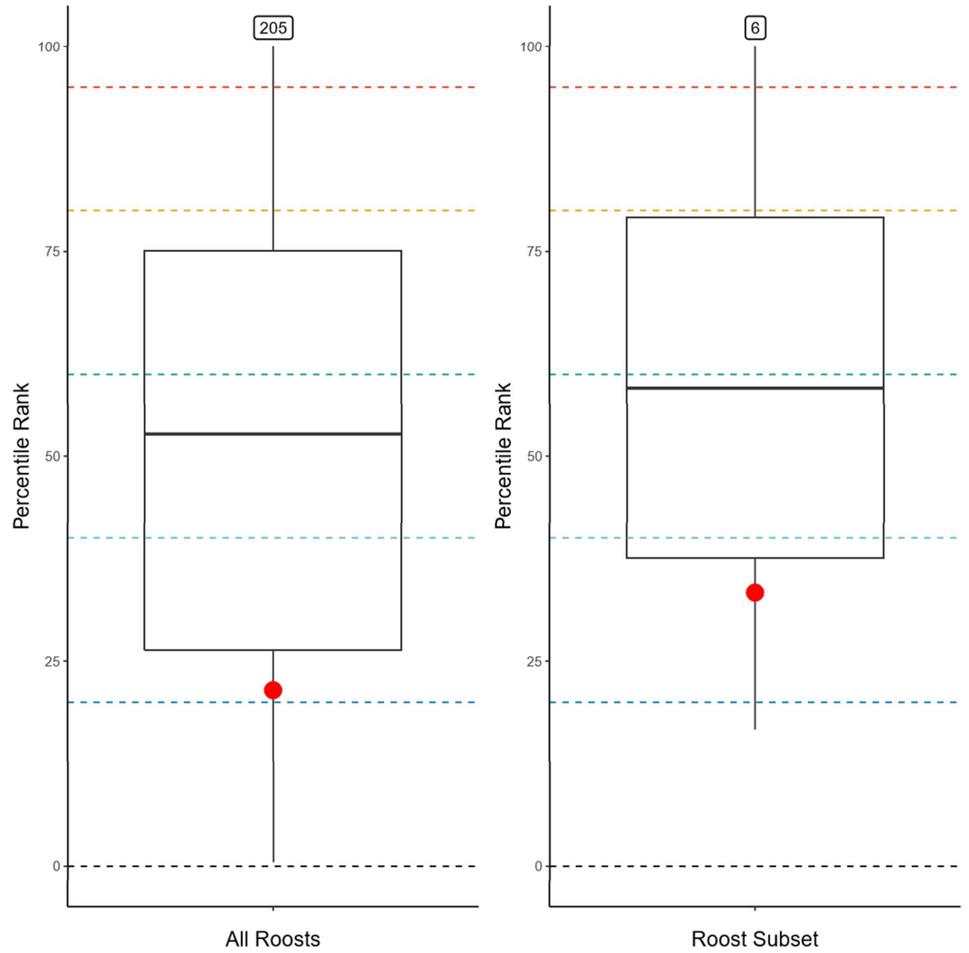


Figure 6: A boxplot showing total count of bats in roosts per month across all years for your roost's Structure Type. Your roost is shown as the red dot.



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*Survey 4 (*Pipistrellus *sp.):*

Count Bat

Site Name: All Hallows Church

Author: Chris Damant

2021-10-18 07:08:39

Your save selection for this data was: This is a new record, please save to database

Summary

A total count of **237 *Pipistrellus spp.*** were found at a **Church** roost on **02/08/2021** in **Bedfordshire, England East & North East, England**

Section 1: Roost Count Data

This section uses the roost count of each ***Pipistrellus spp.*** record in the database. If the same location was recorded more than once, the highest total count for each year was taken and then the median across those years was used. This is the same for the subsets of breeding and structure type data.

The subset takes into account the breeding times:

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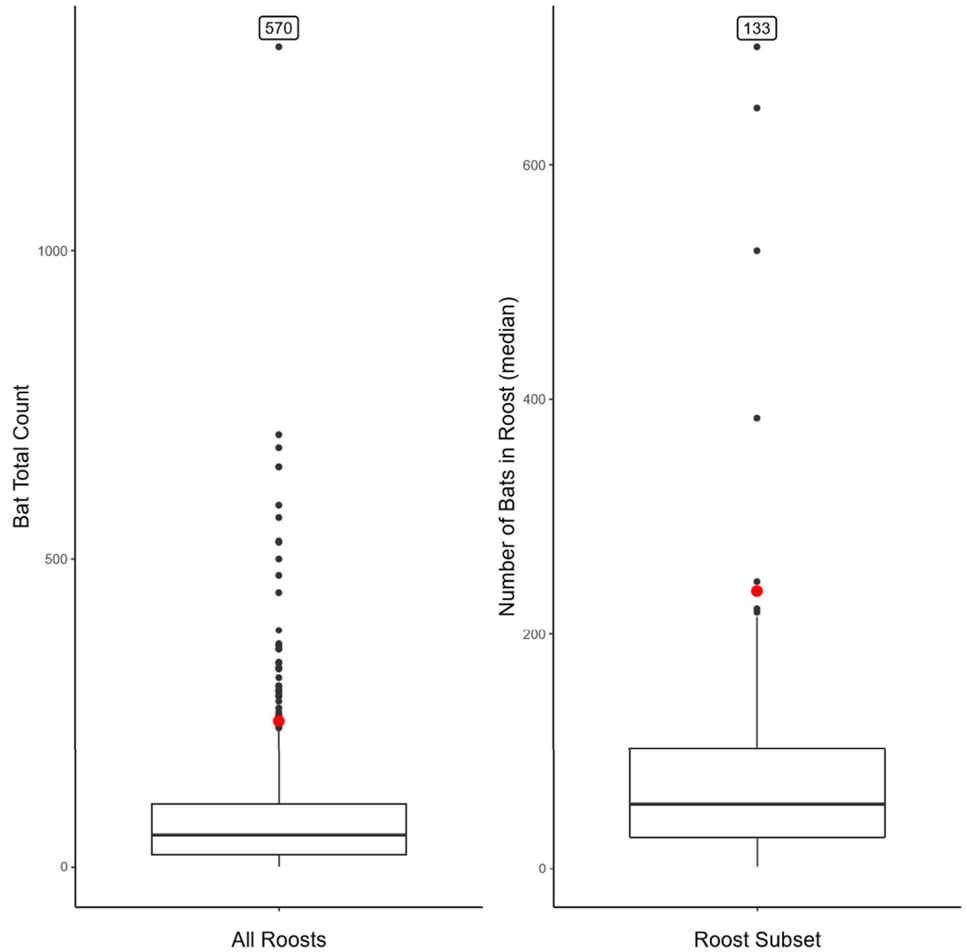

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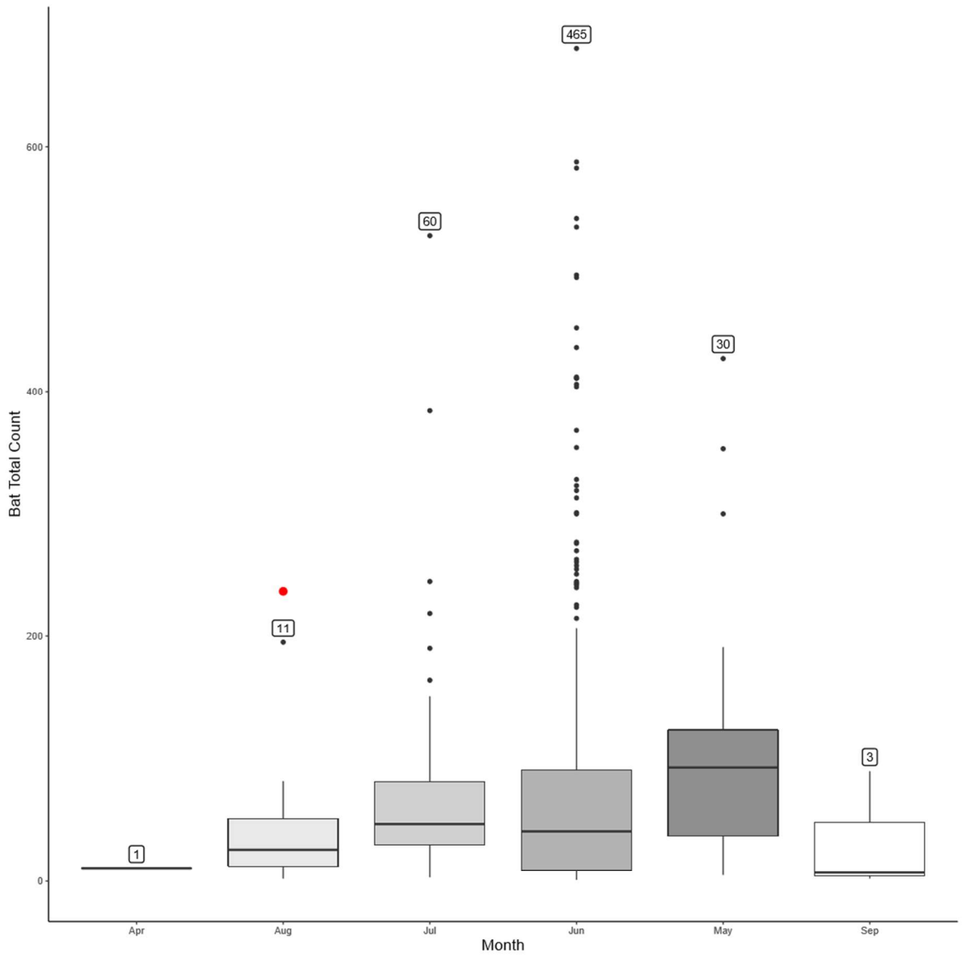

Figure 2: A boxplot showing total count of bats in roosts per month across all years. Your roost is shown as the red dot.The numbers above the boxplots represent the sample size used from the database.

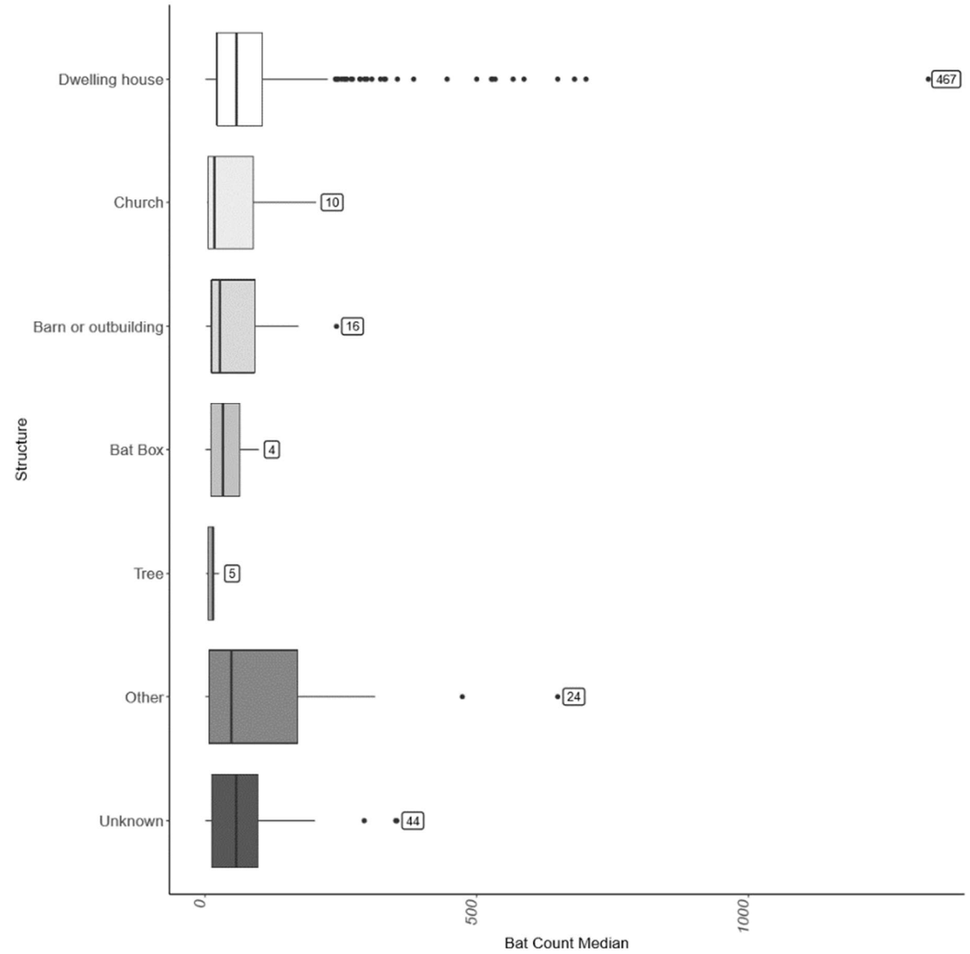

Figure 3: Boxplots of median bat counts in roosts split by structure type of the roost for all roosts in database. Your roost is shown as a red dot. Please note that counts tend to become more variable earlier and later in the season. The numbers alongside the boxplots represent the sample size used from the database.

Section 2: Percentiles Analysis

This analysis looks at the relative size of the ***Pipistrellus spp.*** roost you recorded. We take your total count of *Pipistrellus spp.* at the roost recorded and compare this to values in our reference database. We tell you what percentile your data falls at, and therefore what the relative size of that roost is.

The number of *Pipistrellus spp.* in a roost is ranked based on where it sits in relation to all other roosts in the database.

- low (0-19th percentile)
- low/moderate (20-39th percentile)
- moderate (40-59th percentile)
- moderate/high (60-79th percentile)
- high (80-94th percentile)
- exceptional (95th+ percentile)

Please note that although percentiles are a useful guideline, they are not definitive and it is up to the user to interpret their ecological value.

All data: Your roost is the **93th percentile** when compared to the **570 *Pipistrellus spp.*** roosts in the dataset. This means your roost is ranked as having a **high** number of *Pipistrellus spp.*.

Roost subset: This takes into account breeding times in the same way that the subset of Figure 1 does.

Your roost is the **96th percentile** when compared to the **133 *Pipistrellus spp.*** roosts in the dataset. This means your roost is ranked as having a **exceptional** number of *Pipistrellus spp.*.

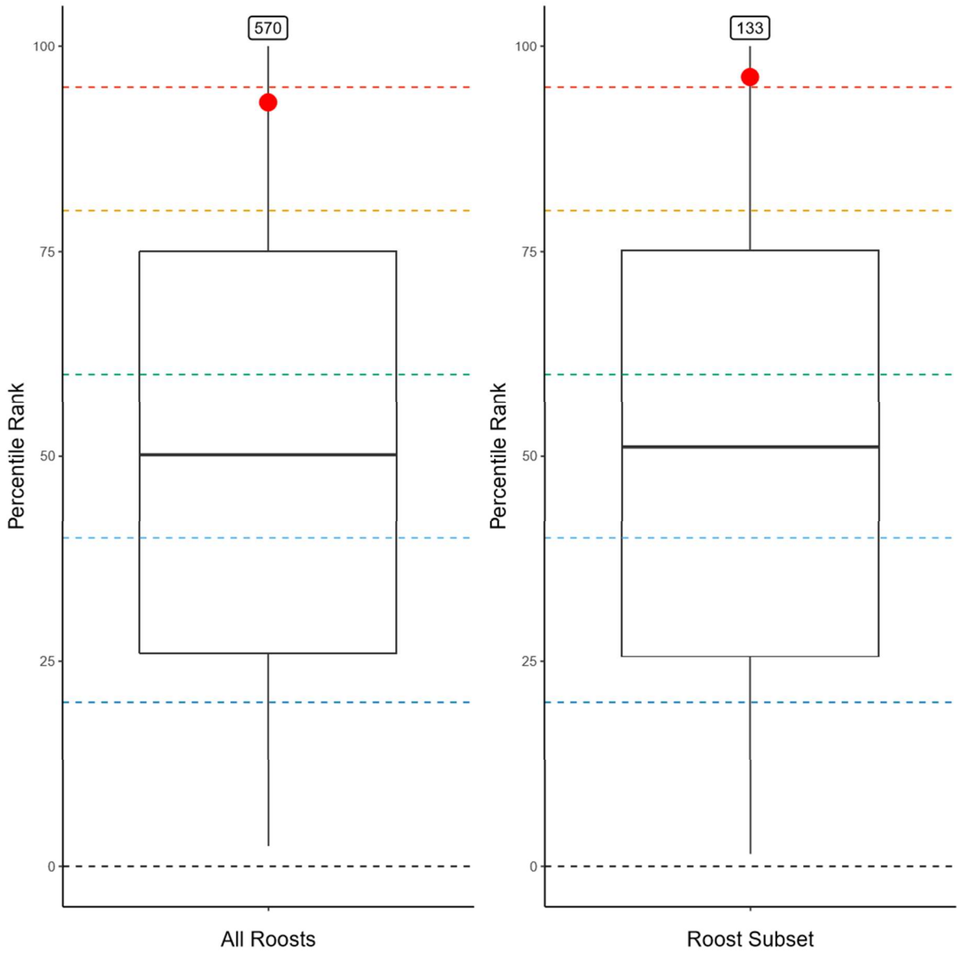

Figure 4: A boxplots showing where your data lies in relation to all other roost data (left) and in relation to a subset of data based on the Assignment you gave your data. Values are the percentile values. The 20th, 40th, 60th, 80th and 95th percentiles are marked by dashed lines. Database sample size is shown above each boxplot.

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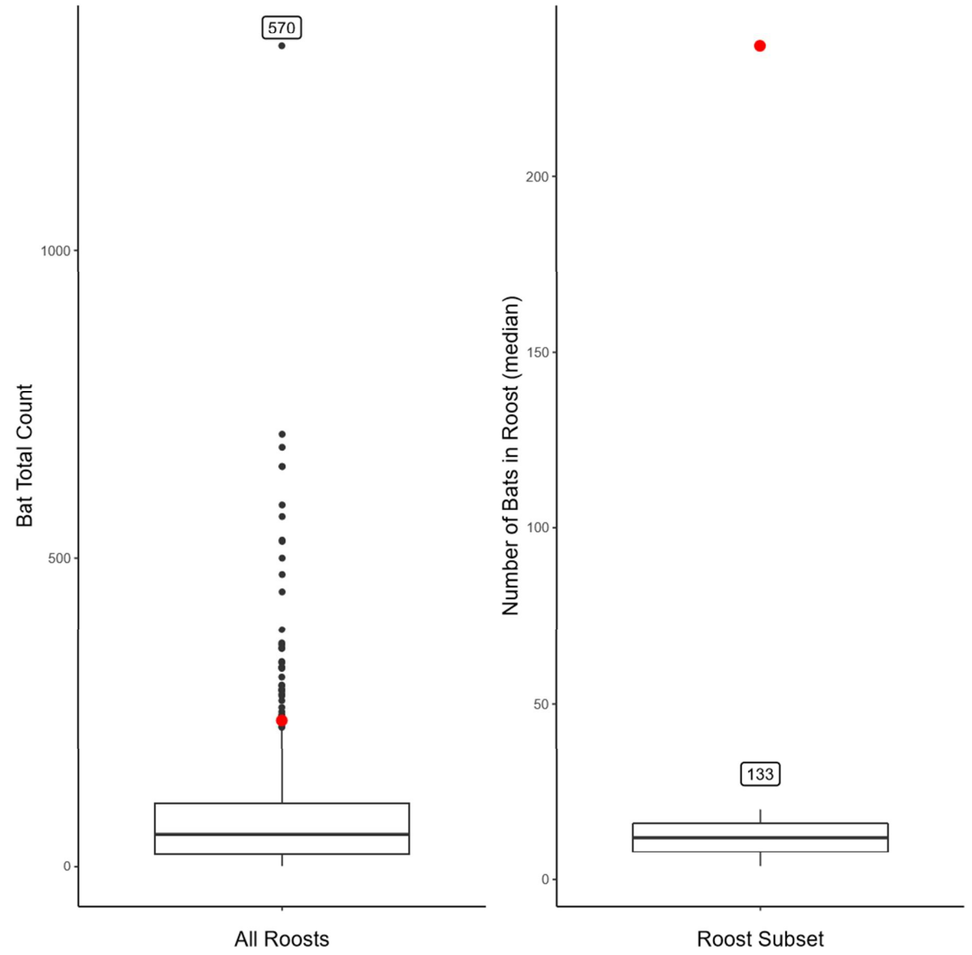


Figure 5: A boxplot of where your roost count sits in relation to all those in the database (left) and a subset based on Assignment (right) of the same structure type. Your data is shown as the red dot.

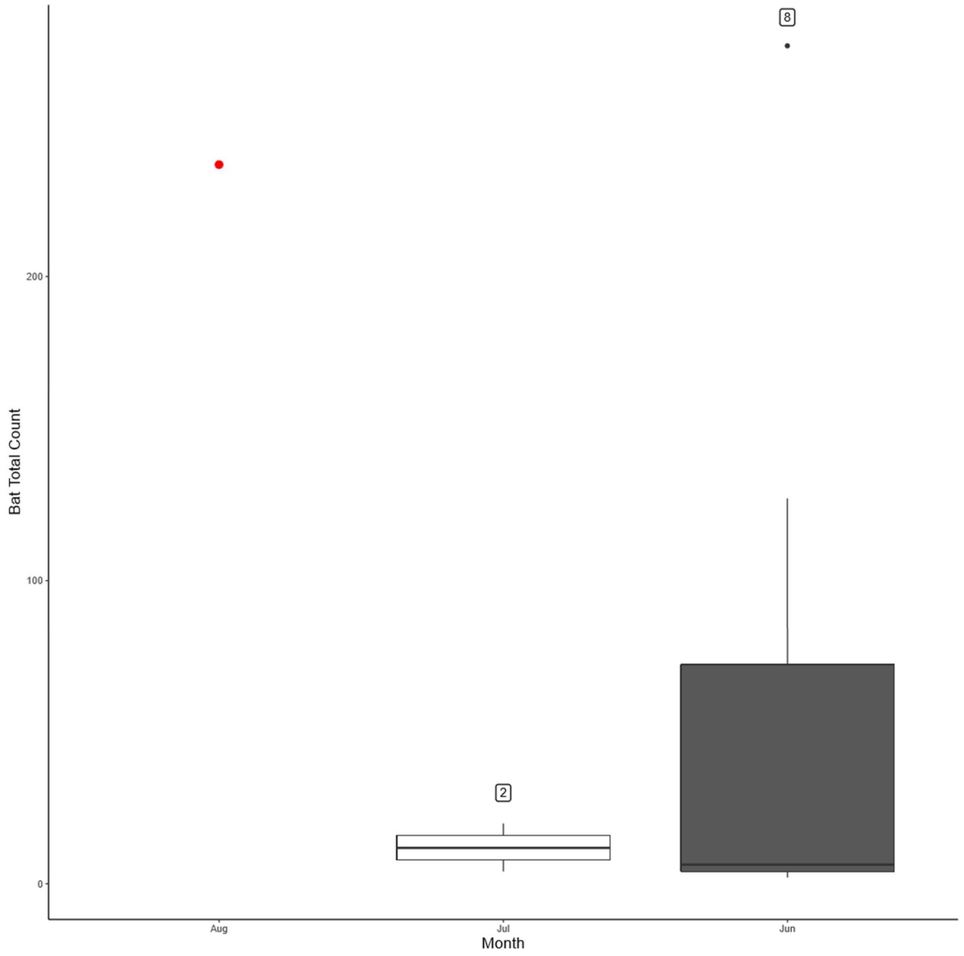


Figure 6: A boxplot showing total count of bats in roosts per month across all years for your roost's Structure Type. Your roost is shown as the red dot.

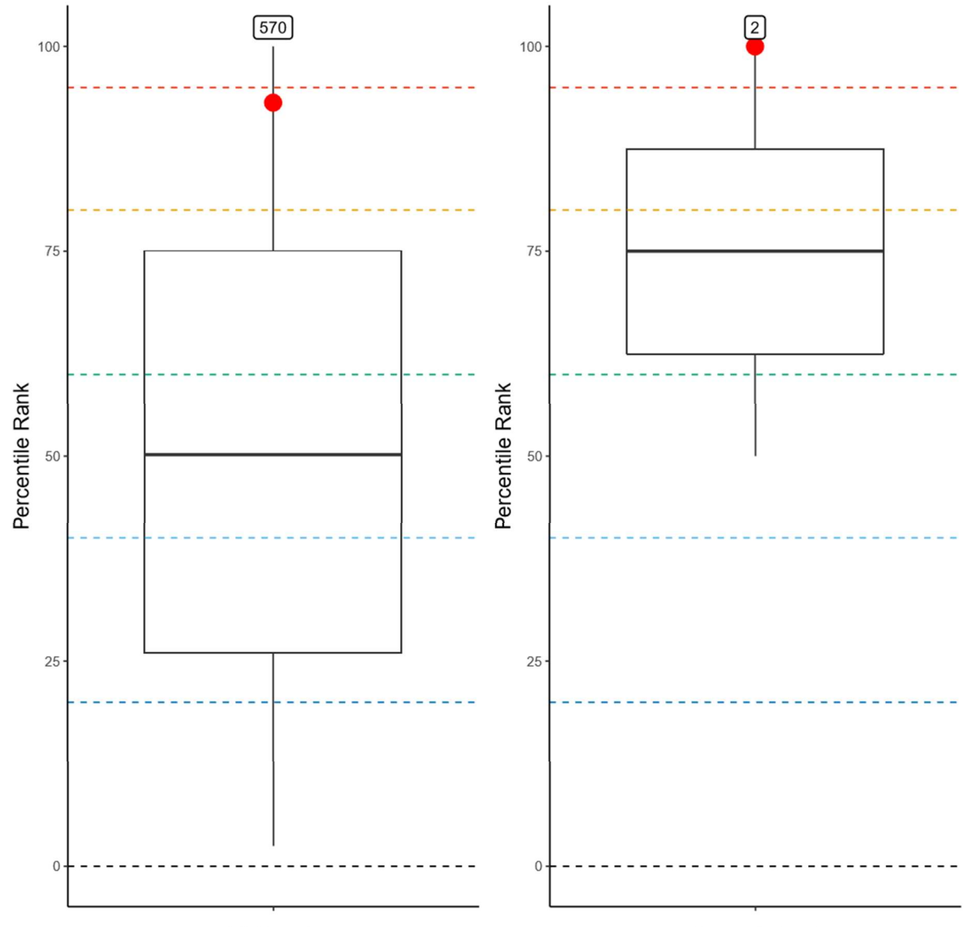


Figure 7: A boxplot showing where your data lies in relation to all other roost data (left) and a boxplot showing where your data lies in relation to a subset of data based on the Assignment you gave your data. Values are the percentile values. The 20th, 40th, 60th, 80th and 95th percentiles are marked by dashed lines. The numbers above the boxplots represent the sample size used for the database

Appendix 8. Current Bats in Churches project expenditure summary.

The following standard costs have been provided by the Bats in Churches Project (October 2021) based on their pilot, Tranche 1 and Tranche 2 works and have been used to inform Projected Options Cost Estimates (Appendices 10-18).

Statistical summary of costs across 29 Bats in Churches projects	
Total Capital Costs	£382,643.03
Number of churches	29
Median Value	£8,765.65
Average/Mean Value	£13,194.59
Max (complex large schemes including new ceilings)	£72,677.00
Min (simple cost – cameras)	£175.00

Summary of indicative costs (October 2021) for individual items

Work Type - Capital	Average Cost
Clean/check bat box	£80.00
Heaters	£266.00
Camera	£322.00
Porta loos	£500.00
Install external bat box/pole	£713.00
Electrician	£924.00
Only blocking up	£2,000.00
Baffle/Catch Boards	£2,160.00
Acoustic Deterrents	£2,299.00
Bat box	£2,878.00
Scaffolding	£3,238.00
Install Rafter Boxes	£4,522.00
Screen	£5,000.00
Install/extend Bat Roof Void	£5,850.00
Exclusion/Blocking up/building work	£6,403.00
Replace/repair ceiling	£43,039.00

Summary of professional/ other fees

Work Type - Professional Fees	Average cost
Architect cost per hour	£91.67
Architect cost average if going to faculty	£3,500.00
Ecologist cost per hour	£50.00
BiCCL licence registration	£500.00
Licence Return (survey data per year to NE)	£350.00
Production of a Bat Management Plan	£1,200.00
Dawn survey	£1,156.00
Dusk survey x 3	£3,515.00
Travel - T&S mileage @per mile	£0.45
Faculty costs	£250

Based on these total capital cost values per church and simplified professional fees, the proposals are broadly divided into three categories:

Low-cost impact solutions **£1 - £4,999**

Simple schemes with little or no impact on bats, the architectural fabric or heritage assets of church and therefore do not include detailed professional bat surveys or post-intervention monitoring, licenses, design or contract specifications.

Moderate-cost impact solutions **£5,000 - £19,999**

Moderate schemes where surveys, licence, basic design and specifications are required, together with minor ecological support. One- or two-year post-intervention monitoring required subject to species present, type of roost and impacts.

High-cost impact solutions **£20,000 and over**

High-cost schemes where surveys are required and with multiple options including detailed design and contract specifications and requirement for greater ecological support. Multiple years post-intervention monitoring required subject to species present, type of roost and impacts.

Simplified Example Cost Breakdown		Value	Low Impact Scheme Example	Moderate Impact Schemes Example	High Impact Scheme Example
Professional fees – Ecologist	Light Touch Survey	£500	£499		
Professional fees – Ecologist	Activity Survey	£4,671		£4,671	£4,671
Professional fees – Ecologist	Design input low	£500	£500		
Professional fees – Ecologist	Design input moderate	£1000		£1000	
Professional fees – Ecologist	Design input high	£2000			£2000
Professional fees – Ecologist	BiCCL Licence	£850		£500	£850
Professional fees – Ecologist	Ecological Clerk of works - major	£500		£500	
Professional fees – Ecologist	Ecological Clerk of works - minor	£2,000			£2,000
Professional fees – Ecologist	Post-intervention monitoring - 1 year	£2,312		£2,000	
Professional fees – Ecologist	Post-intervention monitoring - 3 years	£6,936			£6,000
Professional fees – Architect	Design/Faculty	£3,500	£500	£1,500	£3,500
Professional fees – Architect	Contract administration	£3,000		£1,500	£3,000
Fees	Faculty	£250	£250	£250	£250
Contract value	Low	<£4,999	£3,250		
Contract value	Moderate	£5,000 – £19,999		£8,000	
Contract value	High	>£20,000			£25,000
		Total	**£4,999**	**£19,921**	**£47,271**

Note: No allowance is made for cost rises including inflation, the impact of Brexit or working during the COVID-19 pandemic.

Appendix 9. Projected options cost estimates, based on current survey data (2021) which remains valid for one year in accordance with Bats in Churches Class Licence. Additional surveys will be required where time elapses between the survey and implementation of interventions.

Example Cost Breakdown		BiC Cost Values	Option 1: Cover pews and use voiles	Option 2: Baffles/ Catch boards	Options 3 & 6: Sails (cannot be costed)	Option 4: Box-in south aisle rainspout and create bat box	Options 4 & 5: Box-in south aisle rainspout and nave timber to create bat box	Option 7: Create two bat boxes over chapels	Option 8: Enhance clocktower	Option 9: Bat box behind clocktower (not a standalone option)	Option 10: Options 4, 7 & 8
Professional fees – Ecologist	Light Touch Survey	£500	£500	£500	N/A						
Professional fees – Ecologist	Activity Survey	£4,671			N/A	£4,671	£4,671	£4,671	£4,671		£4,671
Professional fees – Ecologist	Design input low	£500		£500	N/A				£500		
Professional fees – Ecologist	Design input moderate	£1,000			N/A	£1,000		£2,000			
Professional fees – Ecologist	Design input high	£2,000			N/A		£2,000				£2,000
Professional fees – Ecologist	Licence	£850			N/A	£850	£850	£850	£850		£850
Professional fees – Ecologist	Ecological Clerk of works - major	£4,000			N/A		£4,000	£4,000			£4,000
Professional fees – Ecologist	Ecological Clerk of works - minor	£2,000			N/A	£2,000			£1,000		
Professional fees – Ecologist	Post-intervention monitoring (1 year)	£2,312			N/A				£2,312		
Professional fees – Ecologist	Post-intervention monitoring (2 year)	£4,624			N/A						
Professional fees – Ecologist	Post-intervention monitoring (3 years)	£6,936			N/A	£6,936	£6,936	£6,936			£6,936
Professional fees – Architect	Design/Faculty	£3,500			N/A	£3,500	£3,500	£3,500	£3,500		£3,500
Professional fees – Architect	Contract administration	£3,000		£500	N/A	£3,000	£3,000	£3,000	£3,000		£3,000
Fees	Faculty	£250			N/A	£250	£250	£250	£250		£250
Fees	Scaffold	£3,238		£250	N/A	£2,000	£4,000	£4,000			£4,000
Fees	Porta loos	£500			N/A	£500	£500	£500	£500		£1,000
Fees	Bat box	£2,000			N/A	£3,000	£5,000	£4,000			£7,000
Fees	Masonry	£1,000		£500	N/A						
Fees	Boxing in of eaves	£13,000			N/A						
Fees	Linen	£1,000	£1,000								
Contract value				£2,500	N/A	£5,750	£9,750	£8,750	£2,000	£2,000	£14,250
Contingency	10% of contract value			£250.0		£575.00	£975.00	£875.00	£200.00	£200.00	£1,425.00
Estimate values exclude inflation cost on professional fees		**TOTAL:**	**£1,500**	**£4,500**	**N/A**	**£34,032**	**£45,432**	**£43,332**	**£18,783**	**£2,200**	**£52,882**

**Note: Option 4 only to be used in combination with Option 6; and Option 5 in combination with Option 4.*

Appendix 10. Intervention Option 1: Covers and voiles.

Description

Use of linen cloth covers over pews and voiles over monuments.

Purpose

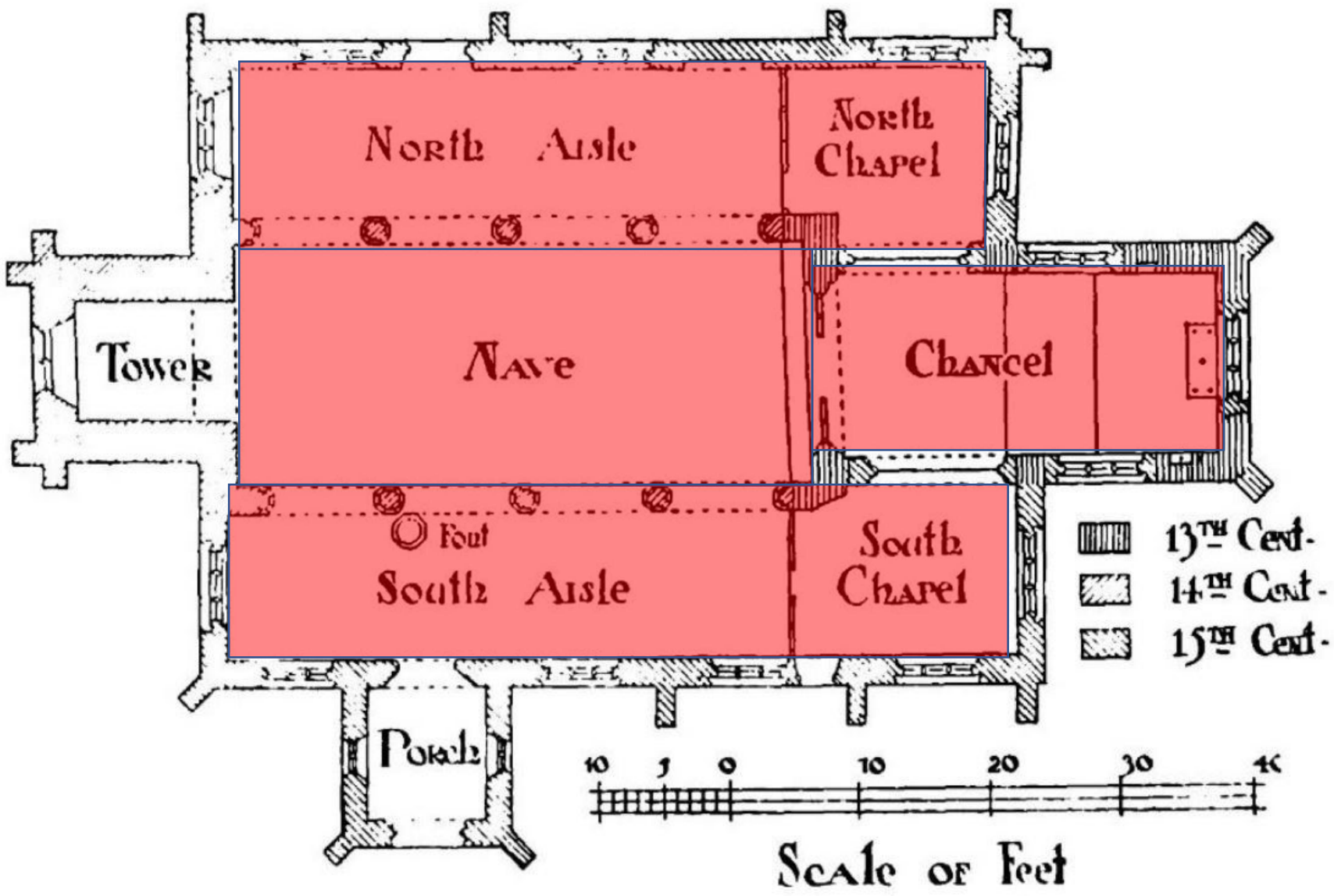
- To protect pews and monuments by covering with linen cloth covers and voiles.
  - Fabric and linen to be used rather than plastic sheeting to allow woodwork and masonry/stone to breathe and reduce build-up of condensation that otherwise would result in damage.
  - Maintain by cleaning weekly during the peak summer activity period when bat droppings, staining and/or smell is obvious.

Nature of work

Although economical, simple and effective to use, this method simply controls the impact of bat droppings and urine staining and can become a burden for church communities where there are sizeable bat populations.

Fabric should ideally be fitted to cover features that need protecting and curtain weights or similar will be needed to hold the material in place.

Regular washing of materials is required to prevent staining. Replacement of fabric materials should be anticipated**.**



Address

All Hallows, High St, Upper Dean, Huntingdon PE28 0LL

Facilities and Services

Car parking:

- All Hallows, High St, Upper Dean, Huntingdon PE28 0LL

Access:

- By arrangement with the PCC.

Water:

- No

Electricity:

- Yes

Toilets:

- No

Consultation

Historic England:	No
Natural England:	No
Local bat group:	No
Bat Conservation Trust:	No
Victorian Society:	
Society for Protection of Ancient Buildings:	
Church Monuments Society:	
Other:	

Consents

Faculty:
Faculty List A: (12) The installation of bat boxes as part of a bat management programme
Faculty List B: other items?
Planning consent:
Listed building consent:
Building regulations:
European Protected Species license (type):

- Not required where the provision of covers and/or voiles.

Other:

Key personnel

DAC:

PCC Chairperson:

Church Representative:	Stephen Holyroyd stephenholyroyd@btinternet.com Lindsay Langley lindsay.m.langley@gmail.com
Church Architect:	John Baker johnbakerltd@btconnect.com
Bats in Churches Engagement Officer:	Honor Gay Honor.gay@churchofengland.org
Ecologist:	Bernwood Ecology Emily Dickins emily@bernwood.net
Bedfordshire Bat Group	Bob Cornes rgcornes@gmail.com

Option Costs

Professional fees:

- Architect:
  - Design and contract specifications
  - Contract management to completion
- Ecologist:
  - Survey. Assessment of location for fabric and material
  - License Application through to license return: Not required.
  - Ecological Clerk of Works. N/A
  - Post-Intervention Monitoring. N/A
- Other (i.e., environmental monitoring, quantity survey, structural engineer): N/A

Contract Cost Forecast:

- Contractors Work Programme:
  - Not required if intervention avoids impacts on bats including disturbance, and damage or destruction of roosts.

Contractors Health and Safety Plan:

- Cleaning materials.
- Animal waste - hygiene

Volunteer Opportunities

- Survey
  - Record bat dropping location and quantities prior to installation of fabric/linen. Use information to accurately locate position of voiles/covers.
- Monitoring
  - Desirable not essential for the installation of fabric/linen
- Maintenance
  - Clean weekly during peak (summer) activity period
- Constraints
  - Hygiene

Management and Maintenance

Inspection:

- Weekly/monthly to determine cleaning programme.

Cleaning:

- Anticipated weekly during peak bat activity period, monthly over winter.

Constraints:

- Do not use plastic sheets as these will increase moisture / dampness, damaging wood.
- Working at height
- Animal waste

Risk Register

Programme

- No restrictions to programme.

Survey coverage and age of data

- Four surveys complying with current guidelines carried out in 2021

Consents

- Identify if Faculty consent is required or covered under list A/B exemption

Uptake of intervention

- Can church community maintain long-term cleaning?

Late discoveries

- Bat roosts are likely to vary through the year and between years. Flexibility in locating covers to pews, etc. will be required throughout the year.

Working methods

- N/A

Material costs / supply

- Regular replacement of linen of fabric covers will be required where staining becomes unattractive.

Assessments of Impacts

Receptor	Bat Populations			Heritage Assets	Architectural	Social	Visual
Intervention Scale	Soprano & common pipistrelle	Brown long-eared bat	Natterer's bat				
Low Impact Intervention	0	0	0	0	0	-1	-2
Moderate Impact Intervention							
High Impact Intervention							

Appendix 11. Intervention Option 2: Baffle / Catch Boards at primary roosting locations.

Description

The addition of baffle/ catch boards below main roost points within the church

Purpose

- To collect bat droppings at concentration points and reduce sight of unsightly accumulations.
  - Cat litter would reduce dampness and reduce smell.
  - Maintained by cleaning once a month during the peak summer activity period when bat droppings are obvious.

Nature of work

To erect baffle/ catch boards above head height below known bat roost points (proposed locations in red below). Boards to be constructed of marine ply or similar and painted to match existing wall colour within the church. A lip of 50mm is to be added to reduce spillage of droppings.

The size of the baffle/ catch boards will be determined by assessment the known roost points and history (coverage) of droppings, although it is recognized that to reduce visual intrusion, the scale and proportions of the baffle/ catch boards will need to be addressed. They must be of sufficient size to meet the 'need', i.e., control coverage of area covered by droppings.

The work will require 'working at height' and need for scaffolding will be determined by design and contractors appointed to carry out works. Cleaning of baffle/ catch boards by volunteers may be possible if placed at sufficiently low level to safely work from a ladder or a mobile scaffold platform. Where baffle/ catch boards are placed at height, the ability to be regularly cleaned by volunteers will be limited. In this instance, the costs of cleaning and scaffold will need to be considered prior to installing baffle/ catch boards.

Address

All Hallows, High St, Upper Dean, Huntingdon PE28 0LL

Facilities and Services

Car parking:

- All Hallows, High St, Upper Dean, Huntingdon PE28 0LL

Access:

- By arrangement with the PCC.

Water:

- No

Electricity:

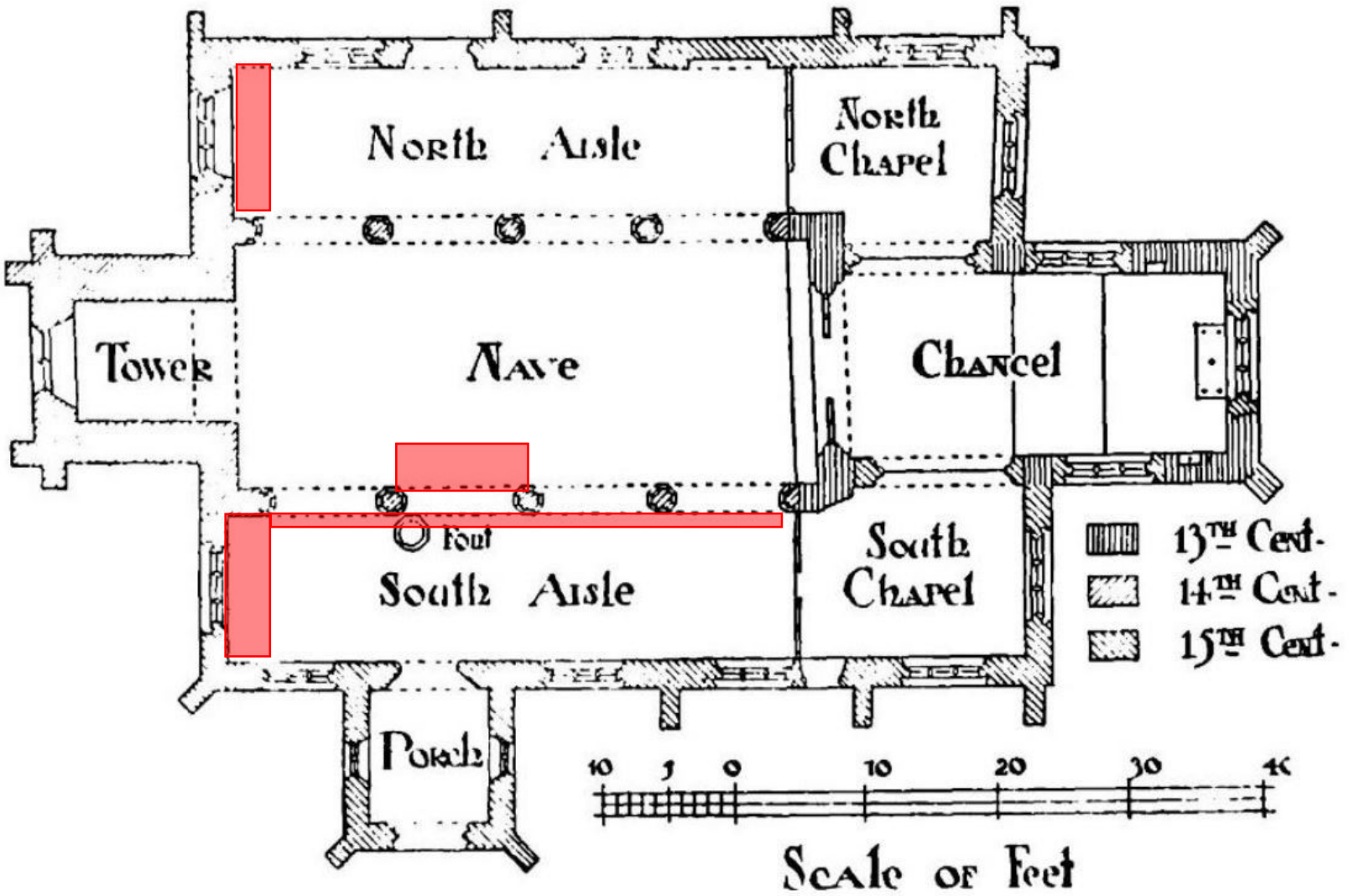
- Yes

Toilets:

- No

Consultation

Historic England:	No
Natural England:	No
Local bat group:	Yes
Bat Conservation Trust:	No
Victorian Society:	
Society for Protection of Ancient Buildings:	
Church Monuments Society:	
Other:	



Consents

Faculty:
Faculty List A: (12) The installation of bat boxes as part of a bat management programme
Faculty List B: other items?
Planning consent:
Listed building consent:
Building regulations:
European Protected Species license (type):

- Not required where the provision of baffle / catch boards will not block bat access points or damage roosts.
- Consider possible disturbance offence if working close to any bat roosts.

Other:

Key personnel

DAC:
PCC Chairperson:

Church Representative:	Stephen Holyroyd stephenholyroyd@btinternet.com Lindsay Langley lindsay.m.langley@gmail.com
Church Architect:	John Baker johnbakerltd@btconnect.com
Bats in Churches Engagement Officer:	Honor Gay Honor.gay@churchofengland.org
Ecologist:	Bernwood Ecology Emily Dickins emily@bernwood.net
Bedfordshire Bat Group	Bob Cornes rgcornes@gmail.com

Option Costs

Professional fees:

- Architect:
  - Design and contract specifications
  - Contract management to completion
- Ecologist:
  - Survey. Assessment of location of bat droppings and placement of baffle/ catch boards.
  - License Application through to license return. Not required.
  - Ecological Clerk of Works. N/A
  - Post-Intervention Monitoring. N/A
- Other (i.e., environmental monitoring, quantity survey, structural engineer): N/A

Contract Cost Forecast

- Contractor's Work Programme:
  - Not required if intervention avoids impacts on bats including disturbance, damage or destruction of roosts.

Contractor's Health and Safety Plan

- Required prior to undertaking works.

Volunteer Opportunities

- Survey
  - Record bat dropping locations and quantities prior to installation of baffle/ catch boards. Use information to accurately locate position of baffle/ catch boards.
- Monitoring
  - Desirable not essential for the installation of baffle/ catch boards
- Maintenance
  - Clean once a month during peak (summer) activity period
- Constraints
  - Cleaning at height

Management and Maintenance

Inspection:

- Weekly/monthly to determine cleaning programme.

Cleaning

- Anticipated once a month if carried out by volunteers. If working at height, restrictions prevent volunteer cleaning; a cleaning contract once a year at the end of the peak (summer) activity season is recommended.

Constraints

- Working at height
- Animal waste

Risk Register

Programme

- No restrictions to programme

Survey coverage and age of data

- Four surveys complying with current guidelines carried out in 2021

Consents

- Identify if Faculty consent is required or covered under list A/B exemption

Uptake of intervention

- Baffle/ catch boards will be located based on current knowledge of the location of main roost points, however roost location will vary over time. Baffle/ catch boards are unlikely to be sufficient in size to control droppings if large bat roosts are present or develop.
- Baffle/ catch boards will not control the random distribution of bat droppings or urine staining from bats flying around inside the church.

Late discoveries

- Bats: Not likely to be a significant risk as bat roosts and bat access points are not likely to be impacted by proposals.
- Architectural issues: Unlikely as baffle/ catch boards will be place on open walls or corners. Architect to review.

Working methods

- Architectural specifications only subject to no roosts being damaged/destroyed or bat access points being impeded.

Material costs / supply

- Current availability of building materials has been a recent issue following Brexit/ COVID-19 pandemic. Material costs have risen significantly and may continue to do so in the foreseeable future.

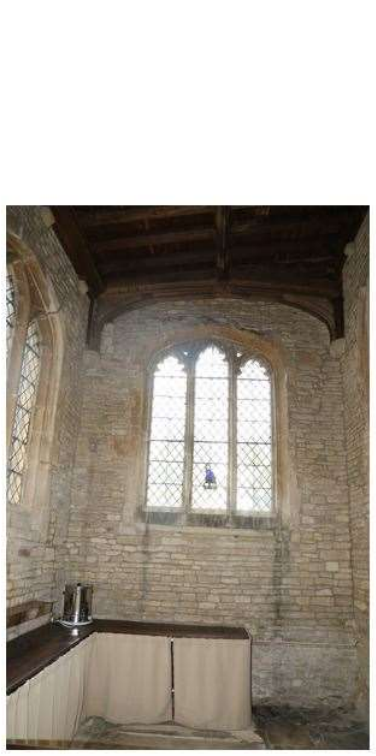
Assessments of Impacts

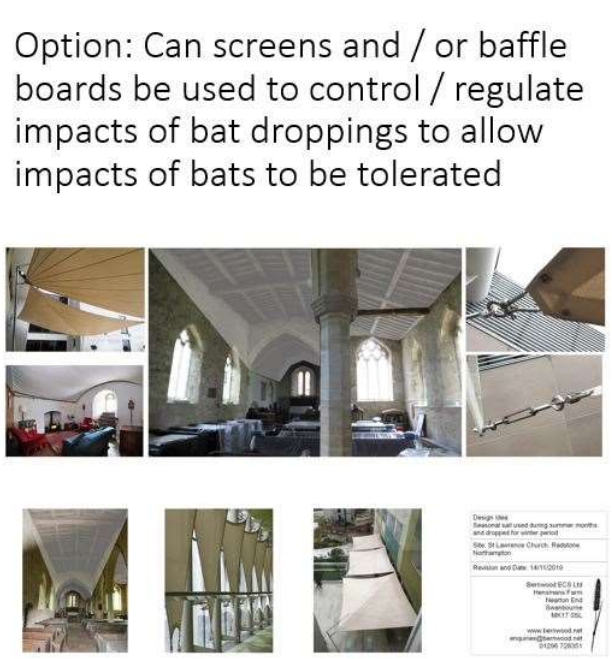
Receptor	Bat Populations			Heritage Assets	Architectural	Social	Visual
Intervention Scale	Soprano & common pipistrelle	Brown long-eared bat	Natterer's bat				
Low Impact Intervention	0	0	0	0	0	1	-1
Moderate Impact Intervention							
High Impact Intervention							

Appendix 12. Intervention Option 3: Small-scale temporary sails below roosts.

Description

The addition of temporary sails, present during summer months only (in place of fixed baffle boards) below main roost points within the church.





Purpose

- To collect bat droppings at concentration points and reduce sight of unsightly accumulations.
  - Maintained by cleaning once a month during the peak summer activity period when bat droppings are obvious.

Nature of work

To erect temporary sails below known bat roost points (proposed locations below in red).

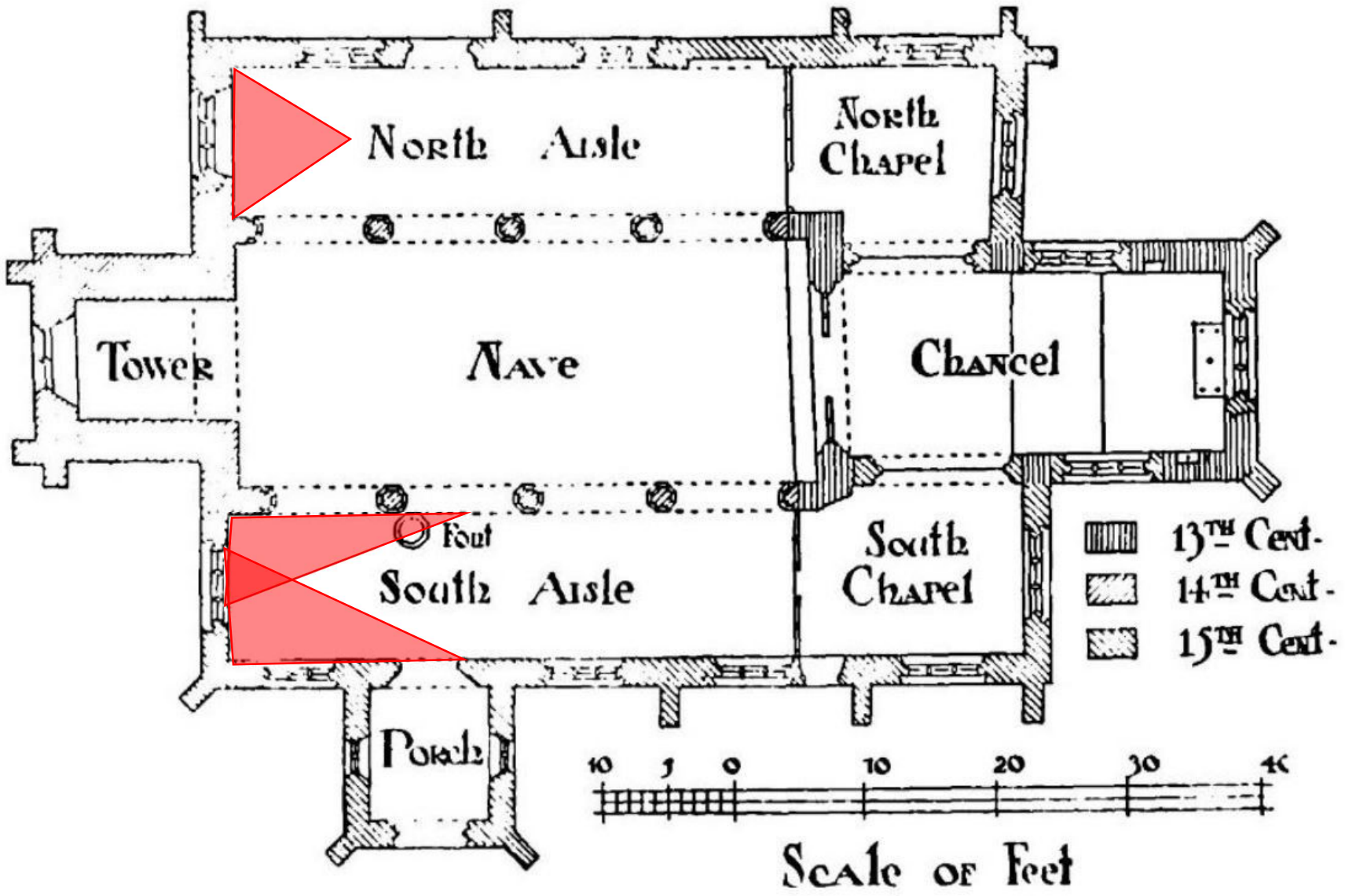
Sails are:

- to be made of a cloth material, coloured as available and chosen by church community
- to be fixed in place a system of lines (sheets), cleats (wall-fitted), blocks and/or pulleys that allow for the sails to be set in place or lowered by members of the church community
- designed in size to collect droppings that fall from main roost points but avoiding larger-scale appearance that might otherwise dominate visual character of the building.
- design influence may be used to allow for religious symbolism or add colour and character where in keeping with the church and/or church community.

The size of the sails will be determined by assessment of the known roost points and history (coverage) of droppings, although it is recognized that to reduce visual intrusion, the scale and proportions of the sails will need to be addressed. They must be of sufficient size to meet the 'need', i.e., control coverage of area covered by droppings.

Placement of fixtures and fittings will require working at height, including the need for scaffolding, which will need to be determined by design and contractors appointed to carry out the initial fittings works. After that, apart from maintenance, no working at height will be required.

Cleaning of sails by volunteers will be possible if placed at sufficiently low level to safely work from ladder or mobile scaffold platform. The annual costs for cleaning sails will need to be considered subject to manufacturer's recommendations.



Address

All Hallows, High St, Upper Dean, Huntingdon PE28 0LL

Facilities and Services

Car parking:

- All Hallows, High St, Upper Dean, Huntingdon PE28 0LL

Access:

- By arrangement with the PCC.

Water:

- No

Electricity:

- Yes

Toilets:

- No

Consultation

Historic England:	
Natural England:	Yes
Local bat group:	Yes
Bat Conservation Trust:	Yes
Victorian Society:	
Society for Protection of Ancient Buildings:	
Church Monuments Society:	
Other:	

Consents

Faculty:
Faculty List A: (12) The installation of bat boxes as part of a bat management programme
Faculty List B: other items?
Planning consent:
Listed building consent:
Building regulations:

European Protected Species license (type):

- Not required where the provision of sails will not block bat access points or damage roosts.
- Consider possible disturbance offence if working close to any bat roosts.

Other:

Key personnel

DAC:
PCC Chairperson:

Church Representative:	Stephen Holyroyd stephenholyroyd@btinternet.com Lindsay Langley lindsay.m.langley@gmail.com
Church Architect:	John Baker johnbakerltd@btconnect.com
Bats in Churches Engagement Officer:	Honor Gay Honor.gay@churchofengland.org
Ecologist:	Bernwood Ecology Emily Dickins emily@bernwood.net
Bedfordshire Bat Group	Bob Cornes rgcornes@gmail.com

Option Costs

Professional fees:

- Architect: N/A (subject to design competition)
  - Design and contract specifications
  - Contract management to completion
- Ecologist:
  - Survey. Assessment of location of bat droppings and placement of sails.
  - License Application through to license return. Not required.
  - Ecological Clerk of Works. N/A
  - Post-Intervention Monitoring. N/A
- Other (i.e., environmental monitoring, quantity survey, structural engineer): N/A

Contract Cost Forecast:

- Contractor's Work Programme:
  - Not required if intervention avoids impacts on bats including disturbance, damage or destruction of roosts.

Contractor's Health and Safety Plan

- Required prior to undertaking works.

Volunteer Opportunities

- Survey
  - Record bat dropping location and quantities prior to installation of sails. Use information to accurately locate position of sail fixtures and fittings.
- Monitoring
  - Desirable not essential for the installation of sails
- Maintenance
  - Annual clean. Where manageable by local community consider basic cleaning once a month during peak (summer) activity period
- Constraints
  - Manageability of sails by local community

Management and Maintenance

Inspection:

- Monthly to determine cleaning programme.
- Annual inspection of fixtures and fittings.

Cleaning

- Anticipated once a month if carried out by volunteers.
- Annual sail cleaning contract once a year at the end of the peak (summer) activity season is recommended.

Constraints

- Animal waste

Risk Register

Design principles:

- Proposals are in principle and subject to design brief that considers:
  - Appearance
  - Fixtures and fittings - permanent on into walls or separate on poles and supports
  - Sail material; durability, impact of faeces and urine on material, staining.
  - Colour and use of decorative finish

Programme

- No restrictions where direct impact on roosts or avoidance of disturbance near to roosts can be controlled.

Survey coverage and age of data

- Four surveys complying with current guidelines carried out in 2021

Consents

- Identify if Faculty consent is required or covered under list A/B exemption

Uptake of intervention

- Sails will be located based on current knowledge of the location of main roost points, however roost location will vary over time. Small scale sails are unlikely to be sufficient in size to control droppings if large bat roosts are present or develop.
- Small scale sails will not control the random distribution of bat droppings or urine staining from bats flying around inside the church.

Late discoveries

- Bats: Not likely to be a significant risk as bat roosts and bat access points are not likely to be impacted by proposals.
- Architectural issues: Unlikely as sails will be place on open walls or corners. Architect to review. Fixtures and fittings applied to wall may require appropriate faculty consent.

Working methods

- Architectural specifications only subject to no roosts being damaged/destroyed or bat access points being impeded.

Material costs / supply

- The design and use of sails remain untested. A full design scheme will be required prior adaption of this approach.
- Current availability of building materials has been a recent issue following Brexit/ COVID-19 pandemic. Material costs have risen significantly and may continue to do so in the foreseeable future.

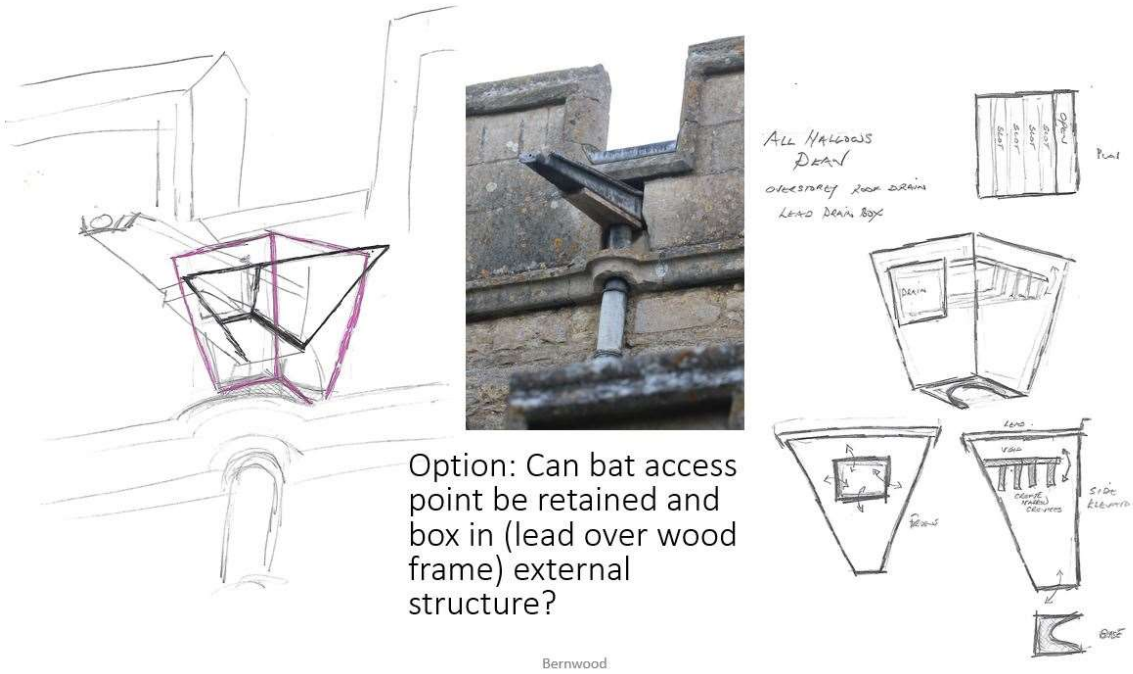
Assessments of Impacts

Receptor	Bat Populations			Heritage Assets	Architectural	Social	Visual
Intervention Scale	Soprano & common pipistrelle	Brown long-eared bat	Natterer's bat				
Low Impact Intervention							
Moderate Impact Intervention	0	0	0	0	0	3	-1
High Impact Intervention							

Appendix 13. Intervention Option 4: Box in overstorey rainspout to create an artificial roost.

Description

Bats are accessing the church on the south side of the overstory via a lead rainspout. It is proposed that, subject to architectural issues with leadwork, masonry and timber beams, a new discreet sealed bat box be created. Once created, the bats can continue using the existing bat access point. The sealed bat box could be used in isolation or combined with Option 5 to allow bat access into the internal sealed timber beam with bat box behind. The option will need to consider intervention options for brown long-eared bat (Options 6, 7 and 8).



Bat access points via lead rainspout on south side of overstorey

Purpose

To allow *Pipistrellus* and *Myotis* sp. bats to continue to use the bat access points and create artificial bat box.

Nature of work

To create a sealed lead bat box with wooden framework and boarding blended to match existing leadwork of rainspout.

Works will need to take place from outside the church working at height from scaffold platform. Material to be used include untreated oak or 5mm ply to create sealed unit, ensuring bat access to the internal area of the church is fully sealed.

The sealed bat box could be used in isolation or combined with Option 5 to allow bats to access the internal sealed timber beam with a bat box behind. Option 5 is aimed to provide sufficient roost opportunities for the multiple species using the church including soprano and common pipistrelle and Natterer's bat. This option will need to be combined with Options 6, 7 & 8 to maintain bat access and roost opportunities for brown long-eared bats.

Address

All Hallows, High St, Upper Dean, Huntingdon PE28 0LL

Facilities and Services

Car parking:

- All Hallows, High St, Upper Dean, Huntingdon PE28 0LL

Access:

- By arrangement with the PCC.

Water:

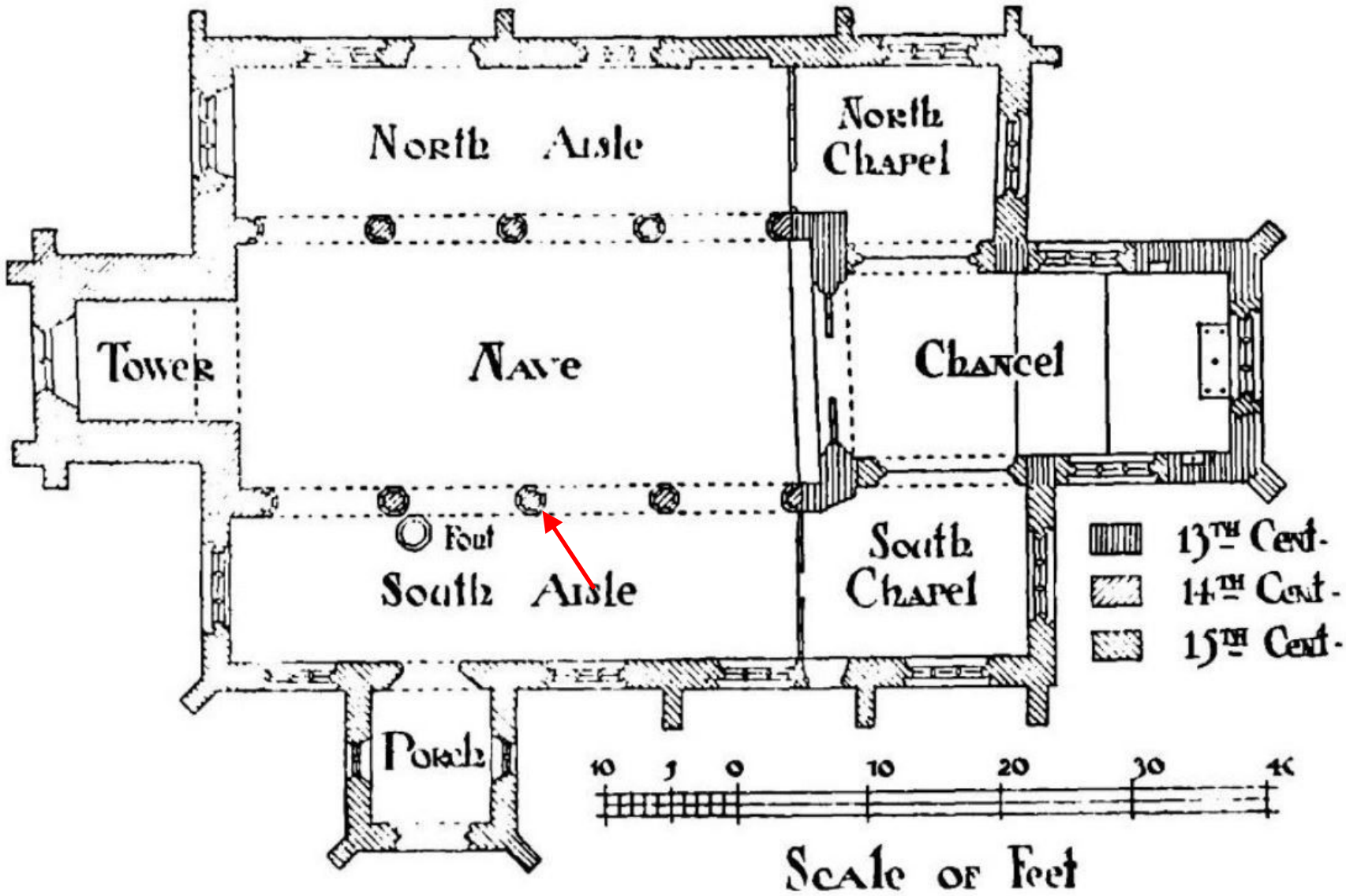
- No

Electricity:

- Yes

Toilets:

- No



Consultation

Historic England:
Natural England: No
Local bat group: No
Bat Conservation Trust: No
Victorian Society:
Society for Protection of Ancient Buildings:
Church Monuments Society:
Other:

Consents

Faculty:
Faculty List A: (12) The installation of bat boxes as part of a bat management programme
Faculty List B: other items?
Planning consent:
Listed building consent:
Building regulations:
European Protected Species license (type):

- Bats in Churches or Standard European Protected Species license required as bat access to the main body of the church will be blocked resulting in the loss of bat roosts for soprano pipistrelle and brown long-eared bat

Other:

Key personnel

DAC:
PCC Chairperson:

Church Representative: Stephen Holyroyd
stephenholyroyd@btinternet.com
Lindsay Langley
lindsay.m.langley@gmail.com

Church Architect:	John Baker johnbakerltd@btconnect.com
Bats in Churches Engagement Officer:	Honor Gay Honor.gay@churchofengland.org
Ecologist:	Bernwood Ecology Emily Dickins emily@bernwood.net
Bedfordshire Bat Group	Bob Cornes rgcornes@gmail.com

Option Costs

Professional fees:

- Architect:
  - Design and contract specifications
  - Contract management to completion
- Ecologist:
  - Additional surveys specifically to address how brown long-eared bats are accessing the structure and to re-evaluate Natterer's bats (very low numbers in 2021) where historical reference indicates a larger presence in the past.
  - Bat surveys will need to be maintained as up-to-date and cover the preceding years peak activity period for a European Protected Species license.
  - License Application through to license return. Registration under the Bats in Churches Class license, following granting of all necessary consents including Faculty.
  - Ecological Clerk of Works will be required to ensure compliance with license, including pre-start briefing/toolbox talk, creation of bat box and bat access point.
  - Post-Intervention Monitoring will be required and comply with current guidance. This is likely to be 2-years' post-intervention monitoring carried out after the peak maternity period but prior to the break-up of colonies. Monitoring surveys will ideally be carried out in the first and third year after completion of works.
- Other (i.e., environmental monitoring, quantity survey, structural engineer): N/A

Contract Cost Forecast

- Contractor's Work Programme:
  - Works will need to be carried out in either the spring or autumn period to avoid the peak maternity and hibernation periods.
  - This option may be used in conjunction with boxing in (Option 5).

Contractor's Health and Safety Plan

- Required prior to undertaking works.

Volunteer Opportunities

- Survey
  - N/A
- Monitoring
  - Encourage volunteers to undertake long-term monitoring following the licensed post-intervention monitoring period
- Maintenance
  - N/A
- Constraints
  - Height prevents long-term inspection or maintenance

Management and Maintenance

Inspection:

- Review effectiveness as part of Quinquennial Review.

Cleaning:

- N/A

Constraints:

- Height prevents long-term inspection or maintenance

Risk Register

Design principles:

- Proposals are in principle and subject to design brief that considers:
  - Practicality of implementation
  - Appearance – must not be visually intrusive
  - Will need to be used in conjunction with either boxing in or closing the existing bat access on east side of the nave

Programme

- Works will need to be carried out in either the spring or autumn period to avoid the peak maternity and hibernation periods

Survey coverage and age of data

- Understanding brown long-eared bat
- Understanding Natterer's bat and other species
- Four surveys complying with current guidelines carried out in 2021.

Consents

- Identify if Faculty consent is required or covered under list A/B exemption

Uptake of intervention

- Changes in bat access to the internal structure may negatively impact on bat uptake of the new eaves box.

Late discoveries

- Bats: Presence of additional species using bat access.
- Architectural issues: Practicality of implementation. Site may not be suitable due to structural complexity. Condition of timbers and masonry once works start. May require additional works and incur further costs.

Working methods

- Subject to architectural specifications

Material costs / supply

- The idea remains untested and requires at height inspection to check for viability.
- Current availability of building materials has been a recent issue following Brexit/ COVID-19 pandemic. Material costs have risen significantly and may continue to do so in the foreseeable future.

Assessments of Impacts

Receptor	Bat Populations			Heritage Assets	Architectural	Social	Visual
Intervention Scale	Soprano & common pipistrelle	Brown long-eared bat	Natterer's bat				
Low Impact Intervention							
Moderate Impact Intervention	0	-3	-2	-1	-1	3	0
High Impact Intervention							

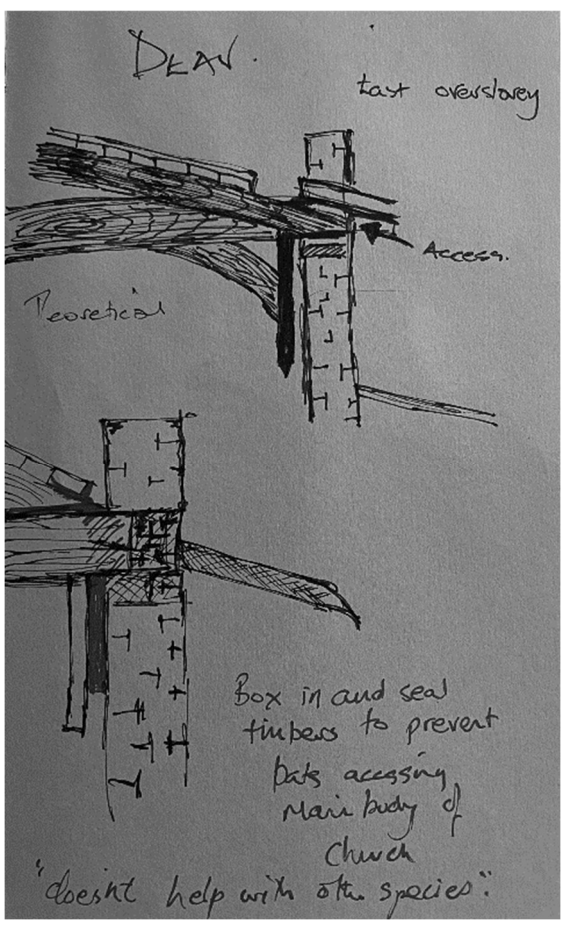
Appendix 14. Intervention Option 5: Box in nave timber to create sealed bat box.

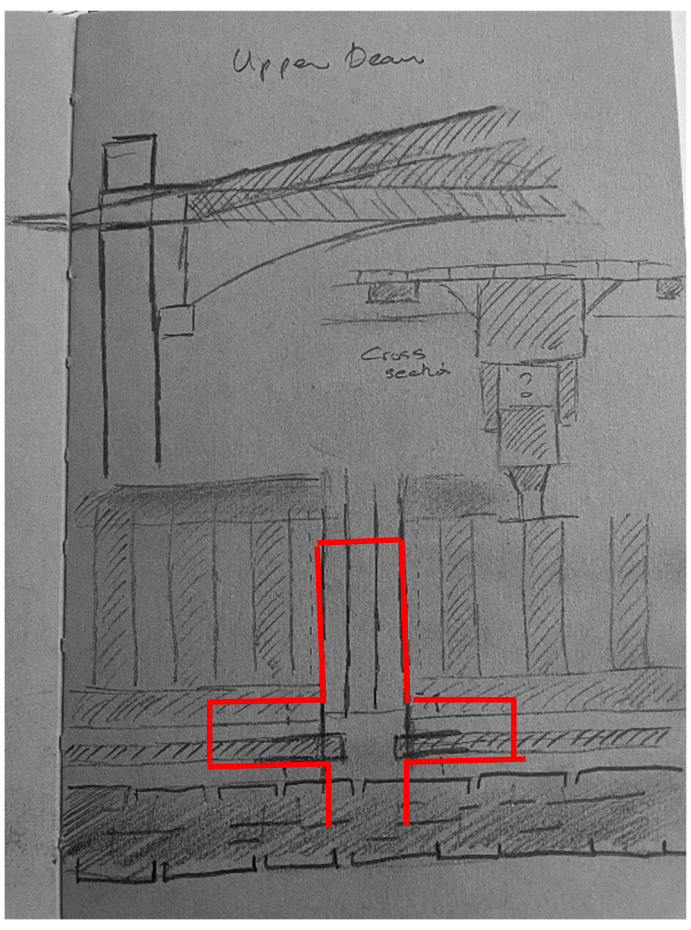
Description

Bats are accessing the church on the south side of the overstory via a lead rainspout. To control bats accessing inside the church and provide an alternative artificial roost structure inside the beam in the church nave. It is proposed that, subject to architectural issues with leadwork, masonry and timber beams, a new discreet sealed bat box be created by boxing in the timber beam. Once created, the bats can continue to the existing bat access points.

The sealed bat box is to be combined with Option 4 to allow bats to access the internal sealed timber beam. Option 5 is aimed at providing sufficient roosting opportunities for the multiple species using the church, including soprano and common pipistrelle and Natterer's bat.

Bat access points via lead rainspout on southern side of overstorey.





Purpose

To allow bats to continue to use the bat access points to gain access to roof timber in nave but prevent access to the main body of the church.

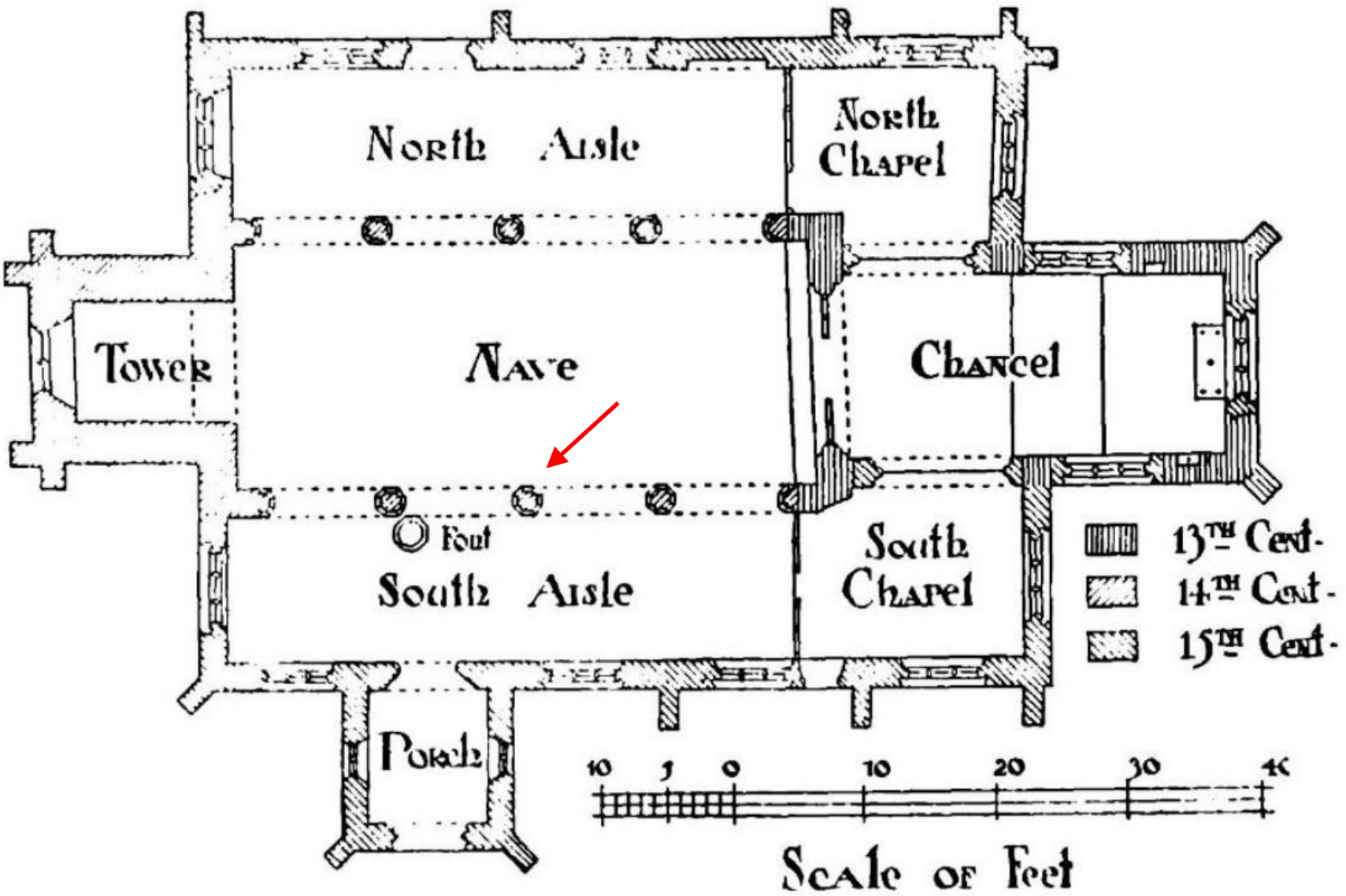
Nature of work

To create a sealed bat box within the framework of the existing nave timber beam associated with the lead rainspout bat access, utilising the existing roof timber framework used by bats, sealed up with batons blended to match existing woodwork.

Works will need to take place from inside the church working at height from scaffold platform.

Material to be used include untreated oak or 5mm ply to create sealed unit, ensuring bat access to the internal area of the church is fully sealed.

The sealed roof timber bat box must be combined with Option 4 to allow bats to access the internal sealed timber beam. Option 4 is aimed to provide sufficient roost opportunities for multiple species using the church including soprano and common pipistrelle and Natterer's bat. This option will need to be combined with Option 6 and/or 7 to maintain bat access and roosting opportunities for brown long-eared bats.



Address

All Hallows, High St, Upper Dean, Huntingdon PE28 0LL

Facilities and Services

Car parking:

- All Hallows, High St, Upper Dean, Huntingdon PE28 0LL

Access:

- By arrangement with the PCC.

Water:

- No

Electricity:

- Yes

Toilets:

- No

Consultation

Historic England:	
Natural England:	Yes
Local bat group:	Yes
Bat Conservation Trust:	Yes
Victorian Society:	
Society for Protection of Ancient Buildings:	

Church Monuments Society:
Other:

Consents

Faculty:
Faculty List A: (12) The installation of bat boxes as part of a bat management programme
Faculty List B: other items?
Planning consent:
Listed building consent:
Building regulations:
European Protected Species license (type):

- Required as bat access to the main body of the church will be blocked, resulting in the loss of bat roosts for soprano pipistrelle and brown long-eared bat

Other:

Key personnel

DAC:	
PCC Chairperson:	
Church Representative:	Stephen Holyroyd stephenholyroyd@btinternet.com Lindsay Langley lindsay.m.langley@gmail.com
Church Architect:	John Baker johnbakerltd@btconnect.com
Bats in Churches Engagement Officer:	Honor Gay Honor.gay@churchofengland.org
Ecologist:	Bernwood Ecology Emily Dickins emily@bernwood.net
Bedfordshire Bat Group	Bob Cornes rgcornes@gmail.com

Option Costs

Professional fees:

- Architect:
  - Design and contract specifications
  - Contract management to completion
- Ecologist:
  - Survey:
    - Additional surveys specifically to address how brown long-eared bats are accessing the structure
    - Allows re-evaluation of Natterer's bats (very low numbers in 2021), as historical reference indicates a larger presence in the past.
    - Bat surveys will need to be maintained up-to-date and cover the preceding year's peak activity period for a European Protected Species license.
    - License Application through to license return. Registration under the Bats in Churches Class license, following granting of all necessary consents including Faculty.
    - Ecological Clerk of Works will be required to ensure compliance with license including pre-start briefing/toolbox talk, creation of bat box and bat access point.
    - Post-Intervention Monitoring will be required and comply with current guidance. This is likely to be 2-years' post-intervention monitoring carried out after the peak maternity period but prior to the break-up of colonies. Monitoring surveys will ideally be carried out in the first and third year after completion of works.
- Other (i.e., environmental monitoring, quantity survey, structural engineer): N/A

Contract Cost Forecast:

- Contractor's Work Programme:
  - Works will need to be carried out in either the spring or autumn period to avoid the peak maternity and hibernation periods.

- This option will need to be used in conjunction with boxing in the rainspout (Option 4).

Contractor's Health and Safety Plan

- Required prior to undertaking works.

Volunteer Opportunities

- Survey
  - Current surveys (2021) complying have been carried out
- Monitoring
  - Encourage volunteers to undertake long-term monitoring following the licensed post-intervention monitoring period
- Maintenance
  - N/A
- Constraints
  - Height prevents long-term inspection or maintenance

Management and Maintenance

Inspection:

- Review effectiveness as part of Quinquennial Review.

Cleaning

- N/A

Constraints

- Height prevents long-term inspection or maintenance

Risk Register

Design principles:

- Proposals are in principle and subject to design brief that considers:
  - Practicality of implementation
  - Appearance – must not be visually intrusive
  - This option will need to be used in conjunction with boxing in the rainspout (Option 4).

Programme

- Works will need to be carried out in either the spring or autumn period to avoid the peak maternity and hibernation periods

Survey coverage and age of data

- Understanding brown long-eared bat
- Understanding Natterer's bat and other species
- Four surveys complying with current guidelines carried out in 2021

Consents

- Identify if Faculty consent is required or covered under list A/B exemption

Uptake of intervention

- Changes in bat access to the internal structure may negatively impact on bat uptake of the new eaves box.

Late discoveries

- Bats: Presence of additional species using bat access.
- Architectural issues: Practicality of implementation. Site may not be suitable due to structural complexity. Condition of timbers and masonry once works start. May require additional works and incur further costs.

Working methods

- Subject to architectural specifications

Material costs / supply

- The idea remains untested and requires at height inspection to check for viability.
- Current availability of building materials has been a recent issue following Brexit/ COVID-19 pandemic. Material costs have risen significantly and may continue to do so in the foreseeable future.

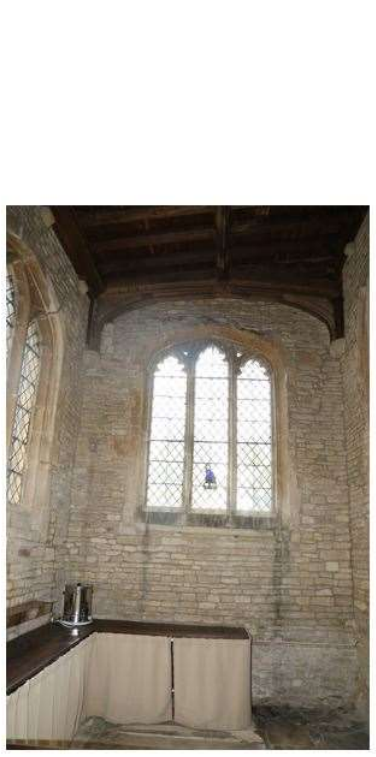
Assessments of Impacts

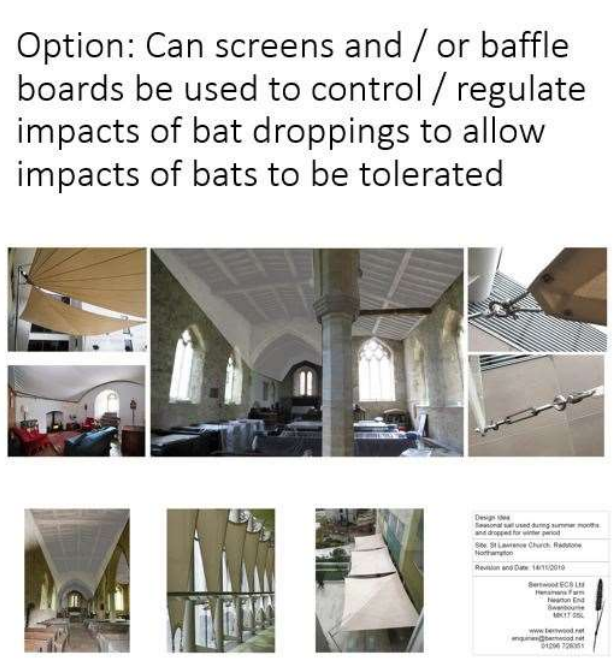
Receptor	Bat Populations			Heritage Assets	Architectural	Social	Visual
Intervention Scale	Soprano & common pipistrelle	Brown long-eared bat	Natterer's bat				
Low Impact Intervention							
Moderate Impact Intervention	0	-3	-1	-1	0	3	0
High Impact Intervention							

Appendix 15. Intervention Option 6: Small scale temporary sails below south aisle brown long-eared bat roosts.

Description

The addition of temporary sails, present during summer months only (in place of fixed baffle boards) below main roost points within the church.





Purpose

- To collect bat droppings at concentration points and reduce sight of unsightly accumulations.
  - Maintained by cleaning once a month during the peak summer activity period when bat droppings are obvious.

Nature of work

To erect temporary sails below known bat roost points (proposed locations below in red).

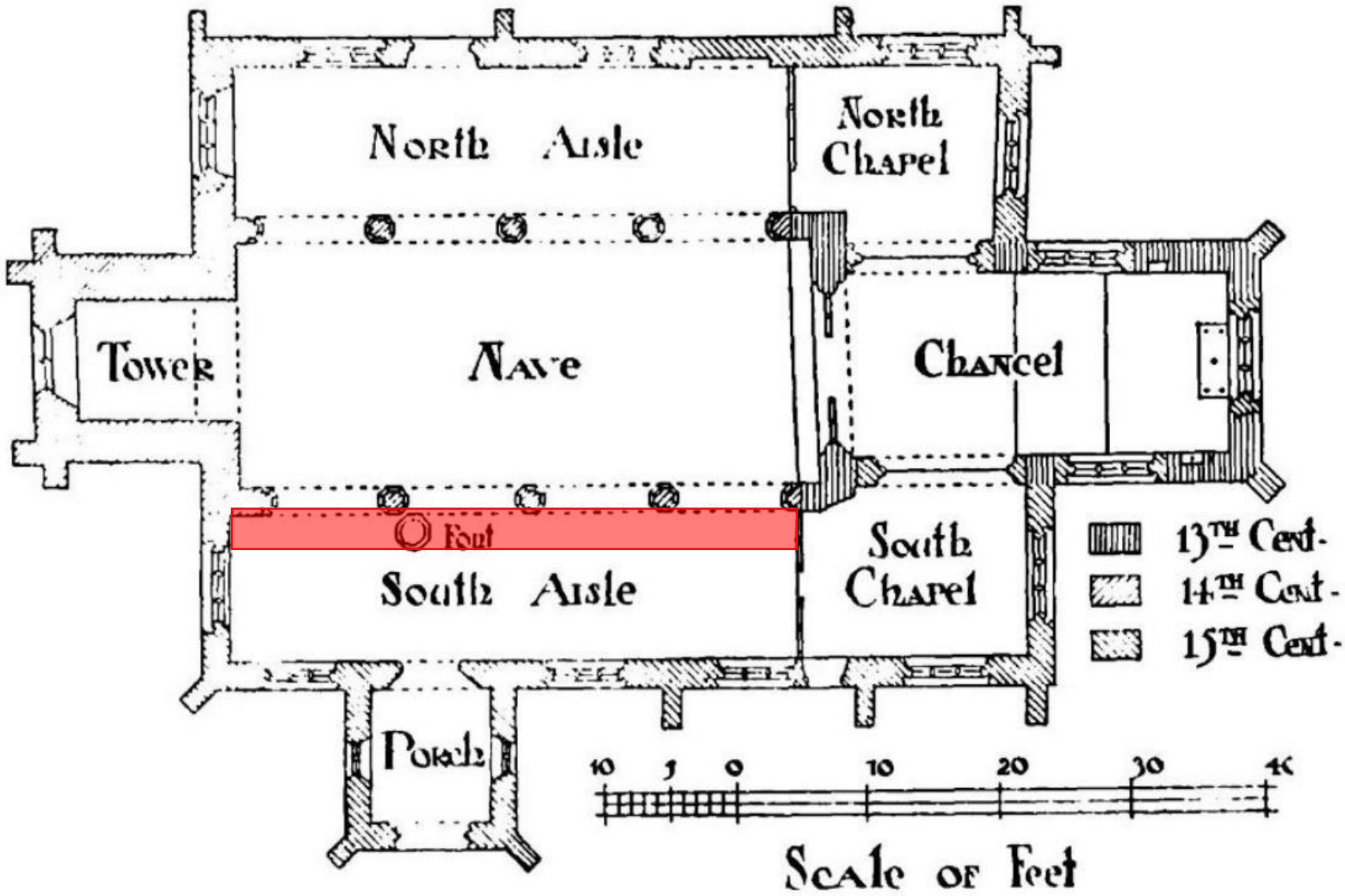
Sails are:

- to be made of a cloth material, coloured as available and chosen by church community
- to be fixed in place a system of lines (sheets), cleats (wall-fitted), blocks and/or pulleys that allow for the sails to be set in place or lowered by members of the church community
- designed in size to collect droppings that fall from main roost points but avoiding larger-scale appearance that might otherwise dominate visual character of the building
- design influence may be used to allow for religious symbolism or add colour and character where in keeping with the church and/or church community

The size of the sails will be determined by assessment of the known roost points and history (coverage) of droppings, although it is recognized that to reduce visual intrusion, the scale and proportions of the sails will need to be addressed. They must be of sufficient size to meet the 'need', i.e., control coverage of area covered by droppings.

Placement of fixtures and fittings will require working at height, including the need for scaffolding, which will need to be determined by design and contractors appointed to carry out the initial fittings works. After that, apart from maintenance, no working at height will be required.

Cleaning of sails by volunteers will be possible if placed at sufficiently low level to safely work from a ladder or a mobile scaffold platform. The annual costs for cleaning sails will need to be considered subject to manufacturer's recommendations.



Address

All Hallows, High St, Upper Dean, Huntingdon PE28 0LL

Facilities and Services

Car parking:

- All Hallows, High St, Upper Dean, Huntingdon PE28 0LL

Access:

- By arrangement with the PCC.

Water:

- No

Electricity:

- Yes

Toilets:

- No

Consultation

Historic England:
Natural England: Yes
Local bat group: Yes
Bat Conservation Trust: Yes
Victorian Society:
Society for Protection of Ancient Buildings:
Church Monuments Society:
Other:

Consents

Faculty:
Faculty List A: (12) The installation of bat boxes as part of a bat management programme
Faculty List B: other items?
Planning consent:
Listed building consent:
Building regulations:

European Protected Species license (type):

- Not required where the provision of sails will not block bat access points or damage roosts.
- Consider possible disturbance offence if working close to any bat roosts.

Other:

Key personnel

DAC:
PCC Chairperson:

Church Representative:	Stephen Holyroyd stephenholyroyd@btinternet.com Lindsay Langley lindsay.m.langley@gmail.com
Church Architect:	John Baker johnbakerltd@btconnect.com
Bats in Churches Engagement Officer:	Honor Gay Honor.gay@churchofengland.org
Ecologist:	Bernwood Ecology Emily Dickins emily@bernwood.net
Bedfordshire Bat Group	Bob Cornes rgcornes@gmail.com

Option Costs

Professional fees:

- Architect: N/A (subject to design competition)
  - Design and contract specifications
  - Contract management to completion
- Ecologist:
  - Survey. Assessment of location of bat droppings and placement of sails.
  - License Application through to license return. Not required.
  - Ecological Clerk of Works. N/A
  - Post-Intervention Monitoring. N/A
- Other (i.e., environmental monitoring, quantity survey, structural engineer): N/A

Contract Cost Forecast:

- Contractor's Work Programme:
  - Not required if intervention avoids impacts on bats including disturbance, damage or destruction of roosts.

Contractor's Health and Safety Plan

- Required prior to undertaking works.

Volunteer Opportunities

- Survey
  - Record bat dropping location and quantities prior to installation of sails. Use information to accurately locate position of sail fixtures and fittings.
- Monitoring
  - Desirable not essential for the installation of sails
- Maintenance
  - Annual clean. Where manageable by local community consider basic cleaning once a month during peak (summer) activity period
- Constraints
  - Manageability of sails by local community

Management and Maintenance

Inspection:

- Monthly to determine cleaning programme.
- Annual inspection of fixtures and fittings.

Cleaning

- Anticipated once a month if carried out by volunteers.
- Annual sail cleaning contract once a year at the end of the peak (summer) activity season is recommended.

Constraints

- Animal waste

Risk Register

Design principles:

- Proposals are in principle and subject to design brief that considers:
  - Appearance
  - Fixtures and fittings - permanent on into walls or separate on poles and supports
  - Sail material; durability, impact of faeces and urine on material, staining.
  - Colour and use of decorative finish

Programme

- No restrictions where direct impact on roosts or avoidance of disturbance near to roosts can be controlled.

Survey coverage and age of data

- Four surveys complying with current guidelines carried out in 2021

Consents

- Identify if Faculty consent is required or covered under list A/B exemption

Uptake of intervention

- Sails will be located based on current knowledge of the location of main roost points, however roost location will vary over time. Small scale sails are unlikely to be sufficient in size to control droppings if large bat roosts are present or develop.
- Small scale sails will not control the random distribution of bat droppings or urine staining from bats flying around inside the church.

Late discoveries

- Bats: Not likely to be a significant risk as bat roosts and bat access points are not likely to be impacted by proposals.
- Architectural issues: Unlikely as sails will be place on open walls or corners. Architect to review. Fixtures and fittings applied to wall may require appropriate Faculty consent.

Working methods

- Architectural specifications only subject to no roosts being damaged/destroyed or bat access points being impeded.

Material costs / supply

- The design and use of sails remain untested. A full design scheme will be required prior adaption of this approach.
- Current availability of building materials has been a recent issue following Brexit/ COVID-19 pandemic. Material costs have risen significantly and may continue to do so in the foreseeable future.

Assessments of Impacts

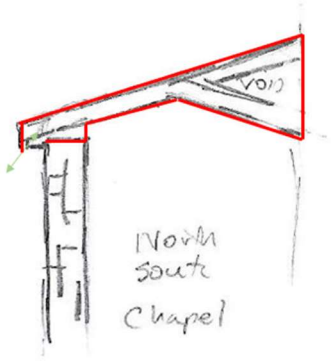
Receptor	Bat Populations			Heritage Assets	Architectural	Social	Visual
Intervention Scale	Soprano & common pipistrelle	Brown long-eared bat	Natterer's bat				
Low Impact Intervention							
Moderate Impact Intervention	0	0	0	0	0	2	-1
High Impact Intervention							

Appendix 16. Intervention Option7: Artificial bat boxes in the north and south chapel roofs.

Description

Bats are utilising gaps in ceilings of both the north and south chapels via an overstorey rainspout. It is proposed that, subject to architectural issues with masonry and timber beams, two new discreet sealed bat boxes be created above both chapels at the east end of the aisles. The bat boxes will require the creation of new external bat access points. The creation of new access points will need to be combined with at least a one-year habituation period to allow the bats to continue to use current roost points while discovering of new bat access points. This remains a high-risk strategy as it requires a degree of discovery and learning by bats prior to decommissioning old access points.

The sealed bat box could be used in combination with acoustic deterrents to encourage a change in behaviour and reduce the internal impacts of large numbers of flying bats.



Purpose

To create two new discreet sealed bat boxes above both chapels at the east end of the aisles. provide alternative external bat access points to previously identified roost areas inside the church.

Nature of work

To create a sealed lead bat box with wooden framework and boarding blended to match existing woodwork within church. Works will need to take place from inside and outside the church working at height from scaffold platform. Material to be used include untreated oak or 5mm ply to create sealed unit. Masonry and/or plaster work will be required to create new external bat access points.

This option will need to be used in conjunction with enhancements to the open tower area for the benefit of brown long-eared bats (Option 8).

Address

All Hallows, High St, Upper Dean, Huntingdon PE28 0LL

Facilities and Services

Car parking:

- All Hallows, High St, Upper Dean, Huntingdon PE28 0LL

Access:

- By arrangement with the PCC.

Water:

- No

Electricity:

- Yes

Toilets:

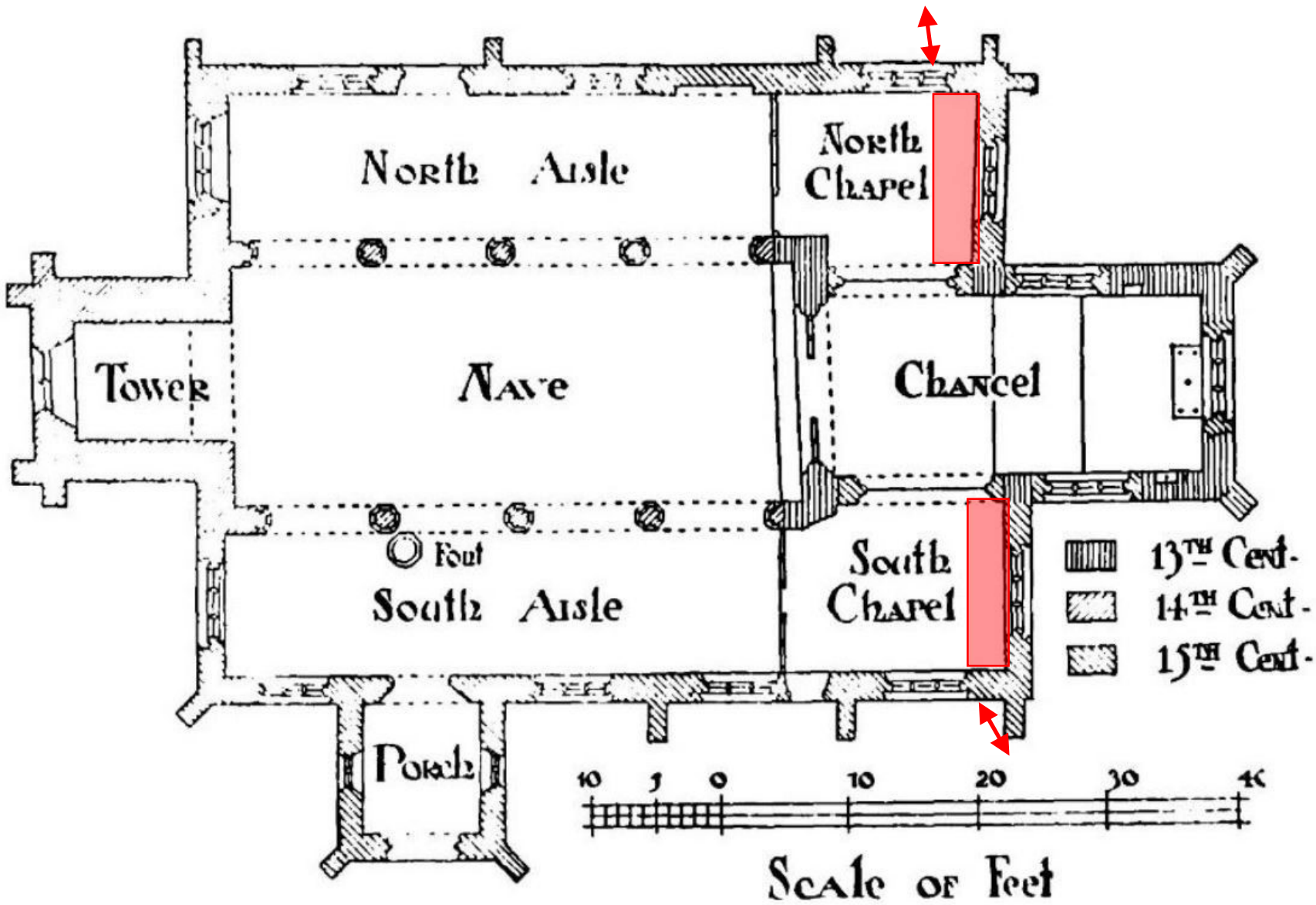
- No

Consultation

Faculty:
Faculty List A: (12) The installation of bat boxes as part of a bat management programme
Faculty List B: other items?
Planning consent:
Listed building consent:
Building regulations:
European Protected Species license (type):

- Required as the works will result in direct impacts on bat roosts and as part of an overall intervention strategy.

Other:



Consents

Historic England:	
Natural England:	Yes
Local bat group:	Yes
Bat Conservation Trust:	Yes
Victorian Society:	
Society for Protection of Ancient Buildings:	
Church Monuments Society:	
Other:	

Key personnel

DAC:	
PCC Chairperson:	
Church Representative:	Stephen Holyroyd stephenholyroyd@btinternet.com Lindsay Langley lindsay.m.langley@gmail.com
Church Architect:	John Baker johnbakerltd@btconnect.com
Bats in Churches Engagement Officer:	Honor Gay Honor.gay@churchofengland.org
Ecologist:	Bernwood Ecology Emily Dickins emily@bernwood.net
Bedfordshire Bat Group	Bob Cornes rgcornes@gmail.com

Option Costs

Professional fees:

- Architect:
  - Design and contract specifications
  - Contract management to completion
- Ecologist:
  - Survey: Additional surveys specifically to address how brown long-eared bats are accessing the structure
  - Allows re-evaluation of Natterer's bats (very low numbers in 2021), as historical reference indicates a larger presence in the past.
  - Bat surveys will need to be maintained up-to-date and cover the preceding year's peak activity period for a European Protected Species license.
  - License Application through to license return. Registration under the Bats in Churches Class license, following granting of all necessary consents including Faculty.
  - Ecological Clerk of Works will be required to ensure compliance with license including pre-start briefing/toolbox talk, creation of bat box and bat access point.
  - Post-Intervention Monitoring will be required and comply with current guidance. This is likely to be 2-years' post-intervention monitoring carried out after the peak maternity period but prior to the break-up of colonies. Monitoring surveys will ideally be carried out in the first and third year after completion of works.
- Other (i.e., environmental monitoring, quantity survey, structural engineer): N/A

Contract Cost Forecast:

- Contractor's Work Programme:
  - Works will need to be carried out in either the spring or autumn period to avoid the peak maternity and hibernation periods.
  - This option will need to be used in conjunction with other interventions as part of a wider intervention strategy.

Contractor's Health and Safety Plan

- Required prior to undertaking works.

Volunteer Opportunities

- Survey
  - Current surveys (2021) complying have been carried out.
- Monitoring
  - Encourage volunteers to undertake long-term monitoring following the licensed post-intervention monitoring period
- Maintenance
  - N/A
- Constraints
  - Height prevents long-term inspection or maintenance

Management and Maintenance

Inspection:

- Review effectiveness as part of Quinquennial Review.

Cleaning

- N/A

Constraints

- Height prevents long-term inspection or maintenance

Risk Register

Design principles:

- Proposals are in principle and subject to design brief that considers:
  - Practicality of implementation
  - Maintenance

Programme:

- Works will need to be carried out in either the spring or autumn period to avoid the peak maternity and hibernation periods.

Survey coverage and age of data

- Understanding brown long-eared bat
- Understanding Natterer's bat and other species
- Four surveys complying with current guidelines carried out in 2021.

Consents

- Identify if Faculty consent is required or covered under list A/B exemption

Uptake of intervention

- Subject to period of habituation to allow bats to discover new bat access points.

Late discoveries

- Bats: Presence of additional species using bat access.
- Architectural issues: Practicality of implementation. Site may not be suitable due to structural complexity. Condition of timbers and masonry once works start. May require additional works and incur further costs.

Working methods

- Subject to architectural specifications

Material costs / supply

- The idea remains untested and requires at height inspection to check for viability.
- Current availability of building materials has been a recent issue following Brexit/ COVID-19 pandemic. Material costs have risen significantly and may continue to do so in the foreseeable future.

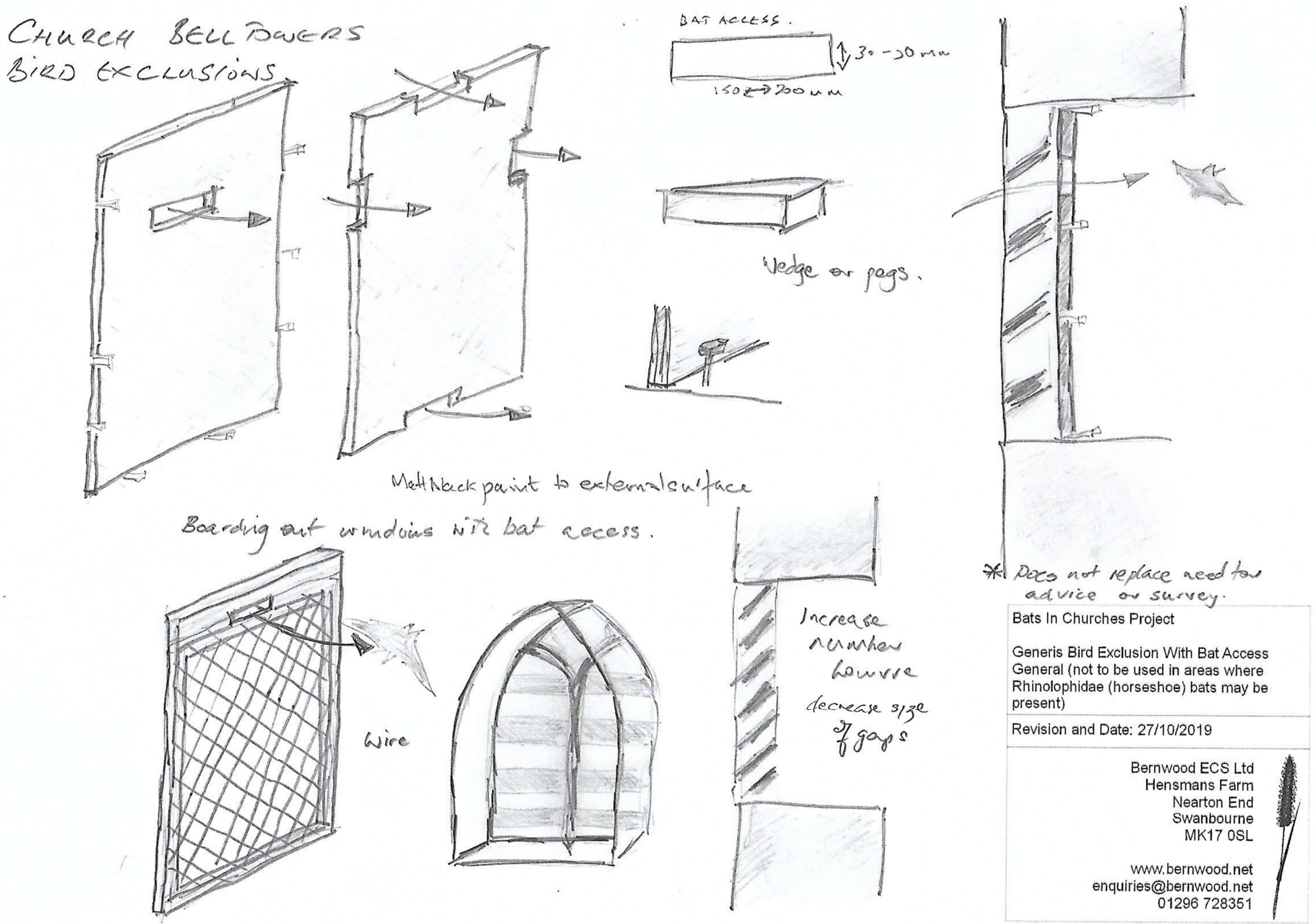
<u>Assessments of Impacts</u>

Receptor	Bat Populations			Heritage Assets	Architectural	Social	Visual
Intervention Scale	Soprano & common pipistrelle	Brown long-eared bat	Natterer's bat				
Low Impact Intervention							
Moderate Impact Intervention							
High Impact Intervention	1	0	1	-1	-1	2	0

Appendix 17. Intervention Option 8: Enhance clocktower for bats.

Description

Carry out enhancements to clocktower to provide improved roost opportunities.



Purpose

To provide alternative enhanced roost opportunities for bats as part of an overall intervention strategy that may include Options 4, 5, 6, 7 and/or 9.

Nature of work

Scope of works could include:

- creating a false suspended ceiling with void for bats between the existing first floor ceiling
- where bells are no longer rung, close clocktower windows with baffle boards, incorporating small bat access points to create dark void space with stabilized temperatures (reduced draft from prevailing winds)

Materials to be used will need to match existing and avoiding detracting from this strong architectural and visual feature of the church. This option may be undertaken in isolation to other options or be used as part of a mitigation package where more complex and high-risk interventions are proposed.

Address

All Hallows, High St, Upper Dean, Huntingdon PE28 0LL

Facilities and Services

Car parking:

- All Hallows, High St, Upper Dean, Huntingdon PE28 0LL

Access:

- By arrangement with the PCC.

Water:

- No

Electricity:

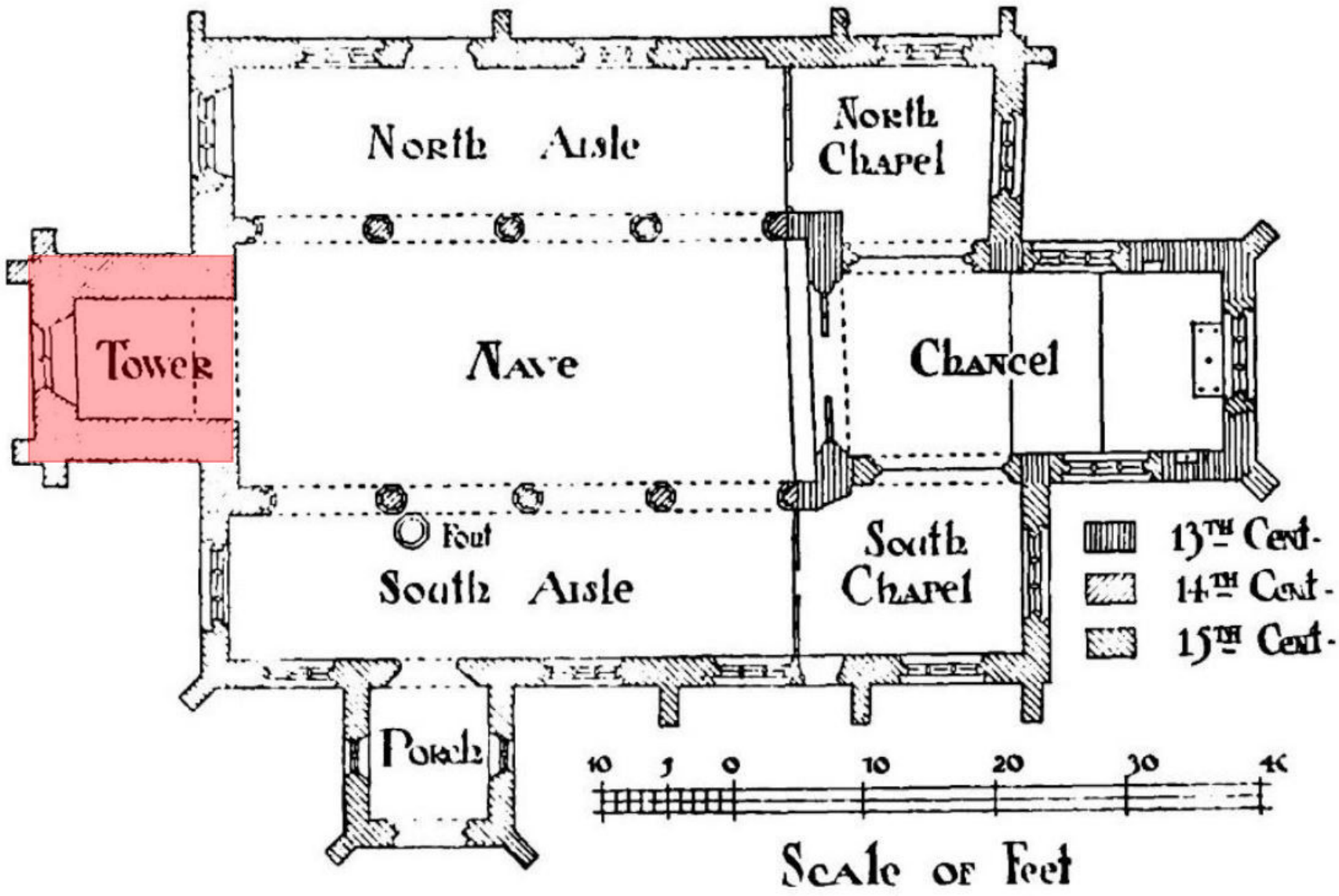
- Yes

Toilets:

- No

Consultation

Historic England:
Natural England: No
Local bat group: Yes
Bat Conservation Trust: No
Victorian Society:
Society for Protection of Ancient Buildings:
Church Monuments Society:
Other:



Consents

Faculty:
Faculty List A: (12) The installation of bat boxes as part of a bat management programme
Faculty List B: other items?
Planning consent:
Listed building consent:
Building regulations:
European Protected Species license (type):

- Ground floor ceiling: Bats in Churches Class or standard European Protected Species licence required
- Clocktower: May be required if clocktower is being used by bats. Further survey may be needed.

Other:

Key personnel

DAC:
PCC Chairperson:

Church Representative: Stephen Holyroyd
stephenholyroyd@btinternet.com
Lindsay Langley
lindsay.m.langley@gmail.com

Church Architect:	John Baker johnbakerltd@btconnect.com
Bats in Churches Engagement Officer:	Honor Gay Honor.gay@churchofengland.org
Ecologist:	Bernwood Ecology Emily Dickins emily@bernwood.net
Bedfordshire Bat Group	Bob Cornes rgcornes@gmail.com

Option Costs

Professional fees:

- Architect:
  - Design and contract specifications
  - Contract management to completion
- Ecologist:
  - Survey: Assessment of clocktower use by bats.
  - License Application through to license return. Not anticipated
  - Ecological Clerk of Works. Yes
  - Post-Intervention Monitoring. Desirable if enhancement only. Will be required if carried out as part of bigger mitigation scheme.
- Other (i.e., environmental monitoring, quantity survey, structural engineer): N/A

Contract Cost Forecast:

- Contractor's Work Programme:
  - Not required if intervention avoids impacts on bats including disturbance, damage or destruction of roosts.

Contractor's Health and Safety Plan

- Required prior to undertaking works.

Volunteer Opportunities

- Survey
  - N/A
- Monitoring
  - Desirable
- Maintenance
  - Annual clean. Where manageable by local community consider basic cleaning once a month during peak (summer) activity period
- Constraints
  - Access.

Management and Maintenance

Inspection:

- Annual inspection of fixtures and fittings

Cleaning

- Annual inspection, clean as required.

Constraints

- Access

Risk Register

Design principles:

- Proposals are in principle and subject to design brief that considers:
  - Appearance
  - Fixtures and fittings
  - External appearance (colour) blackened to reduce appearance from external views

Survey coverage and age of data

- Four surveys complying with current guidelines carried out in 2021

Consents

- Identify if Faculty consent is required or covered under list A/B exemption

Uptake of intervention

- Intervention remains untested and although initial results indicate use of church towers at least one church.

Late discoveries

- Bats: Not likely to be a significant risk as bat roosts and bat access points are not likely to be impacted by proposals.
- Architectural issues: Potential depending on condition of masonry and woodwork. Architect to review. Fixtures and fittings applied to wall may require appropriate Faculty consent.

Working methods

- Architectural specifications only subject to no roosts being damaged/destroyed or bat access points being impeded.

Material costs / supply

- The idea remains untested and requires at height inspection to check for viability.
- Current availability of building materials has been a recent issue following Brexit/ COVID-19 pandemic. Material costs have risen significantly and may continue to do so in the foreseeable future.

Assessments of Impacts

Receptor	Bat Populations			Heritage Assets	Architectural	Social	Visual
Intervention Scale	Soprano & common pipistrelle	Brown long-eared bat	Natterer's bat				
Low Impact Intervention							
Moderate Impact Intervention	1	1	1	-1	-1	1	0
High Impact Intervention							

Appendix 18. Intervention Option 9: Create bat box below clockface.

Description

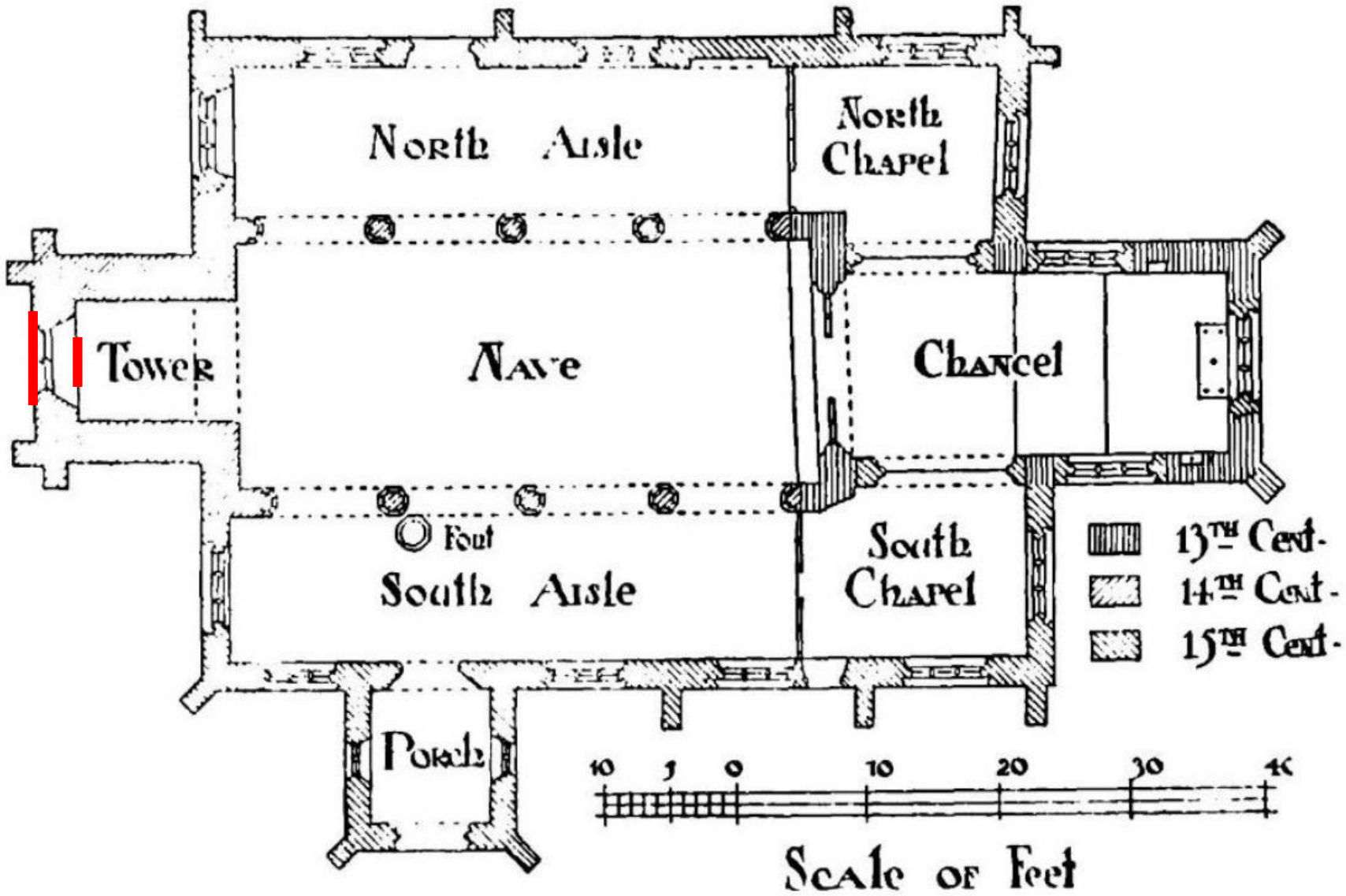
A small number of pipistrelle species were seen to fly behind the clockface on the tower. There may be potential to create a bespoke artificial bat box hidden behind the clockface. In addition, the internal clocktower wall where the clock mechanism is seated has a small void where a small quantity of droppings was noted. A small bat box feature could be created. This will may provide a seal against further bat access into the church if Options 4, 5, 6, 7 and 8 are considered.

Purpose

To provide a localised alternative artificial roost point for pipistrelle bats.

Nature of work

Subject to significance of clockface and suitability of carrying out the work an enclosed wooden (untreated oak) bat box replicating suitable crevice space for bats to roost. The bat box should be separate to the clockface to allow for future maintenance of either the box or clockface/mechanism.



Address

All Hallows, High St, Upper Dean, Huntingdon PE28 0LL

Facilities and Services

Car parking:

- All Hallows, High St, Upper Dean, Huntingdon PE28 0LL

Access:

- By arrangement with the PCC.

Water:

- No

Electricity:

- Yes

Toilets:

- No

Consents

Faculty:
Faculty List A: (12) The installation of bat boxes as part of a bat management programme
Faculty List B: other items?
Planning consent:
Listed building consent:
Building regulations:
European Protected Species license (type):

- Assume a European Protected Species license will be required.

Other:

Key personnel

DAC:
PCC Chairperson:

Church Representative:	Stephen Holyroyd stephenholyroyd@btinternet.com Lindsay Langley lindsay.m.langley@gmail.com
Church Architect:	John Baker johnbakerltd@btconnect.com
Bats in Churches Engagement Officer:	Honor Gay Honor.gay@churchofengland.org
Ecologist:	Bernwood Ecology Emily Dickins emily@bernwood.net
Bedfordshire Bat Group	Bob Cornes rgcornes@gmail.com

Option Costs

Professional fees:

- Architect:
  - Design and contract specifications
  - Contract management to completion
- Ecologist:
  - Survey.
  - License Application through to license return. Yes
  - Ecological Clerk of Works. Yes
  - Post-Intervention Monitoring. N/A
- Other (i.e., environmental monitoring, quantity survey, structural engineer): N/A

Contract Cost Forecast:

- Contractor's Work Programme:
  - Works will need to be carried out in either the spring or autumn period to avoid the peak maternity and hibernation periods.

Contractor's Health and Safety Plan

- Required prior to undertaking works.

Volunteer Opportunities

- Survey
  - N/A
- Monitoring
  - Desirable not essential
- Maintenance
  - Annual clean. Where manageable by local community consider basic cleaning once a month during peak (summer) activity period

- Constraints
  - Historical importance of clockface
  - Clock mechanism

Management and Maintenance

Inspection

- Annual inspection of fixtures and fittings

Cleaning

- Annual.

Constraints

- Working at height.

Risk Register

Design principles:

- Proposals are in principle and subject to design brief that considers:
  - Appearance
  - Fixtures and fittings

Programme

- Avoid hibernation period. Works timed for either spring or autumn.

Survey coverage and age of data

- Four surveys complying with current guidelines carried out in 2021.

Consents

- Identify if Faculty consent is required or covered under list A/B exemption

Uptake of intervention

- Not known.

Late discoveries

- Architectural issues: Clock mechanism and clockface

Working methods

- N/A

Material costs / supply

- The idea remains untested and requires at height inspection to check for viability.
- Current availability of building materials has been a recent issue following Brexit/ COVID-19 pandemic. Material costs have risen significantly and may continue to do so in the foreseeable future.

Assessments of Impacts

Receptor	Bat Populations			Heritage Assets	Architectural	Social	Visual
Intervention Scale	Soprano & common pipistrelle	Brown long-eared bat	Natterer's bat				
Low Impact Intervention							
Moderate Impact Intervention	1	0	0	0	0	1	0
High Impact Intervention							