

# Bat Management Plan



St Nicholas' Church, Arundel

On behalf of The Bats in Churches Project

October 2021

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# 1 Executive Summary

<b>Report purpose</b>	This report is intended for use by the Parochial Church Council (PCC) to understand the status of bats within St Nicholas' Church, Arundel, and how they can work with the Bats in Churches Project to minimise the impacts of bats on the heritage features within the Church and congregation who make use of it.
<b>Date and methods of survey</b>	Surveys of the site were conducted throughout April-August 2021 including: <ul style="list-style-type: none"> <li>• A daytime building assessment for bats; and</li> <li>• Three emergence and one re-entry surveys for bats.</li> </ul>
<b>Key findings</b>	<p>The Church, situated in Arundel currently supports roosting bats at external locations including:</p> <ul style="list-style-type: none"> <li>- One roost on the northern aspect used by an individual common pipistrelle and Nathusius' pipistrelle. It is possible that the bats roosting at this location gain internal access to the building.</li> <li>- 5+ pipistrelle bats within the northern hopper. There is no evidence that the bats roosting at this location gain internal access to the building.</li> <li>- One serotine possibly emerged from southern aspect of the Church or eastern wing of building (Fitzalan Chapel). It is possible that the individual gains access to the inside of the Church via the Fitzalan Chapel.</li> </ul>
<b>Statement of Significance</b>	Internal areas of the Church have historically been subject to higher levels of bat activity which have caused damage to historical artefacts (notably the north wall medieval wall paintings) and caused issues for the large and active congregation and visitors.
<b>Mitigation Strategy</b>	<p>There are six identified solutions (A-F in Section 5) which could be implemented to reduce the incidence of bat activity within the church and/or reduce impacts of bats on the congregation. Solutions A and B are key because they would ensure the likely primary access point is removed whilst maintaining and enhancing external opportunities for the crevice-dwelling bats recorded. Solution F could be implemented immediately to improve efficiency for the congregation.</p> <p>Timing and duration of works: The works to exclude bats from the Church should be conducted between April and October inclusive (avoiding November-March inclusive). Solution F could be conducted at any time.</p> <p>Long-term management: The proposed solutions have been designed to ensure minimal future monitoring or management.</p> <p>Cost: The anticipated costs are outlined in Section 5.6.</p> <p>Means of finance: The Church typically secures funding via personal donations, work of a Friends group, Sussex Historic Churches Trust and the National Lottery Heritage Fund.</p> <p>Faculty consent: Faculty consent is likely to be required for solution A, however, the remainder of solutions can be progressed without requiring specific permission.</p>

## 2 Introduction

### 2.1 Background

2.1.1 A Bat Roost Visit Report was prepared in August 2017 to inform the Bats in Churches project. During the survey, droppings of three species were present within the Church: common pipistrelle (confirmed to be a maternity roost present in 2014), brown long-eared (intermittent day roost confirmed in 2014) and serotine (intermittent day roost confirmed in 2014). The droppings were distributed throughout the sanctuary, tower, nave, side aisle and north aisle.

2.1.2 The Church and adjoining Chapel were built in 1380 on the site of a much smaller Norman Church and Priory. St Nicholas' is the largest Parish Church in West Sussex and includes medieval wall paintings. There is a vibrant, active community fully engaged with the project and actively maintaining the church fabric and engaging visitors and local people.

### 2.2 Site Description

2.2.1 St. Nicholas Parish Church is a Grade I listed building approximately 35m in length and 20m wide. It is located north of London Road in Arundel, BN18 9AT at OS national grid reference TQ 01641 07255. The Church adjoins Fitzalan Chapel to the east. Arundel Park (within the grounds of Arundel Castle) is immediately north of the graveyard and the town of Arundel surrounds the Church to the east and south. Ornamental gardens of The Collector Earl's Garden are immediately west. The grounds of Arundel Park are largely wooded with areas of grassland and a large lake.

2.2.2 In the wider landscape the Wildfowl and Wetland Trust Arundel site is 0.6km north-east and the River Arun is 0.35km south.

2.2.3 The local landscape is optimal for roosting and foraging bats.

### 2.3 Forthcoming Works

2.3.1 The short-term project work proposed at the Church is outlined below.

2.3.2 In 2022 a new side aisle roof will be installed to mirror the previous north aisle work. A temporary protective roof will be installed prior to the work, stretching over the entirety of the south side of the church including the south transept roof up to the Fitzalan Chapel. Cement will be removed from the walls and replaced with a lime mortar whilst the roof covers are in place to help deal with rainwater that is currently getting trapped behind the cement, causing damp and damaging the internal plaster.

- 2.3.3 The wall painting conservator will finish the work on the north aisle wall paintings which are marked with bat droppings and urine splashes.
- 2.3.4 There is a giant redwood tree immediately south-west of the church which drops needles onto the Church roof. The roof, gutters and hoppers require continued maintenance to remove the needles. In 2022 (hopefully) modification of the down pipes can be included in the south aisle roof replacement work (bid pending to the Lottery Heritage Fund). As soon as additional funds can be drawn together, identical work will be carried out on the north aisle, on both transept roofs and the four faces of the tower. The down pipes need to be modified to install new pipe sections which include rodding eye points to improve the process and reduce the risk of water ingress into the Church.
- 2.3.5 The Church aims to share information concerning the heritage and ecology of the church and grounds with the congregation and visitors. The bats will be a particular focus.
- 2.3.6 The West Window will require repair, likely commencing from 2023.

## 2.4 Aims of Report

- 2.4.1 This report is intended for use by the Parochial Church Council (PCC) to understand the status of bats within St Nicholas' Church, Arundel, and how they can work with the Bats in Churches Project to minimise the impacts of bats on the heritage features within the Church and congregation who make use of it.

## 2.5 Personnel

- 2.5.1 The report was prepared by Associate Ecologist Laura Grant BSc (Hons) MCIEEM who has been an ecological consultant for 14 years and has held a personal licence for bats since 2012. Laura routinely conducts surveys and assessments for large heritage buildings and designs mitigation measures to ensure the favourable conservation status of bats is maintained within a given site.
- 2.5.2 Input and review of the report was provided by Bats in Churches licence holder Dr Merryl Gelling CEcol MCIEEM of Spires Ecology who has over 15 years' experience working with Natural England's European Protected Species Licences for bats.
- 2.5.3 The report was reviewed by Director Ben Gardener BSc (Hons) MCIEEM CEnv, a consultant ecologist with 16 years' experience.

### 3 Methods

#### 3.1 Preliminary roost assessment

- 3.1.1 An external and internal Preliminary Roost Assessment was conducted of the Church on 14 April 2021. The assessment was based on the guidance in Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016) and government guidance (Gov.uk., 2015).
- 3.1.2 The survey was conducted by Bats in Churches licence holder Merryl Gelling (Natural England Level 2 Licence 2015-10232-CLS-CLS) and Associate Ecologist Laura Grant (Natural England Level 2 Licence 2015-10871-CLS-CLS). Conditions during the survey were warm and dry and preceding weather was suitable for bats.
- 3.1.3 The surveyors used a high-power torch (LEDLenser Lamp), 10x42mm close focusing binoculars, an endoscope and 3.8m telescopic ladder to inspect features of interest. All external areas of the buildings were inspected as well as internal areas. Evidence searched for included the presence of free hanging bats and bats within gaps and crevices, bat droppings, urine stains, rub marks, scratch marks and feeding remains. Where bat droppings were found a sample was collected to enable DNA analysis to identify the species at a future date, if required.

#### 3.2 Emergence and re-entry surveys

- 3.2.1 Dusk emergence and pre-dawn re-entry surveys were conducted of buildings which had suitability for roosting bats to confirm presence or likely absence of roosting bats, and where present, enable characterisation of the roost(s). The surveys undertaken within the site are detailed in Table 3.1.

**Table 3.1:** Details of bat roost surveys completed in 2021

Date	Type	Surveyors
09 June 2021	Dusk	Laura Grant <sup>1</sup> , Merryl Gelling <sup>2</sup> , Stacey Waring <sup>3</sup> , Tony Wells, Olyvia Hall, Greg Holland
07 June 2021	Pre-dawn	Laura Grant <sup>1</sup> , Merryl Gelling <sup>2</sup> , Stacey Waring <sup>3</sup> , Tony Wells, Olyvia Hall, Greg Holland, Raven Herald
06 July 2021	Dusk	Merryl Gelling <sup>2</sup> , Tristan Carlyle <sup>4</sup> , Amanda Lloyd <sup>5</sup> , Alys Cervetto, Tony Wells, Raven Herald
11 August 2021	Dusk	Laura Grant <sup>1</sup> , Olyvia Hall, Stacey Waring <sup>3</sup> , Tony Wells, Raven Herald and an infrared camera

<sup>1</sup> = Natural England (NE) personal licence Level 2 no. 2015-10871-CLS-CLS

<sup>2</sup> = NE personal licence Levels 3 & 4 no. 2015-13150-CLS-CLS; 2015-13151-CLS-CLS

<sup>3</sup> = NE personal licence Level 2 no. 2015-6768-CLS-CLS

<sup>4</sup> = NE personal licence Level 1 no. 2020-46305-CLS-CLS

<sup>5</sup> = NE personal licence Level 2 no. 2016-23252-CLS-CLS

### 3.3 Site/ Species Valuation for Roosting Bats

3.3.1 Based upon the framework for valuing bats in Ecological Impact Assessment designed by Wray *et al.* (2010), the site's roosts are categorised and valued from District Level to International. These different bat roosts can be assigned to a geographic frame of reference as detailed in Appendix 2. The valuation of roosts reflects the importance of bats.

### 3.4 Limitations/Constraints

3.4.1 There were no constraints to the surveys or assessments, however, it should be recognised that bat activity fluctuates at a given site throughout the year as bats change their roost locations to select optimal conditions including temperature, humidity and feature size or to avoid accumulations of parasites. Bat activity also varies between years as the weather influences mortality of bats over winter (with wet autumns, mild winters or cold or wet springs being likely to result in increased mortality).

3.4.2 The winter of 2020 to 2021 was particularly mild and there was a prolonged cold and wet spell in spring 2021. This may have caused mortality over winter and/or pregnant mothers to abort embryos and therefore not establish maternity colonies. Across the board, ecological consultants have reported many long-established significant roosts have not been present throughout the maternity season in 2021. Anecdotally, Ecology by Design has also noted many roosts comprising individual (non-breeding bats) but generally far lower bat activity than one we would typically expect at suitable sites in 2021.

3.4.3 Bat activity at the Arundel church was far lower than anticipated given the site's location. Furthermore, the congregation have reported far fewer droppings within the Church in 2021 than in previous years. It is therefore considered likely that the findings of the 2021 surveys are not representative of the historical use of the Church which was previously higher. As a result, it is possible that in future years a greater number of roosting bats may re-occupy historical roosts within the Church.



## 4 Overview of Results

4.1.1 Full results of the surveys conducted by Ecology by Design in 2021 are detailed in Appendix 1.

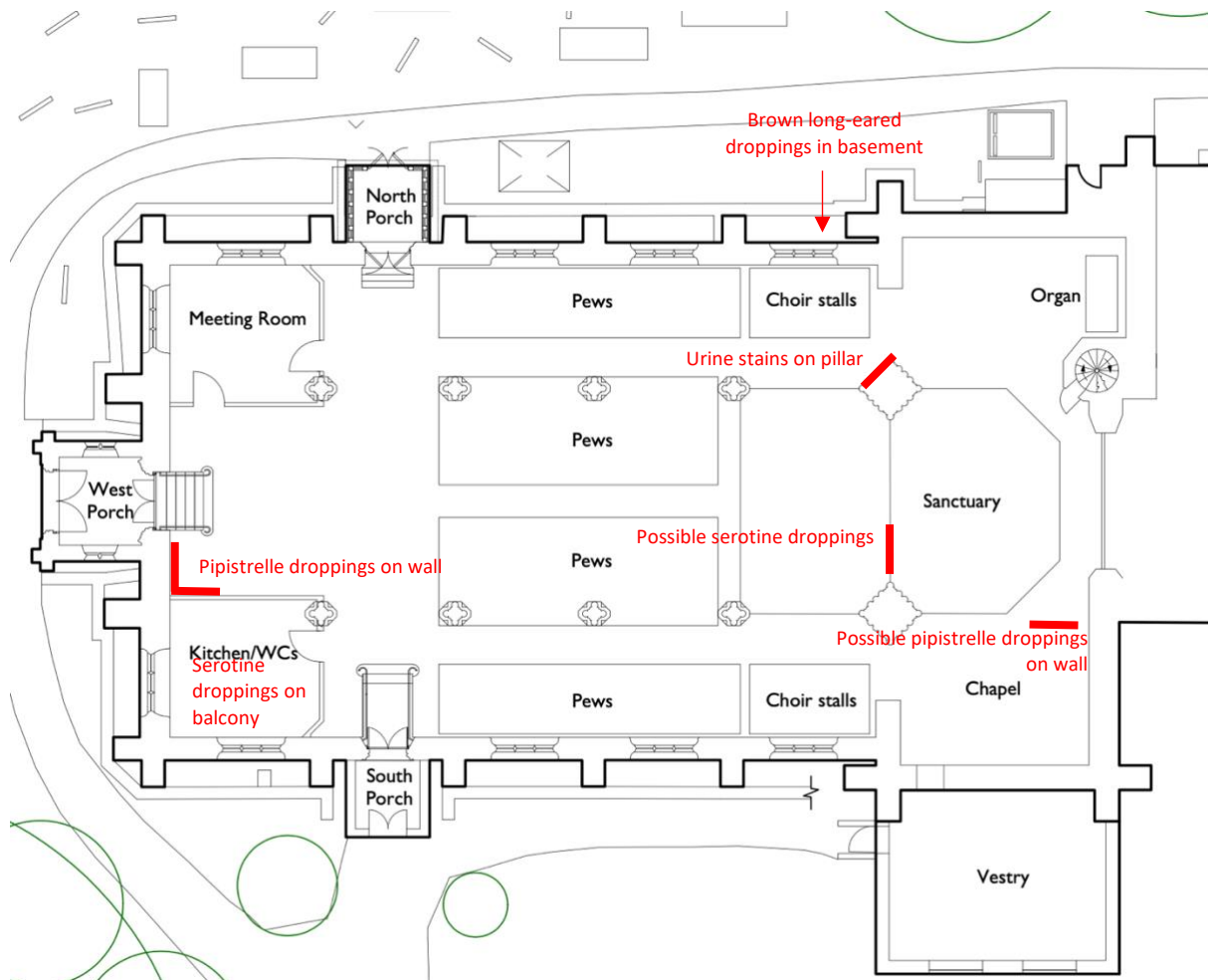
### 4.2 Preliminary roost assessment

4.2.1 The Church is regularly cleaned. Evidence of bats was infrequently found during survey visits. There were limited areas with droppings or urine on the walls, as detailed below.

- 30 x Brown long-eared bat droppings were recorded within the boiler room (confirmed by DNA analysis). Access likely via grilles at ground level on the northern aspect.
- Serotine droppings were present internally (confirmed by DNA analysis).
- Likely pipistrelle droppings (not analysed) were found at height on the internal walls.

4.2.2 Old urine staining was present on the bells within the belfry. A single dropping with characteristics of pipistrelle bats was found within the tower.

**Figure 1: Evidence of bats internally**



### 4.3 Emergence and re-entry surveys

4.3.1 No bat roosts were recorded within the inside of the Church during the emergence and re-entry surveys, however, common pipistrelle and serotine were infrequently recorded foraging within the Church.

4.3.2 Externally, roosts have been recorded at three locations as follows:

- One roost on the northern aspect used by an individual common pipistrelle and Nathusius' pipistrelle. It is possible that the bats roosting at this location gain internal access to the building.
- 5+ pipistrelle bats within the northern hopper. There is no evidence that the bats roosting at this location gain internal access to the building.
- One serotine possibly emerged from southern aspect of the Church or eastern wing of building (Fitzalan Chapel). It is possible that the individual gains access to the inside of the Church via the Fitzalan Chapel.

**Figure 2:** *Confirmed roost locations*



### 4.4 Statement of Significance

4.4.1 St Nicholas' Church is a fine example of the Gothic Perpendicular style of architecture. This style flourished in the late 14th century and is unique to England. Historic England awarded the Church and adjoining Fitzalan Chapel Grade 1 status.

4.4.2 Outstanding architecture and craftsmanship has made St Nicholas’ Church a visually rich experience for visitors from 1380 onwards. It sits on an ancient pilgrimage route and there is a considerable amount of medieval graffiti in the church reflecting the prayers of travellers moving in both directions along the south coast. More than 20,000 people a year sign the visitor book.

4.4.3 The large and prestigious building of church and collegiate chapel would have required the permission of Edward III to draw in the necessary stone masons, carpenters and iron workers. It has many similarities to other important 14th Century buildings constructed under the guidance of Henry Yevele and William Wynford, the leading master masons of the time.

4.4.4 Constructed on a grand scale, the church pillars are made from stone quarried at Beer in Devon. A mix of new Pulborough stone alongside flint and ornamental carvings taken from the earlier church complete the structure. St Nicholas’ is one of the two largest medieval churches in Sussex, the other being at Rye. There are three medieval wall paintings visible on the north aisle wall (see ‘evil man’ to right) and protection of these was a high priority in the restoration work of 2019/2020.



4.4.5 The artefacts within the Church have been subject to damage by urine staining and bat droppings, notably the wall paintings on the north aisle which are in the process of being restored. The stonework of the pillars and to a lesser extent the floors are also subject to staining.

4.4.6 In accordance with the criteria in Appendix 2 the roosts present within the Church in 2021 are categorised as detailed in Table 4.1.

**Table 4.1:** *Status of bat roosts within*

Species	Geographic distribution	Roost Types	
Common pipistrelle	Common and widespread	Day / transitional / occasional / possibly a small maternity roost	Parish / County
Brown long-eared	Common and widespread	Day / transitional / occasional / hibernation	County
Serotine	Frequent	Day / transitional / occasional	Parish

## 5 Mitigation Strategy

### 5.1 Identified Solutions

5.1.1 The proposed solutions have been designed to minimise impacts on the historical appearance and internal aesthetics of the Church. The needs of the building have been considered to ensure breathability, ventilation, use of traditional materials, minimising visibility of the intervention, using appropriate materials and considering reversibility of the solution. Solutions A-F are consistently referred to within the remainder of the mitigation strategy.

#### A) Fascias

5.1.2 The fascias on the southern aspect will be removed in sections with the intention of creating enclosed features for roosting bats between the rafters. In order to maintain ventilation, a stainless-steel mesh with a small gauge such as a 6.35mm Aperture<sup>1</sup> or a greenhouse mesh (a solid fine mesh plastic which is available from garden centres) will be used at the rear of the feature to prevent bats gaining access to internal areas of the Church.

5.1.3 Should modification of the south fascias be successful, those on the northern aspect will be modified in the same way when funds allow. Modification of the northern fascias is most critical given they are the most likely internal access point for bats into the church.

#### B) Bat Boxes

5.1.4 Should removal of the southern fascias reveal there are not opportunities to create enclosed features for bats, the mesh will be installed to prevent internal access and three bat boxes will be affixed to the walls below the fascias.

5.1.5 Installation of the bat boxes in isolation is unlikely to provide an effective solution to internal use of the Church by bats. On the contrary, it might provide increased opportunities for roosting and those bats may then make greater use of internal areas of the Church.

5.1.6 The bat boxes will entail:

- 2 x 1FQ Schwegler bat roost<sup>2</sup> (or similar woodcrete / woodstone box)

<sup>1</sup> [https://www.amazon.co.uk/RatMesh-Rodent-Proofing-Metal-Mesh/dp/B07KXXS87T/ref=asc\\_df\\_B07KXYG2BT/?tag=&linkCode=df0&hvadid=394361800700&hvpos=&hvnetw=g&hvrnd=8939617957047702707&hvpone=&hvptwo=&hvgmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=1006457&hvtargid=pla-838644779478&ref=&adgrpid=90322565188&th=1](https://www.amazon.co.uk/RatMesh-Rodent-Proofing-Metal-Mesh/dp/B07KXXS87T/ref=asc_df_B07KXYG2BT/?tag=&linkCode=df0&hvadid=394361800700&hvpos=&hvnetw=g&hvrnd=8939617957047702707&hvpone=&hvptwo=&hvgmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=1006457&hvtargid=pla-838644779478&ref=&adgrpid=90322565188&th=1)

<sup>2</sup>

[https://www.nhbs.com/4?q=&hPP=60&idx=titles&p=1&fR%5Bhide%5D%5B0%5D=false&fR%5Blive%5D%5B0%5D=true&fR%5Bshops.id%5D%5B0%5D=4&fR%5Bsubsidiaries%5D%5B0%5D=1&hFR%5Bsubjects\\_equipments.lv1%5D%5B0%5D=Bat%20Boxes&slug=bat-boxes&qtview=160551](https://www.nhbs.com/4?q=&hPP=60&idx=titles&p=1&fR%5Bhide%5D%5B0%5D=false&fR%5Blive%5D%5B0%5D=true&fR%5Bshops.id%5D%5B0%5D=4&fR%5Bsubsidiaries%5D%5B0%5D=1&hFR%5Bsubjects_equipments.lv1%5D%5B0%5D=Bat%20Boxes&slug=bat-boxes&qtview=160551)

- 1 x Schwegler 1FE bat access panel<sup>3</sup> (or similar woodcrete / woodstone box)

### C) Down pipes

- 5.1.7 Modification of the down pipes to enable easier cleaning of the hoppers and down pipes will reduce the likelihood of water ingress into the Church. By rodding the down pipes from the bottom it will also be easier and safer for the maintenance teams. Bats will also be less likely to be killed, injured or disturbed given the north-western hopper is a known roost.

### D) Landscape approach

- 5.1.8 The head gardener of Arundel Castle is exploring the potential to install bat boxes on the southern wall of the Castle grounds (i.e. the northern wall of the Church boundary).

### E) Education

- 5.1.9 The Church is looking to share information concerning the heritage and ecology of the church and grounds with visitors, likely via an electronic tablet device rather than fixed signage.

### F) Hygienic Covers

- 5.1.10 When the Church holds events the tables which are installed outside the kitchen area are not able to be left out overnight because of urine and faeces being deposited by bats overnight. A retractable awning could be installed to cover the tables when required.

## 5.2 Likely Impacts of the Solution on Bat Activity

A) Is likely to reduce internal use of the Church by bats and provide enhanced roosting opportunities for bats within an external feature.

B) Should A not be appropriate, B will provide alternative roost locations, however, it should be noted this option will be more visually intrusive and may not be in-keeping with the character of the Church.

C) Bats can continue to use the hoppers for roosting without risk of killing, injury or disturbance.

D) Providing alternative roost locations within the grounds of Arundel Castle to the north could reduce the likelihood of bats making use of roosting opportunities within the Church.

E) Educating the congregation and visitors about bats could have wider conservation gains.

<sup>3</sup> [https://www.nhbs.com/4?slug=bat-boxes&q=&fR\[hide\]\[0\]=false&fR\[live\]\[0\]=true&fR\[shops.id\]\[0\]=4&fR\[subsidaries\]\[0\]=1&hFR\[subjects\\_equipment.lv1\]\[0\]=Bat%20Boxes&qtview=173248](https://www.nhbs.com/4?slug=bat-boxes&q=&fR[hide][0]=false&fR[live][0]=true&fR[shops.id][0]=4&fR[subsidaries][0]=1&hFR[subjects_equipment.lv1][0]=Bat%20Boxes&qtview=173248)

F) Bats will not be impacted by the hygienic covers, however, it will improve efficiency for the congregation as it will mean tables and displays can be installed and left overnight without the risk of bat activity fouling them.

### 5.3 Timing, Detailed Methods and Duration of Works

5.3.1 The 2021 surveys did not confirm the presence of a maternity colony anywhere within the Church, however, it is possible the pipistrelle bats within the external hopper comprise a small maternity colony. A confirmed hibernation roost is present within the basement and it is possible internal and external areas of the church are also used for hibernation.

5.3.2 In order to avoid the least sensitive time of year for bats it is proposed that the following timescales and methods are adopted:

#### **A) Fascias**

5.3.3 Erecting the scaffolding is likely to be the costliest element of the work. It is therefore suggested that works on the south aisle are conducted first to investigate the likely situation on the north aisle and investigate whether it will be feasible to create the bespoke enclosed bat features.

- External scaffolding should be erected alongside to enable access to the fascias.
- Exclusion devices should be affixed to the fascias between April and October inclusive (avoiding November-March when bats are less active or hibernating) to enable bats to exit but not re-enter the features.
- The exclusion devices should be in situ for a minimum of five nights during suitable weather conditions.
- Removal of the fascias should be completed in sections.
- Removal of the first sections should be conducted under the supervision of an ecologist to advise on the size and structure of the bespoke enclosed bat features to be created.
- Any removed sections should be reinstated the same day or the access points should be temporarily blocked over night to prevent bats gaining internal access to the Church.

#### **B) Bat boxes**

5.3.4 The bat boxes can be installed at any time prior to the above scaffolding being removed.

#### **C) Down pipes**

5.3.5 Works to the hoppers can take place at any time of year, although works to the north-western hopper should avoid May-August, where possible. Works should be conducted under the supervision of a licensed bat ecologist given the potential for roosting bats to be disturbed as

part of the works. The works will entail the removal of all rainwater goods and installation of rodding eyes on the downpipes.

#### **D) Landscape approach**

5.3.6 The bat boxes can be installed at any time of year.

5.3.7 Two eco bat boxes<sup>4</sup> with crevice chambers will be installed at 3m height in the vicinity of but not obscured by climbing vegetation.

#### **5.3.8 E) Education**

5.3.9 Ecology by Design will provide images and/or videos of bats and information about their life cycle, foraging and roosting behaviours and the species which have been recorded within the Church. The information can be used by the congregation in whichever way they see fit.

5.3.10 The nearby Arundel Wildfowl Trust and Arundel Castle (Norfolk Estate) Trustees regularly organise bat walks and surveys along with the Sussex Bat Society. The Church will work with school children and other groups to monitor and celebrate bat activity.

#### **F) Hygienic Covers**

5.3.11 The awning can be installed at any time of year.

5.3.12 It would be possible to affix the awning to the northern wall of the kitchen at whatever height is required (suggested to be c. 1.5m to prevent bat flying beneath it) so that it can be extended to cover the tables over night and retracted in the morning to make a usable space unimpeded by visual obstructions during the day.

### **5.4 Personnel Required**

5.4.1 The project will be a collaboration between the BiC licence holder, building contractors and the Quinquennial Architect, as detailed below (all indicative prices are exclusive of VAT).

- BiC Licence Holder Ecologist (Merryl Gelling) = £550 / day
- Local Ecologist acting as Accredited Agent = £400 / day
- Building contractors (Clarke's Roofing) = £345 / day
- Architect (Jane Jones-Warner Associates) = £525 / day

5.4.2 There is the opportunity to build a relationship with Sussex Bat Group in delivery of monitoring, talks, walks and/or events.

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<sup>4</sup> <https://www.gardengiftshop.co.uk/nest-boxes/bat-boxes/integrated-eco-bat-box-with-crevice-chamber>

## 5.5 Long-term Management of Mitigation

- 5.5.1 Solution A should enable droppings to fall from behind the fascia therefore no long-term management is required.
- 5.5.2 Solution B will require the bat boxes to be checked from ground level whilst conducting the Quinquennial reviews. The boxes are constructed of woodcrete / woodstone therefore there should not be a need for any repairs or replacement for at least 25 years. Given they are installed on the northern aspect they are also sheltered from adverse weather conditions.
- 5.5.3 Solution C will require continued rodding as per the current management regime. The proposals will ensure this is possible in a safer way.
- 5.5.4 Solution D will require long-term monitoring by the grounds maintenance teams of Arundel Castle to ensure the boxes are removed if they become damaged.

## 5.6 Cost

- 5.6.1 The cost of the above solutions has been estimated through consultation with the project's architect and securing quotations from a specialist contractor (Clarke Roofing) who have worked on Arundel Church previously. The costs of materials is given where possible, alternatively the budget has been defined as **Low** = under £5,000, **Medium** = £5,001 - £20,000 or **High** = Over £20,001.

### A) Fascias

- 5.6.2 The cost of modifying the fascias will depend on the status and condition of the roof. Excluding the cost of scaffolding which is estimated to be **Medium**, the cost of modifying the fascias is likely to be **Medium for each aspect separately** (depending on condition of rafters etc).

### B) Bat boxes

- 5.6.3 The cost of installing bat boxes below the eaves would be **Medium** if conducted in isolation or c. £350 if conducted alongside other works.

### C) Down pipes

- 5.6.4 The cost of modifying the down pipes is likely to be **Medium**.

### D) Landscape approach

- 5.6.5 The cost of installing two bat boxes on the south wall of the grounds of Arundel Castle would be £156, excluding access provision.

### E) Education

- 5.6.6 The cost of providing a Tablet would be **Low**.



5.6.7 Ecology by Design would provide bat resources free of charge.

#### **F) Hygienic Covers**

5.6.8 The cost of installing an awning would depend upon the specification, but a manual ivory coloured one with 3.5m extension could be as little as £250<sup>5</sup>, not including installation costs.

### 5.7 Means of finance

5.7.1 Over a decade, approximately £1,000,000 has been spent on reduction of water ingress into the church. About 33% of this figure has been raised locally via personal donations, work of a Friends group and support from the Sussex Historic Churches Trust. Lottery funding has provided the bulk of the funds via three specific projects focusing on the tower, vestry roof and south aisle. In each of these, the church has been required to share ever increasing amounts of heritage information to an expanding range of audiences. This has fitted well with the outreach objectives of the church. In addition to these planned programmes, the PCC have had to address serious storm damage, particularly to the West Window. A complete restoration of this window is an unaddressed priority and is a major reason why Historic England continues to see the building as being "at risk".

5.7.2 Work is near completion on a further application for a £250,000 grant from the National Lottery Heritage Fund to replace the south aisle roof, complete the north aisle wall paintings conservation and carry out some internal reordering of the building and install an access lift. To this, local funds of a further £150,000 has to be raised. Beyond this, work has started on a 2022 Church Care grant application (in the order of £30,000 grant and £10,000 parish contribution) which will focus on modifications to all the rainwater goods as well as improvements to the surface water drainage system of the church. This is unattractive but vital work and will be structured to take notice of the bat mitigation priorities that have been identified.

### 5.8 Faculty Consent

5.8.1 Solution A would be at minimum a List B (written permission from the Archdeacon) because of the need to take down and repair the fascia and rafter ends and redecorate the gutters like for like. The DAC will be asked if concealed mesh constitutes the addition of a new material for which a Faculty is required, or if it is minor enough for List B.

5.8.2 Solution B (installation of bat boxes) is a List A matter (formal permission not required) as long as they form part of a Bat Management Plan such as this. The DAC would be made aware of

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<sup>5</sup> <https://www.primrose-awnings.co.uk/35m-budget-manual-awning-ivory-p-10872.html?src=index>

what is being proposed and it would be necessary to ensure they are concealed, fixed only to mortar joints and of an appropriate appearance. There is also Planning permission to consider for an external feature, but they are so small that it might be possible to get agreement in writing that they are a de-minimis addition.

5.8.3 Faculty consent is not likely to be required for elements C-F.

## 5.9 Potential Future Project

5.9.1 There is an opportunity to include a data logger in the basement to study the temperature and humidity over winter, to allow an assessment of the suitability for hibernating bats and consider whether enhancements could be made to improve its suitability.

## 6 References

BSI Standards Limited (2013). BS42020:2013 Biodiversity: Code of practice for planning and development  
CIEEM (2017). *Guidelines for preliminary ecological appraisal, 2<sup>nd</sup> edition*. Chartered institute of Ecology and Environmental management, Winchester.

Collins, J. (ed.) (2016). *Bat surveys for Professional Ecologists: Good Practice Guidelines (3<sup>rd</sup> edn)*. The Bat Conservation Trust, London.

Gov.uk (2015). *Guidance. Bats: surveys and mitigation for development projects*. Natural England and Department for Environment, Food & Rural Affairs, Worcester.

Mitchell-Jones, A.J. (2004). *Bat Mitigation Guidelines*. English Nature, Peterborough.

Wray, S., Wells, D., Long, E. and Mitchell-Jones, T. (2010). Valuing bats in Ecological Impacts Assessment. *In Practice* **70**, 23-26

## Appendix 1 - Full Survey Results

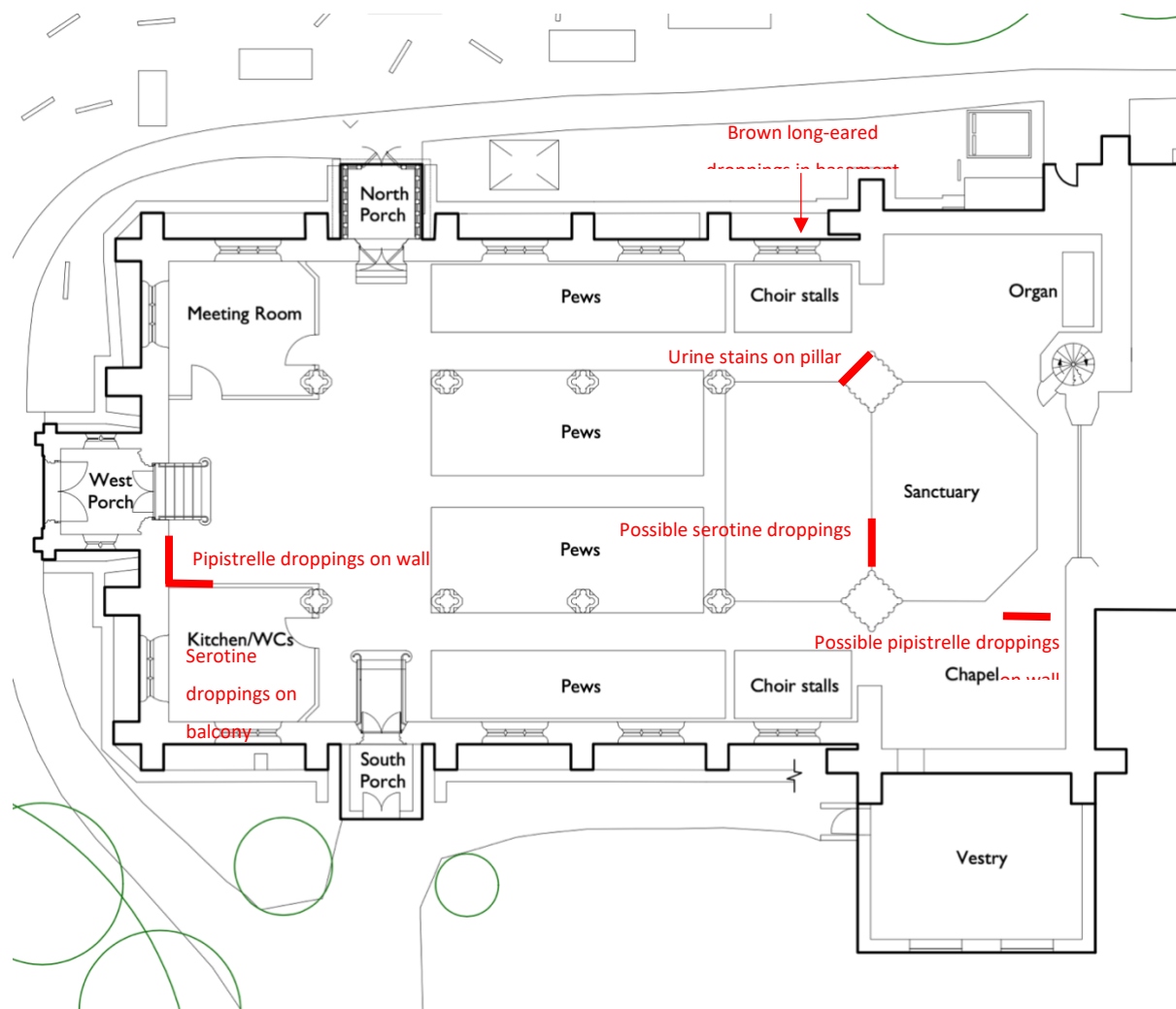
### Evidence of bats internally (April 2021)

The Church is regularly cleaned. Evidence of bats was infrequently found during survey visits. There were limited areas with droppings or urine on the walls, as detailed below.

- 30 x Brown long-eared bat droppings were recorded within the boiler room (confirmed by DNA analysis). Access likely via grilles at ground level on the northern aspect.
- Serotine droppings were present internally (confirmed by DNA analysis).
- Likely pipistrelle droppings (not analysed) were found at height on the internal walls.

Old urine staining was present on the bells within the belfry. A single dropping with characteristics of pipistrelle bats was found.

**Figure 1: Evidence of bats internally**



## Evidence of bats throughout 2021

The locations of roosts are indicated on Figure 2. Within the following descriptions, a sound file of a bat detector containing a bat call sequence is defined as a pass.

### APRIL

Automated bat detector left inside Church from 14 April 2021 (recorded until at least 02 May 2021).

Passes recorded internally included:

- An individual common pipistrelle flew for 4 minutes on 16 April 2021
- An individual serotine flying (one pass) on 21 April 2021
- Noise on 24 April, 27 April and 02 May 2021

### JUNE

#### Dusk 09 June 2021

##### Passes recorded internally

- An individual serotine flew for 30 seconds (heard not seen) at 20:38

##### Emergences

None

A low level of bat activity with infrequent common pipistrelle and rarely occurring soprano pipistrelle, brown long-eared, myotis, serotine and noctule.

#### Pre-dawn 07 June 2021

##### Passes recorded internally

- An individual serotine flew for 4 minutes at 00:12-00:15

##### Emergences / Re-entries

A Nathusius' pipistrelle returned to roost beneath board under gutter on northern aspect at 04:36 

A very low level of bat activity with rarely occurring common and soprano pipistrelle and a single Nathusius' pipistrelle pass.

### JULY

#### Dusk 06 July 2021

##### Passes recorded internally

- An individual serotine for 30 seconds (heard not seen) at 22:44
- An individual common pipistrelle (one pass) at 23:02

### Emergences

One serotine possibly emerged from behind the board on the southern aspect at 22:14 ★

Very low level of bat activity with infrequent common pipistrelle and rarely occurring soprano pipistrelle, myotis and serotine.

### **19 July 2021**

Three pipistrelle bats were washed out of the hopper on the northern aspect of the church following routine checks of the gutters. ★

The incident occurred after a period of hot weather therefore it is possible bats were within the feature outside of their normal roost to cool down. It is considered likely that some additional bats remained within the hopper as calling could be heard after some had been washed out. The bats flew to the tree north of the building (possibly roosting within ivy). ★

The roost was also audibly present on 17 September 2021 when a routine roof inspection was conducted.

## **AUGUST**

### **Dusk 11 August 2021**

#### Passes recorded internally

- An individual common pipistrelle flew continuously from 20:43-20:58 (130 passes).

### Emergences

At 21:02 an individual common pipistrelle emerged from board under gutter on northern aspect ★

At 21:10 a common pipistrelle flew from tree north of the building ★

Highest level of bat activity outside church so far with very low levels of activity until over an hour after sunset. A range of species in low numbers including frequent common pipistrelle, occasional myotis, one noctule and two serotine passes.

**Figure 2:** *Confirmed roost locations*



### Summary of bat activity

Bat activity was lower than expected throughout each of the surveys. Seven species of bat were recorded within the church yard as follows:

- Common pipistrelle (frequent)
- Soprano pipistrelle (occasional)
- Nathusius' pipistrelle (rare)
- Serotine (occasional)
- Myotis sp. (occasional)
- Brown long-eared bat (rare)
- Noctule (rare)

Three species of bat have been recorded within the church as follows:

- **Common pipistrelle** - rarely active within church (flew for one pass, 4 minutes and 15 minutes), potentially an occasional roost on the internal western gable where droppings are present



- **Serotine** - rarely active within church (flew for one pass, 30 seconds (twice) and 4 minutes), a likely occasional roost internally in south-western corner, likely one bat



- **Brown long-eared bat** - no evidence within church itself, roost of likely one hibernating bat in basement







Externally, roosts have been recorded at three locations as follows:

1. One roost on northern aspect used by an individual common pipistrelle and Nathusius' pipistrelle ★
2. 5+ pipistrelle bats within hopper ★

There is no evidence that the bats roosting at these locations gain internal access to the building.



3. One serotine possibly emerged from southern aspect of the Church or eastern wing of building (Fitzalen Chapel) ★ It is possible that the individual gains access to the inside of the Church via the Fitzalen Chapel.



Our survey findings are consistent with the ARBECO 2014: (7th November 2014) findings: *"Evidence of three different species (Pipistrellus sp., serotine and Plecotus sp.) in the form of droppings was discovered in the nave, sanctuary, north and south aisles and transepts during the internal inspection. The droppings from the Pipistrellus sp. were fresh and the droppings from the Plecotus sp. were a combination of fresh and old indicating recent use of the church by both these species. Multiple potential roosting locations were identified within these areas mainly consisting of gaps and crevices between roof timbers and walls but also within roof vent holes.... The amount of serotine and Plecotus sp. droppings present in these areas was indicative of an occasional or intermittent day roost for low number of non-breeding female and/or male bats. Plecotus sp. droppings were also identified within the belfry. The belfry offers some roosting potential internally but is subject to high levels of draft ingress and low daytime light levels so is unlikely to be used as a hibernation roost"*.

## Appendix 2 - Valuing Bat Roosts

Geographic Frame of Reference	Roost Types
District, Local or Parish	<ul style="list-style-type: none"> <li>- Feeding perches (common species)</li> <li>- Individual bats (common species)</li> <li>- Small numbers of non-breeding bats (common species)</li> <li>- Mating Sites (common species)</li> </ul>
County	<ul style="list-style-type: none"> <li>- Maternity sites (common species)</li> <li>- Small numbers of hibernating bats (common and rarer species)</li> <li>- Feeding perches (rarer/rarest species)</li> <li>- Individual bats (rarer/rarest species)</li> <li>- Small numbers of non-breeding bats (rarer/rarest species)</li> </ul>
Regional	<ul style="list-style-type: none"> <li>- Mating sites (rarer/rarest species) including well used swarming sites</li> <li>- Maternity sites (rarer species)</li> <li>- Hibernation sites (rarest species)</li> <li>- Significant hibernation sites for rarer/rarest species or all species assemblages</li> </ul>
National/UK	<ul style="list-style-type: none"> <li>- Maternity sites (rarest species)</li> <li>- Sites meeting SSSI guidelines</li> </ul>
International	<ul style="list-style-type: none"> <li>- SAC sites</li> </ul>