

THE CHURCH OF ST ANDREW, WOOD DALLING, NORFOLK



BAT MANAGEMENT PLAN

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DOCUMENT HISTORY				
Project Reference: 2021- 20		Document Title: Ecological Assessment		
Revision	Status	Originated	Reviewed	Date
Rev. 1	Draft 1	Naomi Parker	Philip Parker	25.09.21
Rev. 2	Final	Naomi Parker	Philip Parker	30.10.21

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THE CHURCH OF ST ANDREW, WOOD DALLING, NORFOLK

BAT MANAGEMENT PLAN

1.0 EXECUTIVE SUMMARY

- 1.1 Philip Parker Associates Ltd have been instructed to undertake bat surveys and provide advice for mitigation/management options at the Church of St Andrew, Wood Dalling, Norfolk as part of the Heritage Lottery Funded project (HLF). This report provides a summary of the surveys undertaken and mitigation/ management options to be considered.
- 1.2 Previous surveys to influence repair works to the south aisle and the chancel were undertaken in 2009, 2010 and 2011 and 2017.
- 1.3 Surveys at the church in 2021 were undertaken as follows:
- 15th April 2021 (preliminary survey following initial meeting with the PCC and Natural England)
 - 2nd June 2021 (emergence)
 - 15th July – 16th July 2021 (emergence and re-entry)
 - 18th August 2021 (emergence)
- 1.4 The 2021 surveys confirmed the presence of the following:
- Natterer's** – Breeding roost, peak count of 76 bats on the 18th August 2021 (including both internal and external roosts), moving between roost locations in the nave and the south aisle and accessing via the north aisle and north side of the chancel (2 separate access points). In addition, the natterer's were using one of the previously identified external roosting locations; in a putlog hole on the eastern side of the chancel on 3 occasions.
- Common pipistrelle** – Peak count of 23 on the 2nd June 2021 roosting internally and accessing over the west door with 15 roosting externally utilising the eaves and purpose made bat tiles;
- Soprano pipistrelle** – The peak count was the same during each of the surveys; 3 bats on the 2nd June 2021, 15th July 2021, 16th July 2021 and 18th August 2021 roosting internally and accessing via the west door. 1 bat was recorded entering the church through the south chancel eaves on the 16th July 2021.
- Serotine** – Peak count of 2 bats on the 18 August 2021 accessing via the north-west chancel eaves (1 roosting in the chancel and 1 within the access point itself).
- 1.5 Mitigation options for consideration are as follows:
- a) Manage the bat impacts by protecting vulnerable items inside the church by creating no-fly zones
- Costs – negligible (supplied by BiC)**

- b) Create new bat roosting at the point of entry (e.g. eaves level boxes). These are unlikely to be successful as the bats access points are all on the north side of the church. Only recommended as part of exclusion from the church
- c) Enhance bat roosting externally where bats have already been seen to be roosting (putlog holes and crevice bat boxes), monitoring use and exclude bats from the inside of the church –
Costs - Medium
- d) Bat nights and interpretation –
Costs – Negligible

1.6 The Bats in Churches Project have limited funds to be able to advise with this mitigation but will provide links to external funders who may be able to assist further. Philip Parker, through the Norfolk Bats in Churches Project, will be able to provide further assistance into the future.

2.0 INTRODUCTION

2.1 GENERAL

Philip Parker Associates Ltd (via Wild Wings Ecology) have been instructed to undertake bat surveys and provide advice for mitigation/management options at the Church of St Andrew, Wood Dalling, Norfolk as part of the Heritage Lottery Funded (HLF) project by way of a Bat Management Plan (BMP).

2.2 The brief for the project states that the BMP should include the following:

- Full ecological report with a summary of bat survey data and a complete picture of how bats are utilising the church.
- Floor plans of the church, internal and external photographs, roost locations, and entry/exit points identified for each species.
- Assessment of the heritage impacts caused by bats. Please reference the Statement of Significance and any associated reports on the impact of bats on church heritage.
- Presentation of all bat management options considered and the reasons why non-favoured options were rejected. Favoured option to be presented in detail and, as far as possible, fully costed (including all works and monitoring).
- A record of meetings, consultations and responses presented to the PCC, Diocesan Advisory Committee or Churches Conservation Trust, Historic England, architect, heritage organisations etc.
- Details of licensing requirements and justifications under the BICCL.

2.3 This report provides the information as required by the Bat Mitigation Plan.

3.0 SUMMARY OF EXISTING INFORMATION RELATING TO BATS AT THE CHURCH

3.1 The Church of St Andrew, Wood Dalling, Norfolk is located at OS Map grid reference; TF 50213 16879.



Figure 1 – Location plan
Crown Copyright and database rights 2021
Ordnance Survey



Figure 2 - Aerial photograph
Imagery © 2021 GeoEye, Getmapping plc,
Infoterra Ltd & Bluesky

3.2 HISTORY OF BAT USE AT THE CHURCH OF ST ANDREW, WOOD DALLING

Previous surveys were undertaken at the church in 2009, 2010 and 2011 in respect of re-roofing the south aisle after lead theft (these works were covered by an EPS licence) and in 2017 in respect of re-roofing the chancel. Further surveys were undertaken in 2012 in respect of the DEFRA Bats in Churches project (in relation to natterer's roosts). A summary of the bat evidence recorded during these surveys is given in Table 1 below.

Table 1 A summary of previous surveys undertaken at the Church of St Andrew, Wood Dalling

Date	Survey Type	Coverage	Species	Location
8/4/09	Physical survey	Whole church	Natterer's Pipistrelle spp	Occasional droppings of both species. Concentrations noted in the south aisle and by the west door
16/4/09	Physical survey	Whole church	Natterer's Pipistrelle spp	Confirmation that the roosting areas in the south aisle were for natterer's
15/7/09	Emergence survey	Whole church	Natterer's Common pipistrelle	Minimum 20 natterer's in the church, access point not identified 5 emerged over the western door (A3) (roost site not located)
16/7/09	Re-entry survey	Whole church	Natterer's Common pipistrelle	64 entered via access point A2 and roosted in south aisle (R2)

Date	Survey Type	Coverage	Species	Location
				5 accessed over the west door A3 and roosted in the south-east corner of the chancel (R5)
18/9/09	Emergence survey	Whole Church	Natterer's Common pipistrelle Soprano pipistrelle	1 roosting internally (R4), 29 emerged from a cavity on the eastern gable (R12) 3 roosting in the church (location unknown) and accessed over the west door (A3) 1 roosting in the church (location unknown) and accessed over the west door (A3)
19/9/09	Re-entry survey	Whole church	Natterer's Common pipistrelle	39 entered the church via the north chancel (A2) and went to roost in various locations within the nave (R4) One entered the church via the west door access (A3) and went to roost in the nave roost (R4)
5/7/10	Emergence survey	Whole church	Natterer's Common pipistrelle	16 emerged from south aisle roost (R2) and left via north chancel access (A2). Many bats were left at the end of the survey (assumed to be juveniles) 6 emerged over the west door (A3)
6/7/10	Re-entry survey	Whole church	Natterer's Common pipistrelle	59 entered Roost (R2) via north chancel (A2) and a further 2 via A1 (by north porch). 3 entered the church via the west door (A3) and roosted in the nave (R4) and the chancel (R5)
26-27/6/11	Emergence and re-entry (EPSL monitoring)	Whole church	Natterer's Common pipistrelle Soprano pipistrelle	Large numbers of droppings by pulpit suggesting new location of roost, none near replacement roost location. Over course of survey, 30 Natterer's (adults) roosting in pulpit location (R3) and 30 into a flue pipe on east end of north aisle (R16). Young also flying inside the church. This level of activity equates to that seen pre-repair works. 9 roosting in the church, accessing over the west door (A3) 1 roosting in the church accessing over the west door (A3)
08/11	DEFRA Bats in Churches project	Unknown	Natterer's Common pipistrelle	At least 30 in external east chancel cavity (R13). Bats also present within the church but numbers not recorded Individuals present within the church Individuals present within the church

Date	Survey Type	Coverage	Species	Location
			Soprano pipistrelle	
07/12 – 08/12	DEFRA Bats in Churches project	Unknown	Natterer's Common pipistrelle Soprano pipistrelle	At least 30 in external east chancel cavity (R13). Small numbers of bats also present within the church Small numbers present within the church Small numbers present within the church
18/6/17	Physical survey	Whole church	Natterer's Pipistrelle spp	Light spread of droppings throughout the church. No concentrations but the church had been recently cleaned.
18/7/17	Emergence survey	Whole church	Natterer's Common Pipistrelle	42 emerged from 2 cavities on the eastern chancel gable (R12 = 33 and R13 = 9). No natterer's were present within the church 4 roosting within the nave (R4) and accessed over the west door (A3). 2 further bats emerged from eaves level on the south side of the chancel (R10)
16/8/17	Physical survey	Whole church	Natterer's Pipistrelle spp	Good spread of droppings throughout the church. Concentrations of natterer's suggesting a roost above the font, south nave pews and the east end of the south aisle.
16/8/17	Emergence survey	Whole Church	Natterer's Common pipistrelle	47 roosting in the cavity on the eastern wall of the chancel (R12). No bats present within the church. 5 emerged from the south slope of the chancel close to the flashing (R10) 6 roosted internally within the nave (R4) and emerged over the west door (A3)

3.3 PREVIOUS MITIGATION WORK AT THE CHURCH

As part of the roof repair works undertaken in 2012, a new roosting location was created in the south aisle (at R2) to replace the original natterer's roost that was in the rotten end of the principal rafter.

3.4 At the same time, oak mortise boxes (constructed by Finnemore Associates) and counters were installed on the nave at base of tower at high level. They showed some minor initial use but the batteries had long since died and it is not known therefore if these have been used since. The

principal of the infrared counters is however sound and could be considered for future monitoring.



Figure 3 – Internal mortise box installed in the nave. Others were installed in the tower

3.5 As part of the chancel roof repairs in 2017, 5 no bat lead bat slots were created in the chancel roof (refer to Figure 4) – 2 on the north and 3 on the south side. These replaced any lost bat roosting potential under the slates as part of the repair works. Several oak Kent bat boxes were installed on trees around the churchyard but these have not been maintained and are starting to vegetate over.

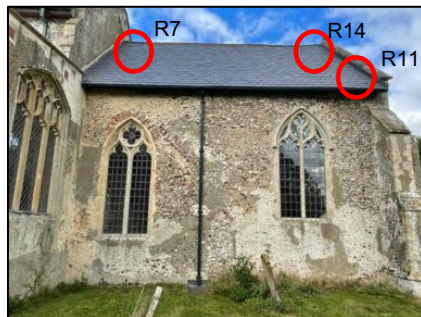


Figure 4 – Lead bat slots put into the chancel as part of the 2017 repair works



Figure 5 – Kent bat box on tree, access partly obstructed by vegetation

3.6 In 2017, the church was put forward as one of the additional churches for a Light Touch Survey and was accepted. The Light Touch Survey was undertaken at the church on the 20th September 2017 by Philip Parker Associates Ltd to determine the overall impact of bats on the significance of the church, determined from the identification of species through evidence i.e. droppings and utilisation of the building by bats through identifying likely access points and roost sites. It was concluded that there were two main concentrations of droppings; one containing c500 fresh droppings on and around the font whilst the second concentration was present in the south aisle (approximately c500). Throughout the nave there was a light to moderate scatter of droppings on the pews and floor with lots of fresh urine on the floor tombs.

- 3.7 Following the initial meeting with the PCC and Nick Warns (Architect) on the 15th April 2021, in view of the previous survey data which confirmed the use of putlog holes by bats, the option of opening up further putlog holes and monitoring these was discussed. The works were approved by Natural England but it transpired in discussion with the Diocesan Advisory Council (DAC) that list B approval would be acquired for the works. Further information can be found in Section 7.7. This was obtained and the bat slots were installed on the 14th June 2021.



Figure 6 – One of the newly installed putlog holes



Figure 7 – Installation of the additional putlog holes on the east face of the chancel

4.0 2021 SURVEY METHODOLOGY

4.1 GENERAL

Update surveys during 2021 were carried out at the church by a team of experienced surveyors, on each occasion led by a licenced bat worker. Surveys were carried out as far as possible following the guidelines given in the Bats in Churches Class Licence.

4.2 This sets out the minimum number and timing of surveys required, as follows:

4.3 At least one dusk survey should be carried out in each of the survey periods identified below with each survey completed at least two weeks apart. In addition, one dawn survey should be carried out in the first period – this can be carried out immediately after the emergence survey.

- Survey 1 May to mid-June
- Survey 2 Mid-June to end July
- Survey 3 August to mid-September

4.4 The exception to the above methodology was that the dawn survey was undertaken immediately after the second dusk survey due to the late spring.

4.5 SURVEY EQUIPMENT

Surveys have been carried out through the use of the following equipment:

Table 2 Survey methodology for the 2021 surveys

Equipment Type	Equipment specifics	Notes	Analysis
Infrared cameras	Infrared cameras Canon XA-10 (2019 - 2021) Canon XA-11 (2019 – 2021) Canon XA-30 (2019 – 2021) Canon XF-400 (2020 – 2021) Thermal imaging camera Guidetrack pro 19	Attached to a rigid tripod for stability (various makes)	Files processed and saved in Photos for MAC programme and saved on 4TB external Western Digital Drives Videos analysed using Quick Time Player
Infrared lights	A minimum of 2 no infrared lights were used per camera (140 led)	Set on brackets attached to a rigid tripod (various makes)	
Additional lighting	Clulite CB2 (million candle power) with additional red filter	Used to provide additional illumination on the preliminary survey and on activity surveys where it is certain it would be an impact on the bats	

Equipment Type	Equipment specifics	Notes	Analysis
Hetrodyne detectors	Batbox Duet detector x 4 Batbox Griffin x 1	Each surveyor was 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 with an Anabat Express detector to enable later checking of any recorded data	Calls analysed using Analook or Insight
Camera	Olympus TG5 camera	Used to record images on the preliminary survey	
Binoculars	Leica 8 x 40	Used to inspect for evidence and roosting sites on both the preliminary and activity surveys	
Thermometer	ETI- Hygro - Thermo Pocket sized hygrometer	Used to provide accurate temperature and humidity readings	

4.6 SURVEY METHODOLOGY

Surveys in 2021 have been undertaken on the following dates using the following surveyors (see Table 3).

4.7 Surveyors who took part in the surveys are listed below. Where the surveyors are licensed, their licence numbers are given.

- Philip Parker (2015-14467-CLS-CLS)
- Karl Charters (2015-13353-CLS-CLS)
- Naomi Parker (2018-34600-CLS-CLS)
- Kate Garner
- Rebecca Easter
- Lisa Gabriel
- Emily Parker

Table 3 Summary of surveys undertaken

Date	Survey Type	Surveyor	Start and finish time	Weather
15 th April 2021	Physical	Philip Parker	14:00 – 15:00	N/A
2 nd June 2021	Emergence survey	Philip Parker Naomi Parker Emily Parker Kate Garner Rebecca Easter	21:02 – 23:02	Weather – Dry, F3, 40% c/c Start Ex - Temp – 16c Ex - Humidity – 82% Finish

Date	Survey Type	Surveyor	Start and finish time	Weather
				Ex - Temp – 15c Ex - Humidity – 82%
2 nd June 2021	Emergence survey	Philip Parker Naomi Parker Kate Garner Rebecca Easter Emily Parker	20:56 – 23:20	Weather – Dry, warm, still, 0% cc, BF1 Start Ex - Temp – 17.6c Ex - Humidity – 32% Finish Ex - Temp – 14.1c Ex - Humidity – 48%
15 th July 2021	Emergence survey	Philip Parker Karl Charters Naomi Parker Kate Garner Rebecca Easter	21:58 – 22:58	Weather – Dry, 100% cc, BF6 Start Ex - Temp – 14.9c Ex - Humidity – 70% Finish Ex - Temp – 13.0c Ex - Humidity – 73%
16 th July 2021	Re-entry survey	Philip Parker Rebecca Easter Karl Charters Kate Garner Naomi Parker	02:50 – 04:50	Weather – Dry, 50% cc, still, BF2 Start Ex - Temp – 11.2c Ex - Humidity – 90% Finish Ex - Temp – 11.6c Ex - Humidity – 93%
18 th August 2021	Emergence survey	Philip Parker Karl Charters Kate Garner Rebecca Easter Lisa Gabriel	20:00 – 22:00	Weather – Dry, 100% cc, still, BF4 Start Ex - Temp – 19.4c Ex - Humidity – 64% Finish Ex - Temp – 16.6c Ex - Humidity – 72%

4.8 During the surveys, surveyors were typically located as follows (as shown on Drawing D2):

Internal

One surveyor internally.

External

- One surveyor to the north of the nave;
- One surveyor to the north-east of the chancel;
- One surveyor to the south-east of the chancel;
- One surveyor to the west of the tower monitoring the door;

- One infrared camera and Anabat Express detector monitoring the south side of the nave (where no bats have previously been observed to be accessing)

4.9 **Survey constraints**

There were no constraints to the surveys.

5.0 2021 SURVEY RESULTS

5.1 The results of the 2021 surveys are summarised in the following table and illustrated on Drawing P2020- 41 D1 (physical survey update), D3 (activity survey summary) and D4 (roost site and access location summary).

Table 4 Survey results

Date	Type of survey	Species Roosting	Species, number and description
15 th April 2021	Physical	Natterer's Pipistrelle	Scattered droppings within the church Small concentrations near to the font (R1) and in the south aisle (R2) Concentrations of droppings on the wall of the north aisle near (A1) and north chancel (A2) Occasional/light scatter of droppings through the church Concentration of droppings on and around the west door (previously recorded access point) Note access not allowed to the tower during the summer due to the level of pigeon droppings and health issues. Access in the later summer after cleaning showed limited evidence but potential for access
2 nd June 2021	Emergence	Natterer's Common pipistrelle Soprano pipistrelle	Natterer's 27 roosting at the west end of the nave over the font (R1), accessing via the north aisle (A1) 2 roosting externally in putlog hole (R12) Common pipistrelle 23 roosting in the nave (R4), accessing via the west door (A3) 10 total externally south side of the chancel; 2 from north-east bat tile R14, 6 from wall cavity (R9), 1 from eaves (R10) and 1 from south-east bat tile (R11) 1 roosting externally at south-east eaves of nave (R7) 4 total externally from north side of chancel; 4 from eaves (R15) Soprano pipistrelle 3 roosting in the nave (R4), accessing via the west door (A3)
15 th July 2021	Emergence	Natterer's Common pipistrelle Soprano pipistrelle	INTERNAL ROOSTING Natterer's

Date	Type of survey	Species Roosting	Species, number and description
			<p>38 roosting internally in the nave (R2), 32 accessed via the north aisle (A1) and 6 via the north chancel (A2)</p> <p>Common pipistrelle 12 roosting in the nave (R4) and accessed via the west door (A3)</p> <p>1 roosting externally south side of chancel in R10</p> <p>4 roosting externally north side of chancel in R15</p> <p>Soprano pipistrelle 3 roosting in the nave and accessed via the west door (A3)</p>
16 th July 2021	Re-entry	Natterer's Common pipistrelle Soprano pipistrelle	<p>Natterer's 29 roosting internally in the south aisle (R2), 8 accessed via the north aisle (A1) and 21 via the north chancel (A2)</p> <p>17 roosting externally in R12</p> <p>Common pipistrelle 7 roosting internally in the nave (R4), 7 accessed via the west door (A3)</p> <p>7 roosting externally north side of chancel in R15</p> <p>8 roosting externally south side of chancel; 1 in R10 and 7 in the north-western bat tile (R6)</p> <p>Soprano pipistrelle 2 roosting in the nave (R4), 1 accessed via the west door (A3) and 1 via the south chancel eaves (A4)</p>
18 th August 2021	Emergence	Natterer's Common pipistrelle Soprano pipistrelle Serotine	<p>Natterer's 66 roosting internally split between R2 in the south aisle and R3 in the nave. Accessing via the north aisle A1 (29 bats), north chancel A2 (34 bats) and south side of chancel; 3 bats from A4.</p> <p>10 emerged externally from R12</p> <p>Common pipistrelle 12 roosting in the nave (R4), accessing via the west door (A3)</p> <p>4 roosting externally north side of chancel in R15</p> <p>10 roosting externally south side of chancel in R6</p> <p>1 roosting externally in north-eastern nave eaves (R17) and 1 in west tower door frame (R8)</p>

Date	Type of survey	Species Roosting	Species, number and description
			<p>1 roosting externally at the north-east nave corner eaves (R18)</p> <p>Soprano pipistrelle 3 emerged from R4, accessing via A3.</p> <p>Serotine 1 accessed the church through the north-western nave corner eaves (A5) and went to roost in the chancel roof timbers (R5)</p> <p>1 went to roost externally in R16</p>

5.2 A summary of the survey results across the years can be found in the following table.

Table 5 Species summary results

Date	Internal/ External	Natterers	Common pipistrelle	Soprano pipistrelle	Serotine
15/7/09	Internal	64			
	External				
16/7/09	Internal	1	3	1	
	External	29			
18/9/09	Internal	20	1		
	External				
19/9/09	Internal	39	1		
	External				
5/7/10	Internal				
	External				
6/7/10	Internal	61	3		
	External				
26/6/11	Internal	30	9		
	External	30	1		
18/7/17	Internal		4		
	External	42	2		
16/8/17	Internal		6		
	External	46	5		
2/6/21	Internal	27	23	3	
	External	2	15		
15/7/21	Internal	38	12	3	
	External		5		
16/7/21	Internal	29	7	1	
	External	17	15		
18/8/21	Internal	66	11	3	1

Date	Internal/ External	Natterers	Common pipistrelle	Soprano pipistrelle	Serotine
	External	10	17		1

5.3 Constraints to the survey

It is not certain (even having checked camera footage) whether all the identified external roost sites for pipistrelles on the north side of the chancel relate to bats that have actually roosted externally or whether some of these have emerged from the inside of the church. These uncertainties will not have impacted on the overall assessment.

5.4 Illustrated photographs of the roost sites, access points etc described in the text above can be found below:



Figure 8 - The nave roof structure provides a multitude of roosting opportunities including principal areas roost R1 and R3



Figure 9 – Roost R2 located in the south aisle. This was re-created under licence as part of the south aisle re-roofing works in 2012



Figure 10 – Droppings at the base of the font during the June survey below roost R1



Figure 11 – Droppings and debris below roost site R2 in the south aisle



Figure 12 – Droppings and urine on ledger stones below the chancel step – August 2021- Roost R3

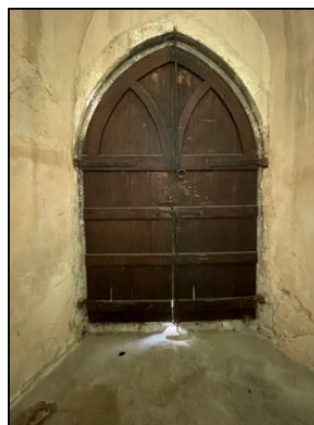


Figure 13 – West door is the main access (A3) for the pipistrelles from the church



Figure 14 – Location of access point A2 (principal access for natterer's). Small numbers of common pipistrelle also emerged (but these did not appear to have come from the inside) and were considered to have roosted beside the rafters



Figure 15 – North aisle and nave, showing the location of principal natterer's access point A1

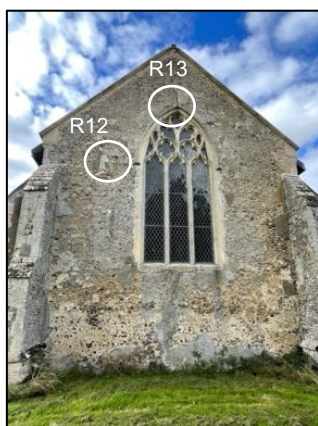


Figure 16 - Eastern wall of the chancel showing the location of the various roost sites



Figure 17 – Bat access is possible to both the silence and bell chamber although there is limited evidence of use. Until recently both areas were heavily impacted by pigeons (these have only recently been excluded)

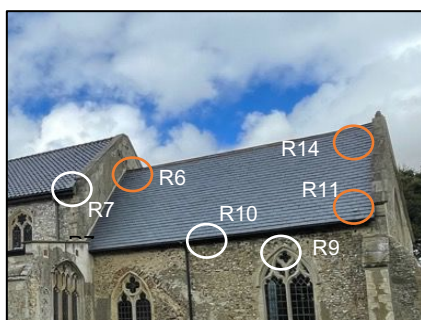


Figure 18 – South side of the chancel roof showing the various bat roost areas (bat slots shown in orange)



Figure 19 - Pond to the north of the church attracts foraging bats

5.5 SUMMARY OF THE SURVEYS BY SPECIES

Natterer's

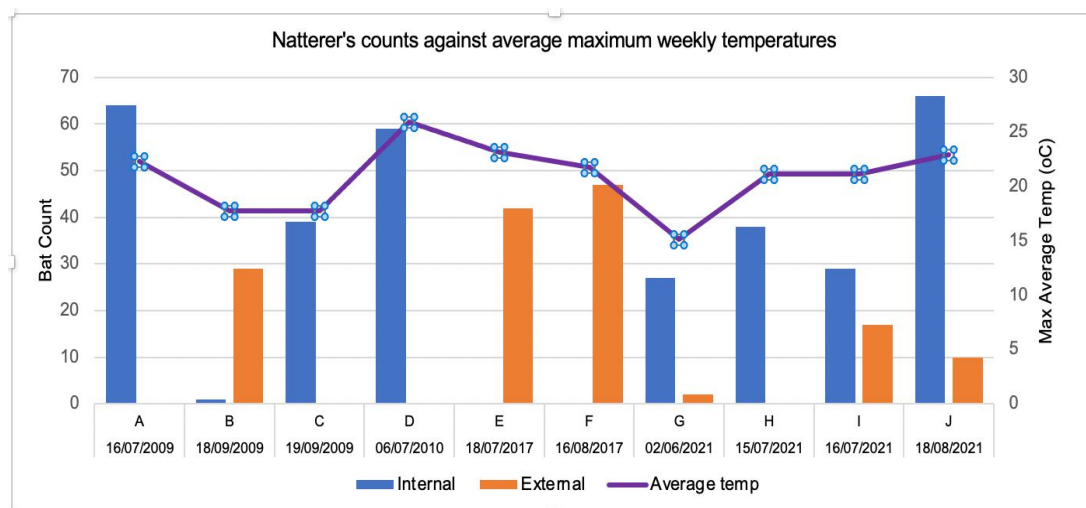
The following table provides a summary of the roost counts (split between internal and external). These counts have been compared to the maximum average temperatures over the week¹

Table 6 Natterer's summary

Date	Internal	External	Total	Max average temp over the week (°C)
16/07/2009	64	0	64	22.29
18/09/2009	1	29	30	17.71
19/09/2009	39	0	39	17.71
06/07/2010	59	0	59	25.86
18/07/2017	0	42	42	23.14
16/08/2017	0	47	47	21.71

¹ The counts have been calculated using data from the nearest weather station at Norwich Airport using the website www.wunderground.com

Date	Internal	External	Total	Max average temp over the week (°C)
02/06/2021	27	2	29	15.14
15/07/2021	38	0	38	21.14
16/07/2021	29	17	46	21.14
18/08/2021	66	10	76	22.86



Graph 1 – Natterer's internal and external count against a weekly average temperature

5.6 The natterer's roost is confirmed as a maternity (dead juvenile found in 2021) with the roost moving between various locations internally and identified location externally (eastern elevation) although other external locations have previously been used. Comparison has been made to the prevailing weather temperatures (see graph above) to how the locations of the roosting bats change. It is concluded that there appears to be no direct correlation in the number of bats roosting externally or internally during periods of colder or warmer weather conditions.

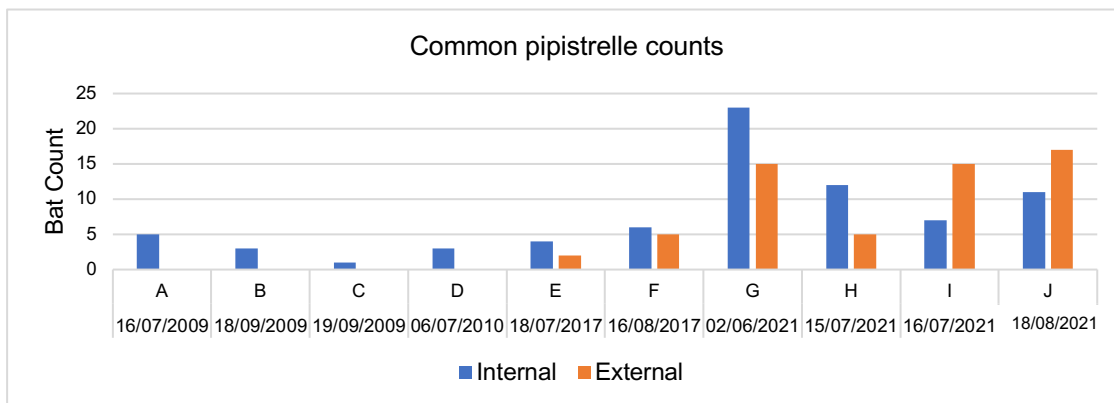
5.7 Common pipistrelle

The following table provides a summary of the common pipistrelle roost counts (split between internal and external) between 2009 and 2021.

Table 7 Common pipistrelle summary

Date	Internal	External	Total
16/07/2009	5	0	5
18/09/2009	3	0	3
19/09/2009	1	0	1
06/07/2010	3	0	3
18/07/2017	4	2	6
16/08/2017	6	5	11
02/06/2021	23	15	38

Date	Internal	External	Total
15/07/2021	12	5	17
16/07/2021	7	15	22
18/08/2021	11	17	28



5.8 The graph above shows that the number of common pipistrelles present at St Andrews church in 2021 has more than doubled since it was last surveyed in 2017 with the utilisation of external roosts significantly greater than previously recorded.

6.0 IMPACTS OF THE BATS ON THE HERITAGE OF THE CHURCH

6.1 The Statement of Significance for the church was prepared by The Bats in Churches Project (Rachel Arnold) dated February 2021 (following a visit on the 29th January 2021). This notes the following;

“St Andrew’s is Grade I listed, the highest grade of listing reserved for 2.5% of buildings with listed status. The body and interior of the church is largely medieval with few major restorations over the period. The church contains many important furnishings and is an important building within the village and is the tallest building for miles around.

The significance of the building lies within its surviving medieval fabric. The design of decorative elements like the window traceries in the aisles and south of the chancel, and their comparison to the earlier lancet windows in the north of the chancel represent the medieval development of the building. The ogee arches over doors and piscina, and the corbels for the roof and window surrounds and their subtle variations are all of significance. The interior white plaster retains a pre-medieval feel to the interior, which has been lost in so many other churches. The roof structure and timbers are at least partly medieval, despite some rebuilding.

The ledger stones and floor brasses within the church are extensive and striking, covering much of the nave floor. These are mostly late medieval or pre-Victorian. The other surviving medieval furnishings and their relatively unaltered appearance adds to the historical feel of the building and its significance. One of the most unusual features of the church is the recurved effigy, which in itself is of high significance”.

6.2 Gradings of the various features is shown below. The level of bat impact (as taken from the table within the Statement of Significance) is also shown, grading from 0 for no impact to 5 for the greatest level of impact.

6.3 **Items of high significance:**

- Re-carved marble effigy (3)
- Ledger stones (4)

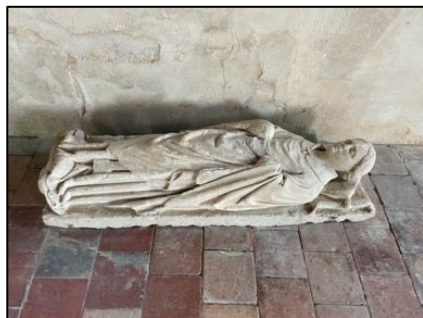


Figure 20 – Marble effigy in the north aisle is of high significance. This is in an area where the bats fly before leaving the church via access A1



Figure 21 – Ledger stones in the nave of high significance. These show a high level of historic and current bat urine damage. These are shown close to roost R3 and therefore suffers significant damage

6.4 Items of moderate-high significance

- Pews (4)
- Chancel stalls (3)
- Wall monument (1)



Figure 22 – Medieval pews in the nave. These show significant urine staining

6.5 Items of moderate significance

- Roof structure (2)
- Lectern and other wooden furniture (3)
- Pulpit (2)
- Font (1)
- Medieval glass fragments (0)



Figure 23 – The font sits directly under one of the bat roosting areas

6.6 Items of low significance

- Wall surfaces (3)
- Floor surfaces (excluding ledger stones) (4)
- Altar (0)
- Altar rail (1)

6.7 The Statement of Significance states that:

“Due to the large numbers of droppings within the church and the continued staining and burden of cleaning options should be sought to restrict bat access to the inside of the church. Although volunteers are keen to use the church and encourage its use as a venue for events, activities and art displays, its status as a ‘Festival Church’ suggests its viability is already stretched. Clearing up droppings is another burden that stretches the volunteers past their limits.

With a large concentration of bats roosting on the outside of the church, and the way that this varies throughout the year, it is hoped that this area can be enhanced and adapted to make it more appealing to the bats and support their habitation throughout the summer.

In addition to these surveys, the BiC project can also support protection of the small, monumental brasses by providing suitable covers. On a small scale these will not impact on the internal aesthetic of the building and its heritage significance. Large scale covering of the floor and pews, would be difficult and destroy the historic, light and atmospheric interior, which is part of its architectural significance. This should be avoided as a permanent solution”.

7.0 MITIGATION/MANAGEMENT RECOMMENDATIONS

7.1 Following consideration of the survey results set out in Section 4, the following mitigation options have been developed for consideration. These were discussed at a meeting with Jonathon Rodwell of the PCC on the 27th September 2021 and were generally approved for final reporting. Estimated costs of the various mitigation proposals can be found in Section 6.

A Manage the bat impacts to prevent damage to items of historical value – this could be achieved by covering up particularly important elements or the use of acoustic deterrents to create no-fly zones within the church

7.2 Within the church, features of high significance are the re-carved marble effigy (north aisle), the ledger stones (nave and chancel), brasses (various) and the piscina and sedilia (chancel). The ledger stones and brasses in particular show the effects of bat urine.

7.3 Given the nature of the roosts (natterer's largely moving around the south aisle and nave R1, R2 and R3) and location of the access points (at the base of the tower A3, the north side of the chancel A2 and the north aisle A1) means it would be difficult to create no fly zones whilst still maintaining bat access into the church.

7.4 Covering the brasses may be successful with limited visual impact (as recommended in the statement of significance) but large scale covering of the ledger stones and pews would be difficult and it would destroy the historic, light and atmospheric interior, which is part of its architectural significance. The Statement of Significance recommends that this should be avoided as a permanent solution.

Costs – Negligible (supplied by BiC)

B Create new bat roosting features at the point of entry

7.5 It is possible on some churches to enclose the bat entry points into the church to create alternative bat roosting areas. This does rely on the structure of the church being suitable (e.g. with large eaves voids – more normally found on the nave and chancel than the eaves) and ideally the access being on the southern side of the church where created roosts can be naturally heated by the sun. At St Andrews there are some suitable voids at the wall top that could be enclosed for the natterer's bats at the access points as part of the exclusion programme to seal up the gaps (see 7.15).

Costs – Carried out as part of C

C Enhance bat roosting externally and obstruct access into the church

- 7.6 This is the PCC's preferred option and they would support the further monitoring works that could help with the mitigation of natterer's bats at other churches.
- 7.7 The Church of St Andrew benefits from a history of monitoring dating back to 2009. This has demonstrated that the common pipistrelle and natterer's (the principal species) not only roost internally but also roost externally, the former in lead bat slots installed on the chancel during the 2017 re-roofing works and the latter in putlog holes on the eastern chancel wall. As identified in Section 3.7, prior to the July survey, 5 additional putlogs were opened up on the chancel to created further natterer's roosting opportunities. There was no evidence of use during the subsequent activity surveys but these surveys only represent a snapshot in time and the features could have been used at other times leaving no obvious evidence of use.
- 7.8 It is recommended that further roosting opportunities could be provided through the opening up more putlog holes and by erecting suitable bat boxes on the elevations which are considered to be less conspicuous. This would provide an ideal opportunity for further research into potentially low cost solutions for a species that is otherwise difficult to manage for. Some boxes that are currently being trialled for natterer's at Saxlingham which resemble putlog holes are constructed by Greenwood Eco Habitats and comprise of 2-3 access slots leading to an internal void (Figure 24 below). These can be coloured to match the general wall colour. It would not be possible to attach them to the walls in the same orientation as the putlog holes so they would either have to be erected horizontally or vertically against the walls.



Figure 24 – Example of a Greenwood Ecohabitat bat box

- 7.9 Consideration could be given to attaching two of the above boxes to the south aisle wall, possibly between the top of the buttress and the eaves where they would be least visible, as shown on the following photograph extract.



Figure 25 – Potential locations of bat boxes on the south aisle

- 7.10 The parvise to the south porch has no internal access but has two louvred windows on the eastern and western elevations, part of which leads internally to the sealed parvise void and the other apparently to a barn owl box. Another location for the void boxes could be to set one into each of the windows on the parvise.



Figure 26 – Potential location for bat boxes behind louvres on the parvise

- 7.11 On the eastern side of the north aisle, a disused flue pipe is present. This was used by natterer's for roosting in June 2011. The architect would ideally like to block this flue to prevent water ingress. This provides the opportunity to incorporate a cavity box into the end of the pipe and seal up around. As this would involve blocking an existing roost, it would require registration under BiCCL.



Figure 27 – Location of flue pipe on the west side of the north aisle

7.12 **MONITORING**

The use of the existing external roost sites (putlog holes, bat slates and other external gaps) has been monitored over a period of years although further regular monitoring will be required to give a better picture of use on a more regular basis if Option C were to be followed.

7.13 This would be achieved through a combination of more conventional activity surveys (x2 emergence surveys per season) which would be required to inform any subsequent BiCCL application and specific day to day monitoring of the external roosts using cameras and internal activity using static detectors.

7.14 Options for cameras have been discussed with Kings and Barnham (electricians). The motion activated bird box type cameras have been used successfully at a number of other churches. They are not waterproof and therefore consideration may need to be given to monitoring use using more conventional Infrared CCTV cameras attached to brackets on the rafters looking down towards the individual roosting areas. These would require installation at a high level by an electrician with cables running over the eaves. They would also require a safe location in which to leave the hard drive (possibly a lockable box on the north aisle near to the organ).

7.15 **LICENSING**

If the monitoring proposed in 2022 confirms the use of the provided external features by the natterer's, the next step would be to apply to Natural England for the church to be registered under BiCCL. This would take account of all of the data gathered and would need to be submitted by a Bats in Churches registered ecologist.

7.16 **EXCLUSION**

Subject to approval of the site registration, the next step would be to exclude the bats from the church. It is recommended that this is undertaken from the inside to maintain all of the identified external roosting areas, with all gaps where bats could access being blocked. It is likely that there would be more potential access points than those that have already been identified. Given the width of the doors and the height of the nave and chancel, this would best be

achieved in these areas from a cherry picker but in the aisles a mobile tower scaffold or ladders may be more appropriate. A drone has been successfully used at another church to assist in locating gaps etc.

7.17 The exclusion will also need to include the western door where the majority of the bats using the inside of the church gain access.

7.18 All of the exclusion works will need to be undertaken or monitored by the licensed bat ecologist.

7.19 **FACULTY AND PLANNING**

Discussion with the Norwich DAC confirms that the installation of bat boxes as part of a bat management programme does not need a faculty approval (List A) although it is always worth confirming where the boxes are likely to be visible.

7.20 The opening up of putlog holes already undertaken required List B approval (Reference 2021-062258 – refer to Appendix A). It is assumed that any further opening up works will be subject to the same approval.

7.21 The proposed use of cabled cameras to monitor the use of the bat boxes/putlog holes will also likely require List B approval.

7.22 **INTERPRETATION/PUBLIC ENGAGEMENT**

As part of the works undertaken at the church in 2021, a Bat Night was held on the 20th August. This was attended by 35 people (many more than anticipated by the PCC). A follow up e-mail was sent by Jonathan Rodwell of the PCC on the 4th September as follows:

I have been meaning to write to you about the bat evening we had in our church, to tell you what a great success it was. Phil gave a very interesting presentation, and everyone has told me how informative and enlightening they found it and how glad they were that they came - in spite of the fact that not everyone loves bats! but at least they are now better informed about them and realise that they are not necessarily scary creatures, and indeed that they do useful things sometimes, if not always. The attendance was about 35, and we made a total of £185 for the church, for which we are very grateful.

Well done Phil and the Bats in Churches project!



Figure 28 – Bat night event in August 2021

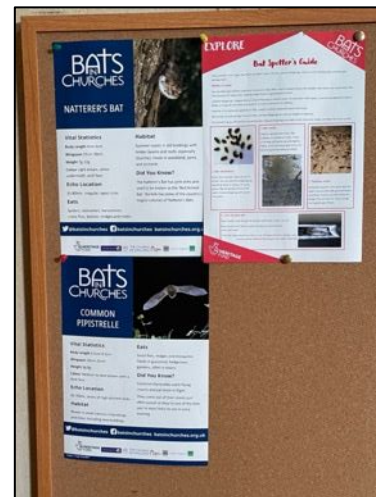


Figure 29 – Bat posters at the church – a more bespoke poster setting out the mitigation and management proposals would be preferable

- 7.23 Further events could be considered in future years although how these are organised will depend on what is decided about whether the bats are managed internally or excluded.
- 7.24 In order to better inform about the proposed works, it is recommended that a detailed display board is installed into the church explaining to visitors about the bats present and the works that are being undertaken.

8.0 WORK SCHEDULE

8.1 The timescales, responsibility and costings for the various mitigation options set out in Section 7 above are set out below. This assumes that the works would commence in the next season (2022). The costs for monitoring are based on 2021 costs. It might be that significant cost savings could be made on the monitoring if volunteers from the local bat group were able to assist in the surveys.

Table 6 Draft Work and cost Schedule

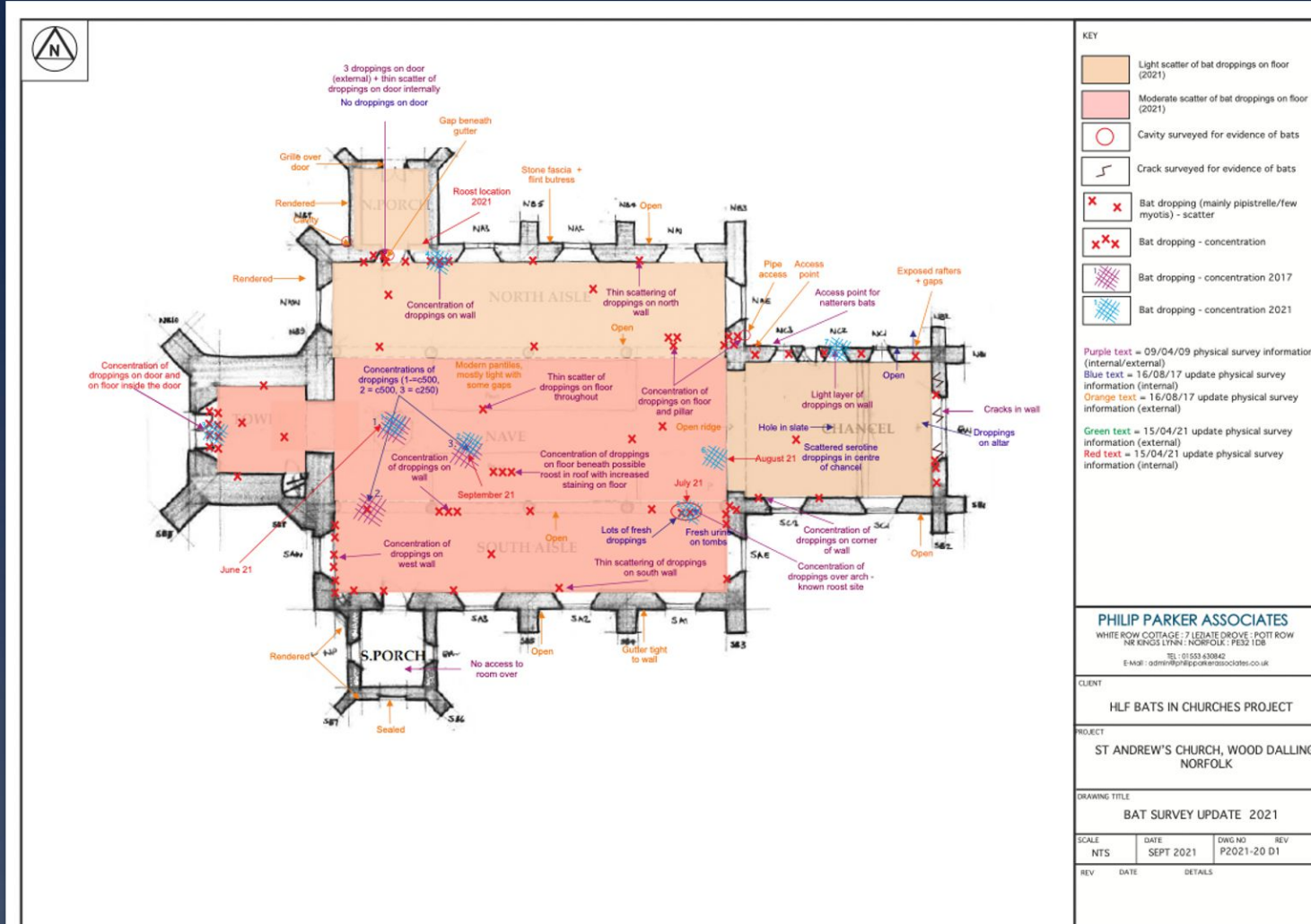
Mitigation Option	Year	Period	Description	Who	Capital works costs (plus VAT)	Monitoring works costs (plus VAT)	Faculty	Planning permission
A1	2021/22	Winter/spring	Covers to brasses etc	BiC Project	FOC		No	No
B1			Bat boxes over windows	Not proposed				
C1	2021/22	Winter/spring	External bat roosting putlog holes and external boxes/Pipe	Ecologist Contractor	£1400		List B	No
C2	2021/22	Winter/spring	Cameras	Ecologist Electrician	£3500		List B	No
C3	2022	Monthly (May to Sep)	Camera survey	Ecologist		£1220		
C4	2022	June July	Monitoring survey	Ecologist		£2598		
C5	2022	Oct	Licence application	Ecologist		£600		
C6	2023	April	Exclusion of bats from the church	Contractor Ecologist	£2000		? for Door	No
C7	2023	Monthly (May – Sep)	Camera survey	Ecologist		£1245		
C8	2023	June July	Monitoring survey	Ecologist		£2666		

Mitigation Option	Year	Period	Description	Who	Capital works costs (plus VAT)	Monitoring works costs (plus VAT)	Faculty	Planning permission
C9	2023	Oct	Extra exclusion	Contractor Ecologist	£1500			
C10	2023	Dec	Licence return	Ecologist		£450		
C11	2024	Monthly (May – Sep)	Camera survey	Ecologist		£1270		
C12	2024	June July	Monitoring survey	Ecologist		£2734		
C13	2024	Dec	Licence return	Ecologist		£450		
C14	2025	Monthly (May – Sep)	Camera survey	Ecologist		£1295		
C15	2025	June July	Monitoring survey	Ecologist		£2802		
C16	2025	Dec	Licence return	Ecologist		£450		
C17	2026	Monthly (May – Sep)	Camera survey	Ecologist		£1320		
C18	2026	June July	Monitoring survey	Ecologist		£2830		
C19	2027	Monthly (May – Sep)	Camera survey	Ecologist		£1345		
C20	2027	June July	Monitoring survey	Ecologist		£2858		
C21	2026	Dec	Licence return and final report	Ecologist		£2000		
Total					£8,400	£28133		

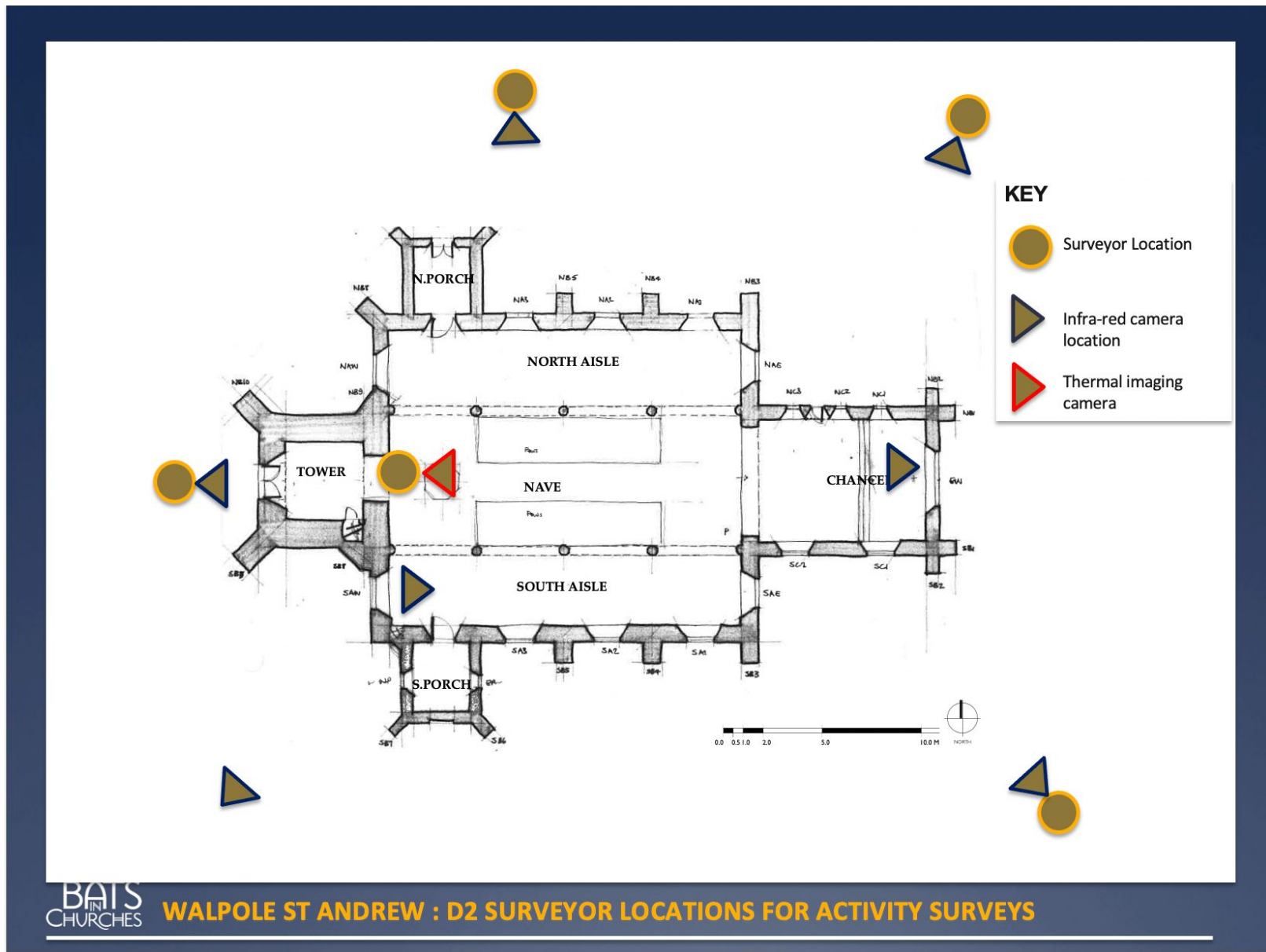
9.0 REFERENCES

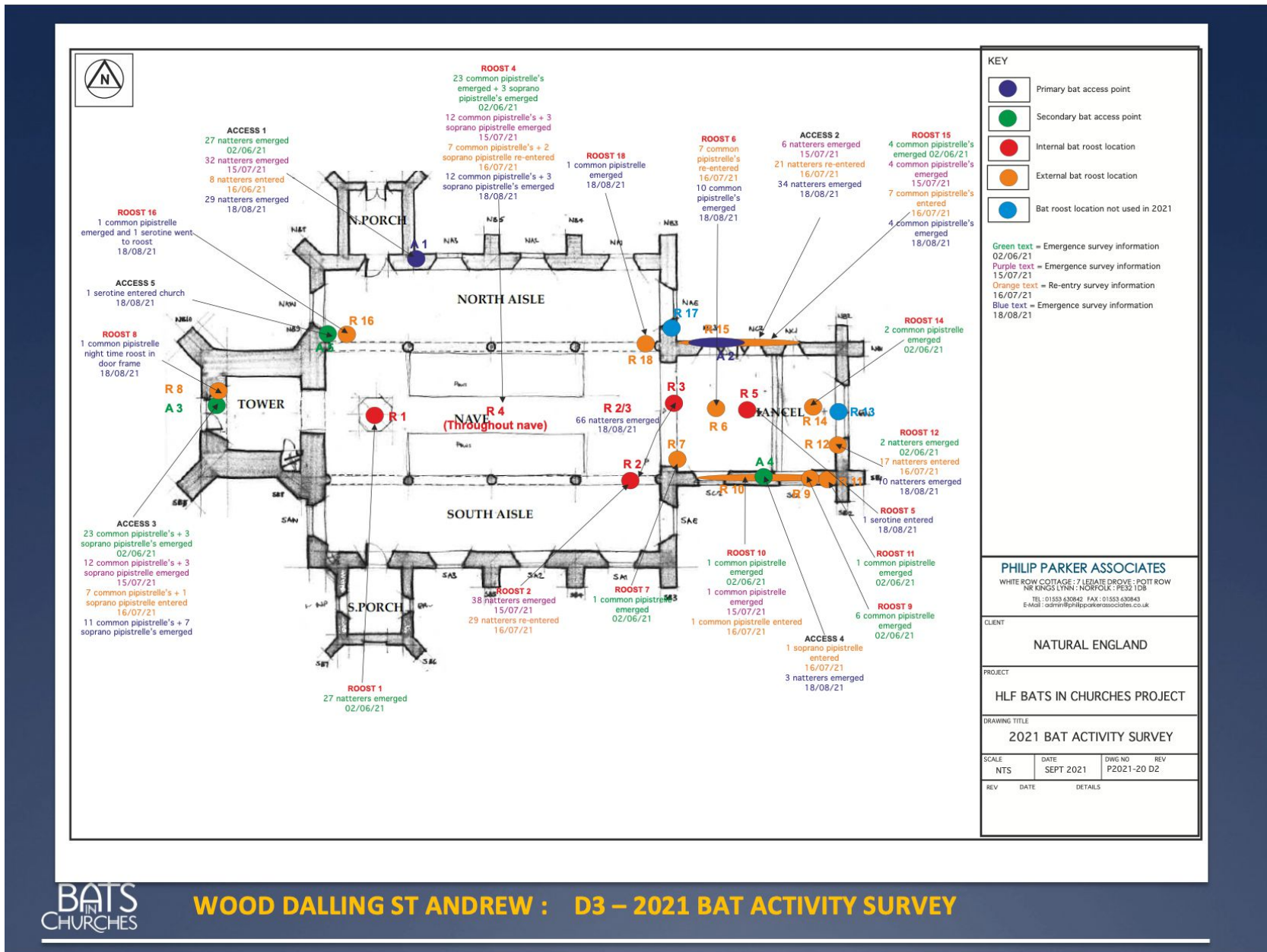
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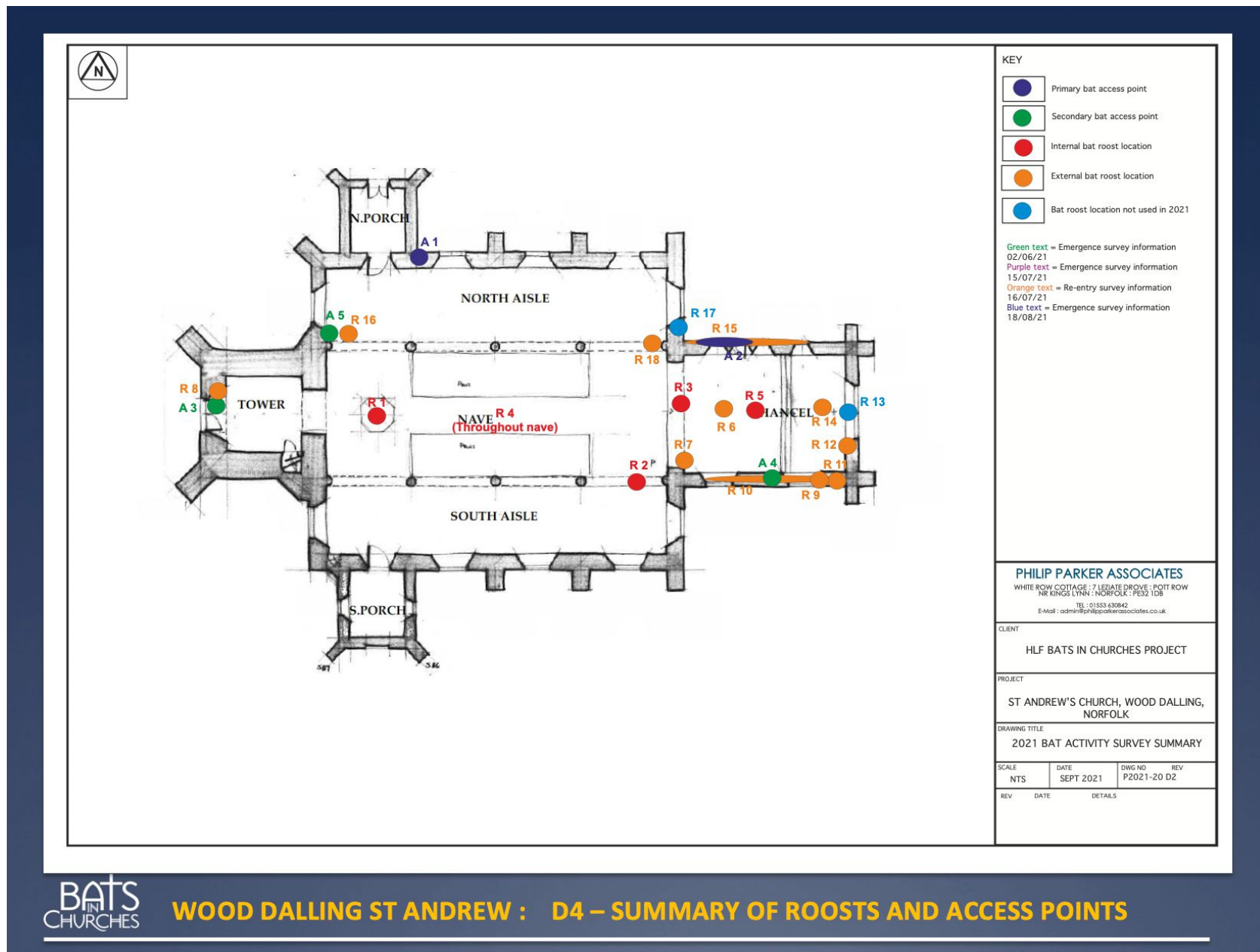
DRAWINGS



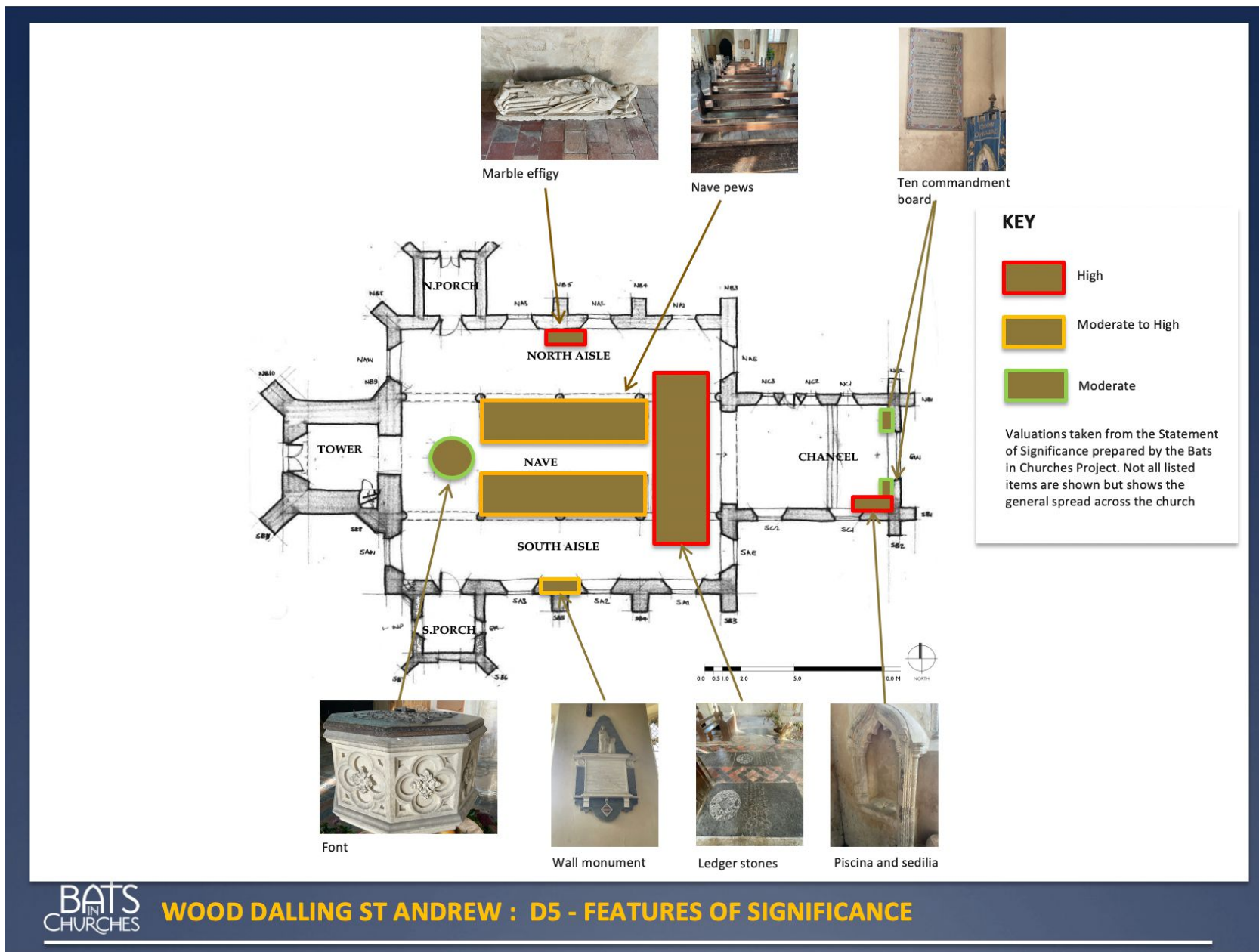
WOOD DALLING ST ANDREW : D1 – BAT SURVEY UPDATE 2021

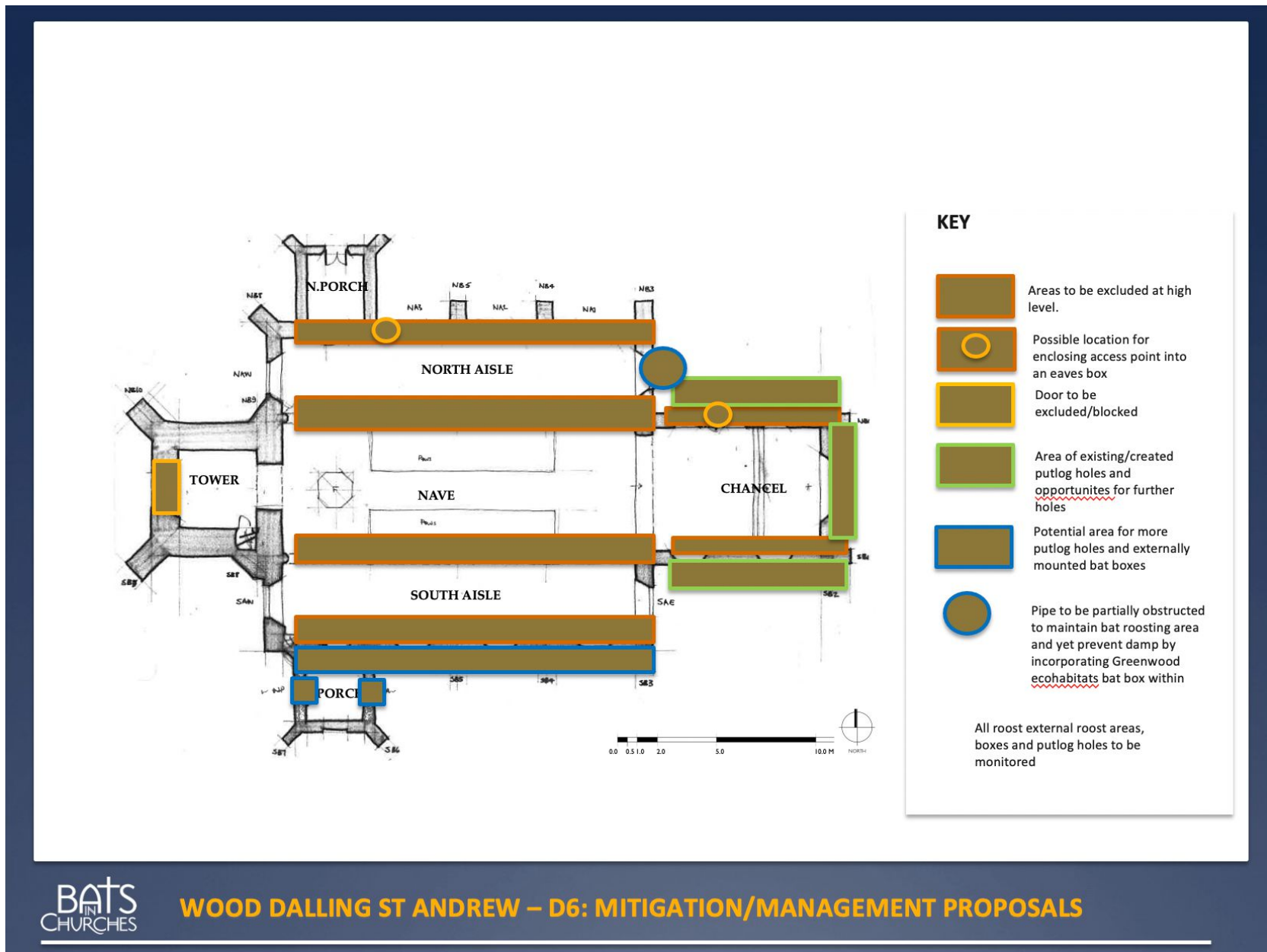






WOOD DALLING ST ANDREW : D4 – SUMMARY OF ROOSTS AND ACCESS POINTS





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