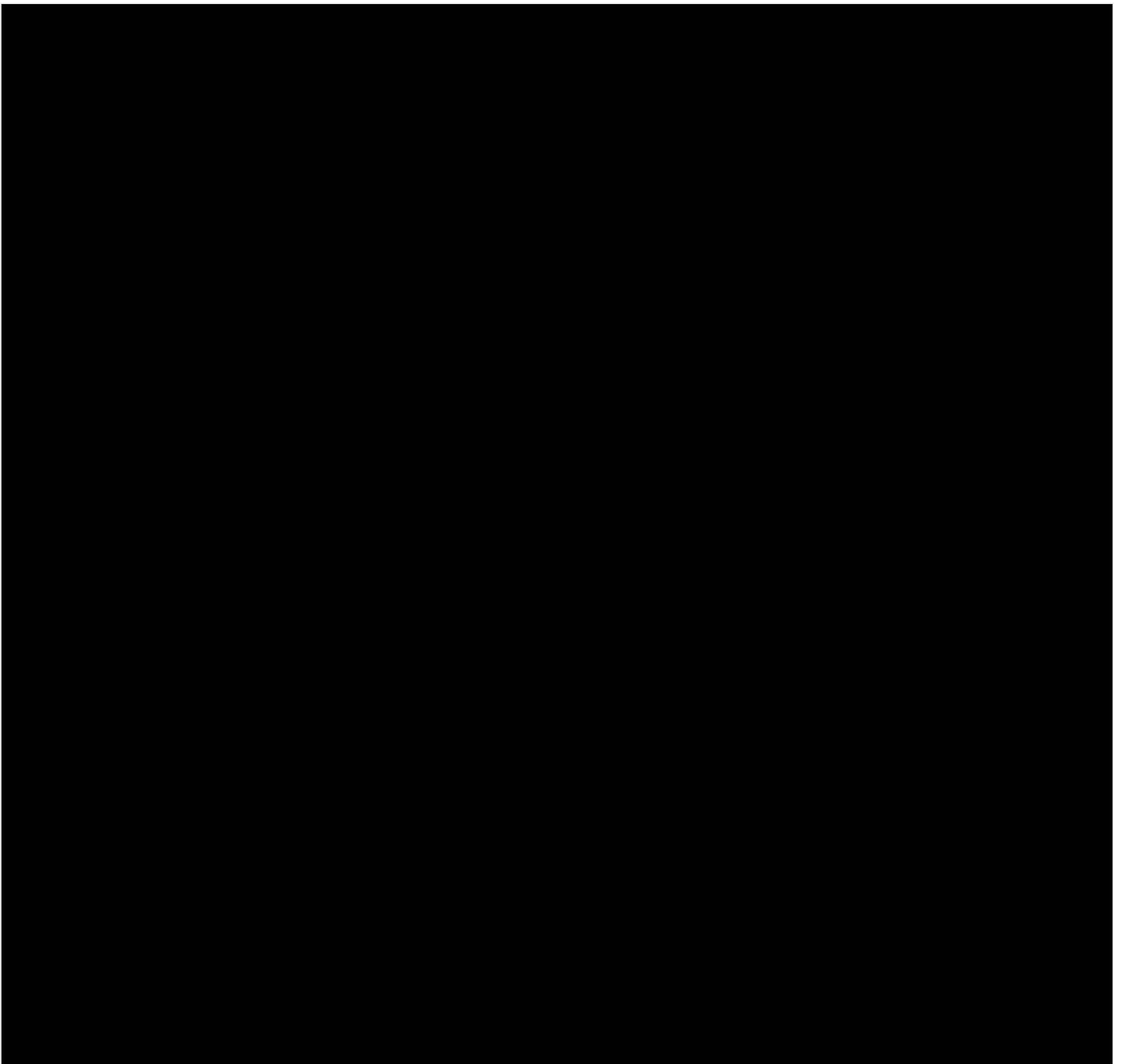


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<sup>1</sup> Defra (2014): *Response to Environmental Information Request: Badger Population Size and bTB Incidence*. Accessed online [November 2014] at: [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/320950/6488.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/320950/6488.pdf)

<sup>2</sup> Badger Trust (Revised 2011): *Badger Factsheet*. Accessed online [November 2014] at: <http://badgertrust.org.uk/badgers/badger-portrait.aspx>



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<sup>3</sup> Natural England (2015): Badgers: surveys and mitigation for development projects. Accessed online at:  
<https://www.gov.uk/guidance/badgers-surveys-and-mitigation-for-development-projects>

## 3 Methods

### 3.1 Desk Study

3.1.1 A desk-based study was undertaken to examine published information and biological records from within the search area (site centroid plus 2km for bats, and 1km for all other data). The desk study established the presence of designated sites of nature conservation interest, or records of protected/notable habitats/species within the site and its surrounding area. This information was collected from the following sources:

- ▶ The 'MAGIC' (Multi-agency Geographic Information for the Countryside) website: [www.magic.gov.uk](http://www.magic.gov.uk); and
- ▶ Thames Valley Environmental Records Centre (TVERC).

3.1.2 The desk study was carried out as part of the PEA (UEEC, 2022)<sup>4</sup>.

### 3.2 Bat Surveys

3.2.1 Field survey work undertaken for the project utilised a range of techniques in order to assess the usage of the site by bats:

- ▶ Preliminary Roost Assessment (PRA), including internal/external inspection of structures and trees;
- ▶ DNA analysis; and
- ▶ Presence/absence surveys.

#### **Preliminary Roost Assessment**

3.2.2 External inspection of the structures and trees was undertaken during the PEA on 3 February 2022 by a suitably licenced and experienced ecologist. Weather conditions were mild (c.10°C), with a light south-westerly breeze (Beaufort Scale 2), 100% cloud cover and no precipitation. Internal inspection of building B4 was undertaken on 15 June 2022. All observable features potentially suitable for bats were noted and the overall suitability of the structure/tree for roosting bats was classified with reference to Box 1 (Collins (ed.), 2016).

3.2.3 The inspections were undertaken with the aid of the following equipment: telescopic ladders to gain safe access; Wildlife Acoustics EM3 full spectrum bat detector to record and identify the calls of any bats which were present; CB-2 high-powered searchlight fitted with a red filter to search dark areas for signs of bats; Hawke Sport Optics 10x42 close-focusing binoculars to view areas inaccessible on foot; and digital camera with flash to record any evidence of bats or features suitable for use by bats.

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<sup>4</sup> Urban Edge Environmental Consulting (UEEC; 2022): *Grandpont House, Abingdon Road, Oxford: Preliminary Ecological Appraisal*.

- 3.2.4 The external inspection from ground-level focused on potential access points and roosting opportunities such as lifted lead flashing, broken, lifted or missing roof or ridge tiles, cracks in the render or gaps between exterior cladding and weatherboards, soffits or fascias. The internal inspection included a search for live animals and other signs that give an indication of past or present occupancy. In the case of bats, typical indicators include droppings (which are characteristic and are often indicative of species), signs of fur oil staining, urine splashing, characteristic odours, and accumulations of discarded prey remains. It also assessed the overall suitability of the structure for roosting bats focusing particularly on the interior roof spaces and cellars (subject to safe access). The objective was to establish whether structures are of low, moderate or high bat roosting suitability.
- 3.2.5 Trees were assessed for PRFs such as woodpecker holes, cavities, cracks or splits in major limbs (e.g. hazard beams, rot holes, frost cracks, knot holes, occlusions, flush cuts, tear-outs, cankers or butt-rots), loose platey bark, aerial deadwood and dense ivy or epicormic growth. The tree inspection was carried out from ground level.

<b>Box 1: Potential suitability of structures/trees for roosting bats (after Collins, 2016)</b>	
<b>Suitability</b>	<b>Roosting habitats</b>
<u>Negligible</u>	Negligible habitat features on site likely to be used by roosting bats
<u>Low</u>	A structure with one or more potential roost features (PRF) that could be used by individual bats opportunistically, but do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats A tree of sufficient size and age to contain PRFs but with none seen from the ground / using ladders or features seen with only very limited roosting potential
<u>Moderate</u>	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (for roost type only)
<u>High</u>	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat
<u>Confirmed roost</u>	Bats or unequivocal evidence of bats found, i.e. bat droppings

### **DNA Analysis**

- 3.2.6 The inspections included a search for bat droppings which, if found, would be collected in accordance with BCT protocols (Collins (ed.), 2016) to be sent for DNA analysis by the ecological forensics team within the School of Life Sciences at the University of Warwick.

### **Presence/Absence Surveys**

- 3.2.7 Where a structure/tree is found to contain evidence of roosting bats, or judged to be potentially suitable as a roost, then further surveys are required prior to undertaking works in order to confirm whether bats are currently present or are likely to be absent. These surveys typically take the form of emergence surveys (carried out as the bats leave the roost at dusk) and re-entry surveys

(as bats return to the roost at dawn), and can be carried out between May and September (May to August being the optimal period).

- 3.2.8 The emergence surveys commenced at least quarter of an hour before dusk and continued for up to 2 hours after sunset, while return-to-roost surveys (where applicable) began 1.5 to 2 hours before dawn and continued until 15 minutes after sunrise. The objective was to establish the presence or likely absence of bats within each feature, determine the assemblage and relative abundance of bat species using the features, and identify the type(s) of roost (e.g. day roost or maternity roost).
- 3.2.9 Detection equipment included Wildlife Acoustics Echo Meter Touch, EM Touch2 Pro, Anabat Walkabout and Elekon Batlogger-M full spectrum detectors. Recordings of bat calls were analysed using Kaleidoscope Pro (v5.4.8) software. The number of bats leaving/entering each building were noted, together with observations regarding point of emergence/re-entry, type of behaviour and areas of particularly high activity. Survey covariates were also noted (minimum/maximum air temperatures, wind speed/direction, precipitation and cloud cover). Table 3.1 shows the dates and weather conditions for each survey visit.

**Table 3.1: Bat survey dates and weather conditions**

Date	Time	Weather conditions
4 May 2022	Dusk	14°C–11°C, 20-40% cloud cover, north-westerly Beaufort 2, no precipitation
25 May 2022	Dawn	8°C–8°C, 100-80% cloud cover, southerly Beaufort 1, no precipitation
15 June 2022	Dawn	10°C–10°C, 0% cloud cover, southerly Beaufort 1, no precipitation

- 3.2.10 Current guidelines (Collins (ed.), 2016) recommend the minimum levels of presence/absence survey effort for structures, based on their overall suitability for roosting bats; see Box 2. The PRA concluded that buildings B1/B2/B3/B4 were of low suitability for roosting bats, the culvert under Abingdon Road was of moderate suitability, and B5 was of high suitability. Three presence/absence surveys were undertaken with varying numbers of surveyors depending on how many buildings were being surveyed. Surveyors also utilised Canon XA11 infrared cameras where appropriate, with illumination provided by infrared flood lighting. Appendix II presents a map of surveyor positions.
- 3.2.11 For the avoidance of doubt, no trees were included as part of the presence/absence surveys. All trees likely to be affected by proposals for the site were of negligible or low suitability and are not required to undergo further surveys under current guidelines.

**Box 2: Recommended minimum survey effort for presence/absence surveys (Collins, 2016)**

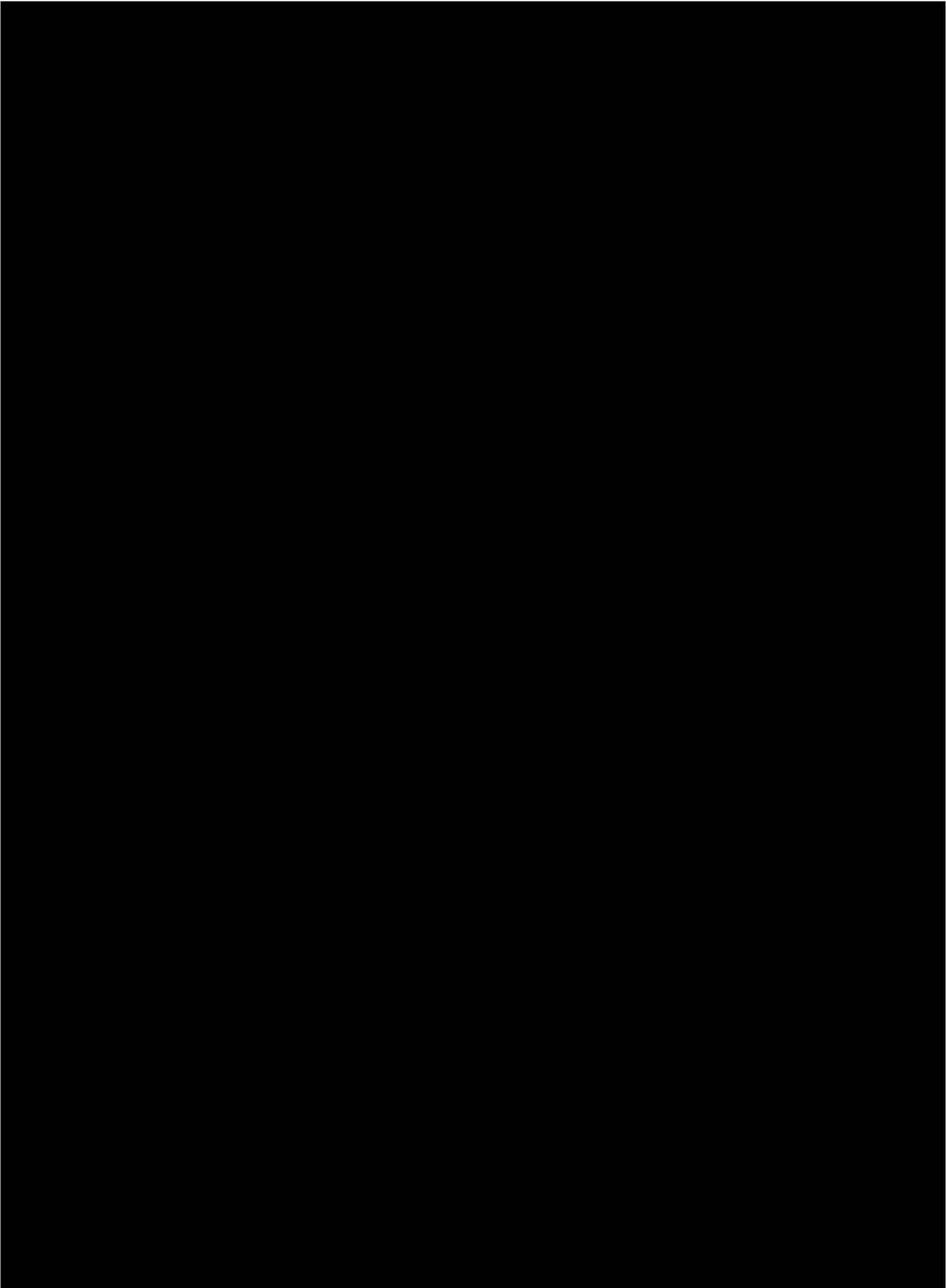
Low roost suitability	Moderate roost suitability	High roost suitability
One survey visit: One dusk emergence or dawn re-entry survey	Two survey visits: One dusk emergence and a separate dawn re-entry survey	Three survey visits: At least one dusk emergence & at least one separate dawn re-entry survey

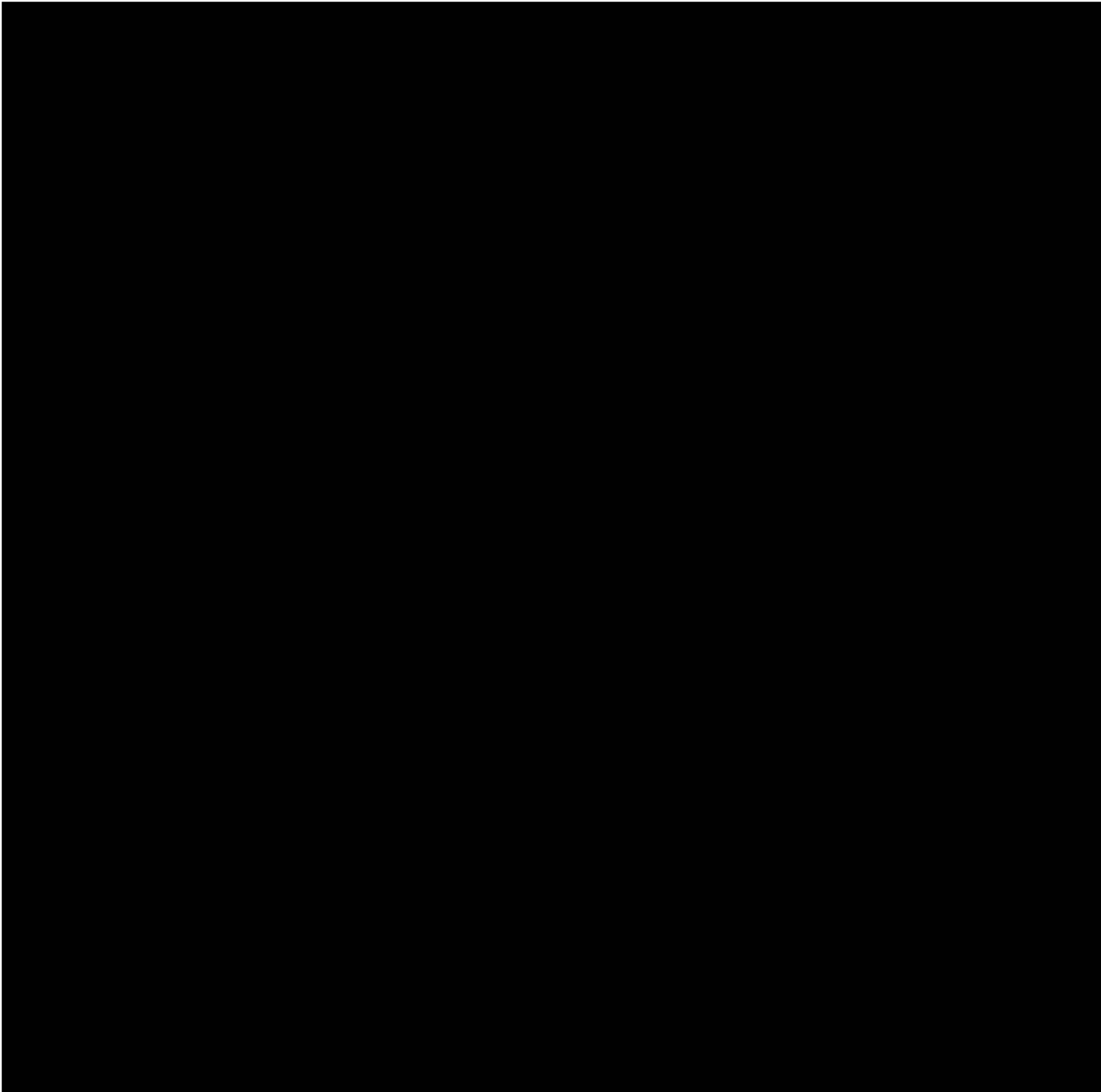
### **Evaluation**

- 3.2.12 Within this bat survey report, the potential suitability of roosting and foraging/commuting habitats is classified as negligible, low, moderate or high with reference to Table 4.1 in the *Good Practice Guidelines* (Collins (ed.), 2016). The conservation significance of bat roosts is classified as low, moderate or high with reference to Figure 4 in the *Bat Mitigation Guidelines* (English Nature, 2004). However, these are relative terms which require an interpretation of the rarity of different species and regional variations therein. The terms are hence applicable within the survey area only and are intended to indicate which features of the survey area may be of importance to the conservation status of local bat populations.
- 3.2.13 Evaluation of the potential impacts on bats was undertaken with reference to Chapter 6 of English Nature (2004) and Natural England Standing Advice, with predicted impacts to each feature noted as of Low, Medium or High significance.

### **Limitations**

- 3.2.14 The presence/absence survey reported herein was carried out during May and June 2022, with at least 14 days between each survey on the same feature. The surveys were hence undertaken in accordance with the BCT's recommended timings for presence/absence surveys (Collins (ed.), 2016) and during the peak maternity period of May to August.
- 3.2.15 There were no difficulties in gaining access to the site to carry out the presence/absence surveys. All elevations were all viewed directly, except for the rear (north) elevation of buildings B1/B2/B4 which backed onto private land comprising hardstanding, tall modern buildings and a tributary of the River Thames. Weather conditions were generally good and within acceptable parameters despite cool air temperatures during the second survey. There were no equipment malfunctions or other limitations of relevance to the methods applied.
- 3.2.16 See Appendix VI for general Legal and Technical Limitations which apply to this document.





### 3.4 Personnel

3.4.1 The personnel deployed on the surveys are listed in Table 3.4.

**Table 3.4: Survey personnel and qualifications**

Feature / Task	Personnel
Preliminary Roost Assessment	Richard Bickers (external); Nick Pincombe (internal B5)
Survey 1: B1/2/3/4, B5, culvert	1. Tim Lees 2. Dan Maude 3. Nick Pincombe (Lead) 4. Canon XA11 5. Rich Emerson



	<ol style="list-style-type: none"> <li>6. Hannah Goldenwalla</li> <li>7. Hayley Fuller</li> </ol>
<p>Survey 2: B5, culvert</p>	<ol style="list-style-type: none"> <li>1. Tim Lees</li> <li>2. Dan Maude</li> <li>3. Nick Pincombe (Lead)</li> <li>4. Canon XA11</li> <li>5. Rich Emerson</li> <li>6. Hannah Goldenwalla</li> </ol>
<p>Survey 3: B5</p>	<ol style="list-style-type: none"> <li>1. Dan Maude</li> <li>2. Canon XA11</li> <li>3. Nick Pincombe (Lead)</li> <li>4. Rich Emerson</li> <li>5. Hannah Goldenwalla</li> </ol>
<b>Personnel</b>	<b>Qualifications</b>
Nick Pincombe BA(Hons) MSc CEnv MIEMA MCIEEM	Director with seventeen years' experience leading survey and impact assessment teams for a wide range of ecology and environmental planning projects. Natural England Class Licences to survey for bats (WML-CL18) and great crested newt (WML-CL08).
Tim Lees BA(Hons) MSc MCIEEM	Principal Ecologist with nine years' professional consultancy experience. Licences to survey for bats (WML-CL17) and great crested newt (WML-CL08). Keen botanist.
Hayley Fuller BSc (Hons) MSc	Ecologist and keen botanist with five years' professional consultancy experience.
Dan Maude BSc(Hons) MRes qCIEEM	Assistant with two seasons' survey experience.
Hannah Goldenwalla BSc qCIEEM	Assistant with two seasons' survey experience.
Rich Emerson BSc qCIEEM	Assistant with one seasons' survey experience.

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## 4 Results

### 4.1 Desk Study

4.1.1 TVERC returned 304 records of twelve species of bat from within 2km of the survey area, during a date range of 1983 to 2017, as summarised in Table 4.1. Most were records of bats in flight but they also included roost sites.

**Table 4.1: Summary of bat records data within 2km of the site**

Species	Protection
Barbastelle <i>Barbastella barbastellus</i>	Habs.Dir.Ax.2&4, CHS Sch.2, WCA Sch.5 full, NERC s41
Serotine <i>Eptesicus serotinus</i>	Habs.Dir.Ax.4, CHS Sch.2, WCA Sch.5 full
Alcathoe <i>Myotis alcathoe</i>	Habs.Dir.Ax.4, CHS Sch.2, WCA Sch.5 full
Daubenton's <i>Myotis daubentonii</i>	Habs.Dir.Ax.4, CHS Sch.2, WCA Sch.5 full
Natterer's <i>Myotis nattereri</i>	Habs.Dir.Ax.4, CHS Sch.2, WCA Sch.5 full
Leisler's <i>Nyctalus leisleri</i>	Habs.Dir.Ax.4, CHS Sch.2, WCA Sch.5 full
Noctule <i>Nyctalus noctula</i>	Habs.Dir.Ax.4, CHS Sch.2, WCA Sch.5 full, NERC s41
Nathusius' <i>Pipistrellus nathusii</i>	Habs.Dir.Ax.4, CHS Sch.2, WCA Sch.5 full
Common pipistrelle <i>Pipistrellus pipistrellus</i>	Habs.Dir.Ax.4, CHS Sch.2, WCA Sch.5 full
Soprano pipistrelle <i>Pipistrellus pygmaeus</i>	Habs.Dir.Ax.4, CHS Sch.2, WCA Sch.5 full, NERC s41
Brown long-eared <i>Plecotus auritus</i>	Habs.Dir.Ax.4, CHS Sch.2, WCA Sch.5 full, NERC s41
Lesser horseshoe <i>Rhinolophus hipposideros</i>	Habs.Dir.Ax.2&4, CHS Sch.2, WCA Sch.5 full, NERC s41

Habs.Dir.Ax.2/4      Habitats Directive 92/43/EEC Annex 2 and/or 4  
 CHS Sch.2            Conservation of Habitats & Species Regulations 2010 Schedule 2 (EPS animals)  
 WCA Sch.5 full      Wildlife and Countryside Act (1981), Schedule 5 (fully protected)  
 NERC s41             Natural Environment and Rural Communities (Act 2006) Section 41

4.1.2 A search of the MAGIC database for granted EPS mitigation licenses for bats within a 2km radius found eight licenced sites, summary details of which are listed in Table 4.2. There are 36 SSSI and two SAC within 10km of the survey area. Bat populations do not feature among the notified features of any of these sites.

## 4.2 Roosting Bats

### **Preliminary Bat Roost Assessment**

#### *Landscape setting*

4.2.1 The site is located in an area of moderate-quality habitats for foraging and commuting bats, lying at the southern edge of a densely developed city but adjacent to the River Thames with pasture and woodland beyond. The site itself is relatively wooded which provides some protection from off-site sources of artificial light.

**Table 4.2: Summary of granted EPS mitigation licences within 2km of the site**

Case ref.	Location	Species affected & licensed actions	Start date	End date
2016-20931- EPS-MIT	c.1.1km north	Common pipistrelle, soprano pipistrelle Damage of a resting place	2016	2021
2017-29441- EPS-AD2	c.0.1km north-west	Daubenton's Damage of a breeding site Damage of a resting place	2017	2027
2017-30258- EPS-MIT	c.1.1km north-east	Common pipistrelle Destruction of a resting place	2017	2023
2018-34136- EPS-MIT	c.1.3km north-west	Soprano pipistrelle Destruction of a resting place	2018	2023
2018-38241- EPS-MIT	c.2.0km north	Soprano pipistrelle Destruction of a breeding site	2019	2024
2019-41811- EPS-MIT	c.1.7km north-east	Soprano pipistrelle, brown long-eared Destruction of a resting place	2019	2024
2019-41811- EPS-MIT-1	c.1.7km north-east	Soprano pipistrelle, brown long-eared Destruction of a resting place	2019	2024
2019-44056- EPS-MIT	c.1.3km south-west	Common pipistrelle Destruction of a breeding site	2020	2030

#### *Buildings*

4.2.2 There were several buildings located in the north west of the survey area, including Grandpont House and several smaller outbuildings. An external assessment of the buildings for their potential to be used by roosting bats is presented in Table 4.3; results of the internal inspection are included for building B5.

**Table 4.3: Preliminary Roost Assessment of buildings within the survey area**

<b>Preliminary Roost Assessment of buildings</b>	
<b>B1:</b>	
<i>External description</i>	
Single storey brick building with slate tiled pitched gable ended roof. Frequent windows in southern elevation of western section. No windows in southern and eastern elevations of eastern section.	
<i>Internal description</i>	
Not accessed internally. Western section used as living area and appeared to include roof space. Eastern section reportedly used as storage/maintenance area and lacks roof void.	
<i>Evidence of bats</i>	
None observed	
<i>Potential roost features (PRF)</i>	
Several missing or slipped tiles. Gaps under barge boards, e.g. at east end. Missing brick at east end probably provides access to inside of at least eastern part of building.	
<i>Overall suitability for roosting bats</i>	
Low	
<b>B2:</b>	
<i>External description</i>	
Brick walls. Central brick chimney stack. Aerial images suggest roof may be missing. No windows on southern, western or eastern elevations.	
<i>Internal description</i>	
Not accessed internally.	
<i>Evidence of bats</i>	
None observed	
<i>Potential roost features (PRF)</i>	
Small cracks and gaps in all brickwork. Possible access into chimney from top. Small gaps between wooden lintel above door and adjoining bricks. Locally dense ivy at least in north eastern corner.	
<i>Overall suitability for roosting bats</i>	
Low	
<b>B3:</b>	
<i>External description</i>	
Small brick 'shed' with slate tiled pitched gable ended roof. One small window on east elevation.	
<i>Internal description</i>	
Not accessed internally.	

<b>Preliminary Roost Assessment of buildings</b>	
<i>Evidence of bats</i>	None observed
<i>Potential roost features (PRF)</i>	Gaps between brick walls and roof at eaves and apex. Gaps in barge boards. Missing and lifted tiles.
<i>Overall suitability for roosting bats</i>	Low
<b>B4:</b>	
<i>External description</i>	Brick walled lean-to structure. Walls on eastern and southern elevation pebble dash rendered, though some crumbled and lost. One window on eastern elevation. Southern part of roof slate tiled, northern part of roof corrugated clear plastic.
<i>Internal description</i>	Not accessed internally.
<i>Evidence of bats</i>	None observed
<i>Potential roost features (PRF)</i>	Cracks and gaps in walls, esp western elevation. Gaps between top of brick wall and roof on western elevation. Slipped and missing tiles.
<i>Overall suitability for roosting bats</i>	Low
<b>B5: Grandpont House</b>	
<i>External description</i>	Large Grade II historic house. Brick walls with parts rendered, including parts where render appears to have been removed quite recently (e.g. southern elevation) and parts covered with plywood (eastern elevation). Pitched, slate tiled hip ended roofs. From aerial images eastern part of building may include areas of flat roof/gullies. Two small single storey 'extensions' on northern side with brick walls and pebble dash render and pitched slate tiled roofs. Also flat roofed 'extension' to east. Small single storey 'extension' on western side with brick walls and pebble dash render and pitched slate tiled roof.
<i>Internal description</i>	A single roof void over the west wing was accessible for inspection during the final survey on 15 June 2022. This was a timber framed structure with no supports, lined with tightly fitting bituminous sarking in good condition, although the brick walls were exposed at either end. It measured approximately 8.5m by 5.7m and c.1.8m floor to ridge, was relatively uncluttered except for a large water tank present on the east side, but was heavily cobwebbed and provided only a constrained flight space. No bats or evidence of bats were found. The double ridged roof over the east wing is lower in height and volume and was inaccessible.
<i>Evidence of bats</i>	