



ECOLOGICAL IMPACT ASSESSMENT

MOAT BRIDGE AT CASTLE GROUNDS
DEVIZES CASTLE
CASTLE GROUNDS
DEVIZES
WILTSHIRE
SN10 1HL

FEBRUARY 2025

ON BEHALF OF KAZUHIKO AKAO



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1.0 EXECUTIVE SUMMARY

- 1.1 LC Ecological Services Limited (LCES) was commissioned by Kazuhiko Akao to conduct an Ecological Impact Assessment on The Moat Bridge, Devizes Castle, Devizes, Wiltshire SN10 1HL (central OS grid reference: SU 00247 61261). The report has been prepared to support a planning application to undertake repair, and restoration works to a listed building.
- 1.2 The Ecological Impact Assessment (EcIA) was informed by the results of the phase 1 and 2 bat surveys conducted by LC Ecological Services Limited.
- 1.3 The scoping information provided by the phase 1 and 2 bat surveys summarises the ecological baseline methods and results, evaluates the important ecological features, and indicates the potential impacts and proposes mitigation for the construction and operational of the proposed development.
- 1.4 The zone of influence of the project was determined by the sensitivity of the ecological features to environmental change within the site and the surrounding area in accordance with the guidelines for EcIA (CIEEM, 2018).
- 1.5 Hibernation surveys confirmed that Chamber 3 supported a hibernation roost for a single Natterer's bat, and Chamber 5 supported a hibernation roost for two lesser horseshoe bats.
- 1.6 DNA analysis confirmed that the droppings collected in Chamber 5 beneath the bridge were from lesser horseshoe bats.
- 1.7 Dusk emergence surveys confirmed the presence of a day roost for at least two lesser horseshoe bats, and a day roost for least one Natterer's bat.
- 1.8 Acoustic autumn swarming surveys indicate that the structure functions as a swarming site for multiple species, including barbastelle, brown long-eared and Natterer's bat.
- 1.9 Recommended mitigation includes timing of the works, supervision by a suitability licenced ecologist during any required soft demolition, temporary roosting provisions during the works, and provision of permanent roosting features following completion of the works.
- 1.10 Prior to the works commencing a licence from Natural England will be required and can only be obtained once all consents (either planning and / or listed building consent) is in place.

2.0 INTRODUCTION

- 2.1 LC Ecological Services Limited (LCES) was commissioned by Kazuhiko Akao to conduct an Ecological Impact Assessment on The Moat Bridge, Devizes Castle, Devizes, Wiltshire SN10 1HL (central OS grid reference: SU 00247 61261). The report has been prepared to support a planning application to undertake repair, and restoration works to a listed building. A location plan and site layout have been provided in appendix I. Site proposals have been included in appendix II.
- 2.2 The report summarises the ecological baseline methods and results; evaluates the Important Ecological Features (IEFs); and indicates the potential impacts and proposes mitigation for the construction and operational stages of the proposed development.
- 2.3 The purpose of this report is to outline the following:
- To identify and describe all potentially significant ecological effects associated with the proposed development.
 - To set out the mitigation measures required to ensure compliance with nature conservation legislation and to address any potentially significant ecological effects.
 - To identify how mitigation measures will/could be secured.
 - To provide an assessment of the significance of any residual effects.
 - To identify appropriate enhancement measures.
 - To set out the requirements for post-construction monitoring.

3.0 LEGISLATION AND POLICY

Legislation

- 3.1 Full details of statutory obligations with respect to biodiversity and the planning system can be found in DEFRA Circular 06/2005. Relevant legislation to this application site includes the following:
- **Bats:** all species of British bats and their roosts are fully protected under the Wildlife and Countryside Act (WCA) 1981 (as amended) and the Conservation of Habitats and Species (Amendment) Regulations 2017.

National planning policy

- 3.2 Chapter 15 of the National Planning Policy Framework (NPPF, 2024) '*Conserving and enhancing the natural environment*' sets out the Government's planning policies relating to biodiversity, landscape, and geological conservation. The relevant paragraphs within this chapter include:
- **Paragraph 187:** Recognise the wider benefits of ecosystem services and minimise impacts on biodiversity, providing net gains in biodiversity.
 - **Paragraph 192:** Protect and enhance biodiversity and geodiversity by safeguarding wildlife-rich habitats and wider ecological networks; promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and securing biodiversity net gain.
 - **Paragraph 193:** Refuse development if found to have significant harm to biodiversity; is on land within or outside a Site of Special Scientific Interest (SSSI) which is likely to have an adverse effect; if results in the loss of deterioration of irreplaceable habitats. Developments with the primary objective to conserve or enhance biodiversity will be supported, while opportunities to improve biodiversity in and around developments should be integrated as part of their design and can secure measurable net gains for biodiversity or enhance public access to nature.

Local planning policy

- 3.3 The Wiltshire Core Strategy was adopted in 2015. Relevant strategic objectives include:
- Strategic objective 5: protecting and enhancing the natural, historic and built environment.
- 3.4 Core Policies include:
- Core Policy 50: Biodiversity and Geodiversity

Biodiversity Action Plans

3.5 Relevant Biodiversity Action plans (BAPs) are as follows:

- UK Biodiversity Action Plans (UK BAP)
- Barbastelle (*Barbastella barbastellus*) (UK BAP)
- Bechstein's bat (*Myotis bechsteinii*) (UK BAP)
- Brown long-eared bat (*Plecotus auritus*) (UK BAP)
- Greater horseshoe bat (*Rhinolophus ferrumequinum*) (UK BAP)
- Lesser horseshoe bat (*Rhinolophis hipposideros*) (UK BAP)
- Noctule (*Nyctalus noctula*) (UK BAP)
- Soprano pipistrelle (*Pipistrellus pygmaeus*) (UKBAP)

4.0 ASSESSMENT METHODOLOGY

Study area

4.1 The site is located at central Ordnance Survey (OS) grid reference SU 00247 61261 and the study area comprises the site plus:

- Previous records of bats within a two-kilometre radius from the Wiltshire and Swindon Biological Records Centre (WSBRC)

Sources of information

4.2 The following sources of information were used to inform the impact assessment:

Table 1: Summary of survey work and sources of information for the Moat Bridge at Devizes Castle

Survey type	Year(s)	Comment
Desk study – International sites designated for Annex II bat species within an eight-kilometre radius and granted EPS licence within a two-kilometre radius	2024	Information obtained from Natural England's web-based Multi-Agency Geographic Information for the Countryside (MAGIC)
Data search of bat species within 2 kilometres of the site	2024	Information obtained from Wiltshire and Swindon Biological Records Centre (WSBRC).
Preliminary ecological appraisal and bat survey report	2022	Aspect Ecology (2022)
Phase 1 bat survey	2024	LC Ecological Services in January 2024
Phase 2 bat surveys, including hibernation, dusk emergence and autumn swarming surveys.	2024	Conducted by LC Ecological Services between January and October 2024.

4.3 The Chartered Institute of Ecology and Environmental Management (CIEEM) provided guidelines for preparing the Ecological Impact Assessment (CIEEM, 2018).

Phase 1 bat survey summary

4.4 A direct search for evidence of bats was conducted on the 11th January 2024 by licensed bat workers Hannah Barlow [2023-11703-CL17-BAT] and Jenny Sutch [2015-12971-CLS-CLS], in accordance with table 2 derived from the Bat Conservation Trust survey guidelines (Collins, et al, 2023).

Table 2: Criteria for assessing bat potential within the building

Confirmed Roost	Evidence of bat occupation found
High Roosting Potential	Structure with one or more potential roosting area that are suitable for large number of bats on regular basis, including hibernation season.
Moderate Roosting Potential	Structure with one or more potential roosting area that could be used by bats for shelter and protection but is unlikely to support a high conservation roost feature such as maternity roost or hibernation roost.
Low Roosting Potential	Structure with one or more feature that can be use by individual bats opportunistically at any time of year. The potential roosting area is not large enough to support a larger number of bats.
Negligible Roosting Potential	No obvious habitat features on the buildings likely to be used by roosting bats, however a small element of uncertainty remains as bats can use apparently unsuitable features on occasion
No Roosting potential	No habitat features likely to be used at any time of the year by any roosting bats

DNA analysis

- 4.5 Bat droppings were collected from Chamber 5 beneath the Moat Bridge and sent to Swift Ecology for analysis.

Phase 2 bat surveys

Hibernation surveys

- 4.6 Three hibernation surveys were undertaken in January, February, and March 2024. The surveys included internal inspections of the structure during the winter and the installation of static bat detectors in the chambers for two weeks per visit.

Dusk emergence surveys

- 4.7 The dusk emergence surveys were conducted on the 11th June, 9th July, and 30th July 2024. The surveys were led by experienced surveyors Jenny Sutch, Nicola Hesketh-Roberts and Hannah Barlow. The evening emergence surveys commenced 15 minutes before sunset and continued for up to 1.5 hours after sunset.

Swarming surveys

- 4.8 Three acoustic swarming surveys were undertaken in August, September, and October 2024. The surveys included the deployment of static bat detectors in strategic locations on both the east and west elevations of the Moat Bridge. The statics detectors were left in-situ for at least five nights per visit.

Assessment process

- 4.9 The EclA is in accordance with the CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2018).
- 4.10 The starting point was to determine which features should be subject to detailed assessment, that is, those receptors:
- a) Of sufficient value that impacts upon them may be significant (in terms of legislation or policy); and
 - b) Potentially vulnerable to significant impacts arising from the development.
- 4.11 This approach is consistent with the EIA Regulations, which only require investigation of likely significant effects.
- 4.12 The CIEEM guidelines recommend that the value of ecological receptors or features is determined based on a geographic frame of reference that includes the following levels:

Table 3: Level of value assigned to each IEF (adapted from CIEEM, 2018)

Level of Value	Example of Definitions
International	An internationally important site e.g. SPA, SAC, Ramsar (or a site considered worthy of such a designation). A viable area of a habitat type listed in Annex 1 of the Habitats Directive, or smaller areas of such habitats which are essential to maintain the viability of a larger whole. A regularly occurring population of an internationally important species (listed on Annex IV of the Habitats Directive).
UK / National	A nationally designated site e.g. SSSI or a site considered worthy of such designation. A viable area of a priority habitat identified within the UK BAP, or of smaller areas of such habitat which are essential to maintain the larger whole. Any recurring population of a nationally important species e.g. listed on Schedules 5 and 8 of the Wildlife and Countryside Act 1981 (as amended). A feature identified as of critical importance in the UK BAP.
Regional (Wiltshire)	A site designated as a Site of Nature Conservation Interest (SNCI) or habitats that meet the designation criteria for SNCI's in Wiltshire. Areas of internationally or nationally important habitats which are degraded but are considered readily restored. A regularly occurring, locally significant population of a species listed as being nationally scarce.

Level of Value	Example of Definitions
	A regularly occurring, locally significant number of a regionally important species.
Local (the zone of influence including the site and its immediate vicinity, including habitats within or linked to those on site)	Areas of internationally or nationally important habitats which are degraded and have little or no potential for restoration. A good example of a common or widespread habitat in the region. A notable population or assemblage of common or widespread species in the region.

Assessment criteria

Predicting and characterising ecological impacts

- 4.13 The assessment of magnitude of effect assesses whether an impact will be positive or negative; its extent; duration; reversibility and timing and frequency as well as the cumulative effect. A combination of quantitative information and qualitative assessment based on professional judgment was used whilst considering all of these factors to assign effects on the IEFs to one of four categories as detailed in table 4 below.

Table 4: Assessment of magnitude of effects

Category	Definition
High	A permanent or long-term effect on the extent/size or integrity of a site, habitat, species assemblage or community, population or group. If adverse this is likely to threaten its sustainability. If beneficial this is likely to enhance its conservation status.
Medium	A permanent or long-term effect on extent/size or integrity of a site, habitat, species assemblage or community, population or group. If adverse this is unlikely to threaten its sustainability. If beneficial this is likely to be sustainable but is unlikely to enhance its conservation status.
Low	A short-term but reversible effect on the extent/size or integrity of a site, habitat or species assemblage or community, population or group that is within the range of variation normally experienced between years.
Negligible	A short-term but reversible effect on the extent/size or integrity of a site, habitat or species assemblage or community, population or group that is within the normal range or annual variation.

- 4.14 For each IEF, the significance of the effects of the proposed development during construction and operation are assessed and the type of impacts are characterised according to their importance and magnitude. Where there is uncertainty over the appropriate level of significance to assign, this will be stated but as a precautionary measure the higher level of significance will be applied. Where impacts will arise, mitigation and enhancement measures are provided.

Direct and indirect ecological impacts

- 4.15 Both direct and indirect impacts are considered within this assessment. A direct impact is a defined action such as the physical loss of a habitat or the immediate mortality of an individual of a particular species. Indirect impacts are attributable to an action, but which affect ecological resources through effects on an intermediary ecosystem, process or receptor e.g. the loss of an important prey species for a predator.

Limitations

- 4.16 The static detector deployed in Chamber 2 during the February 2024 hibernation survey did not record, however data was collected by two other static detectors deployed within the structure.
- 4.17 The static detector deployed at location 4 during the October 2024 swarming survey only recorded during the second night of deployment, however data was collected over seven nights by the detector at location 3.
- 4.18 Due to the complex structure and dilapidated condition of the Moat Bridge, it was not possible to safely check every crevice during the hibernation survey structure inspections, therefore it is possible that some hibernating bats were missed.
- 4.19 *Myotis* species of bat are difficult to differentiate between their calls and require analysis to determine the exact species of bat encountered. Similarly, not all bats echolocate whilst leaving the roost, and due to this, there is always the potential for this species to be under-recorded.
- 4.20 Long-eared species are very quiet and difficult to pick up on bat detectors. Recordings were analysed to confirm any long-eared calls which may have been missed during the surveys.
- 4.21 There are no other significant limitations with the surveys. The emergence surveys were completed during the peak survey season and all surveys were conducted in accordance with the current Bat Conservation Trust guidelines (2023).

5.0 BASELINE

Desk study

- 5.1 A records search from Wiltshire and Swindon Biological Records Centre (WSBRC) returned records of thirteen bat species within a two-kilometre radius of the site, along with records of roosts for ten bat species within two kilometres of the site. The full results of the desk study are provided as appendix III.
- 5.2 Six granted European Protected Species licence applications for six species of bat, including, serotine (*Eptesicus serotinus*), Natterer's (*Myotis nattereri*), common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle and brown long-eared, were recorded following a search of the MAGIC database within a two-kilometre radius of the site.

Phase 1 bat survey results

- 5.3 The building was assessed as a confirmed bat roost with high potential to support roosting bats, and as a swarming site. The full results of the phase 1 survey are presented in appendix IV

DNA results

- 5.4 DNA analysis confirmed that the droppings collected in chamber 5 were from lesser horseshoe bats. The full DNA results are shown in appendix V.

Phase 2 bat survey results

Hibernation results

- 5.5 During the hibernation surveys, a single Natterer's bat was recorded hibernating in Chamber 3 in January, and up to two lesser horseshoe bats were recorded hibernating in Chamber 5 in January, February and March. No other bats were seen hibernating throughout the surveys.
- 5.6 During the static monitoring, bats were detected on 32 nights between 11th January and 27th March 2024, using three static bat detectors. Throughout this period at least eight species of bats were recorded. The results are summarised in the table below whilst the full results are shown in appendix VI.

Table 5: Summary of hibernation survey results for the Moat Bridge.

Bat species	Highest level of activity recorded (number of nights at that level, total number of nights recorded across all three detectors)		
	January	February	March
Serotine	-	-	Low (7, 7)
Myotis species	Low (1, 1)	Low (3, 3)	Low (20, 20)
Natterer's	Low (3, 3)	-	Low/moderate (15, 16)

Bat species	Highest level of activity recorded (number of nights at that level, total number of nights recorded across all three detectors)		
	January	February	March
Nyctaloid (Serotine/Noctule/ Leisler)	-	-	Low (19, 19)
Noctule species	-	-	Low (2, 2)
Leisler's noctule (<i>Nyctalus leisleri</i>)	-	-	Low (5, 5)
Pipistrelle species (<i>Pipistrellus</i> sp.)	-	Low (1, 1)	Low (4, 4)
Common pipistrelle	Low (19, 19)	Low (7, 7)	Low/moderate (10, 39)
Soprano pipistrelle	Low (2, 2)	Low (7, 7)	Low/moderate (6, 34)
Brown long-eared	Low (1, 1)	Low (2, 2)	Moderate (2, 19)
Greater horseshoe	-	Low/moderate (1, 1)	Moderate/high (1, 4)
Lesser horseshoe	Moderate/high (2, 9)	Low activity (2, 2)	Exceptional (2, 41)

5.7 The acoustic recordings suggest that Chamber 3 is potentially also used as a roost by lesser horseshoe and brown long-eared bats and that Chamber 5 is also used by roosting brown long-eared bats.

5.8 The presence of common and soprano pipistrelle during every survey month indicates that the area around the Moat Bridge is an important foraging area for these species.

Dusk emergence surveys

5.9 A summary of the results is provided below for each emergence survey with the full results provided in appendix VII.

Dusk survey 11th June 2024

5.10 During the survey a lesser horseshoe was recorded emerging from Chamber 5 of the Moat Bridge.

General activity

5.11 During the survey commuting and foraging were recorded on site from common pipistrelle, soprano pipistrelle, and lesser horseshoe. Single registrations were recorded for greater horseshoe and a *Myotis* species.

Dusk emergence survey 9th July 2024

5.12 During the survey a lesser horseshoe was recorded emerging from Chamber 5 of the Moat Bridge.

General activity

5.13 During the survey continuous foraging and commuting passes by common pipistrelle and regular foraging and commuting passes from serotine were recorded. Occasional registrations from soprano pipistrelle were recorded. Infrequent recordings of *Myotis* species, common noctule, and Leisler's noctule

(*Nyctalus leisleri*) were made. A single greater horseshoe registration was recorded on the east elevation.

Dusk emergence survey 30th July 2024

- 5.14 During the emergence survey a lesser horseshoe was recorded entering and re-emerging from Chamber 5 of the Moat Bridge.

General activity

- 5.15 During the survey continuous foraging, social calls and commuting passes by common pipistrelle were detected. Frequent registrations were recorded, including foraging, social calls and commuting passes, from serotine and soprano pipistrelle. Two passes by a greater horseshoe were recorded on the east elevation. Single passes from a *Myotis* species, and a noctule species were recorded.

Autumn swarming survey

- 5.16 During the static monitoring, bats were detected on 25 nights between 4th August and 7th October 2024, using two static bat detectors. Throughout this period 16 species of bats were recorded.
- 5.17 A summary of the results is provided in table 6 below for each acoustic survey, with the full results provided in appendix VIII.

Table 6: Summary of swarming survey results for the Moat Bridge.

Bat species	Highest level of activity recorded each month (number of nights at that level, total number of nights recorded across both detectors)		
	August	September	October
Barbastelle	Moderate (5, 17)	High (2, 12)	Low (2, 2)
Serotine	Moderate (11, 20)	High (2, 12)	Low (8, 8)
Myotis species	Low/moderate (4, 13)	High (2, 12)	Low/moderate (2, 9)
Natterer's bat	Low/moderate (2, 8)	Moderate (2, 9)-	Low (3, 3)
Nyctaloid (Serotine/Noctule/ Leisler)	Exceptional (2, 20)-	Moderate (4, 11)-	Low (6, 6)
Noctule species	Low/moderate (3, 16)	Low (5, 5)	Low (2, 2)
Leiser's noctule	Low (15, 15)	Low (2, 2)	-
Common noctule	Low (13, 13)	Low (5, 5)	Low (3, 3)
Pipistrelle species	Low/moderate (7, 20)-	Moderate/high (2, 13)	Low (9, 9)
Nathusius' pipistrelle (<i>Pipistrellus nathusii</i>)	Low (3, 3)	-	Low (1, 1)
Common pipistrelle	High (6, 20)	High (2, 15)	Low (9, 9)
Soprano pipistrelle	Moderate/high (2, 20)	Exceptional (2, 15)	Low (9, 9)
Brown long-eared	Moderate/high (4, 19)	Moderate/high (4, 11)	Low/moderate (2, 6)
Greater horseshoe	High (2, 18)	Exceptional (2, 10)	Low (3, 3)
Lesser horseshoe	Moderate/high (4, 18)	High (2, 10)	Low/moderate (2, 8)

Assessment of species

- 5.18 The level of value of these species is summarised in table 7 below.

Table 7: Assessment of the importance of the bat assemblage at the Moat Bridge, Devizes Castle.

Species	Importance of roosts	Importance of commuting and foraging habitat	Importance of assemblage
Widespread Common pipistrelle Soprano pipistrelle Brown long-eared	There are recorded pipistrelle day roosts within the main Castle on site. There are 23 records of pipistrelle roosts within 2 kilometres of site. Does not exceed District/County importance – noting location of maternity roosts is off-site. A brown long-eared day roost has been recorded within the main Castle. There are 18 records of brown long-eared roosts, including 7 maternity roosts within 2 kilometres of site. The Moat Bridge is an autumn swarming site for brown long-eared bats. Does not exceed District/County importance.	The habitats combined in and around the redline boundary meet the definition of ‘moderate potential value’ as defined in Collins (2023). The Castle Grounds in the immediate surroundings of the site are considered high suitability for commuting and foraging bats. Exceptional activity levels were recorded for soprano pipistrelle, greater horseshoe and Nyctaloid species during the static surveys.	<i>1 point per species</i> Score 3 for this part of the assemblage (of a maximum of 3)
Widespread but not as abundant in all geographies Whiskered bat Brandt’s bat Daubenton’s bat Natterer’s bat Noctule	Hibernation and summer day roost for Natterer’s on site. The Moat Bridge is an autumn swarming site for Natterer’s bats. Does not exceed County/Regional importance. No recorded roosts for whiskers, Brandt’s, Daubenton’s or Noctule on site, however roosts (including maternity roosts) for all species occur within 2 km of the site. There is potential that other Myotis species use the site for swarming, but it was not possible to distinguish between them using acoustic data Does not exceed County/Regional importance –	- High activity levels for barbastelle, serotine, Myotis species, lesser horseshoe, and common pipistrelle were recorded during the static surveys. - Moderate/high activity levels for brown long-eared were recorded during the static surveys. - Moderate activity levels for	<i>2 points per species</i> Score 10 for this part of the assemblage (of a maximum of 10)

Species	Importance of roosts	Importance of commuting and foraging habitat	Importance of assemblage
	noting roosting locations are off-site.	Natterer's bat were recorded during the static surveys.	
Rarer or restricted distribution Lesser horseshoe Serotine Leisler's bat Nathusius' pipistrelle	Hibernation and summer day roost for Lesser horseshoe on site. Summer day roost for serotine recorded in the main Castle. Does not exceed District/ County importance There are 11 records of lesser horseshoe roosts, including 4 maternity roosts, and 8 serotine roosts, including 4 maternity roosts, within 2 kilometres of the site. Does not exceed County/ Regional importance – noting location is off-site. No recorded roosts for Leisler's bat or Nathusius' pipistrelle on site or within 2 kilometres.	• Low activity levels for common noctule and Leisler's noctule were recorded during the static surveys. Taking the above into account, the mosaic of habitats within the Zone of Influence is considered to be of Regional importance.	<i>3 points per species</i> Score 12 for this part of the assemblage (of a maximum of 12)
Rarest Annex 2 species and very rare Greater horseshoe Western barbastelle Bechstein's bat	A day roost and hibernation roost for greater horseshoe has been recorded within the Castle Grounds. Does not exceed County/ Regional importance A transitional roost for western barbastelle has been recorded within the main Castle. The Moat Bridge is an autumn swarming site for barbastelle bats. Does not exceed County/ Regional importance There are no records of roosts on site, or within 2		<i>4 points per species</i> Score 12 for this part of the assemblage (of a maximum of 12 ¹)

¹ The maximum score for this category has been adjusted from 16 to 12 due to the absence of grey long-eared bat in Wiltshire.

Species	Importance of roosts	Importance of commuting and foraging habitat	Importance of assemblage
	kilometres for Bechstein's bat.		
Overall score: Assemblage score 37/37 = 100 %. This site would therefore exceed the threshold (70%) for National importance .			

6.0 ASSESSMENT OF POTENTIAL IMPACTS

Bats

Roosting bats

- 6.1 The combined surveys suggest that the Moat Bridge supports the following bat roosts:
- Summer day roost and hibernation roost for at least one Natterer's bat.
 - Summer day roost and hibernation roost for at least two lesser horseshoe bats.
 - Autumn swarming site for barbastelle, Myotis, and brown long-eared bats.
 - DNA analysis has confirmed the presence of lesser horseshoe bats in Chamber 5.
- 6.2 The repairs to the structure of The Moat Bridge will result in the temporary disturbance and modification of the above roosts.
- 6.3 **A European Protected Species Licence will be required from Natural England prior to the commencement of works.** A licence from Natural England can only be applied for once full planning permission has been granted. Surveys from the most recent or current survey period are required to support the application process and therefore, if there is a delay in applying for a licence, update surveys may be required.
- 6.4 Licences will only be issued where the application is considered to meet the requirements of the following three tests:
- The development is in the interests of public health and safety or is required for other imperative reasons of overriding public interest.
 - There is no satisfactory alternative to the development.
 - The development will not be detrimental to the maintenance of the bat populations concerned at a favourable conservation status in their natural range.

7.0 MITIGATION

Avoidance

- 7.1 The possibility of avoiding/minimising the extent of works that affects cavities where use by bats cannot be ruled out should be explored (though may not be possible for safety reasons). Avoidance of impacts can also be achieved through any repairs that can be completed off-site, for example ironmongery.

Timing of works

- 7.2 Hibernating lesser horseshoe and Natterer's bats were confirmed in Chambers 3 and 5. It is highly likely that other bats could use the Moat Bridge for hibernation, therefore, works to the bridge should avoid the key hibernation period (November to March, inclusive).
- 7.3 The status of the structure as a swarming site has been confirmed, therefore the most important part of any mitigation approach will be timing the works, including avoiding light-spill or the use of scaffolding during the critical months of August to October.
- 7.4 The optimum period for undertaking the proposed works is between April to July.

Mitigation

Timing of works

- 7.5 The surveys have confirmed the presence of non-breeding summer roosts for lesser horseshoe and Natterer's bats, therefore, works can continue on the structure between early April and the end of July, inclusive.

Pre-works survey and ecological watching brief

- 7.6 A pre-works survey of the building will be undertaken by the named/accredited ecologist to check for the presence of bats. This will be required immediately prior to any works including any masonry removal. If bats are encountered during the survey, a licensed bat worker wearing gloves will capture the bat(s) by hand or using a hand net and a cloth bag and relocate the bat(s) to one of the external bat boxes. Once the area is clear of bats then any 'soft' dismantling works will proceed.
- 7.7 Pre-start briefings and toolbox talks included in site inductions for all staff, contractors and sub-contractors working on the project will be provided, as well as supervision by a suitably qualified and licenced Ecological Clerk of Works.
- 7.8 The removal of masonry will be done carefully by hand and checking for roosting bats, under the supervision of a licensed bat worker, until it is no longer suitable for roosting bats. The masonry will be removed by hand gently in a vertical rather than horizontal sliding motion. If any bats are encountered during the

dismantling of the masonry, works will be halted until the bat(s) vacate the building or a licensed bat handler removes the bat(s) using gloves and a cloth bag. Once the area is clear of bats then works will proceed. The bats will then be relocated to the temporary bat box. Injured bats will be taken immediately into care (as directed by the Bat Worker's Manual, s.7.3, pp. 64-66; 3rd ed.2004).

- 7.9 As bat boxes are not suitable for lesser horseshoe bats, the temporary exclusion of this species from Chamber 5 may be required during the works. Lesser horseshoe bats have been recorded using other structures (including Tunnels 1 and 2) within the Castle Grounds as roosting sites and these will remain available to them during the works. If temporary exclusion from Chamber 5 is not possible, any bats encountered will be safely relocated to one of the other known roosts within the Castle Grounds.

Compensation

Temporary roosting provisions

- 7.10 A series of bat boxes such as Schwegler 2FN, 1FF, or similar will be erected on mature trees near the bridge prior to the commencement of works, to act as temporary roosting provisions during the restoration and repair works. These boxes will be retained for the duration of the works.
- 7.11 If cavities or other roosting opportunities will be lost, they will need to be compensated. Permanent features integrated into the non-structural elements of the bridge are preferable. These generally take the form of bat bricks, but it may be possible to build in larger chambers. It is important that the flightpath from such replacement roosts avoids artificial lighting and collision risks from vehicles.

Permanent roosting provisions

- 7.12 To ensure that the roosts are retained after the repair and restoration works, the access points to Chambers 3 and 5 will be reinstated.

Monitoring

- 7.13 The Moat Bridge has been confirmed as a regionally important site for bats, therefore monitoring is recommended to ensure that bats continue to use the site following the restoration works to the bridge.

1.0 ECOLOGICAL ENHANCEMENTS

- 7.14 In line with national planning policy (2024) all developments are required to provide a biodiversity net gain. The temporary bat boxes can be retained permanently to provide additional roosting opportunities for bats.
- 7.15 Disturbance of the existing roosts will be prevented by installing a grilled door to these areas, and the existing roost within Chamber 5 will be enhanced by the

installation of internal boxes to increase the variety of environmental variables available to roosting bats.

8.0 RESIDUAL EFFECTS

- 8.1 No significant negative impacts from the proposed works were identified during the assessment following implementation of all the above mitigation. The proposed enhancements outlined above will result in a **minor positive impact** overall.

9.0 IN-COMBINATION EFFECTS

- 9.1 There are multiple planning applications associated with the restoration and repair of Devizes Castle, the most relevant being planning application PL/2023/07677 for external conservation repair and restoration works to the external fabric of Devizes Castle and other external alterations at roof level alongside other associated works. The works to the castle are being phased and are subject to mitigation and a European Protected Species Licence. The phasing of the works will ensure that roosting opportunities for bats will be retained on each building during the works.
- 9.2 No other applications were identified that could cause in-combination effect on the roosts identified at the Moat Bridge.
- 9.3 It is concluded that no in-combination effects from the works on Devizes Castle and the Moat Bridge will occur as works will commence at different times and therefore, roosting opportunities will be retained on site.

10.0 CONCLUSION

- 10.1 Phase 1 and 2 bat surveys were undertaken at the proposed development site. Assessments of desk studies including the proximity to designated sites and protected and notable species were made. The impact assessment concluded that there would be a minor impact overall.
- 10.2 Mitigation measures have been provided for roosting bats. Implementing these mitigation measures will ensure that there are not any residual effects.
- 10.3 These surveys are valid for 18 months and should the works be delayed past this time then an updated survey will be required.

11.0 REFERENCES

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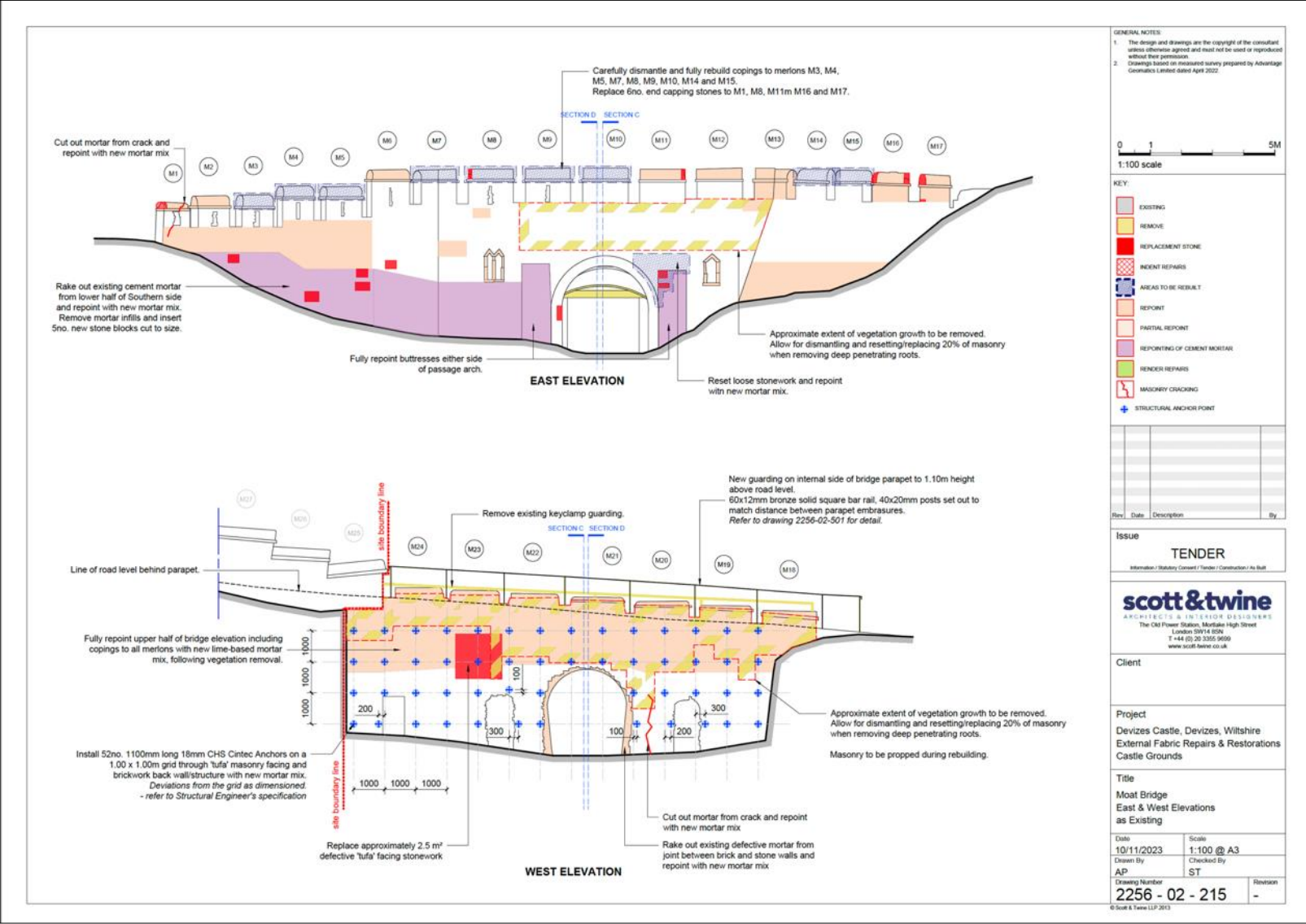
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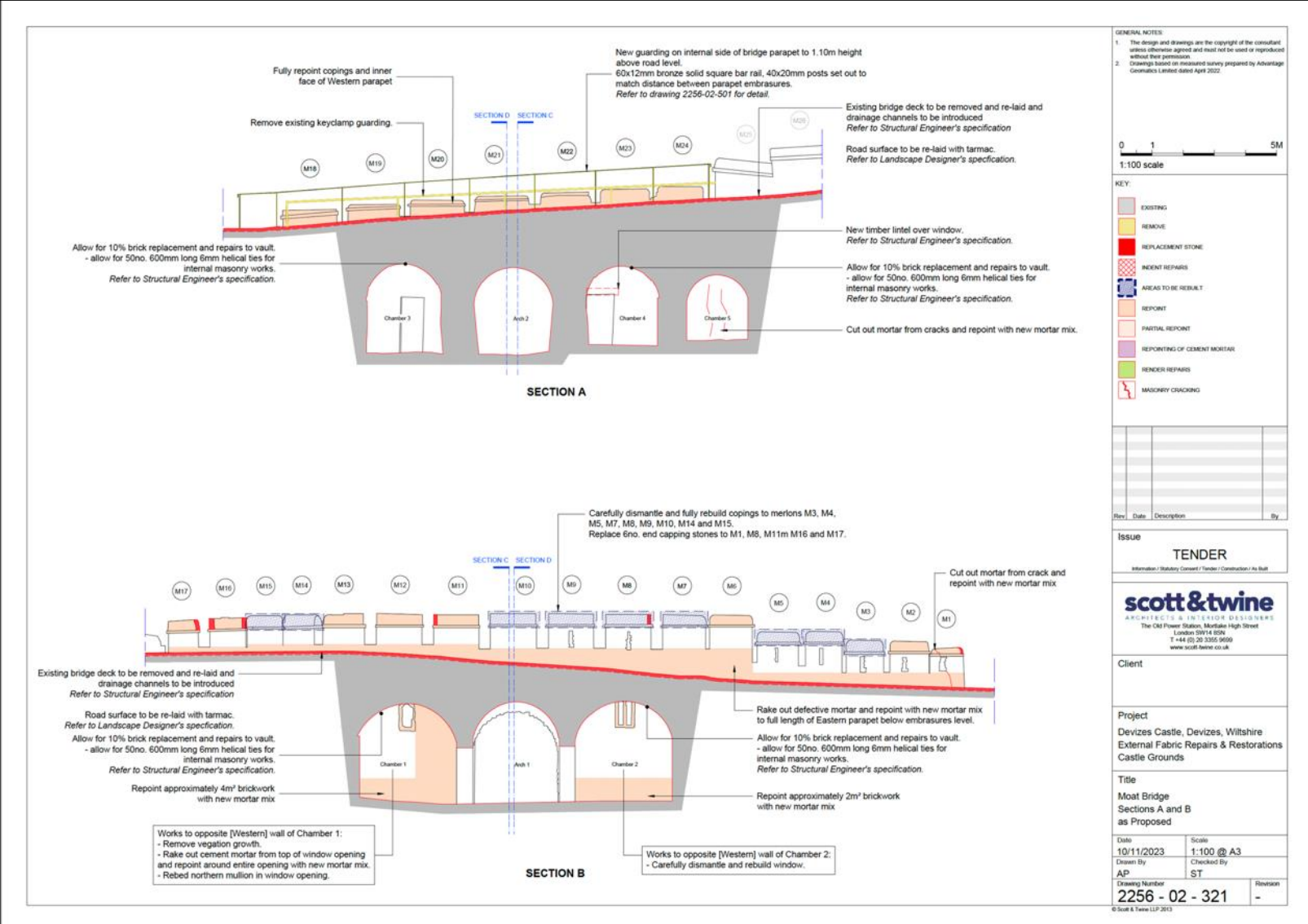
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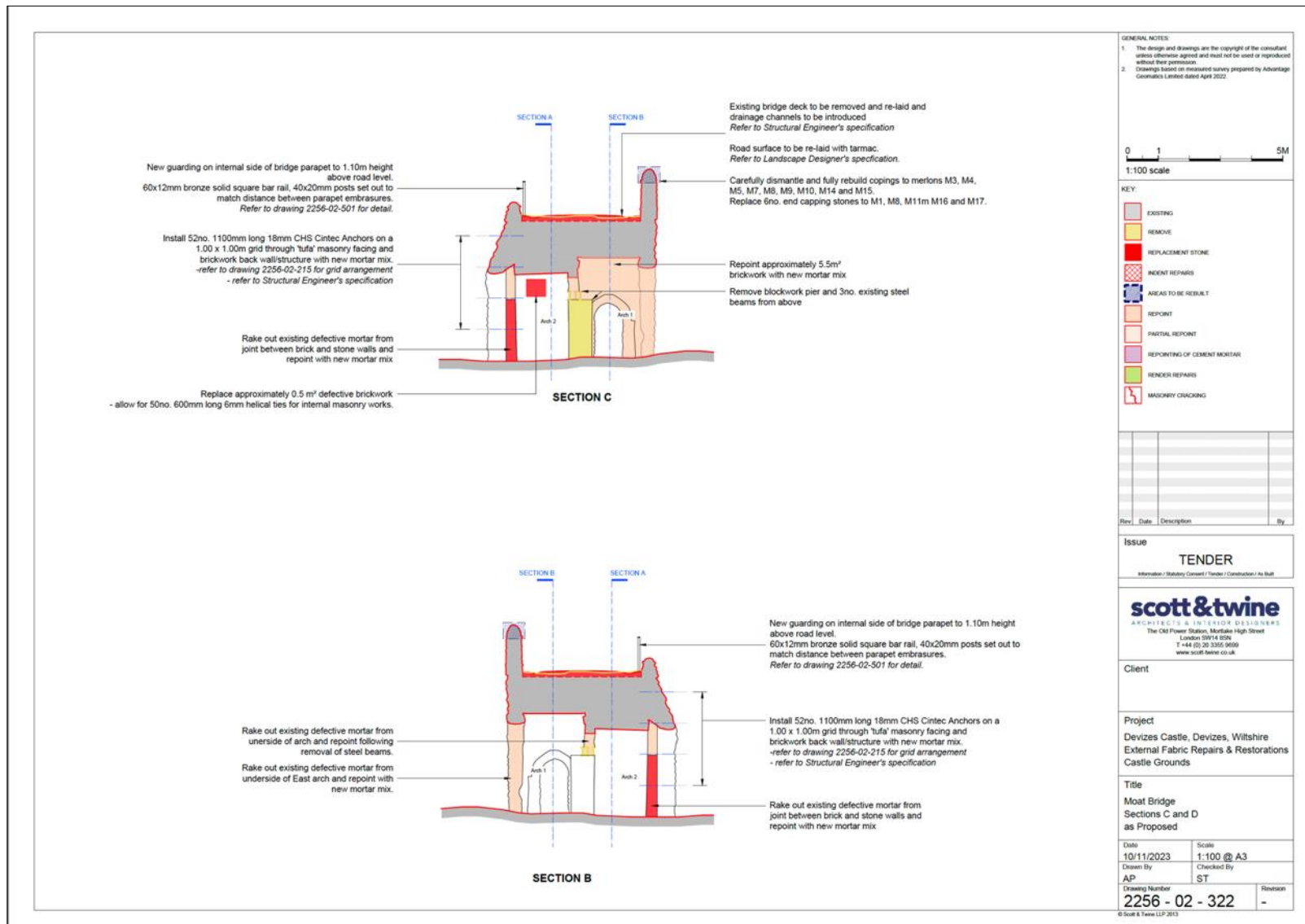
APPENDIX I **Site location plan**



APPENDIX II **Site proposals**







APPENDIX III Desk study

Table 8 below lists bat records within two kilometres of the site as provided by Wiltshire and Swindon Biological Records Centre (WSBRC), February 2024.

Table 8: Bat species records within two kilometres of the site.

Common Name	Scientific Name	Status	Location
Bat species	<i>Chiroptera</i>	Hab (1992) ² , HR (2017) ³ , WCA (1981) ⁴ , EPS ⁵ , NERC (2006) ⁶	7 records within 2 km of the site dated between 2000 and 2022.
Serotine	<i>Eptesicus serotinus</i>	Hab (1992), HR (2017), WCA (1981), EPS	8 records within 2 km of the site dated between 2003 and 2018.
Myotis bat species	<i>Myotis</i> sp.	Hab (1992), HR (2017), WCA (1981), EPS, NERC (2006)	6 records within 2 km of the site dated between 2006 and 2018.
Bechstein's bat	<i>Myotis bechsteinii</i>	Hab (1992), HR (2017), WCA (1981), EPS, NERC (2006)	8 records within 2 km of the site dated between 2013 and 2015.
Brandt's bat	<i>Myotis brandtii</i>	Hab (1992), HR (2017), WCA (1981), EPS	1 record within 2 km of the site dated 2013
Daubenton's bat	<i>Myotis daubentonii</i>	Hab (1992), HR (2017), WCA (1981), EPS	3 records within 2 km of the site dated between 2007 and 2020.
Whiskered bat	<i>Myotis mystacinus</i>	Hab (1992), HR (2017), WCA (1981), EPS	6 records within 2 km of the site dated between 2006 and 2013.
Natterer's bat	<i>Myotis nattereri</i>	Hab (1992), HR (2017), WCA (1981), EPS	2 records within 2 km of the site dated between 2014 and 2019.
Nyctalus bat species	<i>Nyctalus</i> sp.	Hab (1992), HR (2017), WCA (1981), EPS, NERC (2006)	3 records within 2 km of the site dated between 2015 and 2016.
Leisler's bat	<i>Nyctalus leisleri</i>	Hab (1992), HR (2017), WCA (1981), EPS,	1 record within 2 km of the site dated 2020.

²Hab (1992): European Protected Species from Habitats and Species Directive II and IV

³HR(2017): Habitats Regulations (1994) includes those now covered by Conservation of Habitats and Species Regulations (2010). This has now been updated to the European Protected Species from Habitats and Species Regulations (2017)

⁴WCA (1981): species included in the Wildlife and Countryside Act (1981) Schedule 5

⁵EPS: European Protected Species includes species from Hab(1992) and HR(2017)

⁶NERC (2006): Species of Principle Importance in England, NERC Act (2006), Section 41 list

Common Name	Scientific Name	Status	Location
Noctule	<i>Nyctalus noctula</i>	Hab (1992), HR (2017), WCA (1981), EPS, NERC (2006)	7 records within 2 km of the site dated between 2013 and 2018.
Pipistrelle bat species	<i>Pipistrellus</i> sp.	Hab (1992), HR (2017), WCA (1981), EPS, NERC (2006)	2 records within 2 km of the site dated between 2000 and 2004.
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	Hab (1992), HR (2017), WCA (1981), EPS	21 records within 2 km of the site dated between 2000 and 2020.
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	Hab (1992), HR (2017), WCA (1981), EPS, NERC (2006)	9 records within 2 km of the site dated between 2009 and 2021.
Long-eared bat species	<i>Plecotus</i> sp.	Hab (1992), HR (2017), WCA (1981), EPS, NERC (2006)	3 records within 2 km of the site dated 2016
Brown long-eared bat	<i>Plecotus auritus</i>	Hab (1992), HR (2017), WCA (1981), EPS, NERC (2006)	16 records within 2 km of the site dated between 2000 and 2020.
Greater horseshoe	<i>Rhinolophus ferrumequinum</i>	Hab (1992), HR (2017), WCA (1981), EPS, NERC (2006)	8 records within 2 km of the site dated between 2011 and 2017.
Lesser horseshoe	<i>Rhinolophus hipposideros</i>	Hab (1992), HR (2017), WCA (1981), EPS, NERC (2006)	11 records within 2 km of the site dated between 2009 and 2018.

Table 9 below lists known bat roosts in the area as provided by WSBRC.

Table 9: Known bat roosts within two kilometres of the site.

Common Name	Scientific Name	Status	Location
Bat species	<i>Chiroptera</i>	Hab (1992) ⁷ , HR (2017) ⁸ , WCA (1981) ⁹ , EPS ¹⁰ , NERC (2006) ¹¹	2 roosts recorded dated between 2016 and 2022.
Serotine	<i>Eptesicus serotinus</i>	Hab (1992), HR (2017), WCA (1981), EPS	8 roosts, including 4 maternity roosts, recorded dated between 2003 and 2018.
Myotis bat species	<i>Myotis</i> sp.	Hab (1992), HR (2017), WCA (1981), EPS, NERC (2006)	6 roosts, including 2 maternity roosts dated between 2006 and 2018.

⁷Hab (1992): European Protected Species from Habitats and Species Directive II and IV

⁸HR(2017): Habitats Regulations (1994) includes those now covered by Conservation of Habitats and Species Regulations (2010). This has now been updated to the European Protected Species from Habitats and Species Regulations (2017)

⁹WCA (1981): species included in the Wildlife and Countryside Act (1981) Schedule 5

¹⁰EPS: European Protected Species includes species from Hab(1992) and HR(2017)

¹¹NERC (2006): Species of Principle Importance in England, NERC Act (2006), Section 41 list

Common Name	Scientific Name	Status	Location
Daubenton's bat	<i>Myotis daubentonii</i>	Hab (1992), HR (2017), WCA (1981), EPS	1 record within 2 km of the site dated 2013.
Natterer's bat	<i>Myotis nattereri</i>	Hab (1992), HR (2017), WCA (1981), EPS	2 roosts recorded dated between 2014 and 2019.
Whiskered bat	<i>Myotis mystacinus</i>	Hab (1992), HR (2017), WCA (1981), EPS)	1 roost recorded dated 2006.
Noctule	<i>Nyctalus noctula</i>	Hab (1992), HR (2017), WCA (1981), EPS, NERC (2006)	4 roosts, including 1 maternity roost, recorded dated between 2014 and 2018.
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	Hab (1992), HR (2017), WCA (1981), EPS	13 roosts, including 1 maternity roost, recorded dated between 2002 and 2020.
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	Hab (1992), HR (2017), WCA (1981), EPS, NERC (2006)	8 roosts, including 3 maternity roosts, recorded dated between 2016 and 2021.
Long-eared bat species	<i>Plecotus</i> sp.	Hab (1992), HR (2017), WCA (1981), EPS, NERC (2006)	3 roosts, including 1 maternity roost, within 2 km of the site dated 2016
Brown long-eared bat	<i>Plecotus auritus</i>	Hab (1992), HR (2017), WCA (1981), EPS, NERC (2006)	15 roosts, including 6 maternity roosts, recorded dated between 2000 and 2020.
Greater horseshoe	<i>Rhinolophus ferrumequinum</i>	Hab (1992), HR (2017), WCA (1981), EPS, NERC (2006)	8 roosts recorded within 2 km of the site dated between 2011 and 2017.
Lesser horseshoe	<i>Rhinolophus hipposideros</i>	Hab (1992), HR (2017), WCA (1981), EPS, NERC (2006)	11 roosts, including 4 maternity roosts, recorded dated between 2009 and 2018.

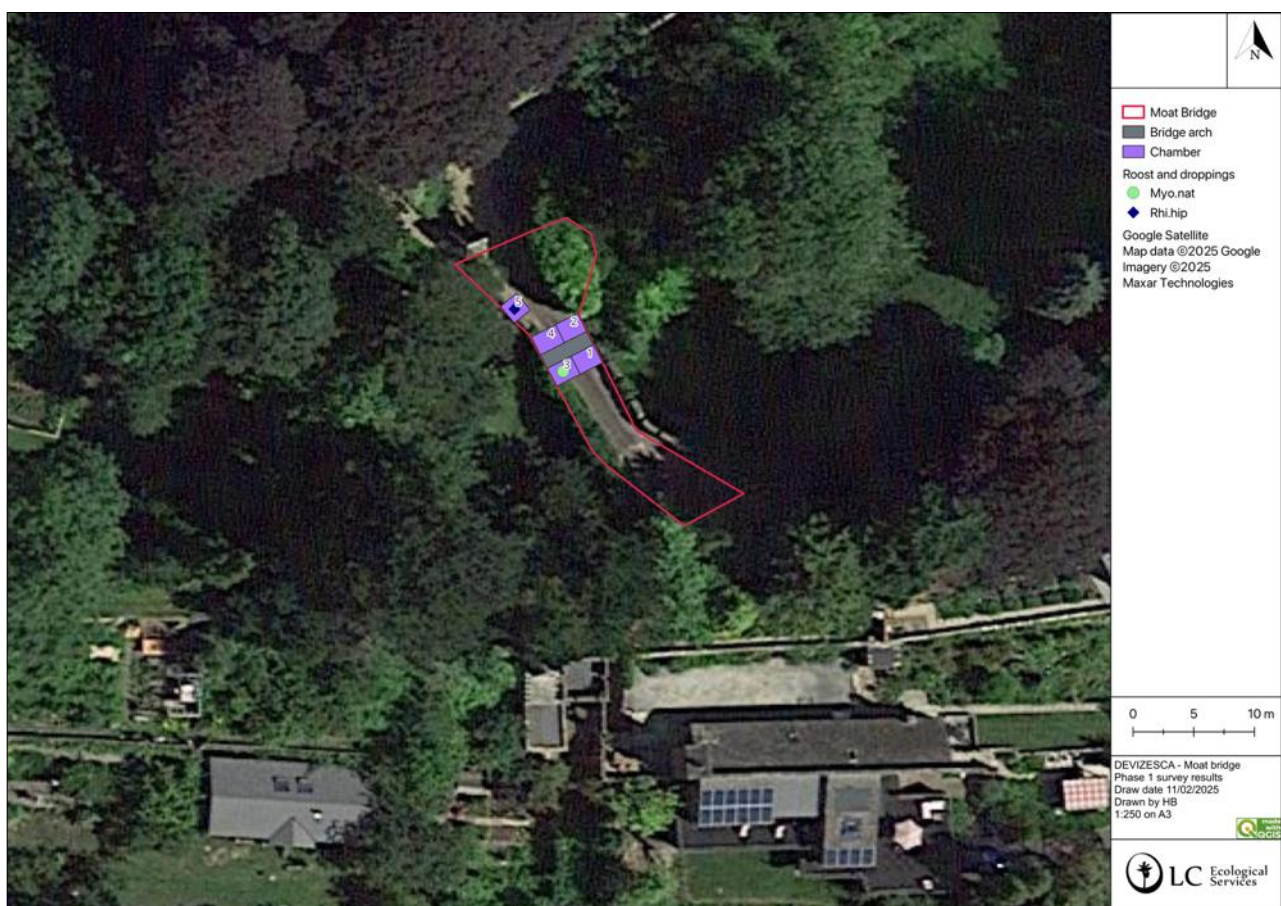
APPENDIX IV Phase 1 survey and photographs

11th January 2024

The phase 1 survey was undertaken on the 11th January 2024 by licensed bat workers Hannah Barlow [2023-11703-CL17-BAT] and Jenny Sutch [2015-12971-CLS-CLS] and involved a direct search for evidence of bats on the internal and external features of the target buildings (including droppings and staining) while also assessing the buildings on their potential to support roosting bats.

The weather conditions were dry with sunny spells and a cold breeze, with a temperature of 1 to 3°C, cloud cover of 5/8 to 6/8 and wind 4/12 increasing to 5/12 on the Beaufort Scale.

Figure 1: Building layout and locations of bat evidence.



Building description

External

- The bridge crosses the castle moat south of the castle.
- The bridge is of stone and brick construction.
- Parts of the bridge are of rubble masonry construction, with the undressed stone creating multiple gaps leading to cavities.

Chambers beneath the bridge

A total of five chambers are located at ground level, beneath the bridge. An arched passageway leads under the bridge, with two chambers leading off from the passageway to either side.

- The rooms are of stone and brick construction, have arched ceilings, and multiple gaps present within the masonry.
- A number of open doorways and windows result in some parts of the interior being light and draughty.
- The chambers are currently in use for storage, with some areas recorded as being cluttered as a result.
- These chambers connect to two further chambers on the west side of the bridge via open mullioned windows and access via wooden lattice gates on the west elevation. These rooms are darker and have less airflow.

A small cavern-like chamber of stone and brick construction is located at the northern end of the bridge on the west elevation.

- The entrance is approximately 1.2 metres high by 80cm wide.
- The chamber inside is approximately 2 metres by 2 metres.

Evidence of bats

- A small pile of droppings (approximately 100 in number) was recorded near to the entrance of the cavern-like chamber at the northern end of the western elevation.
- A sample of these droppings was collected for DNA analysis.

Potential for bats

The building provides multiple roosting opportunities for bats both internally and externally, including:

- Crevices and perching within the brickwork and stonework structures of the ceilings of all chambers beneath the bridge.
- Gaps, cracks and missing mortar leading to cavities in the stonework on all elevations.

Immediate surroundings

Devizes castle is set within grounds which include woodland, amenity grassland, scattered trees, amenity planting, and ornamental ponds. The woodland is classed as a priority habitat, therefore is considered to represent an important ecological feature, which is of value at the local level. The grounds as a whole provide high quality commuting and foraging habitat for bats.

The site is located at the western boundary of Devizes, a historic market town and civil parish in Wiltshire. The site surroundings comprise residential properties to the north and east. The wider environment is rural, widely comprising mixed agriculture, with the Kennet and Avon Canal to the north.

Conclusions

- The building has multiple roosting features and access/egress points. There are numerous gaps, cracks and missing mortar leading to cavities in the stonework the structure, which offer potential features for roosting bats. Therefore, the Moat Bridge has been considered to have **high potential** to support roosting bats.
- Bat droppings were recorded within Chamber 5, located at the northern end of the western elevation, during the building inspection on 11th January 2024. A sample was collected for DNA analysis.
- Previous surveys by Aspect Ecology (2022) recorded the presence of a Myotis bat, likely Natterer, day roost within the ceiling of Chamber 3.
- Due to the presence of bat droppings and bats themselves, the Moat Bridge is a **confirmed bat roost**.

Photographs (All photographs taken in 2024, unless otherwise stated.)

External images



Photograph 1: Driveway over the Moat Bridge looking southeast (05/03/2024).



Photograph 2: View towards east elevation from the driveway.



Photograph 3: East elevation viewed from the base of the moat.



Photograph 4: Detailed view of the archway, depicting windows into Chambers 1 and 2 on the east elevation.



Photograph 5: Gate at northern end of Moat Bridge leading from the driveway down to the gardens owned by the neighbouring property.



Photograph 6: View of the west elevation, depicting archway and gated entrances to Chambers 3 and 4 beneath the bridge.



Photograph 7: Entrance to Chamber 5 on the west elevation visible at left of image.



Photograph 8: Detail of entrance to Chamber 5 on west elevation.

Internal images:



Photograph 9: Entrance to Chamber 5, depicting bat droppings on floor.



Photograph 10: Internal view of Chamber 5 at northern end of west elevation.



Photograph 11: Lesser horseshoe above entrance to Chamber 5.



Photograph 12: Second lesser horseshoe to the right of the entrance of Chamber 5.



Photograph 13: Internal view of archway from the northeast, depicting doorways into Chambers 1 and 2 on either side.



Photograph 14: Depicting shifted stonework above the archway following heavy rain in early 2024 (14th March 2024).



Photograph 15: Internal view of Chamber 2 room depicting internal windows through to Chamber 4.



Photograph 16: Depicting shifted stonework around the doorway to Chamber 2, following heavy rain in early 2024.



Photograph 17 View through from Chamber 2 to Chamber 4, depicting the latticed entrance gate.



Photograph 18: Depicting shifted brickwork around the doorway to Chamber 4 on the west elevation, following heavy rain in early 2024.



Photograph 19: Chamber 1 room on east elevation of the bridge, depicting storage of materials.



Photograph 20: Chamber 3 on the west elevation, depicting window through to Chamber 1 on the east elevation.



Photograph 21: Depicting Natterer's bat within the ceiling brickwork of Chamber 3.

APPENDIX V DNA results

Order Number: 2546



Lindsay@ecological-services.co.uk

Samples submitted

Sample Code	Multi-species?	Sample Type	Date Sample Found	Species Group	Site postcode/post town /grid ref	Site description / comments (Optional)	Suspected identity of species
SEL-2546-1	No	Faecal	11/01/2024	C. Bats	Devizes Castle Moat bridge	Small room under Moat Bridge	

Analysis Results

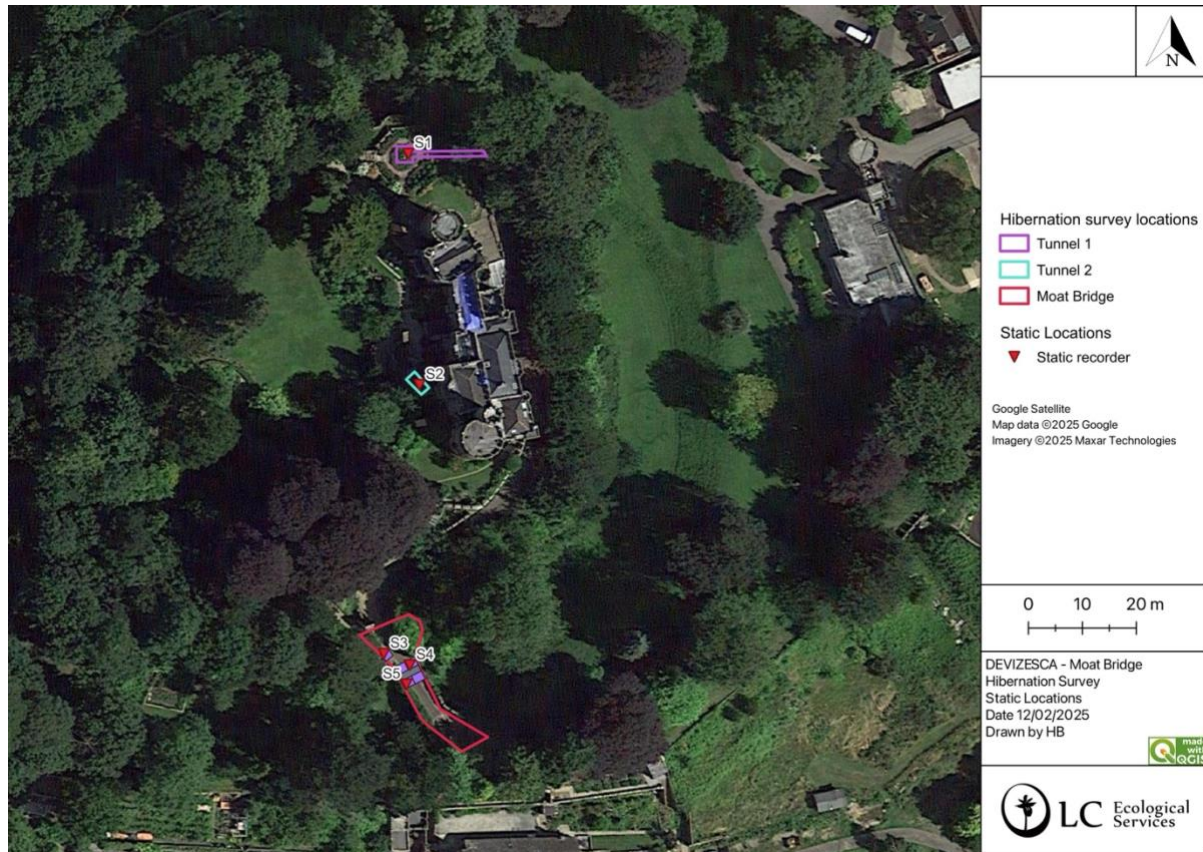
Sample Code	DNA Extraction Code	Species Identified	ID Method	Ct value	% match
SEL-2546-1	EG-2024-0169	Rhinolophus hipposideros (Lesser horseshoe bat)	qPCR	24	

SEL-2546-1 sample of the dropping pile at the entrance to Chamber 5 at the northern end of the southwest elevation.

APPENDIX VI Hibernation surveys

Static detector surveys were undertaken over fourteen nights in January, February and March 2024. Three Titley Scientific Anabat Swift full spectrum bat detectors were deployed, sited within Chambers 2 (S4), 3 (S5) and 5 (S3) of the Moat Bridge.

Figure 2: Static locations during hibernation surveys at Devizes Castle.



The weather conditions recorded during the period of deployment were recorded using the Met Office weather observations website (the nearest weather station is located in Devizes, less than 1 kilometre east of the site). Figures 3, 4 and 5 below illustrate the weather conditions recorded.

Figure 4: Weather conditions recorded during January 2024 hibernation surveys.

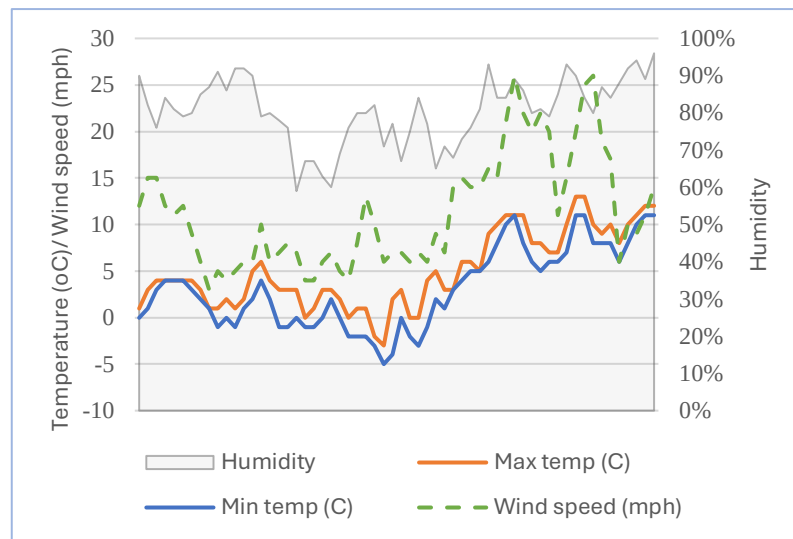


Figure 3: Weather conditions recorded during February 2024 hibernation surveys.

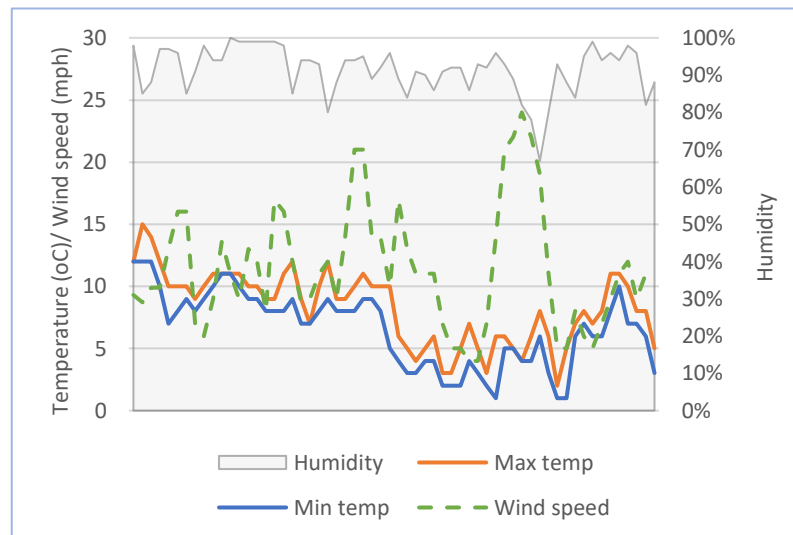
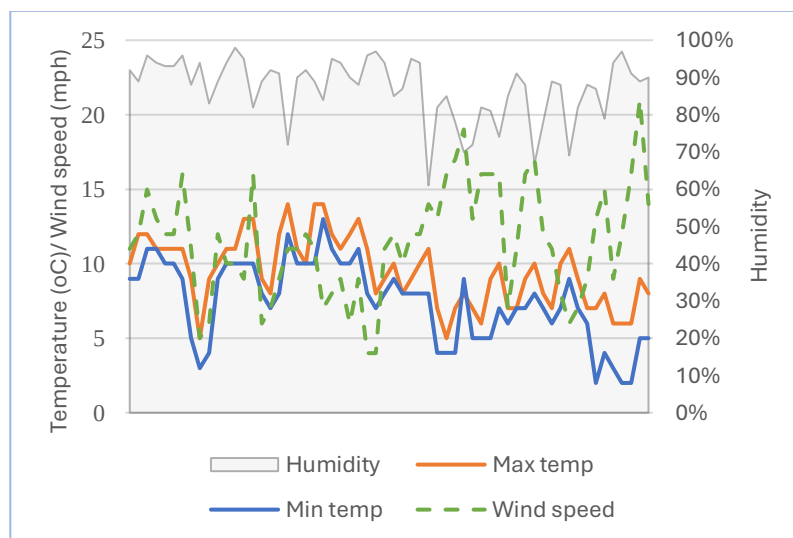


Figure 5: Weather conditions recorded during March 2024 hibernation surveys.



Evidence of bats

A Natterer's bat was recorded hibernating within the brickwork of the ceiling of Chamber 3 when collecting the static detectors on 25th January 2024. Up to two lesser horseshoes were recording in Chamber 5 during all months of the hibernation surveys.

Acoustic results

The data collected was analysed using Kaleidoscope Pro software. The AutoID feature within this software package was used to classify the recordings, these results were then manually audited by experienced bat call analyst Hannah Barlow, who holds both a BatAbility Technician Level certificate and BatAbility Auditor Level certificate.

For this study, the auditing of a sample of files containing the following descriptions was carried out:

Rhinolophus hipposideros (March only) / *Pipistrellus pipistrellus* / Noise

For folders described, as above, the following rules regarding the sample size to be audited were applicable and adhered to:

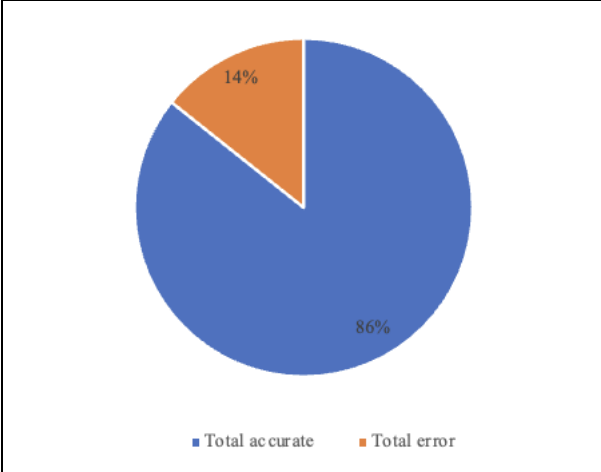
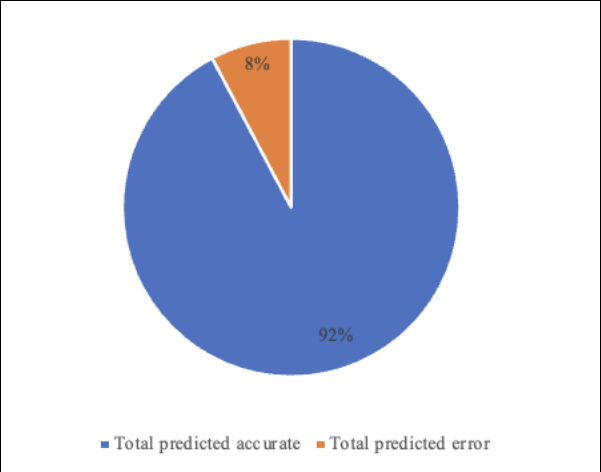
- A minimum of 30% of the *Rhinolophus hipposideros* files were checked
- A minimum of 30% of the *Pipistrellus pipistrellus* files were checked
- A minimum of 5% of Noise files were audited.

For all other folders generated as a result of this study, all files were audited irrespective of the number of files contained within that folder.

If at any point during the audit an error was found, the file(s) was then correctly labelled, and thereafter allocated to its correct folder.

The results of the auditing procedure, for this case, are summarised in table 10 below:

Table 10: Summary of auditing procedure for bat call data collected in January, February and March 2024

Results of Audit (Based on original sample)	Post Audit - Predicted Error/Accuracy Rates (Based on updated sample after audit)												
Sample size: 16,967 of 48,846 total recordings													
 <table border="1"><thead><tr><th>Category</th><th>Percentage</th></tr></thead><tbody><tr><td>Total accurate</td><td>86%</td></tr><tr><td>Total error</td><td>14%</td></tr></tbody></table>	Category	Percentage	Total accurate	86%	Total error	14%	 <table border="1"><thead><tr><th>Category</th><th>Percentage</th></tr></thead><tbody><tr><td>Total predicted accurate</td><td>92%</td></tr><tr><td>Total predicted error</td><td>8%</td></tr></tbody></table>	Category	Percentage	Total predicted accurate	92%	Total predicted error	8%
Category	Percentage												
Total accurate	86%												
Total error	14%												
Category	Percentage												
Total predicted accurate	92%												
Total predicted error	8%												

Interpretation of results

Following the auditing process, the data was run through the free online data analysis tool Ecobat (The Mammal Society, 2024). The results are presented below.

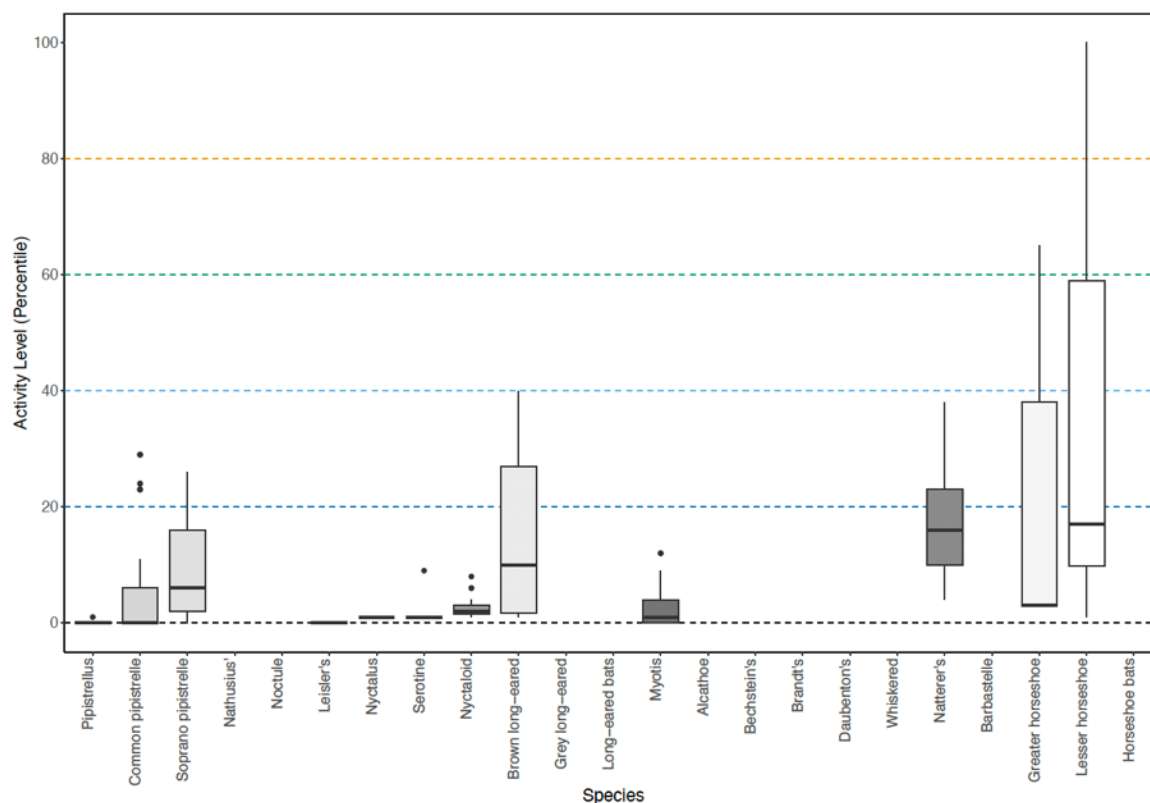
Percentile analysis

This part of the analysis looks at the relative activity levels of the bats. The value for the total bat passes each night for each species, is compared to the values in the Ecobat reference database. The analysis software returns the percentile that the survey data falls at, and therefore what the relative activity level is. For example, if the reference database has values of 5, 10, 15, 20 and the survey data returns a value of 18, this would be within the 80th percentile and be classed as high activity.

Table 11: Summary table showing the number of nights recorded bat activity falling into each activity band for each bat species.

Detector ID	Species/ Species group	Nights of exceptional activity	Nights of high activity	Nights of moderate/ high activity	Nights of moderate activity	Nights of low/ moderate activity	Nights of low activity
S3 (Chamber 5)	Serotine	0	0	0	0	0	1
	Natterer	0	0	0	0	0	3
	Nyctaloid	0	0	0	0	0	4
	Common pipistrelle	0	0	0	0	0	20
	Soprano pipistrelle	0	0	0	0	0	7
	Brown long-eared	0	0	0	0	0	3
	Greater horseshoe	0	0	1	0	0	0
	Lesser horseshoe	2	0	10	2	3	6
S4 (Chamber 2)	Serotine	0	0	0	0	0	5
	Myotis species	0	0	0	0	0	12
	Natterer	0	0	0	0	2	11
	Nyctaloid	0	0	0	0	0	6
	Leisler's noctule	0	0	0	0	0	5
	Pipistrelle species	0	0	0	0	0	3
	Common pipistrelle	0	0	0	0	5	17
	Soprano pipistrelle	0	0	0	0	2	14
	Brown long-eared	0	0	0	2	3	4
	Greater horseshoe	0	0	0	0	0	1
	Lesser horseshoe	0	0	0	2	2	10
S5 (Chamber 3)	Serotine	0	0	0	0	0	1
	Myotis species	0	0	0	0	0	12
	Natterer	0	0	0	0	13	5
	Nyctaloid	0	0	0	0	0	9
	Noctule species	0	0	0	0	0	2
	Pipistrelle species	0	0	0	0	0	2
	Common pipistrelle	0	0	0	0	5	18
	Soprano pipistrelle	0	0	0	0	4	16
	Brown long-eared	0	0	0	0	2	8
	Greater horseshoe	0	0	0	0	1	2
	Lesser horseshoe	0	0	0	0	3	12

Figure 6 below summarises the activity level for all species recorded at all locations across each night of the hibernation surveys throughout January, February and March 2024.

Figure 6: The activity level (percentile) of bats recorded across each night of the hibernation surveys for all recording locations at the Moat Bridge

Bat Passes

Table 12 below summarises the total number of bat passes recorded for each species during January, February and March 2024.

Table 12: Total number of passes recorded for each species across all of the detectors

Species	Passes (no.)	Percentage of Total (%)
<i>Eptesicus serotinus</i>	10	0.1
<i>Myotis</i>	86	1.0
<i>Myotis nattereri</i>	127	1.4
<i>Nyctaloid</i>	49	0.5
<i>Nyctalus</i>	2	0.0
<i>Nyctalus leisleri</i>	9	0.1
<i>Pipistrellus</i>	6	0.1
<i>Pipistrellus pipistrellus</i>	4663	51.7
<i>Pipistrellus pygmaeus</i>	1645	18.2
<i>Plecotus auritus</i>	108	1.2
<i>Rhinolophus ferrumequinum</i>	25	0.3
<i>Rhinolophus hipposideros</i>	2292	25.4
Total	9022	100.0

Figure 7: Bat Passes Potentially Indicating Close Proximity to a Roost (Russ 2012).

Time from 15 minutes before to 90 minutes after sunset. Species-specific emergence time ranges are shown as grey bars. Bat passes overlapping species-specific grey bars, or occurring earlier than this time range, may potentially indicate the presence of a nearby roost.

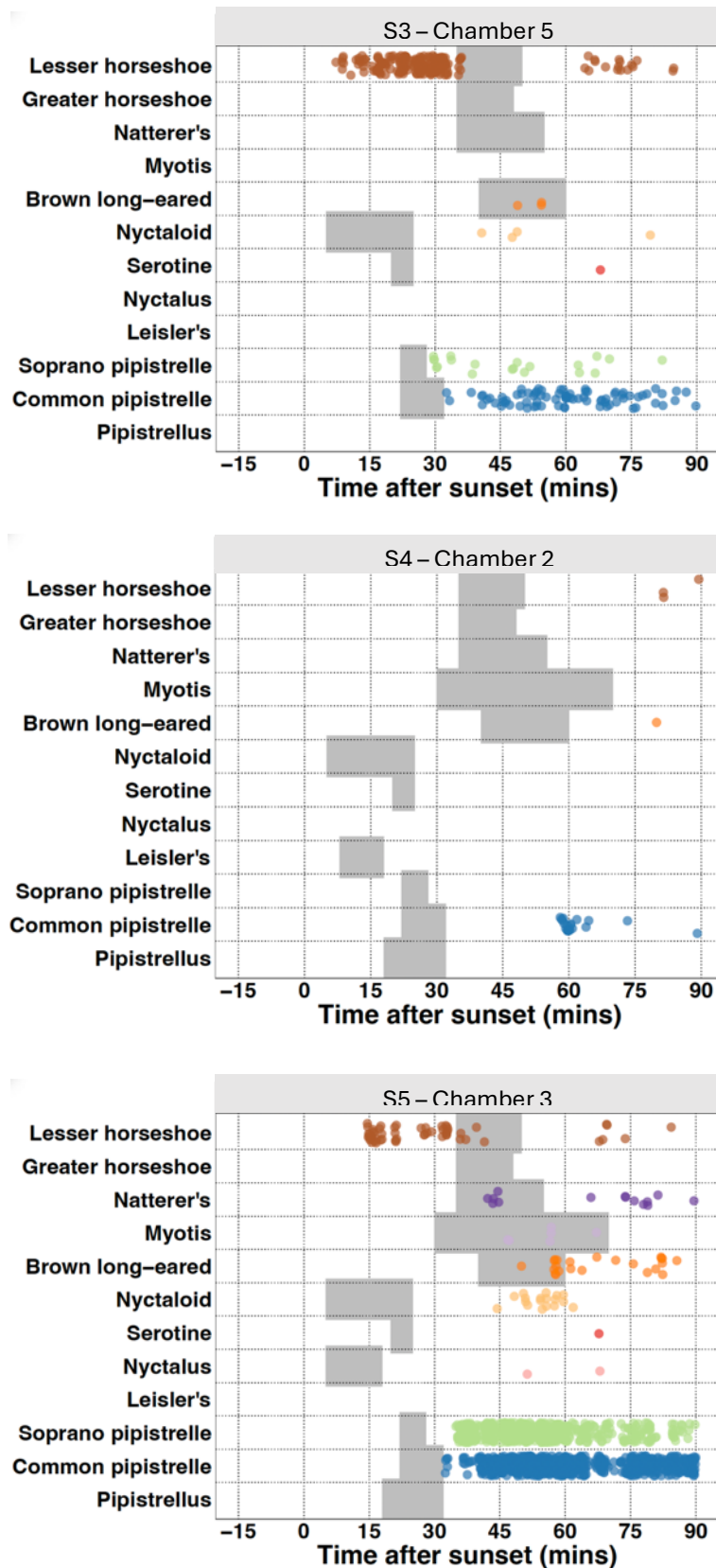


Figure 7 above reflects the known roosts for lesser horseshoes within Chamber 5, and for Natterer's within Chamber 3. These results also suggest that other species potentially have roosts nearby. Of note are the results for Chamber 5 which indicate that the area is also potentially used as a roost by brown long-eared bat, and for Chamber 3, which suggests that lesser horseshoe and brown long-eared also potentially use this Chamber as a roosting area.

APPENDIX VII Dusk emergence surveys

The Moat Bridge is confirmed as a roost for multiple species therefore, in accordance with the methodology in the Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th Edition) (Collins et al, 2023), three emergence surveys were undertaken. Echo Meter Touch bat detectors were used to record any bats that were seen leaving or entering the buildings, with three infra-red cameras (Canon XA20 Camcorder paired with surveyors or Anabat Swift bat detectors) and Nightfox whisker night vision goggles used to record activity around the structure and to record any bats emerging or entering the structure.

Visual observations were also used to record flight patterns and feeding behaviour to aid identification to species level. General bat activity within the vicinity of the property was also recorded. Notes were recorded on times, species, and behaviour. All recorded bat calls were subsequently analysed using the software Kaleidoscope Pro and video footage was reviewed using VLC Media Player software.

Dusk emergence 11th June 2024:

BAT EMERGENCE SURVEY – COMBINED RESULTS												
SURVEY LOCATION:		The Moat Bridge, Devizes Castle Grounds			SURVEYORS:		Nicola Hesketh-Roberts (S1), Hannah Barlow (S2)					
DATE	25/07/2024		SUNSET	21:24		START TIME	21:09		END TIME	22:44		
WEATHER:	START	TEMP.	12.5°C		CLOUD (oktas)	8/8		WIND (bft)	1/12		RAINFALL	Nil
	END	TEMP.	11°C		CLOUD (oktas)	8/8		WIND (bft):	0/12		RAINFALL	Nil
Equipment used:		EMT2, EMT2 Pro, 2 x Anabat Swift, 3 x Nightfox Whisker, 2 IR cameras (Canon XA20), each with 2 external IR floodlights.										
Comments:		Juvenile badgers foraging beside S2 Anabat swifts were positioned with cameras on the western elevation. This equipment was regularly checked during the survey by S2.										
Time	Species and numbers	Roost type	Structure reference	Roost location	Access points (include # of them)			Dimension of roost or explanation of roost location				
21:25	Lesser horseshoe (1)	Day/hibernation	Moat Bridge	Cavern room	Cavern entrance			Entrance 120 cm by 80 cm Internal dimensions 200 cm by 200 cm				
Notes/observations:												
Review of camera footage showed lesser horseshoe light sampling at the entrance to the cavern room at 21:25:52, before emerging at 21:25:59.												
- Frequent foraging and commuting were recorded from common pipistrelle on the west elevation between 21:22 and 22:44. Continuous foraging on east elevation by S1 between 21:48 and 22:07, then occasional until 22:41. - Occasional passes, including foraging and commuting, were recorded from lesser horseshoe on the west elevation between 21:25 and 22:55.												

- Occasional passes were recorded from soprano pipistrelle on the east elevation at 21:42, and 22:20-22:21 and 22:48. Passes were recorded on the west elevation between 21:27 and 22:51, with brief foraging above S2 at 22:51.
- Single pass by greater horseshoe, commuting north to south across southwest elevation at 21:52
- Single registration for a *Myotis* species (likely Natterer) was recorded on the west elevation at 22:37.

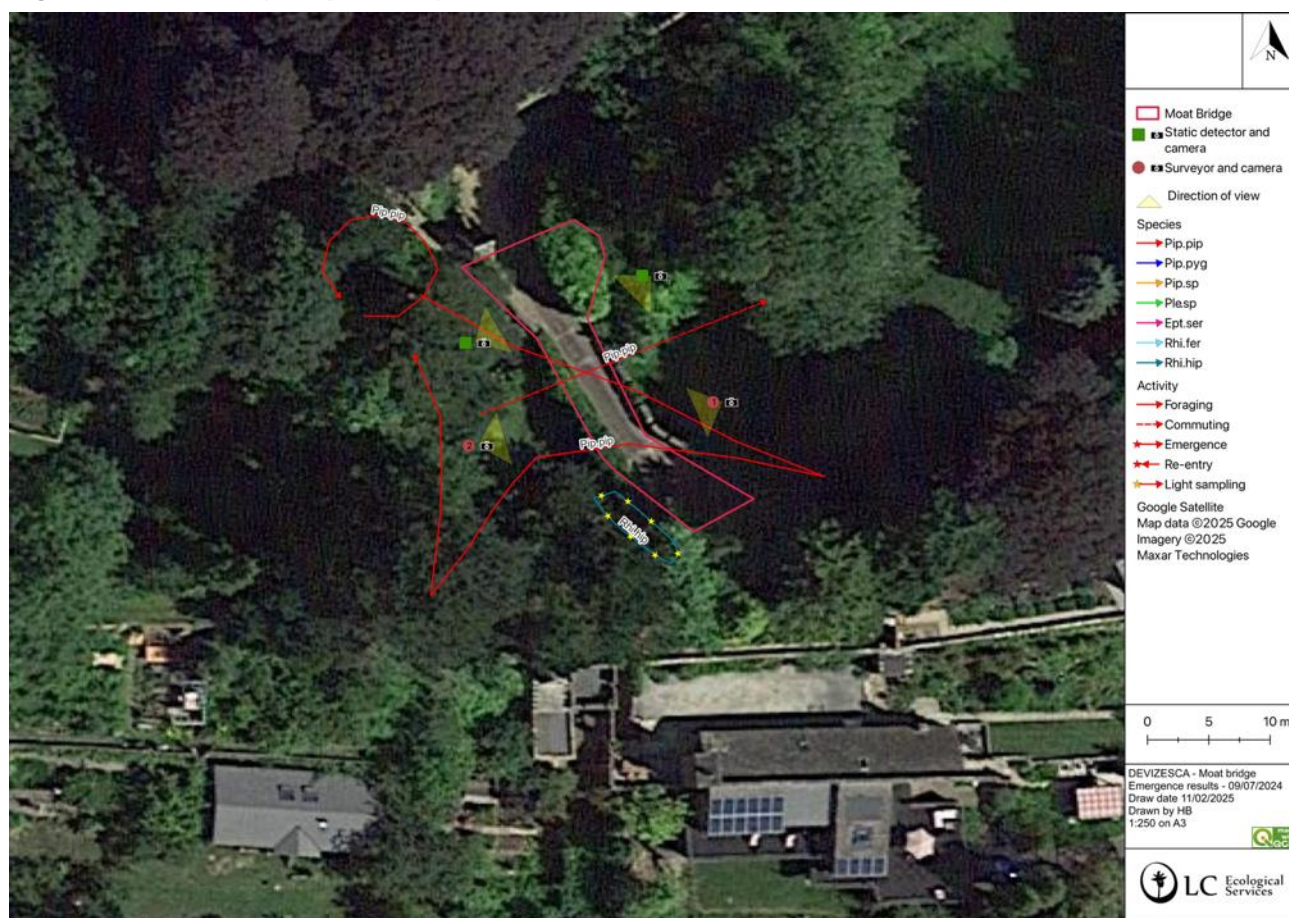
Figure 8: Bat activity map 11th June 2024.

Dusk emergence 9th July 2024:

BAT EMERGENCE SURVEY – COMBINED RESULTS									
SURVEY LOCATION:		The Moat Bridge, Devizes Castle Grounds				SURVEYORS:		Hannah Barlow (S1), Jenny Sutch (S2)	
DATE	09/07/2024	SUNSET	21:23	START TIME	21:08	END TIME	22:53		
WEATHER:	START	TEMP.	18°C	CLOUD (oktas)	8/8	WIND (bft)	2-3/12	RAINFALL	Nil. Humid
	END	TEMP.	16°C	CLOUD (oktas)	8/8	WIND (bft):	4/12	RAINFALL	Nil
Equipment used:	1 x EMT2 Pro, 1 x Anabat Scout, 2 x Anabat Swift, 2 x IR cameras (Canon XA20), each with 2 external IR floodlights, 3 x Nightfox Whisker								
Comments:	Foraging badgers recorded by both surveyors.								

Time	Species and numbers	Roost type	Structure reference	Roost location	Access points (include # of them)	Dimension of roost or explanation of roost location
21:27	Lesser horseshoe (1)	Day / hibernation	Moat Bridge	Cavern room	Cavern entrance	Entrance 120 cm by 80 cm Internal dimensions 200 cm by 200 cm
Notes/observations:						
Review of camera footage showed lesser horseshoe light sampling at the entrance to the cavern room at 21:26:56, before emerging at 21:27:05. Calls were recorded by S2 at 21:48, 21:50 (5 passes), 22:21 and 22:31 (2 passes). Observed light sampling by Surveyor 2 at 21:48. Other activity included: • Continuous activity, including foraging, social, and commuting calls, was recorded from common pipistrelle on the east elevation between 21:27 and 22:03, with regular passes between 22:11 and 22:59. On the west elevation calls were recorded continuously between 21:27 and 22:03, then occasionally from 22:11 to 22:49. • Regular foraging and commuting calls were recorded from serotine between 21:37 until 22:53. • Occasional passes from soprano pipistrelle were recorded on both elevations between 21:31 and 22:51, with a peak in activity at 21:38-21:39. • Five passes from <i>Myotis</i> species were recorded on the west elevation, between 22:03 and 22:41. A single pass was recorded on the east elevation at 22:51. • Four passes from noctule were recorded on the east elevations between 22:19 and 22:25. • Infrequent passes from Leisler's bat were recorded on the east elevation at 22:44. 22:14 and 22:43 with six registrations occurring between 22:53 and 22:54. • A single pass from a greater horseshoe was recorded by Surveyor 2 at 21:46.						

Figure 9: Bat activity map 9th July 2024.



Dusk emergence 30th July 2024:

BAT EMERGENCE SURVEY – COMBINED RESULTS																				
SURVEY LOCATION:			The Moat Bridge, Devizes Castle Grounds				SURVEYORS:		Hannah Barlow (S1), Jenny Sutch (S2)											
DATE		30/07/2024		SUNSET		20:58		START TIME		20:43		END TIME		22:28						
WEATHER:		START		TEMP.		25°C		CLOUD (oktas)		1/8		WIND (bft)		3/12		RAINFALL		Nil		
		END		TEMP.		21°C		CLOUD (oktas)		5/8		WIND (bft):		3-4/12		RAINFALL		Nil		
Equipment used:		1 x EMT2 Pro, 1 x Anabat Scout, 2 x Anabat Swift, 2 x IR cameras (Canon XA20), each with 2 external IR floodlights, 3 x Nightfox Whisker																		
Comments:																				
Time		Species and numbers		Roost type		Structure reference		Roost location		Access points (include # of them)			Dimension of roost <u>or</u> explanation of roost location							
21:27		Lesser horseshoe (1)		Day/hibernation		Moat Bridge		Cavern room		Cavern entrance			Entrance 120 cm by 80 cm Internal dimensions 200 cm by 200 cm							

Notes/observations:

Review of camera footage showed lesser horseshoe entering the entrance to the cavern room at 22:16:26, before re-emerging at 22:16:53. Calls were recorded by S2 at 21:33 (3 passes), 22:44.

Other activity included:

- Continuous activity on both elevations, including foraging, feeding buzzes and social calls, was recorded from common pipistrelle between 21:10 and 22:29. Up to four individuals observed chasing and emitting type D social calls on the east elevation.
- Frequent foraging and social calls were recorded from serotine between 21:23 until 21:44, with the majority of registrations recorded on the east elevation.
- Frequent passes, including foraging and social calls from soprano pipistrelle were recorded on both elevations of the bridge between 21:15 and 21:30, with less regular passes between 21:34 and 21:54.
- Two passes from a greater horseshoe were recorded by Surveyor 2 at 21:28. The individual was observed commuting southwest.
- A single pass from a Myotis species was recorded by Surveyor 2 at 21:50.
- A single pass from a Nyctalus species was recorded by Surveyor 2 at 21:34.

Figure 10: Bat activity map 30th June 2024.



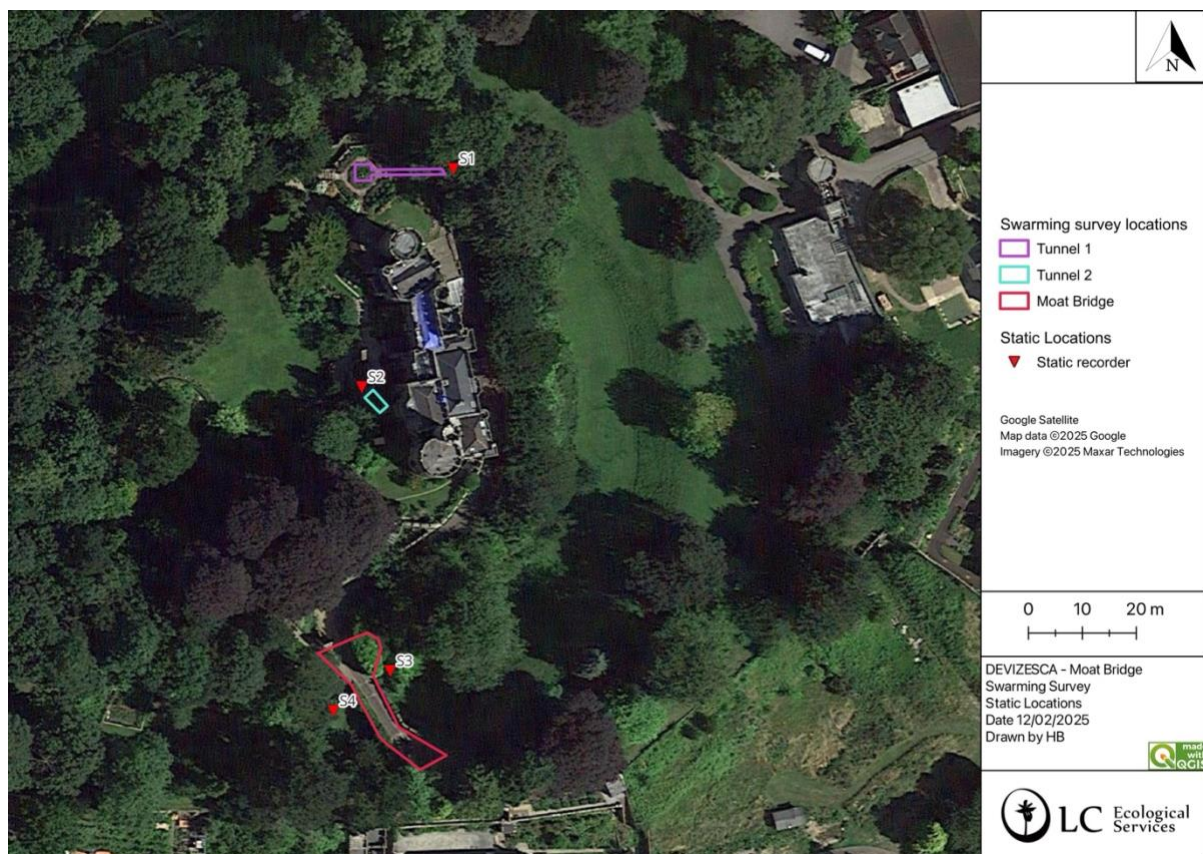
APPENDIX VIII Acoustic swarming surveys

The aim of carrying out acoustic bat activity surveys at potential swarming sites is to establish the extent and nature of use by swarming bats and therefore determine the need for further surveys and the extent of potential impacts.

The current guidelines recommend, as a minimum, five nights of survey with a static detector (in appropriate conditions for bats) in each month of the swarming season of mid-August to the end of October, to establish whether the site is used for swarming or not. If the sites are used by swarming bats, we would expect to see repeated peaks in ultrasonic activity reaching a maximum 2 to 3 hours after sunset.

Static detectors were deployed outside and close to the entrance to the Moat Bridge over a minimum of five nights in August, September and October 2024. Two Titley Scientific Anabat Swift full spectrum bat detectors were deployed, sited opposite the east and west elevations of the Moat Bridge.

Figure 11: Static locations during swarming surveys at Devizes Castle.



The weather conditions recorded during the period of deployment were recorded using the Met Office weather observations website (the nearest weather station is located in Devizes, less than 1 kilometre east of the site). Figures 12, 13 and 14 below illustrate the weather conditions recorded.

Figure 12: Weather conditions recorded during August 2024 swarming surveys.

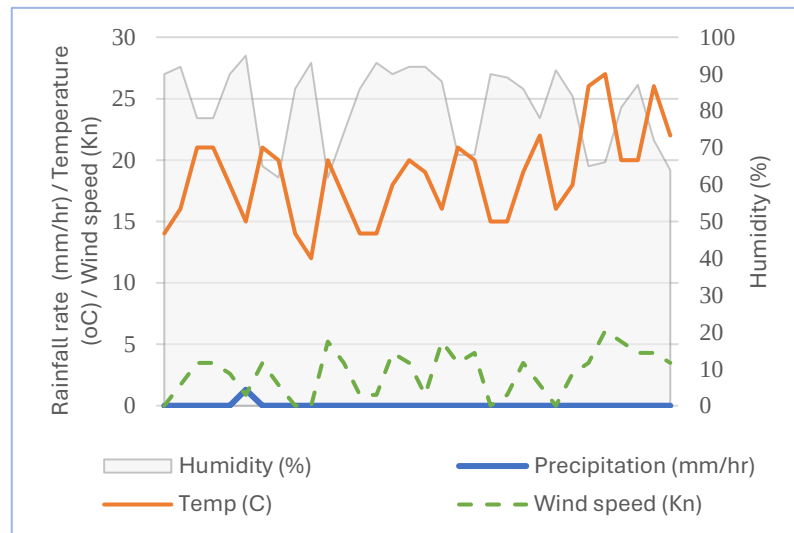


Figure 13: Weather conditions recorded during September 2024 swarming surveys.

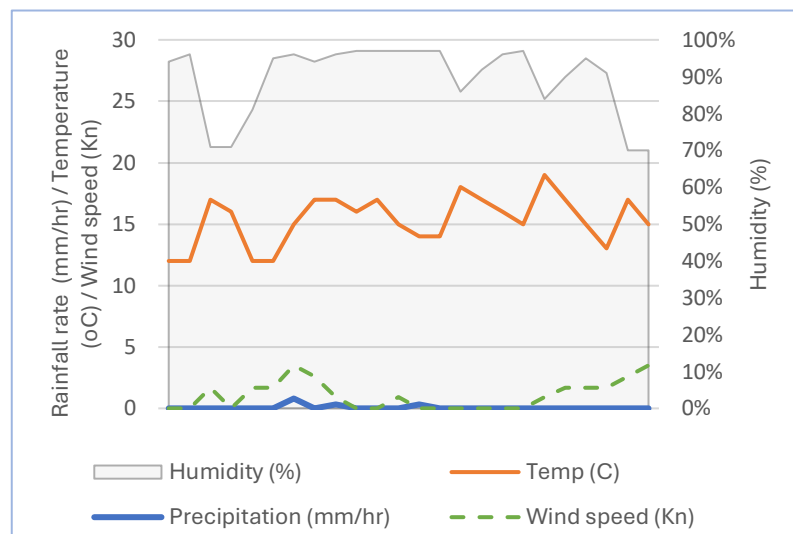
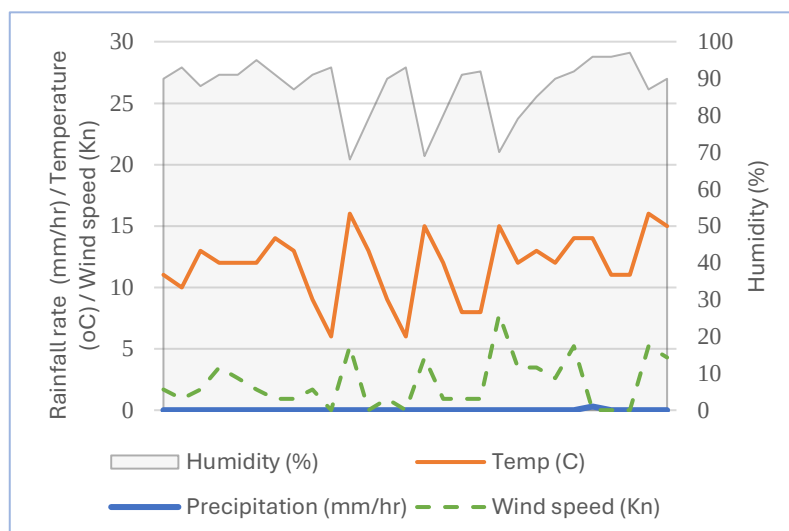


Figure 14: Weather conditions recorded during October 2024 swarming surveys.



The data collected was analysed using Kaleidoscope Pro software. The AutoID feature within this software package was used to classify the recordings, these results were then manually audited by experienced bat call analyst Hannah Barlow, who holds both a BatAbility Technician Level certificate and BatAbility Auditor Level certificate.

For this study, the auditing of a sample of files containing the following descriptions was carried out:

Pipistrellus pygmaeus / *Pipistrellus pipistrellus* / Noise

For folders described, as above, the following rules regarding the sample size to be audited were applicable and adhered to:

- A minimum of 30% of the *Pipistrellus pygmaeus* files were checked.
- A minimum of 5% of the *Pipistrellus pipistrellus* files were checked.
- A minimum of 5% of noise files were audited.

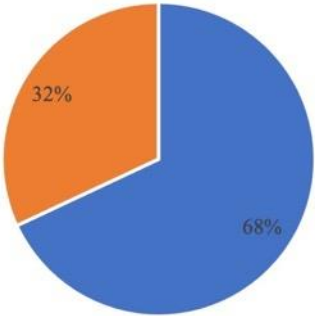
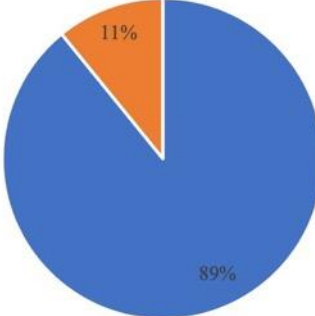
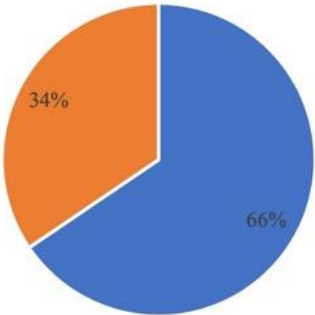
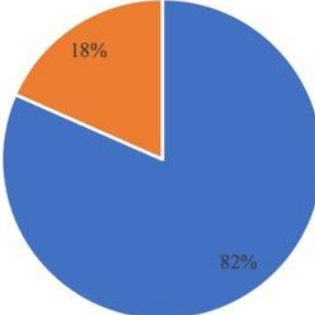
If the predicted accuracy rate following the audit was below 75% for any folder, the number of files audited was increased until a level of at least 75% predicted accuracy was reached.

For all other folders generated as a result of this study, all files were audited irrespective of the number of files contained within that folder.

If at any point during the audit an error was found, the file(s) was then correctly labelled, and thereafter allocated to its correct folder.

The results of our auditing procedure, for this case, are summarised in table 13 below:

Table 13: Summary of auditing procedure for bat call data collected in August, September and October 2024

Results of Audit (Based on original sample)	Post Audit - Predicted Error/Accuracy Rates (Based on updated sample after audit)
Location 3 Sample size: 8,935 of 36,502 total recordings	
 ■ Total accurate ■ Total error	 ■ Total predicted accurate ■ Total predicted error
Location 4 Sample size: 12,347 of 29,381 total recordings	
 ■ Total accurate ■ Total error	 ■ Total predicted accurate ■ Total predicted error

Interpretation of results

Following the auditing process, the data was run through the free online data analysis tool Ecobat (The Mammal Society, 2024). The results are presented below.

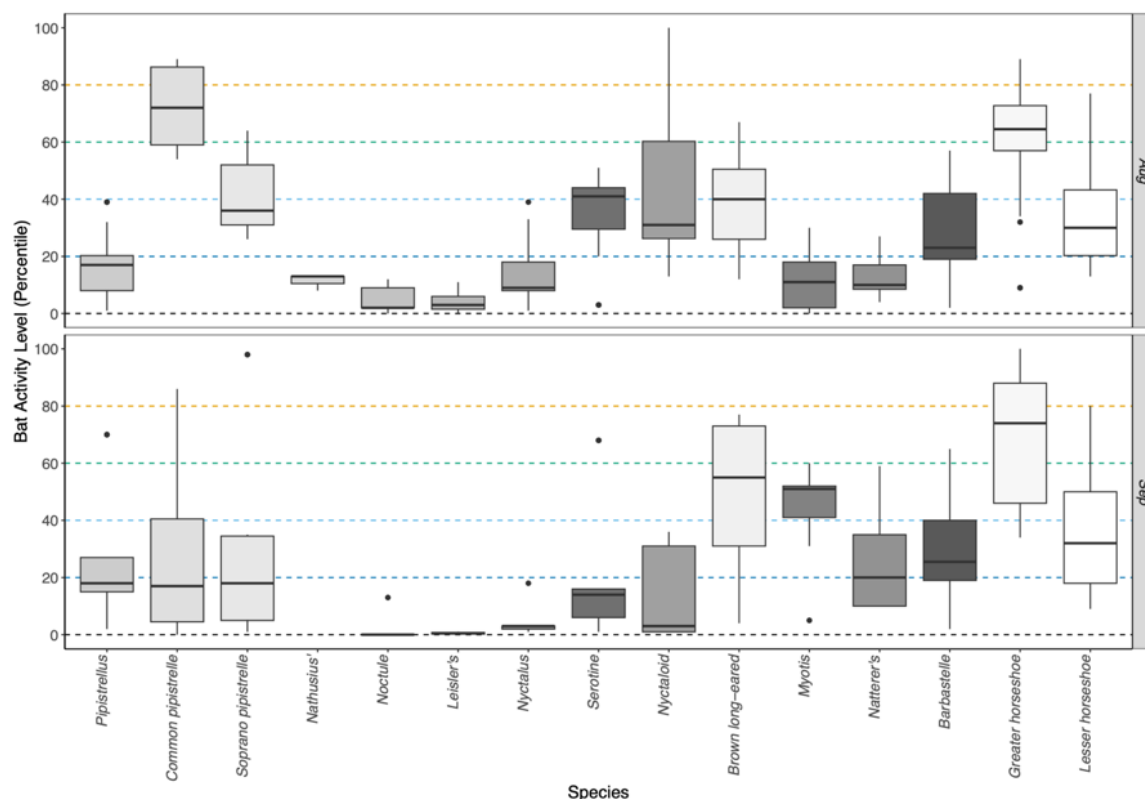
Percentile analysis

This part of the analysis looks at the relative activity levels of the bats. The value for the total bat passes each night for each species, is compared to the values in the Ecobat reference database. The analysis software returns the percentile that the survey data falls at, and therefore what the relative activity level is. For example, if the reference database has values of 5, 10, 15, 20 and the survey data returns a value of 18, this would be within the 80th percentile and be classed as high activity.

Table 14: Summary table showing the number of nights recorded bat activity falling into each activity band for each bat species.

Detector ID	Species/ Species group	Nights of exceptional activity	Nights of high activity	Nights of moderate/ high activity	Nights of moderate activity	Nights of low/ moderate activity	Nights of low activity
S3 (east elevation)	Barbastelle	0	0	2	2	4	8
	Serotine	0	0	2	6	4	11
	Myotis species	0	0	0	4	2	17
	Natterer	0	0	0	0	3	9
	Nyctaloid	2	0	3	0	7	8
	Nyctalus species	0	0	0	0	3	11
	Nyctalus leisleri	0	0	0	0	0	10
	Nyctalus noctula	0	0	0	0	0	14
	Pipistrelle species	0	0	2	0	2	21
	Nathusius' pipistrelle	0	0	0	0	0	2
	Common pipistrelle	0	3	5	4	0	13
	Soprano pipistrelle	0	0	2	3	7	13
	Brown long-eared	0	0	4	7	3	7
	Greater horseshoe	0	0	8	2	4	3
	Lesser horseshoe	0	0	2	1	6	12
S4 (west elevation)	Barbastelle	0	0	0	5	4	6
	Serotine	0	0	0	5	3	9
	Myotis species	0	0	2	2	3	3
	Natterer	0	0	0	2	3	3
	Nyctaloid	0	0	2	0	8	7
	Nyctalus species	0	0	0	0	0	9
	Nyctalus leisleri	0	0	0	0	0	7
	Nyctalus noctula	0	0	0	0	0	7
	Pipistrelle species	0	0	0	0	9	8
	Nathusius' pipistrelle	0	0	0	0	0	2
	Common pipistrelle	0	5	3	4	2	5
	Soprano pipistrelle	2	0	2	2	8	5
	Brown long-eared	0	0	2	3	8	2
	Greater horseshoe	2	4	5	1	0	2
	Lesser horseshoe	0	2	2	3	7	1

Figure 15 below summarises the activity level for all species recorded at all locations across each night of the swarming surveys throughout August, September and October 2024.

Figure 15: The activity level (percentile) of bats recorded across each night of the swarming surveys for all recording locations at the Moat Bridge, split between months

Bat Passes

Table 15 below summarises the total number of bat passes recorded for each species during August, September and October 2024.

Table 15: Total number of passes recorded for each species across all of the detectors.

The 'Total' percentage may not be exactly 100% due to rounding of the percentages per species.

Species	Passes (no.)	Percentage of Total (%)
Barbastella barbastellus	248	0.5
Eptesicus serotinus	750	1.5
Myotis	805	1.6
Myotis mystacinus	1	0.0
Myotis nattereri	97	0.2
Nyctaloid	981	2.0
Nyctalus	114	0.2
Nyctalus leisleri	126	0.3
Nyctalus noctula	101	0.2
Pipistrellus	937	1.9
Pipistrellus nathusii	6	0.0
Pipistrellus pipistrellus	34580	69.9
Pipistrellus pygmaeus	9106	18.4
Plecotus auritus	562	1.1
Rhinolophus ferrumequinum	343	0.7
Rhinolophus hipposideros	716	1.4
Total	49473	99.9

Figure 16: Distribution of bat activity across the night through time

Timing of bat calls plotted as minutes before/after sunset, whereby 0 on the y axis represents sunset. Sunrise throughout the survey period is depicted as the red dashed line. Colours indicate kernel densities, with darkest colours showing peaks of activity. These colours are comparative only within each plot, and do not account for overall activity. The horizontal grey shading indicates the period 125-250 minutes after sunset (swarming activity is expected to peak between 120-180 minutes after sunset).

