THE CHURCH OF ST MARY THE VIRGIN, WIGGENHALL ST MARY, NORFOLK

BAT SURVEY AND MITIGATION PROPOSALS IN RESPECT OF THE HLF BATS IN CHURCHES PROJECT

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1.0 INTRODUCTION

1.1 Philip Parker Associates have been instructed to undertake bat surveys and provide advice as to bat mitigation/management options at the Church of St Mary the Virgin, Wiggenhall St Mary, as part of the Heritage Bats in Churches Lottery Project (HLF). This report provides details of the surveys undertaken and mitigation/management options to be considered to mitigate the impact of the bats on the church.

1.2 The church of St Mary, Wiggenhall St Mary, is located at OS Map grid reference TF 5824 1440.

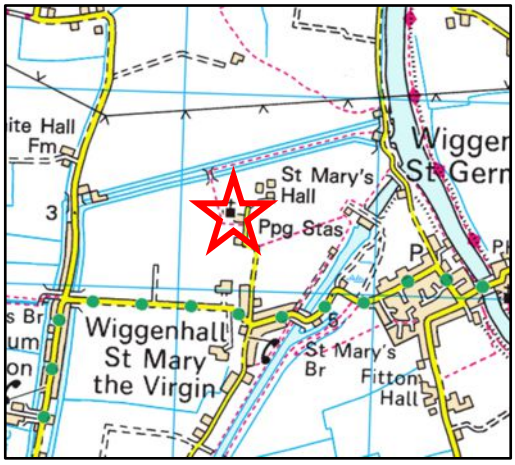


Figure 1 – Location plan
Crown Copyright and database rights 2015
Ordnance Survey

Figure 2 - Aerial photograph
Imagery © 2015 GeoEye, Getmapping plc, Infoterra Ltd & Bluesky

1.3 **History of bat use at Wiggenhall St Mary the Virgin**

The only known survey that has been undertaken at the church was an emergence survey undertaken on the same day as the HLF Light Touch Survey on the 14th September 2017, results as follows.

Table 1 A summary of previous surveys undertaken the Church of St Mary the Virgin, Wiggenhall St Mary

Date	Emergence/re-entry	Coverage	Species	Number and location
14th September 2017	Emergence	North porch South aisle	Soprano pipistrelle	Several seen roosting between boards at the west end of the south aisle.

Date	Emergence/re-entry	Coverage	Species	Number and location
				45 were seen to emerge via the north door.
			Common pipistrelle	5 were noted emerging over the north door.
			Natterer's	1 noted internally (not seen to emerge)

1.4 **Previous mitigation works carried out at the church**

No known mitigation works have previously taken place at the church. The Light Touch Survey suggested that consideration be given to creating a roosting area between the two layers of boards in the south-west corner of the south aisle (where the bats were noted to be roosting in September 2017) and providing the bats with an alternative access point at eaves level on the south aisle. The access points over the north aisle door would then be blocked.

1.5 **Statement of Significance**

The Statement of Significance was prepared by Richard Halsey following a site visit on the 17th September 2019. His report is summarised as follows:

1.6 The Church of St Mary is described as a large, complete early fourteenth century aisled church on an older site close to the Hall, but now distant from the modern settlement. The perpendicular architecture is refined and consistent in style and quality, suggesting the work of one architect. The ribbed stone barrel vault of the south porch is a rarity in Norfolk. The 1862 restoration was by the nationally important architect G.E. Street and his nave roof and chancel furnishings are of good quality. The church retains a possibly complete set of extraordinarily well preserved late medieval benches and bench ends, with many finely carved figures. The late medieval font has a complete, if badly re-painted, tabernacle cover dated 1625 and topped by a large pelican. In addition, there is a well-preserved painted chancel screen dado of c.1500 with eight standing figures, a 1518 brass eagle lectern and a fine alabaster monument to Sir Henry Kervile (d.1624), the last of the medieval lords of the manor. The church therefore has **high archaeological, architectural, historical, and artistic significance.** It stands amongst mature trees with the Hall and Old Vicarage, an island of wood in a flat, intensively farmed countryside. It therefore has **moderate-high landscape significance.**

1.7 The furnishings can be categorised as follows.

- Of **high significance:**
- The late medieval nave and aisle benches
- The c.1500 chancel screen dado
- The 1518 brass lectern

- The late medieval font and 1625 cover
- The fragmentary heart brass to Sir Robert Kervile c.1450

1.8 Of **moderate-high** significance:

- Late medieval stained glass fragments
- The Jacobean pulpit and dole cupboard (possibly of 1639)
- Sir Henry Kervile (d.1624) monument

1.9 Of **moderate** significance

- Edmund Hardwick (d.1759) memorial
- Two much renewed aisle parclose screens and re-used Jacobean woodwork of the north-west vestry partition;
- G.E. Street's chancel furnishings

1.10 Of **Low-moderate** significance

- W.D. Caroes's sanctuary furnishings
- The various seventeenth – eighteenth century black marble ledger stones;
- Remains of censecrations cross
- 1791 Royal Arms;
- c.1865 organ.

1.11 Photographs of some of the features and the impacts of the bats can be seen below.

Figure 3 – Severe urine damage on the Brass eagle lectern

Figure 4 – C15 Chancel screen with droppings and urine

Figure 5 – Urine staining on the C19 organ pipes

Figure 6 – Droppings and urine on the Sir Henry Kervile tomb

2.0 2019 SURVEY METHODOLOGY

2.1 Survey Methodology

Surveys during 2019 have been carried out at the church by a team of experienced surveyors, on each occasion led by Philip Parker.

2.2 Survey Equipment

Each of the surveys have been carried out with the use of the following equipment:

Table 2 Survey methodology for the 2019 surveys

Equipment Type	Equipment specifics	Notes	Analysis
Infra-red cameras	Canon XF-400 Canon XA-10 Canon XA-11 Canon XA-30	Attached to a rigid tripod for stability (various makes)	Files processed and saved in Photos for MAC and saved on 4TB external Western Digital Drives Videos analysed using Quick Time Player
Infra-red lights	A minimum of 2 no infra-red lights per camera (140 led)	Set as on brackets attached a rigid tripod (various makes)	
Additional lighting	Clulite CB2 (million candle power) with additional red filter	Used to provide additional illumination	
Hetrodyne detectors	Batbox Duet detector (mainly) Batbox griffin	Each surveyor has been equipped with one or other of these detectors to enable audible monitoring of the bats during the course of the survey	
Static detectors	Anabat Express detector	Each surveyor was equipped within one or other of these	Calls analysed using Analook or Insight

Equipment Type	Equipment specifics	Notes	Analysis
		devices to enable later call assessment	
Thermometer	ETI- Hygro - Thermo Pocket sized hygrometer	Used to provide accurate temperature and humidity readings	

2.3 **Survey Methodology**

Surveys have been undertaken on the following dates using the following surveyors. Where the surveyors are licensed, their survey licence numbers are given.

- Philip Parker 2015-14467-CLS-CLS
- Karl Charters 2015-13353-CLS-CLS
- Ash Murray 2015-16562-CLS-CLS
- Kate Garner
- Lisa Gabriel
- Rebecca Easter
- Emily Parker

2.4 On the first survey (21st May 2019) one volunteer, Andy Elliot also assisted as a volunteer.

2.5 Where surveys are in addition to those costed as part of the HLF project, this is identified.

2.6 On each of the designated surveys, 5 surveyors were positioned around the church, one in each corner (south-east, south-west, north-east and north-west), one centrally on the south side of the church and one internally. Two of the external surveyors were supported by infra-red cameras as listed above, other surveyors utilised Culite lamps with red filters to provide additional lighting. The internal surveyor was also supported by two infra-red cameras, one on the northern door access to monitor the numbers of bats leaving the church and the second looking into the nave to monitor bats leaving the identified roost sites. On the extra survey at the end of September, two surveyors were used, one internally utilising three infra-red cameras and one externally on the south side using one infra-red camera.

2.7 Anabat Express static detectors were left in the church overnight on each of the designated HLF surveys plus externally on the southern and northern elevations of the church to confirm the identification of bats recorded. Additionally, an Anabat Express detector was left in the church close to the northern access door for a prolonged period to add further details to the species of bats using the church:

- 9th May 2019 to 25th May 2019
- 6th August to the 12th August 2019

2.8 Data collected from the Anabat express detectors was analysed with Analook.

2.9 Prior to each survey commencing, any concentrations of droppings noted within the church have been recorded. In addition, sheets of lining paper were placed in strategic locations around the church (ones were accumulations of bat droppings had been noted following the survey on the 3rd July). The location of these sheets is shown on Drawing D2. At the survey of 12th August 2019, it was noted that a new accumulation of droppings had appeared on the north side of the church and therefore the sheet from Location 2 was moved (there was little evidence of bat use on that sheet).

Table 3 Bat survey dates

Date	Emergence/ Re-entry	Surveyor	Start and finish time	Weather
9th May 2019	Physical	Philip Parker	14:00 – 16:00	**N/A**
21st May 2019	Emergence	Philip Parker Karl Charters Lisa Gabriel Kate Garner Rebecca Easter Emily Parker	20:50 - 22:50	**Start –** Ext temp =13.9 C Ext humidity = 80% **Finish –** Ext temp =7.8 C Ext humidity = 85% **Weather –** still, Dry with 100% cloud cover
2nd July 2019	Emergence	Philip Parker Karl Charters Ash Murray Lisa Gabriel Kate Garner Rebecca Easter	21:00 – 22:00	**Start –** Ext temp =15.2 C Ext humidity = 95% **Finish –** Ext temp =15.2 C Ext humidity = 82% **Weather –** Still, dry, 100% cloud cover
3rd July 2019	Re-entry	Philip Parker Karl Charters Ash Murray Lisa Gabriel Kate Garner Rebecca Easter	02:30 – 04:30	**Start –** Ext temp = 9.2C Ext humidity = 97% **Finish –** Ext temp = 7.7 C Ext humidity = 95% **Weather –** Still, dry, 100% cloud cover

12th August 2019	Emergence	Philip Parker Ash Murray Lisa Gabriel Kate Garner Rebecca Easter Emily Parker	20:15 – 22:15	**Start –** Ext temp =18.9 C Ext humidity = 55% **Finish –** Ext temp = 11.3 C Ext humidity = 80% **Weather –** Dry with light cloud
25th September 2019	Emergence	Philip Parker Karl Charters	18:40 – 20:40	**Start –** Ext temp =18.7 C Ext humidity = 81% **Finish –** Ext temp = 11.3 C Ext humidity = 80% **Weather –** Dry with light cloud

3.0 SURVEY RESULTS

3.1 The results of the 2019 physical and activity surveys are summarised in the following table. Roost/access counts and locations are summarised on Drawing D3 and D4. Please note that it proved difficult to identify which pipistrelle species was using each roost site as they don't always call when emerging.

Table 4 2019 survey results

Date	Survey Type	Species	Number and location
9th May 2019	Physical	Pipistrelle spp Long eared spp	A moderate scatter pipistrelle type droppings in the nave and the south aisle, a light scatter of droppings in the chancel and north aisle (including the occasional long eared type). Concentrations of pipistrelle droppings noted by the north door (known access point from the 2017 surveys) and in several locations in the nave. On walls, concentrations were noted the west end of the north aisle (close to the access) and on the chancel and tower arch.
21st May 2019	Emergence	Soprano pipistrelle Common pipistrelle Natterer's	**INTERNAL** Bats noted to be roosting behind wall post on the southern side of the nave (Eastern end). It is not known whether these were common or soprano pipistrelles from the views possible.

Date	Survey Type	Species	Number and location
			Soprano pipistrelle The first emerged in the church at 21:00 and quickly over the north door. A peak of 3 flying internally at any time, 15 emerged by end of the survey and 2 had re-entered. The majority of these bats appeared to emerge from behind the wall post on location A. **Common pipistrelle** The first emerged in the church at 21:22 and left the church at 21:23 via the north door. over the door on the north aisle. 12 emerged by the end of the survey and none had returned. Where identifiable, bats appeared to emerge from several locations in the nave roof. **Natterer's** Single flying in the church at 22.41, not seen to re-enter. **EXTERNAL - Other than those bats emerging over the north door.** No bats seen to emerge from the church in any other locations.
2nd July 2019	Emergence	Soprano pipistrelle Common pipistrelle	**INTERNAL** **Soprano pipistrelle** The first bat emerged within the church at 21:31 from the nave roof towards the western end). The first emerged over the door on the north aisle at 21:32. Over the course of the survey, 18 soprano pipistrelles were noted to emerge over the north door. The last soprano pipistrelle was noted to emerge via this location at 22:51. Not all of the roost sites were noted as the bats appeared to emerge from numerous locations with no concentrations noted. **Common pipistrelle** 8 bats emerged over the door on the north aisle between 22:10 and 22:34. The precise roosting locations were noted distinguished from the soprano pipistrelle **EXTERNAL – Other than those bats emerging over the north door.** **Common pipistrelle** 1 entered the eaves on the south aisle at 21:46 (from 3m west of the eastern end of the aisle over the window apex, Roost E). 2 emerged from the same location at 22:05 and 22:15. It is not certain whether these were able to enter the church at this location.

Date	Survey Type	Species	Number and location
			1 emerged at 22:38 (from eaves level at the eastern corner of the south aisle, Roost E). **Note:** Single serotine noted to pass the southern elevation of the church.
3rd July 2019	Re-entry	Soprano pipistrelle Common pipistrelle Brown long-eared Natterer's	**INTERNAL** **Soprano pipistrelle** 19 bats entered over north aisle door between 02:59 and 04:25. 4 exited via this location during this period. The bats flew up into various locations in the nave and the south aisle. There did not seem to be any concentrations of bats in any particular location other than Roost A where 3 entered and centre of south aisle Root D where 5 entered. **Common Pipistrelle** 3 bats entered over north aisle door between 03:18 and 03:51. 1 exited via this location at 03:03. **Natterer's** A single natterers flying within the nave at 02:55. **Brown long eared** 2 brown long-eared flying in chancel roof at 03:52. Presumed went to roost in the chancel **EXTERNAL – Other than those bats emerging over the north door.** **Common pipistrelle** 1 entered south aisle eaves at 03:06 (30cm to the west of downpipe eastern). 1 entered beneath a pantile on southern elevation of the nave (9th tile up from eaves level, last run at eastern end) at 03:50 (Roost F). **Note:** Single daubenton's recorded east to west along southern elevation. Brown long-eared pass to north.
12th August 2019	Emergence	Soprano pipistrelle Common pipistrelle Natterer's	**INTERNAL** **Soprano pipistrelle** 83 emerged over north aisle door (first bat at 20:23) and 5 re-entered via this location. The majority of bats were noted to be roosting behind the wall post on the north side of the nave (Roost B) but small numbers of bats were also noted emerging from other locations in the nave and south aisle. **Common pipistrelle** 2 exited over north aisle door (20:31). The roosting locations were not specifically noted.

Date	Survey Type	Species	Number and location
			Natterer's Single noted hanging up in the nave. This bat flew into the south aisle, west end eaves at 22:04 and returned at 21:35. It is not certain whether this bat emerged or it was a roost site. **EXTERNAL – Other than those bats emerging over the north door.** **Soprano pipistrelle** 3 emerged from south aisle eaves (over eastern window) at 20:54, Roost E. It is not certain whether these emerged from inside the church or were roosting at the wall top **Pipistrelle species** 1 emerged from south aisle eaves (centrally above eastern window, Roost E) **Other :** Single daubentons noted along north-eastern elevation. Single natterer's pass recorded
25th September 2019	Emergence	Soprano pipistrelle Common pipistrelle	**INTERNAL –** **Monitoring papers** Assessment of the monitoring papers prior to the commencement of the survey indicated good numbers of droppings on sheets under roost A, more droppings on the sheet under roost B, limited droppings on sheet in the south-east corner of the south aisle and few droppings on the altar, at the east end of the south aisle and centre south aisle. **Soprano pipistrelle** First bat emerged from the north door at 18:59. 17 emerged in total, the last at 19.38 **Common pipistrelle** First bat emerged over north aisle door at 18:57, 2 bats emerged in total **Brown long eared** Single roosting in the chancel, perched on the ridge, for the duration of the survey **EXTERNAL – Other than those bats emerging over the north door.** No bats noted to emerge on the south side of the church

3.2 The results of the Anabat survey can be found in the following table. The counts are the number of passes over the course of the night. The detector was left in the north-west corner of the north aisle close to the access door.

Table 5 Anabat survey data

Date	Soprano pipistrelle	Common pipistrelle	Pipistrelle social calls	Natterer's	Long eared	Serotine
9/5/19	67	6				
10/5/19	176	70		1		
11/5/19	102	8	14			
12/5/19	138	37	1			
13/5/19	231	83	20			
14/5/19	256	66	30			
15/5/19	272	42	15	2		
16/5/19	409	76	64	6		
17/5/19	468	152	73	16		
18/5/19	445	73	40	3		
19/5/19	351	157	28	5		
20/5/19	380	130	33	4	42	
21/5/19	104	52	6	2		
6/8/19	214	136	4			
7/8/19	209	106	5			
8/8/19	144	98	6			
9/8/19	181	114	20	1		1
10/8/19	165	68	0	1		
11/8/19	169	55	11			
12/8/19	163	22	1	2		

3.2 **Summary of surveys**

5 species of bats have been recorded using the church during the course of the 2019 surveys, as follows:

- Soprano pipistrelle - peak of 85 on 12th August 2019 (83 of which emerged from the north door and 2 from the south aisle);
- Common pipistrelle – peak of 12 on the 21st May 2019 (all emerged over the north door);
- Natterer's – peak of 1 on the several surveys;
- Brown long eared – 1 observed on the survey of the 25th September 2019;
- Serotine – recorded on the static detector on the 9th August 2019.

3.3 Given the counts observed on 14th September 2017, and the evidence of droppings and urine throughout the church, it was anticipated that the number of bats using the church would be greater than that actually recorded in 2019. This perhaps reflects the fact that the church is not used very often (despite having good numbers of visitors as noted in the visitors book) and therefore it is only cleaned infrequently. Despite this, the pattern of use is puzzling. The distribution of roosts does not suggest maternity roost behaviour (unless in very small numbers). The large increase in numbers in August, perhaps suggests the use of a transitionary roost for soprano pipistrelle. More certainty of the root type could be gathered from further monitoring in 2020 and catching bats emerging over the door to check breeding status.

3.4 The level of bat use in the church is classed at a moderate level (Norfolk Bats in Churches category) and the roosts are considered to be of local importance.

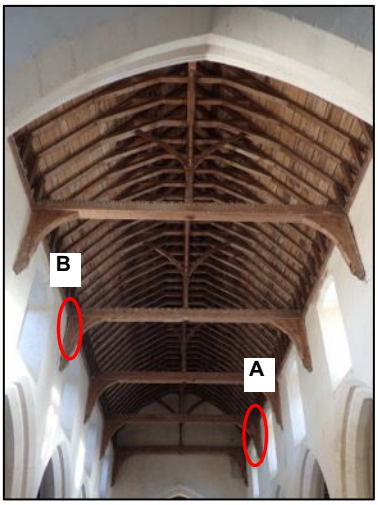


Figure 7 – View of the nave roof from the west end with the 2 main roost sites identified

Figure 8 – Recording sheet under roost location A (Dec 2019). This sheet was cleaned during the August survey and therefore the droppings represent the deposition since that time

Figure 9 – Recording sheet under roost location B (Dec 2019) – This has been in place since August 2019

Figure 10 – Location of occasional pipistrelle access/roost E on the south side of the nave

Figure 11 – Recording sheet in the south-west corner of the south aisle where the soprano pipistrelles were noted to be roosting in September 2017 and occasional roost in 2019

Figure 12 – Large numbers of droppings in the south-west corner of the south aisle (close to roost C). The only bat seen to potentially emerge during the surveys from this location was a natterer's during the August surveys

Figure 13 – Large numbers of droppings on the north door indicating the principal access point into the church. The main area for access is highlighted red.

Figure 14 – Outside of the north door showing where the lichen has been worn away, presumably by the bats landing on the door.

4.0 MITIGATION RECOMMENDATIONS

4.1 There are a number of potential mitigation options that could be considered as part of the management of the bat roost.

4.2 **Option 1**

As discussed in Section 1.1, the Light Touch Survey suggested a possible mitigation of creating a bat box in the south-west corner of the south aisle (where the bats were noted to be roosting in September 2017) and providing an alternative access out at eaves level. The bottom layer of wooden boards (visible inside the church) run lengthways along the aisle. The upper layer of boards runs perpendicular, separated by diagonal battens. Gaps between the boards allow access into the main body of the church from the roosting area. Although a limited number of bats were noted to be roosting here during the 2019 surveys, droppings on the sheet below this area, post the survey on the 10th September 2019 suggest that they did move towards the

end of the survey season (perhaps mirrors the 2017 use). It is proposed that a new access is created into this area at eaves level near the porch and then monitored through the use of a camera (access) or paper sheets (roost), this location is shown in Drawing D4. Following a minimum of 1 years monitoring, the gaps in the boards would be blocked with wooden infills to create a single bat box. Consideration should be given to providing some provision for cleaning out the box (perhaps by temporarily removing some of the infills or lower boards).

4.3 Although little evidence of roosting was noted at the eastern end of the south aisle, there were several recorded possible emergences from this location. Therefore, a similar feature could be considered at the eastern end also.

Figure 15 – Proposed location for the south-west south aisle box

4.4 **Option 2**

The main soprano pipistrelle roost appears to be behind wall posts in the nave (Roost A), and a similar feature on the north side of the church (Roost B). It is proposed therefore that 2 boxes are built under the south slope of the roof adjacent to the principal rafter (Roost A). There is no purlin on the roof so the box will either need to extend up to the ridge or be blocked at the top end, half-way up. The proposed location is shown on Figure 16 and 17. Initially, the box would not be connected to the eaves, just made available for the bats to use. At the time the box is installed, the potential for access at eaves level would be investigated and enhanced (created) as necessary. Again, the box would be provided with cameras to allow the use to be monitored. Finally, after 2 years of monitoring, the box would be connected to the created/enhanced access point to allow bats direct access.

Figure 16 – Location of main bat roosting area behind the wall post with the location for the boxes shown

Figure 17 – Proposed location of bat boxes under the slope of the south nave roof next to current mid-summer roosting location

4.5 **Option 3**

The majority of the bats currently emerge over the north door. From experience, bats are more likely to accept changes to the roost site rather than the access point. Therefore, another option proposed is the construction of a bat box over the inside of the north door. Given that this would be on the north side of the church, the box would need to be heated. The use of a reptile heat mat could be considered for this. It would also be provided with a camera to allow the use to be monitored (refer to Appendix A for details).

4.6 It is proposed that the box is constructed in 2 phases, Phase 1 would maintain the access into the church for the bats but provide a contained roosting area next to the access. This would allow the bats to continue to access the church but also have access to the box, to give them time to find and get used to it. After 1/2 years (depending on monitoring), the box would be completed and access into the church via this route denied.

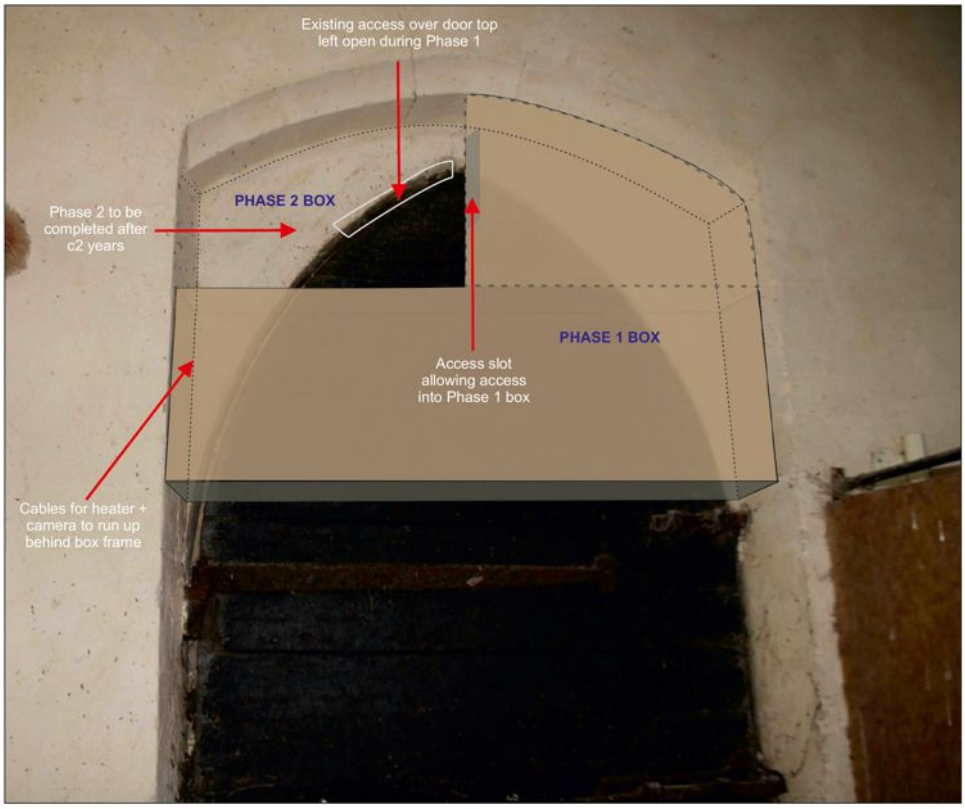


Figure 18 – Proposed location of north aisle door bat box

4.7 Option 4

Consider erecting a pole mounted maternity bat box in the churchyard. This would need to be positioned in a location that is in full sun, so it benefits from natural thermal radiation, thus avoiding any heating. An example is shown in Figure 19 below. Such a feature is likely to require planning permission and may require a faculty. The precise location would also depend on the positioning of graves etc.

Figure 19 – Example of bat boxes erected on pole

4.8 In addition, standard Kent boxes should be erected on trees within the churchyard to provide roosting sites for natterer's and brown long eared which have been observed in the church in small numbers.

4.9 Although serotine has only been recorded on one occasion during the survey, if mitigation prevents access into the church an alternative roosting site will need to be provided. Natural England do not normally consider that bat boxes can be used as mitigation for serotine. However, it is known that Schweglar box 2FE has been used by roosting serotine successful at a site in Norfolk and one of these is therefore proposed on the southern elevation of the church to provide a suitable roosting site should this bat be excluded.

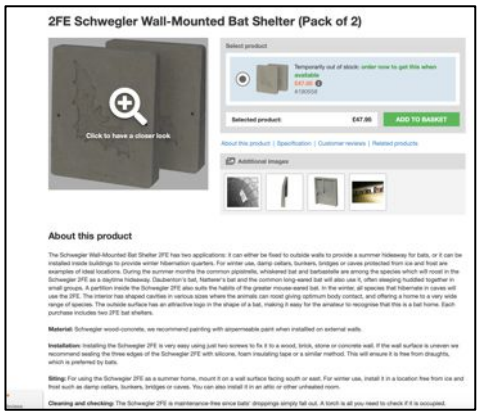


Figure 20 – Schwegler 2FE boxes (stained black) have successfully supported roosting serotine at another mitigation sites in Norfolk (small numbers)

4.10 **Blocking of the access points**

The provision of the bat box in Option 3 will automatically result in the main access being blocked. In other options, if option 3 is not used the main access will need to be excluded. Other identified access points will be excluded at the same time but there is always the possibility that some access points may have been missed and these could be adopted by the bats post exclusion. This effect would need to be monitored and other access points excluded as they become apparent.

4.11 **Summary**

It is difficult to know which options are most likely to be successful in attracting the bats to roost but from experience bats are more likely to accommodate changing roost sites rather than access points and therefore option 3 should be considered the primary option for consideration. The more options the bats are given, the more likely one will be successful.

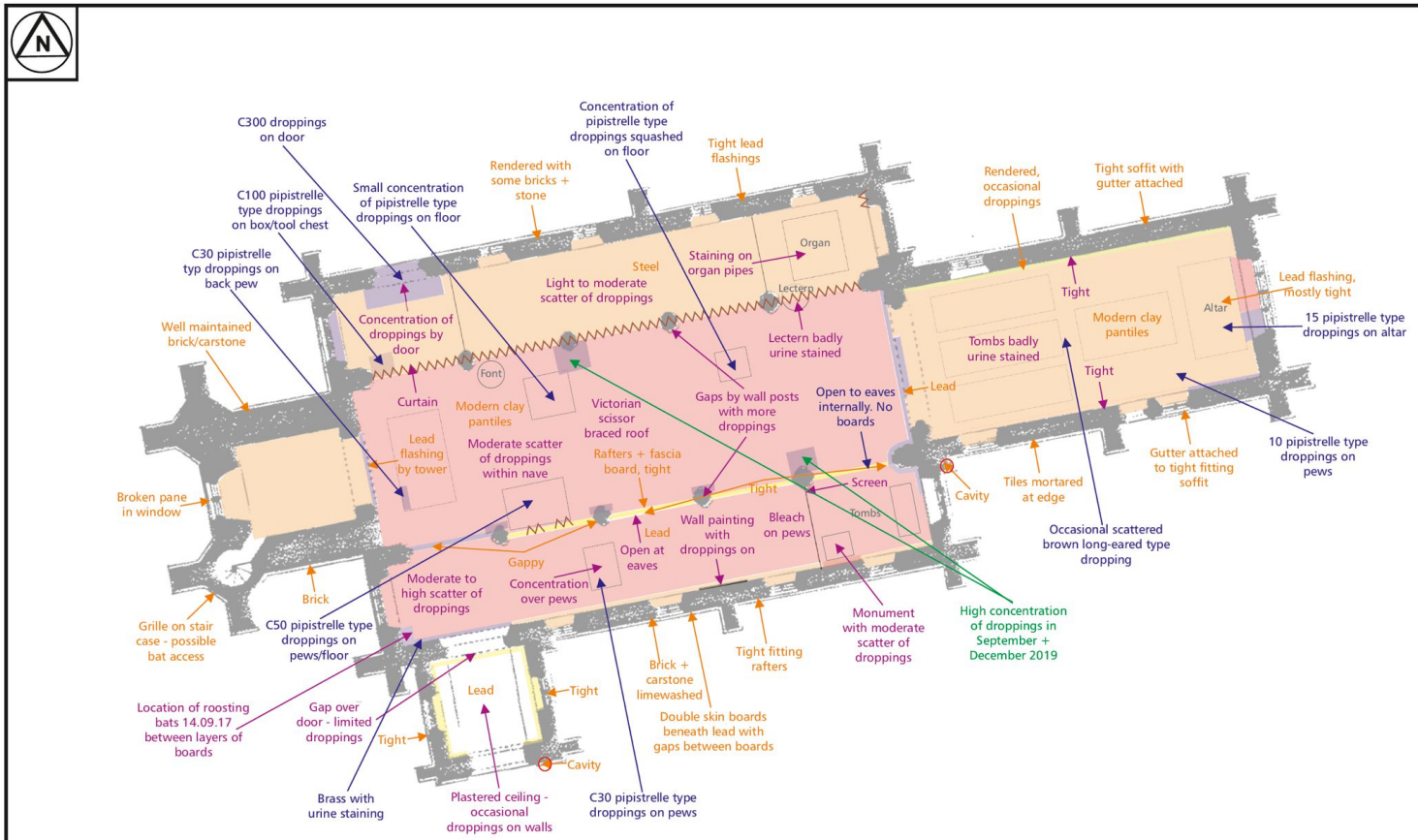
5.0 WORK SCHEDULE

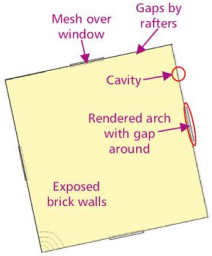
5.1 The following timescales for the various operations, staffing and approximate costings are shown in the following table. This is for the purpose of discussion to finalise the preferred options. It is understood that the provision of bat boxes does not require a faculty. This issue does need confirmation from the DAC secretary. Provision of cameras and heat mats, whilst in themselves may not require a faculty, permanent wiring might. Again, this needs further discussion. Costs are approximate and need confirmation from architects/ contractors. There is likely to be cost savings if elements are completed at the same time.

Table 6 Draft Work Schedule

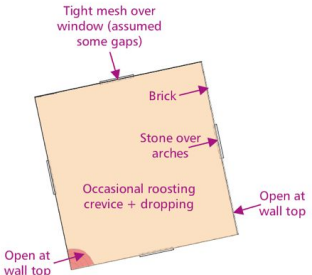
Option	Description	Who	Cost (plus VAT)	Faculty	Planning permission	Long term maintenance requirements
1	Bat box into south aisle (each location)	Building contractor	£1000 ? The box	No ?	No	Moderate
	Camera plus installation	Electrical contractor	£750	?	No	Low
2	South nave boxes	Building contractor	£1000	No	No	Moderate
	Camera plus installation	Electrical contractor	£500	?	No	Moderate
3	Bat box over door	Architect Building Contractor PPA	??	No ?	No	Moderate
	Heat mat and camera	Electrical contractor	£750	?	No	High
4	Pole mounted bat box	Building contractor PPA	£600	No ?	Yes ?	Low

Option	Description	Who	Cost (plus VAT)	Faculty	Planning permission	Long term maintenance requirements
	Kent Bat Boxes on trees	PPA	£250	No	No	Low
	Schweglar 2FE	Contractor	£100	No ?	No	Low





BELL CHAMBER (NTS)



SILENCE CHAMBER (NTS)

Note: Tower not updated in 2019

LOCATION PLAN (NTS)

SITE PLAN (NTS)

KEY

Crack with bat roost potential

Cavity with bat roost potential

Bat evidence - Floor/walls

Occasional bat droppings

Light scatter of bat droppings

Moderate scatter of bat droppings

Main concentration of bat droppings

Purple text = Internal information 14/09/17
Orange text = External information 14/09/17
Blue text = Internal information 09/05/19
Green text = Internal information 08/12/19

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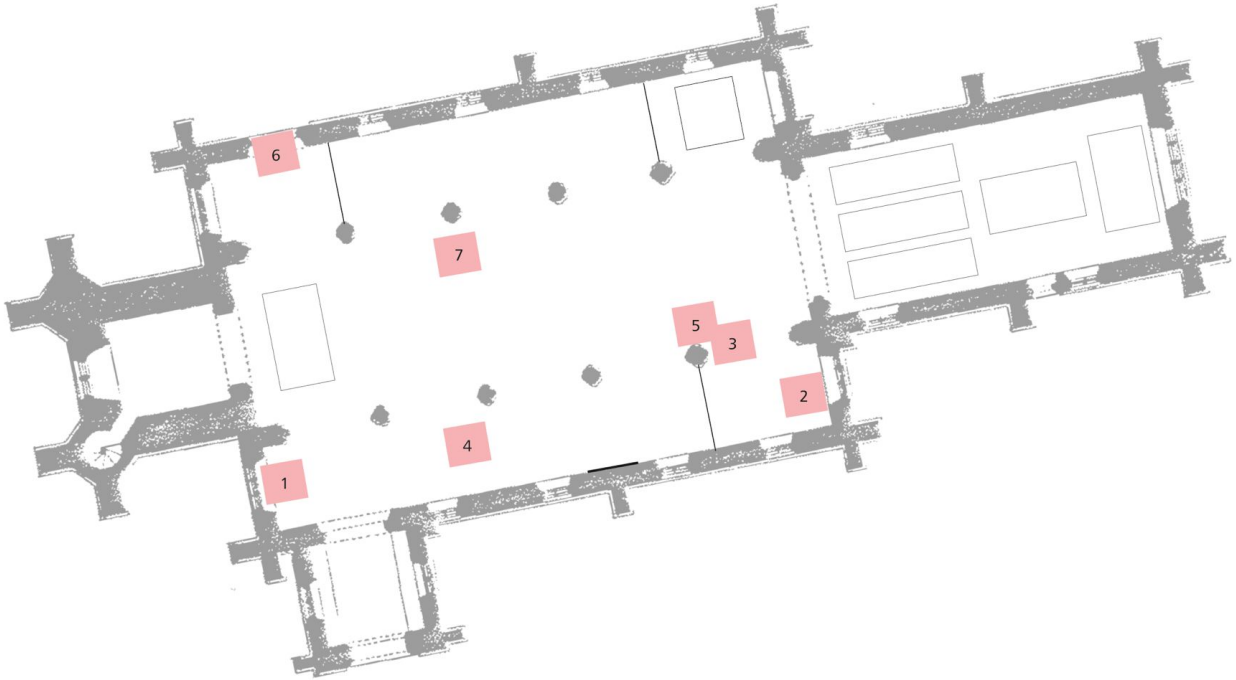
CLIENT
HLF BATS IN CHURCHES PROJECT

PROJECT
ST MARY THE VIRGIN CHURCH,
WIGGENHALL ST MARY,
NORFOLK

DRAWING TITLE
BAT SURVEY - PHYSICAL

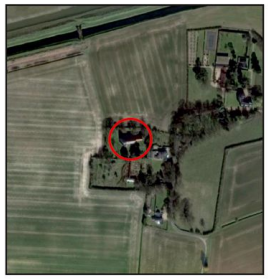
SCALE	DATE	DWG NO	REV
NTS	DEC 2019	P2019 - 35 D1	

REV DATE DETAILS



KEY

Monitoring sheet locations



LOCATION PLAN (NTS)

SITE PLAN (NTS)

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CLIENT

HLF BATS IN CHURCHES PROJECT

PROJECT

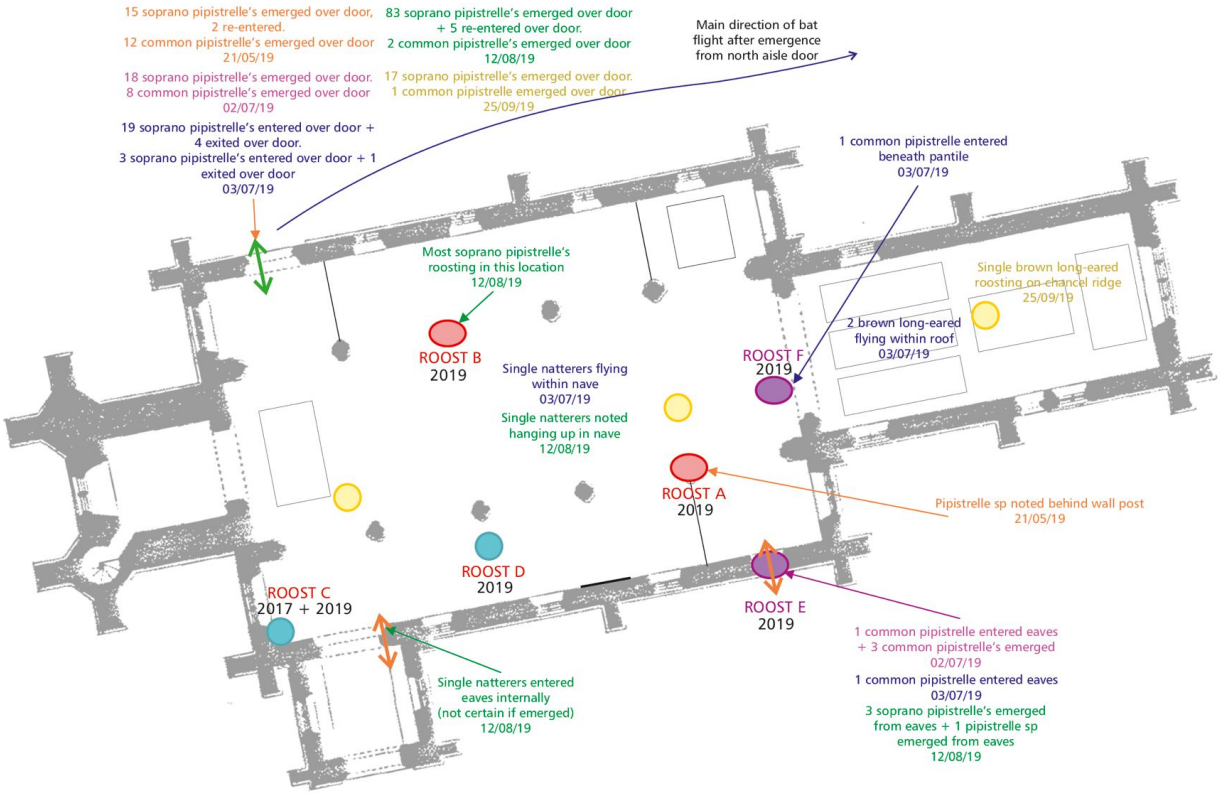
ST MARY THE VIRGIN CHURCH,
WIGGENHALL ST MARY,
NORFOLK

DRAWING TITLE

MONITORING SHEET LOCATIONS

SCALE	DATE	DWG NO	REV
NTS	AUG 2019	P2019 - 35 D2	

REV	DATE	DETAILS



Regular soprano pipistrelle + common pipistrelle foraging around church during all surveys

Single serotine pass 02/07/19

1 daubentons pass 03/07/19 & 12/08/19

LOCATION PLAN (NTS)

SITE PLAN (NTS)

KEY

- Primary internal roost location
- Secondary internal roost location
- Other internal roost location
- External roost location
- Primary access point into church
- Secondary (potential) bat roost location
- Main bat flight path when leaving the church

Orange text = Emergence survey information 21/05/19
Purple text = Emergence survey information 02/07/19
Blue text = Re-entry survey information 03/07/19
Green text = Emergence survey information 12/08/19
Yellow text = Emergence survey information 25/09/19

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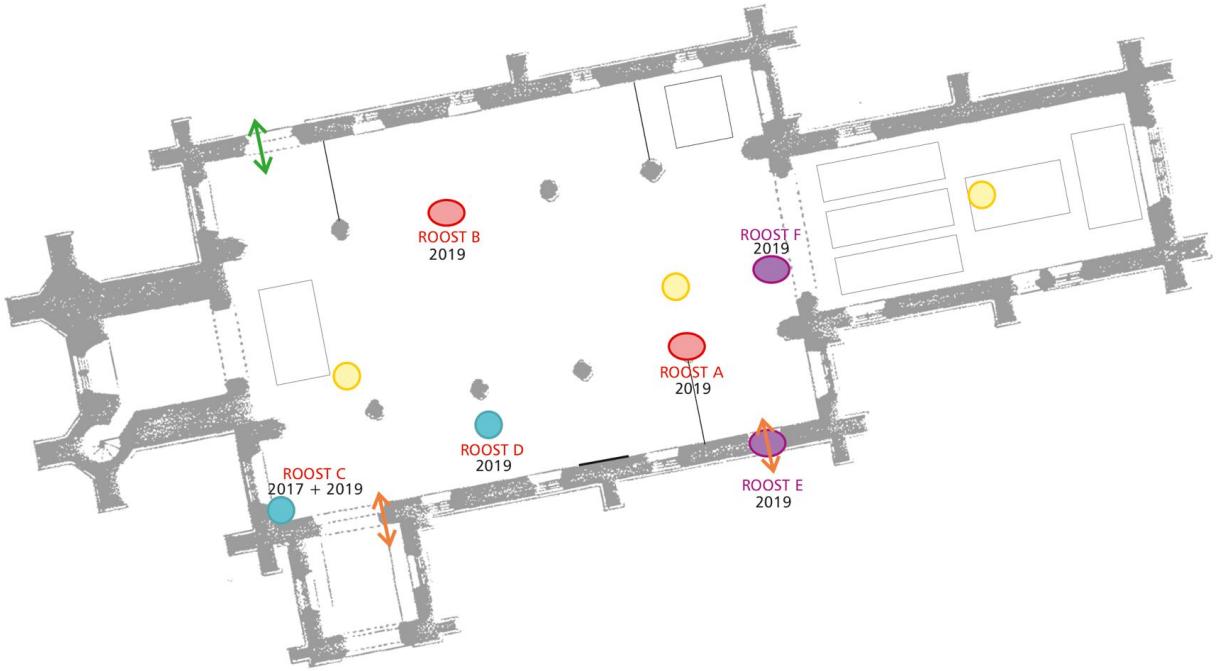
CLIENT
HLF BATS IN CHURCHES PROJECT

PROJECT
ST MARY THE VIRGIN CHURCH,
WIGGENHALL ST MARY,
NORFOLK

DRAWING TITLE
BAT SURVEY - ACTIVITY

SCALE	DATE	DWG NO	REV
NTS	DEC 2019	P2019 - 35 D3	

REV DATE DETAILS



KEY

- Primary internal roost location
- Secondary internal roost location
- Other internal roost location
- External roost location
- Primary access point into church
- Secondary bat roost location

Note:

1. There may be other roost locations not observed during the surveys.

2. All of the roosting sites noted in the nave and south aisle are either common pipistrelle or soprano pipistrelle. It is difficult to distinguish which bats are emerging from the secondary roost sites, as the bats do not always call as they emerge.

3. It was not clear from the surveys if bats accessed the church via Roost E.

LOCATION PLAN (NTS)

SITE PLAN (NTS)

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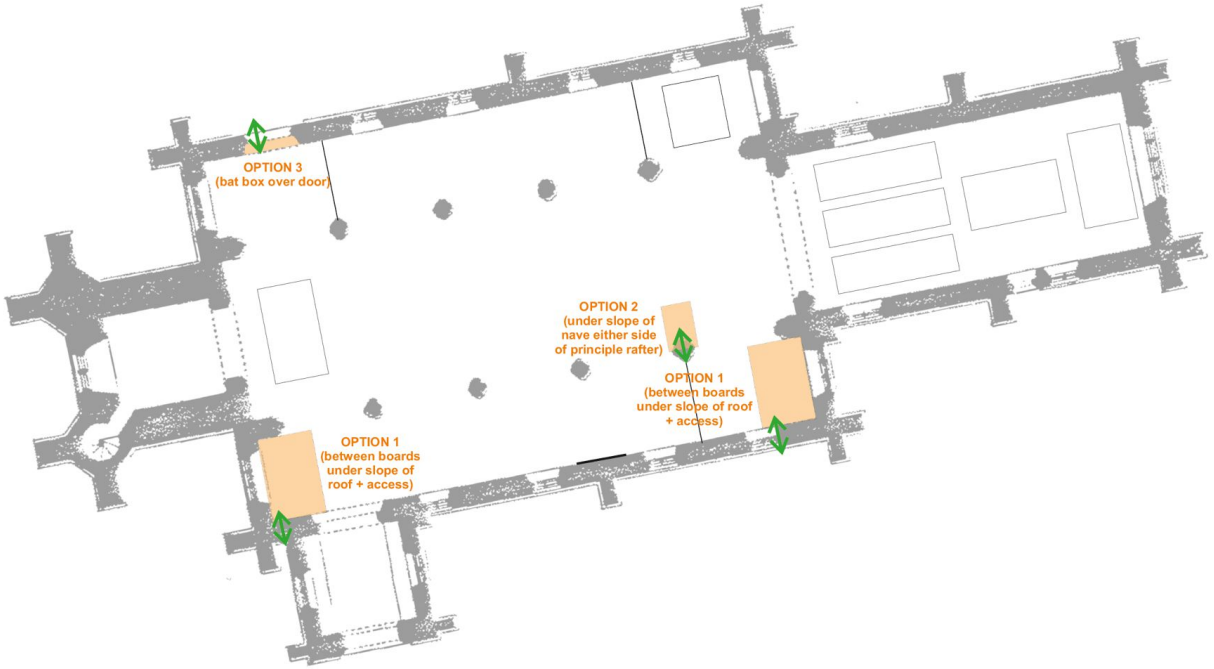
CLIENT
HLF BATS IN CHURCHES PROJECT

PROJECT
ST MARY THE VIRGIN CHURCH,
WIGGENHALL ST MARY,
NORFOLK

DRAWING TITLE
BAT ROOST LOCATIONS/ACCESS POINTS

SCALE	DATE	DWG NO	REV
NTS	DEC 2019	P2019 - 35 D4	

REV	DATE	DETAILS



KEY

Bat mitigation option

Access

LOCATION PLAN (NTS)

SITE PLAN (NTS)

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CLIENT
HLF BATS IN CHURCHES PROJECT

PROJECT
ST MARY THE VIRGIN CHURCH,
WIGGENHALL ST MARY,
NORFOLK

DRAWING TITLE
LOCATION OF BAT MITIGATION OPTIONS

SCALE	DATE	DWG NO	REV
NTS	DEC 2019	P2019 - 35 D5	

REV	DATE	DETAILS

APPENDIX A – BAT BOX CAMERA & HEAT MAT EXAMPLES

Example of bird box camera with night vision

Example of reptile heat mat that can be used to heat the bat box.

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