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## **Bat roost surveys for proposed new prison, bowling club, and boiler house on land adjacent to HMP Garth and HMP Wymott, Leyland**

CGO Ecology Ltd  
Christchurch

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## **Non-technical summary**

### Introduction

CGO Ecology Ltd was instructed by Mace Ltd, on behalf of the Ministry of Justice, to conduct a series of bat emergence/re-entry surveys of potential roosts at HMPs Garth and Wymott, Leyland, Lancashire. The Ministry of Justice proposes a development as part of its New Prisons Programme on land centred on (SD 502 205). The Local Planning Authority (LPA) is Chorley Council. This report deals with buildings and one tree. Woodland and other trees are dealt with in a separate report.

### Methodology

Haycock and Jay Associates Ltd undertook the surveys as subconsultants for CGO Ecology Ltd. Karl Harrison MCIEEM conducted a Preliminary Roost Assessment (PRA) on 24<sup>th</sup> February 2021, guided by a Preliminary Ecological Appraisal by Ramboll Ltd. In May to June 2021, dusk emergence and dawn re-entry surveys were undertaken at 11 buildings and one tree identified as having bat roost suitability, following standard guidelines. In addition, a Vantage Point Survey (VPS) was undertaken at a known common pipistrelle maternity roost, to determine the commuting direction of emerging bats. The surveyors were Rachel Whitaker, Richard Else, and Hazel Watson, all suitably experienced, with full-spectrum electronic detectors.

### Results

The nocturnal surveys identified two buildings containing bat roosts. B15, a Probation Service office, supports a common pipistrelle maternity roost. B10, a farm building, supports a common pipistrelle day roost. The VPS confirmed that nearly all bats emerging from B15 commute south, away from the new prison and boiler house developments. Therefore, their foraging habitats will not be impacted.

Buildings B15 and B10 will be retained, but they will be in close proximity to development, and potential impacts include disturbance from increased levels of noise, vibration and artificial lighting during the construction and operational phase.

### Conclusions, mitigation and enhancement recommendations

Mitigation measures will include timing works to avoid the May-August maternity period, design of lighting schemes to avoid light spill onto roosts and commuting routes, and production of a Construction Environmental Management Plan.

Batboxes and enhancement measures such as large areas of new habitat creation will ensure there is no negative significant residual effects on bats roosting at B15 and B10.

Bats using the site for foraging and/or commuting will be dealt with in a separate activity survey report.

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## 1. Introduction

### 1.1. Background

CGO Ecology Ltd (CGO) was instructed by Mace Ltd, on behalf of the Ministry of Justice (MoJ), to conduct a series of bat dusk emergence and dawn re-entry surveys of potential roosts at HMPs Garth and Wymott, Leyland, Lancashire. The MoJ proposes a new prison, boiler house, and bowling club as part of its New Prisons Programme on land centred on (SD 502 205). The Local Planning Authority (LPA) is Chorley Council.

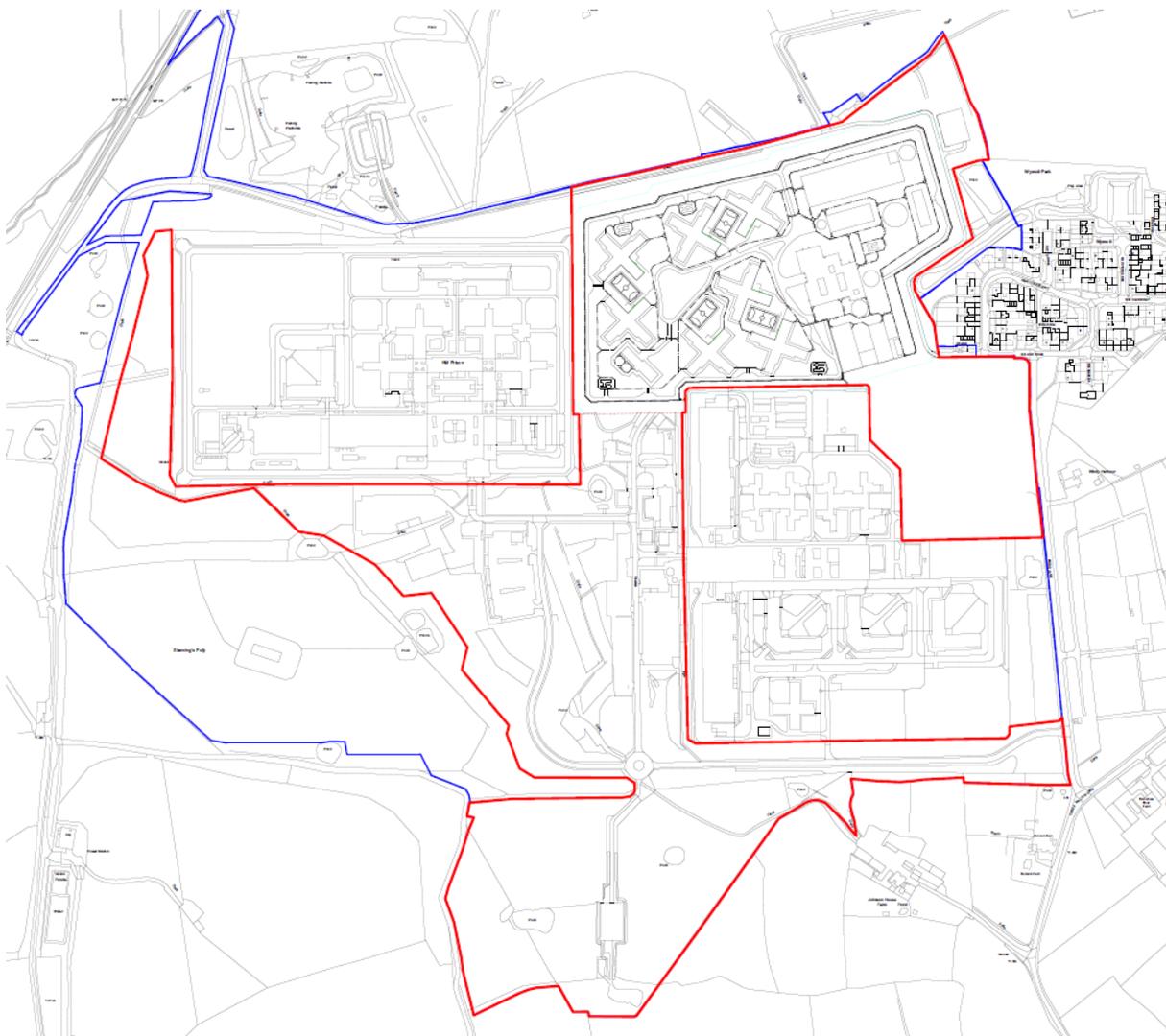


Figure 1 – Development site boundary (red line) and MoJ ownership boundary (blue line).

All UK bats and their roosts are protected by the Wildlife and Countryside Act 1981 (as amended) and the Habitats Regulations 2017 (as amended). Bats may roost in crevices in building roofs, loft voids, and other built features, or in trees and other natural cavities.

A Preliminary Ecological Appraisal (PEA) conducted by Ramboll (Molesworth, 2020). Additional areas were subjected to a PEA by CGO (Gleed-Owen, 2021a). An Ecological Impact Assessment (EclA) has already been conducted by CGO (Gleed-Owen, 2021b). This report deals with bat roost surveys of buildings and a single tree in the Zone of Influence (Zoi). Bat roost surveys of woodland areas are dealt with in a separate report (Gleed-Owen, 2021c).

Natural England has issued 16 European Protected Species (EPS) mitigation licences within 5km. Eight of these were for bats, the nearest being 400m south for common pipistrelle (*Pipistrellus pipistrellus*). The others are for common pipistrelle and/or brown long-eared bat (*Plecotus auritus*), with one also including Brandt's bat (*Myotis brandtii*) 4.3km north.

A Lancashire Environment Record Network (LERN) search yielded 33 bat records within 2km, comprising common pipistrelle, soprano pipistrelle (*Pipistrellus pygmaeus*), Brandt's bat, brown long-eared bat, and unidentified bats. The records include roosts for both pipistrelle species within 2km.

Haycock and Jay Associates Ltd (HJA) was commissioned to carry out the surveys as subconsultant to CGO. Karl Harrison MCIEEM (Natural England level 2/CL18 bat licence) of HJA is the lead surveyor, and lead author of this report, acting as an Associate Ecologist to CGO.

Dr Chris Glead-Owen MCIEEM is Director and Principal Ecologist of CGO, and project manager for the Garth Wymott 2 phase 2 ecological surveys.

This report aims to follow CIEEM (2017) guidance, and provide sufficient information to assist an EclA conforming to CIEEM (2018) guidance.

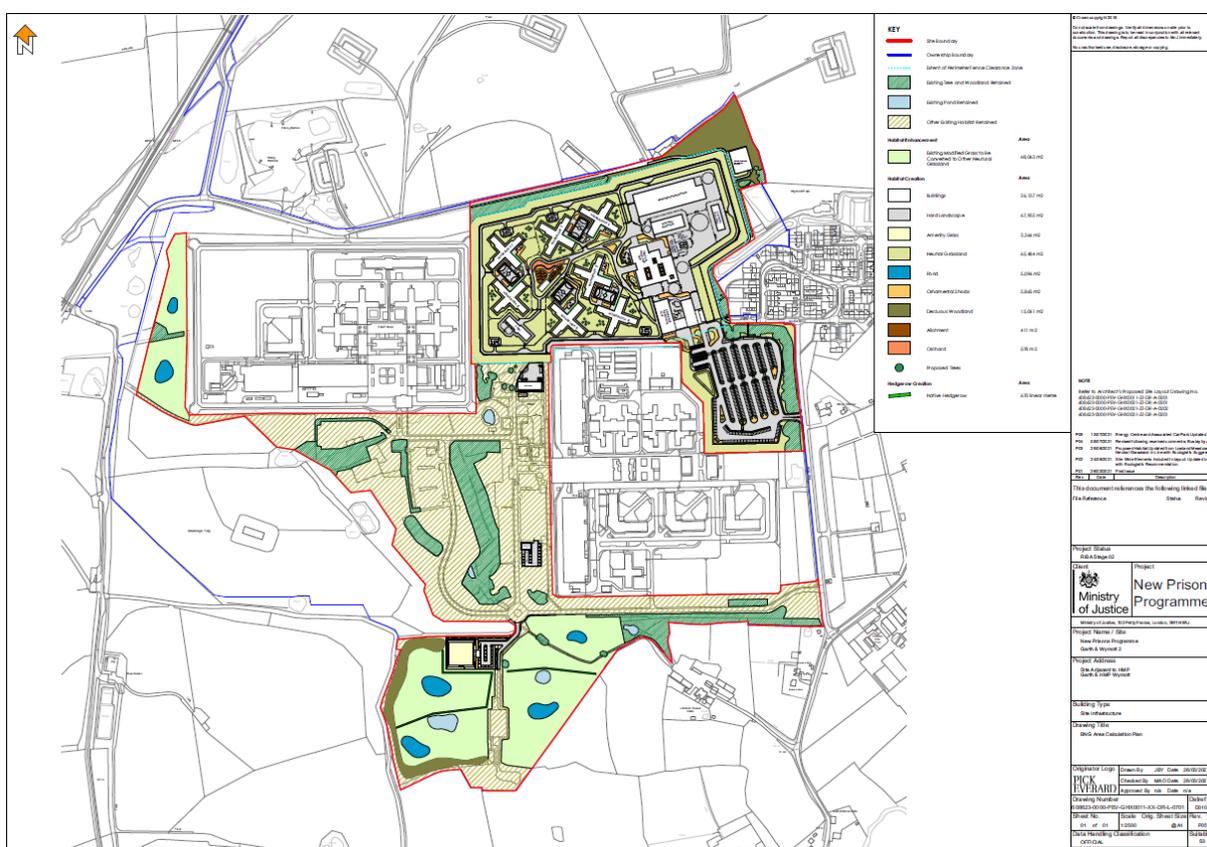


Figure 2 – Proposed development and landscaping plan, with habitat areas for BNG purposes, produced by Pick Everard.

## 1.2. Site context

The development site comprises predominantly land north of HMP Wymott, currently used as a sheep (*Ovis aries*) farm, stables, bowling club, boiler house, and utility buildings. The part within HMP Wymott is a sports field and disused assault course. The new boiler house will be between the existing prisons. The new bowling club will be on farmland to the south. Some woodland will be lost for the new prison development. Larger areas of woodland will remain.

The surrounding area is intensively farmed for a mixture of livestock and arable crops, but there are significant areas of woodland and other land uses. A large area of woodland lies to the southwest of the site, extending around the west and north of HMP Garth. There are major urban areas to the northeast (Leyland and Preston), and a network of minor roads, railway lines, villages, hamlets, and farms in all directions.

### **1.3. Proposed works**

The proposed development is a hybrid planning application seeking: Outline planning permission (with all matters reserved except for access, parking and landscaping) for a new prison (up to 74,531.71m<sup>2</sup>) within a secure perimeter fence following demolition of existing buildings and structures and together with associated engineering works; Outline planning permission for a replacement boiler house (with all matters reserved except for access); and Full planning permission for a replacement bowling green and club house.

## **2. Methodology**

### **2.1. Preliminary Roost Assessment**

On 24<sup>th</sup> February 2021, HJA conducted bat Preliminary Roost Assessment (PRA) of buildings and trees identified by Ramboll (Molesworth, 2020) as requiring nocturnal survey. The Ramboll recommendations were modified to reflect the PRA findings. The PRA survey personnel were: Karl Harrison MCIEEM (Natural England CL18 licence 201732750-CLS-CLS) and Will Steele ACIEEM (CL17 licence 2019-43393-CLS-CLS).

The inspections were carried out during daylight hours and in accordance with standard methodology (Collins, 2016). The external inspection was undertaken with the aid of a powerful torch (Cluson Clulite Clubman, one million candle power) and close-focus binoculars from ground level. Internal inspections of buildings were not undertaken.

Cavities, cracks, and crevices which may offer potential emergence points or suitable roosting features for bats were identified and, where accessible, were also searched. In addition, the inspection recorded any evidence of use by bats, including feeding remains, claw marks, staining from urine and fur, droppings or bats themselves.

Features at the buildings and trees with opportunity for roosting were recorded and categorised according to their level of suitability, from negligible to high (cf. Collins, 2016). Suitability was determined by factors including type, size, and locations of features; site context, local environmental conditions, and proximity to suitable bat foraging habitat. The PRA was conducted in line with published Covid-19 advice (BCT, 2020; CIEEM, 2020; IUCN, 2020).

### **2.2. Emergence/re-entry surveys**

Between 11<sup>th</sup> May and 10<sup>th</sup> June 2021, dusk emergence and dawn re-entry surveys were conducted on 11 buildings and one tree in the Zone of Influence (ZOI), totalling 50 surveyor sessions. This was to determine bat roost presence-absence, and characterise roosts, as per standard survey guidelines (Collins, 2016). Surveyors were positioned to observe potential bat emergence and re-entry points on buildings and trees. The lead bat surveyor was Karl Harrison MCIEEM (Natural England CL18 2017-29880-CLS-CLS), with assistance from experienced bat surveyors: Will Steele ACIEEM (Natural England CL17 licence 2019-43393-CLS-CLS), Rachel Whitaker, Emma Sutton, Richard Else, and Hazel Watson. The surveys were conducted in line with published Covid-19 advice (BCT, 2020; CIEEM, 2020; IUCN, 2020).

Surveys were carried out in accordance with the current methodology (Collins, 2016) with the aid of full-spectrum bat survey and monitoring equipment to record bats in the field. Equipment used included: Anabat Scout full spectrum bat detector; Pettersson M500-384 full spectrum recorders; Anabat Express and Anabat Swift passive recorders; Batbox Duet heterodyne bat detectors.

Full-spectrum and time-expansion calls were later analysed manually using Kaleidoscope Viewer software by Wildlife Acoustics. Where possible, calls were identified to species level. Zero cross calls were analysed manually using AnalookW software.

Surveys were carried out from surveyor positions spread around the buildings and tree, as detailed in Appendix 2, to provide full visual coverage of potential bat entry/exit points.

Any sightings of bats emerging from and/or returning to the buildings, bat activity/behaviour (where visible), and targeted bat calls suggesting a particular interest in features at the buildings/walls/structure, were recorded.

The full results, dates, times, sunset/sunrise times, and weather conditions are provided in Appendix 2.

### **2.3. Vantage Point Survey**

A Vantage Point Survey (VPS) was conducted at building B15 (Probation Service offices) with two surveyors positioned on 22<sup>nd</sup> June 2021. This was in order to ascertain the commuting direction of bats emerging from the common pipistrelle maternity roost in B15. The survey comprised a VP to the north of B15, and one to the south (see Appendix 3). These were positioned to enable observation of the direction that emerging bats commuted.

The surveyors were Karl Harrison MCIEEM (Natural England CL18 licence 2017-29880-CLS-CLS) and Will Steele ACIEEM (Natural England CL17 licence 2019- 43393-CLS-CLS). Full survey details are provided in Appendix 3.

### **2.4. Interpretation and evaluation of results**

Where roosts have been identified, these have been categorised according to the main bat roost types listed in the Natural England European Protected Species (EPS) mitigation licence application form, and in accordance with current guidelines. This information has been used to assess potential impacts of the proposed development and to design suitable mitigation.

### **2.5. Incidental observations**

Sightings of notable wildlife observed during the bat emergence/re-entry surveys were also recorded. In particular, sightings of barn owl (*Tyto alba*) have been fed into the relevant survey for that species. Hedgehog (*Erinaceus europaeus*) was also observed on one survey.

### **2.6. Limitations**

Internal inspections of buildings were not undertaken. However, this was considered when assessing bat roost suitability.

Suboptimal weather occurred on 10<sup>th</sup> and 25<sup>th</sup> May 2021, comprising brief periods of light rain during the survey. However, bat activity did not appear to be negatively affected by the change in weather conditions.

Technical malfunctions of bat detectors occurred on 19<sup>th</sup> and 20<sup>th</sup> May 2021, which meant that bat calls were not recorded for a single position on each occasion. However, adjacent surveyors' equipment was functioning on both occasions, and results were successfully corroborated. Therefore, no loss of information was experienced.

Lines of sight for buildings B5 and B6 were slightly obscured, although VPs were selected to maximise visibility of potential roost entry/exit features. No bat behaviour indicating roosting was observed for either building; therefore, no emergences or re-entries have been missed.

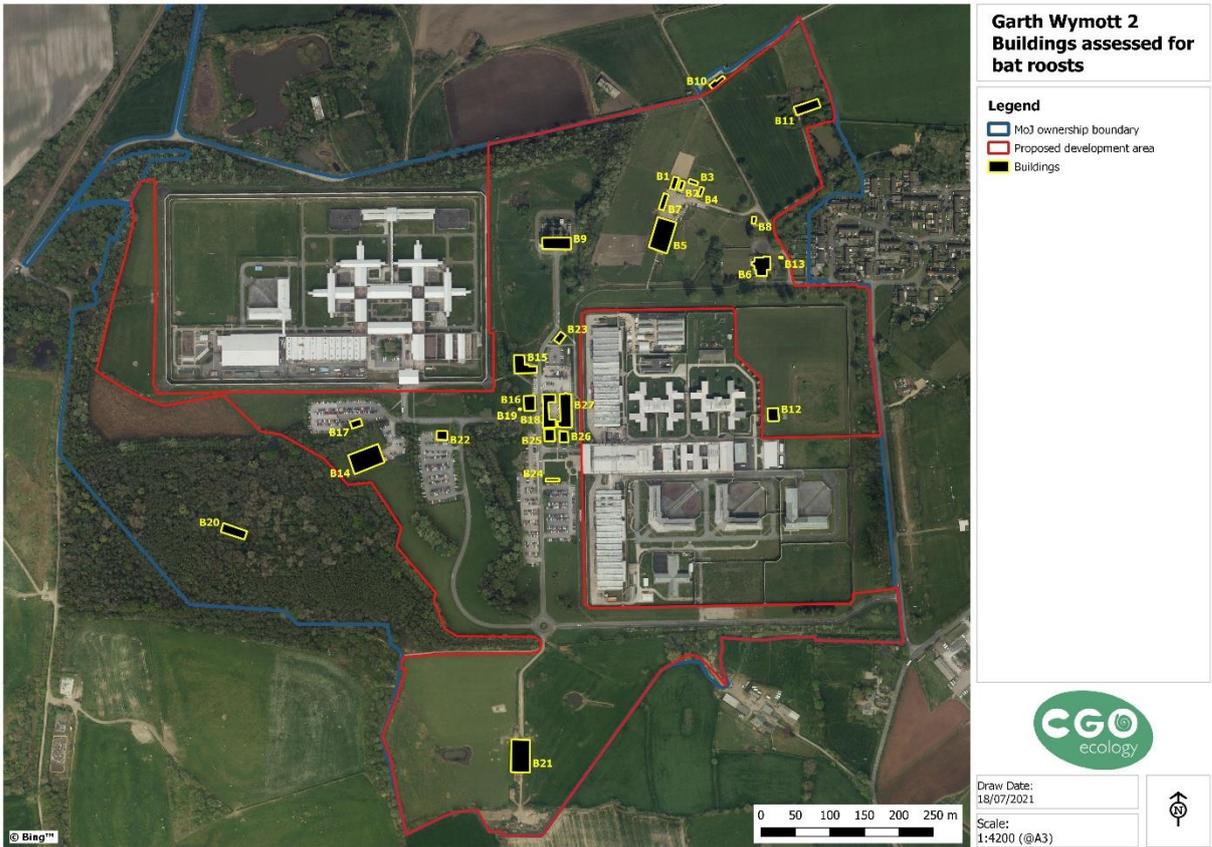


Figure 3 – Buildings within and outside red line boundary. B1-13 and B15 are within the ZOI and were subjected to PRA.

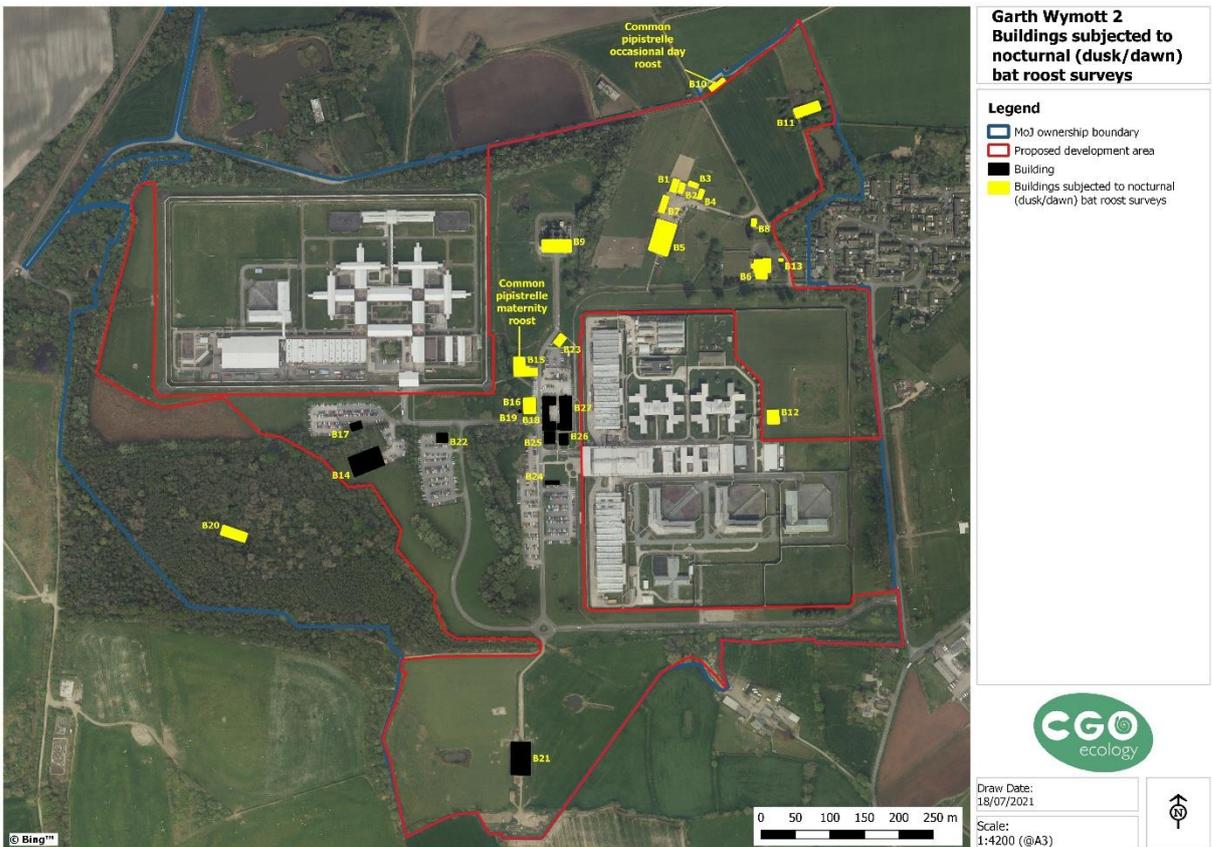


Figure 4 – Buildings graded negligible to high roost potential. Those within the ZOI with low, medium, or high potential were subjected to nocturnal surveys (dusk emergence, dawn re-entry) for bats in May/June 2021.

### 3. Results

#### 3.1. Preliminary Roost Assessment

##### 3.1.1. Buildings B1-B4

See also photographs in Appendix 1. B1-4 are four single-storey wooden stables (Photos 1 and 2) with concrete tiled apex roofs. Wooden soffits are present at overhanging eaves and walls are clad within wooden panelling. Open windows and stable doors are present. Internally rooms are used as stables and storage. The underside of the roof is lined with bitumen felt, and the roof is supported by a wooden truss structure (Photo 3). There is no enclosed roof space. Gaps are present between and beneath tiles and at the underside of wooden soffits. Buildings B1-B4 were assessed as being of low bat roost suitability.

##### 3.1.2. Building B5

A single-storey agricultural building comprising two single shallow pitched animal and storage sheds with a gap between (Photos 4, 5 and 6). The building is constructed of brick supporting a concrete roof, the roof is covered in bitumen roofing felt. Large open doorways and windows are present. There is no enclosed roof space. Gaps are present beneath areas of lifted roofing felt and in areas where mortar is missing. Access internally is provided by open doorways and windows. B5 was assessed as being of low bat roost suitability.

##### 3.1.3. Building B6

A single and two-storey brick building (Photos 7 and 8), with a predominantly flat roof. Visible areas of roof appear to be lined with a plastic material. A small parapet is present. All windows and doors are covered with metal shutters/sheets. Small areas of wooden cladding are present above doors and windows. Small gaps in mortar are present in brickwork and the roof covering has small gaps at the parapets. B6 was assessed as being of low bat roost suitability.

##### 3.1.4. Building B7

A plastic polytunnel housing chickens (*Gallus gallus domesticus*), with negligible bat roost suitability.

##### 3.1.5. Building B8

A single-storey brick electricity substation (Photo 9). It has a flat concrete roof lined with plastic. The building is well-sealed, except for small gaps in the concrete roof, and gaps between wooden slats in louvered windows. B8 was assessed as being of low bat roost suitability.

##### 3.1.6. Building B9

A large boiler house building constructed of brick (Photos 10 and 11). A higher section appears to be constructed from, or clad with, a metal/plastic material, and has a shallow apex roof. Lower roof sections are flat, but the roofing material cannot be identified from ground-level. Large metal louvered vent/doors are present at the south aspect. Metal pipework and staircase are present at the north aspect. The building is in good condition, except for small gaps in brickwork at the top and bottom of walls, and where pipework enters/exits brickwork. B9 was assessed as being of low bat roost suitability.

##### 3.1.7. Building B10

A brick agricultural storage building (Photos 12 and 13), with an apex roof covered with concrete asbestos corrugated panelling. A lower concrete flat-roof section is present at the north aspect. Guttering is fixed into brickwork and eaves appear to be open. The west gable is

rendered, and a large metal shutter door is present at the east aspect. Grilled open windows are present on all aspects. The building has numerous features which provide access internally and may support roosting themselves. B10 was assessed as being of moderate bat roost suitability. The building was built as an engine shed to house steam locomotives.

### 3.1.8. Building B11

An animal shed (Photo 14). A metal framed building supporting a concrete roof, walls comprise a single skin of brick. There is no enclosed roof space. No features suitable for use by roosting bats were observed, and the building was assessed as being of negligible bat roost suitability. A barn owl box and barn owl pellets were observed within the building.

### 3.1.9. Building B12

B12 was assessed by CGO as part of the PEA of additional areas (Chris Gleed-Owen, 2021a). A single-storey modern brick-built office/classroom building with a hipped metal roof, located within HMP Wymott. It has tight soffits and no gaps wide enough for bats. B12 was assessed as having negligible bat roost suitability.

### 3.1.10. Building B13

A small brick building with a plastic material covered flat roof (Photo 15). Wooden cladding is present at the top of the wall and is in poor condition. Gaps behind wooden cladding may provide access internally or offer suitability themselves. Building B13 is assessed as being of low bat roost suitability.

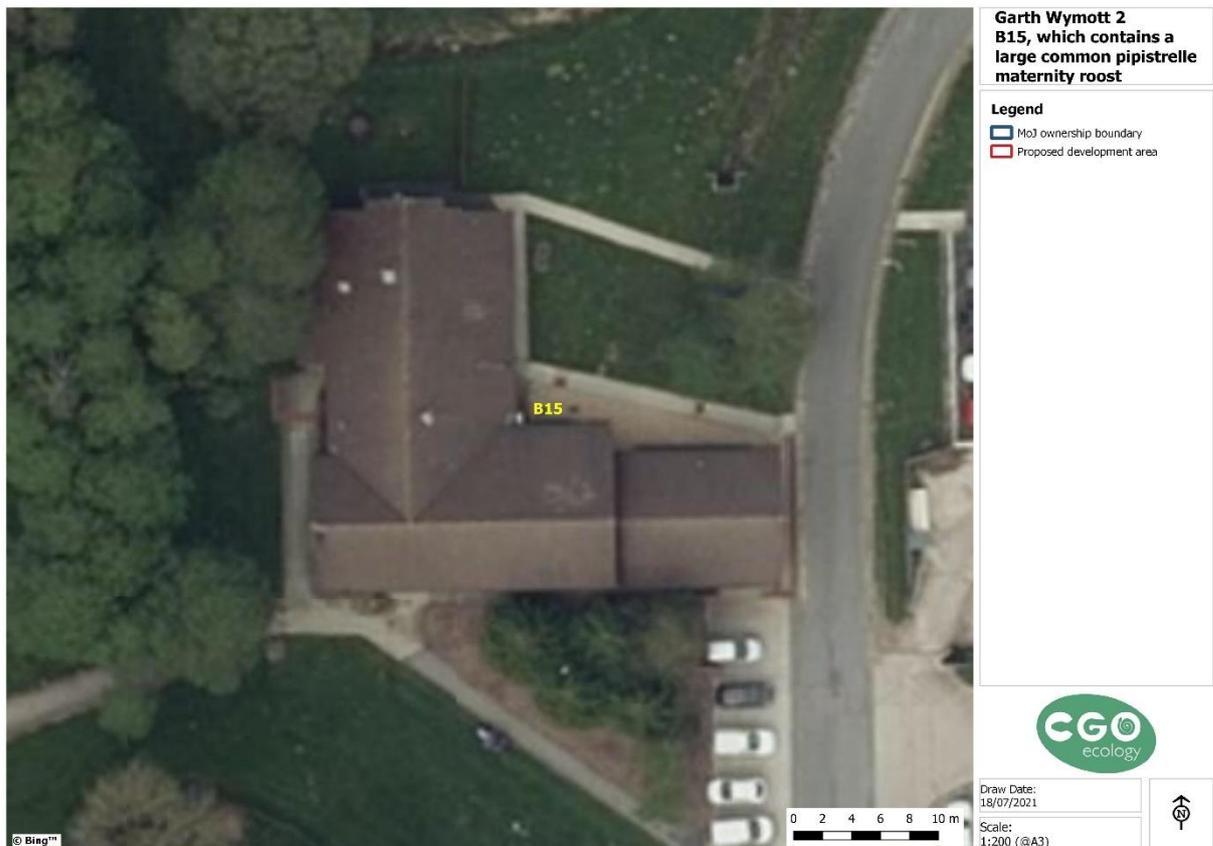


Figure 5 – Building 15 (common pipistrelle maternity roost). The new boiler house will be located to the east of B15.

### 3.1.11. Building B15

An L-shaped single-storey brick building with apex roof (Photos 16 and 17). The roof is covered with concrete tiles, it has overhanging eaves with large wooden boxed soffits. A small section of wooden cladding is present between differing height roof sections. Plastic-framed (uPVC) windows and doors are present on all aspects. The building is in good condition, except for gaps behind the wooden soffits. Records of a common pipistrelle maternity roost were highlighted in the Ramboll PEA (Molesworth, 2020). Tens of scattered bat droppings were visible below soffits around much of the building during the PRA. B15 is therefore treated as a confirmed roost. It is located near the proposed boiler house; therefore, it must be surveyed to assist in determining potential impacts.

### 3.1.12. Building B23

Three small single-storey portacabin buildings, constructed of metal and plastic. These are of negligible bat roost suitability.

### 3.1.13. Other buildings

B14 and B16-22 were deemed to be outside the ZOI of the development, and therefore did not require PRA and follow-up nocturnal surveys.

### 3.1.14. Tree T3

See figure 6. A mature ash (*Fraxinus excelsior*) tree located in a field. Several areas of damage and split wood features were observed from ground level. As such, T3 was assessed as being of at least moderate bat roost suitability.

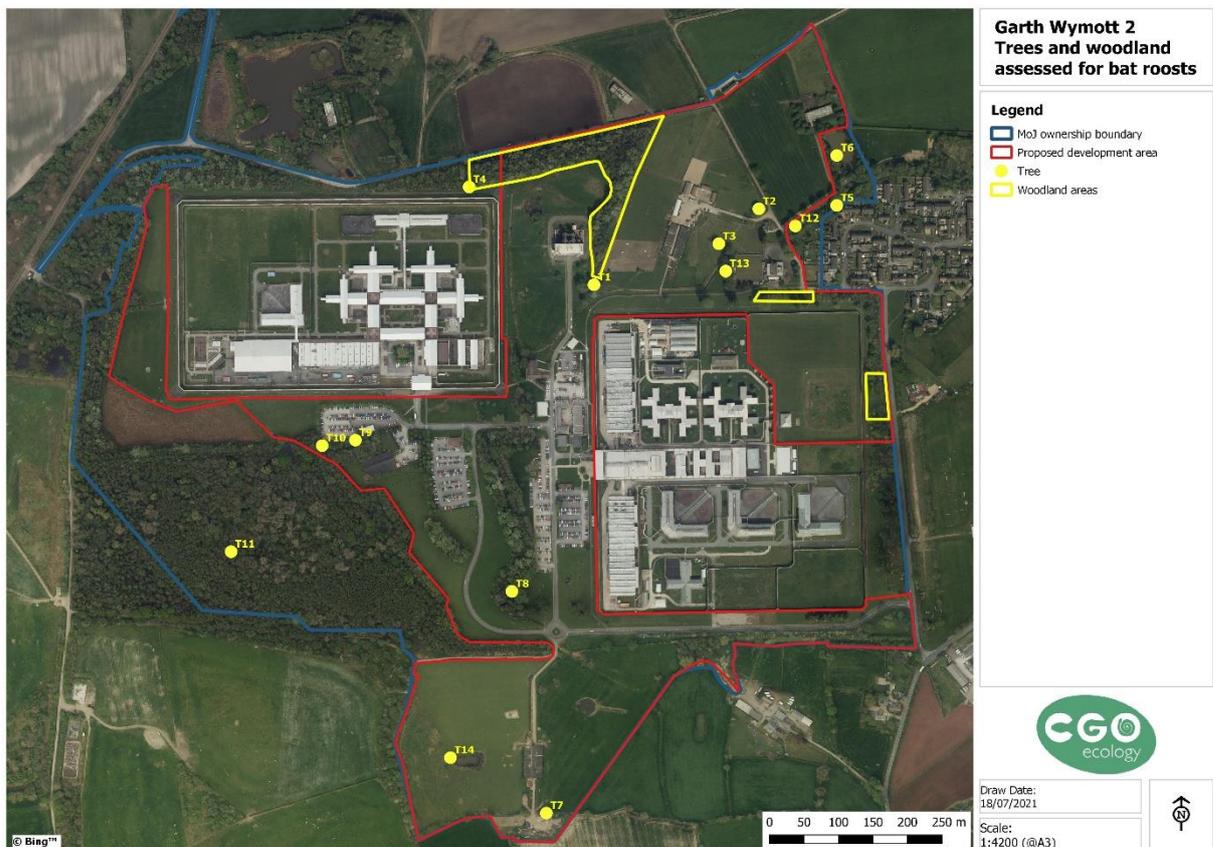


Figure 6 – Woodland and individual trees subjected to a bat PRA survey in 2021.

### 3.1.15. Woodland surveys

A PRA, climbed aerial assessments, and emergence/re-entry surveys of woodland areas and isolated trees in figure 6 are reported separately (Gleed-Owen, 2021c).

Building	Roost	Species	Maximum count	Roost location(s)	Access point(s)
B10	R1	Common pipistrelle	1	Gable eaves, west elevation	Fascia
B15	R1	Common pipistrelle	128	Gable eaves, west elevation	Soffit
	R2	Common pipistrelle	22	Gable eaves, north elevation	Soffit
	R3	Common pipistrelle	4	Gable eaves, east elevation	Soffit

Table 1 – Summary of PRA and emergence/re-entry survey results for B10 and B15.

## 3.2. Emergence/re-entry surveys

### 3.2.1. Overview and limitations

Bat surveys identified bat roosts within Building B15 and Building 10. No emergences and/or re-entries were observed at any other building or tree T3. A summary of the roosts identified is provided in table 1. Full details, results, photographs, and roost descriptions from all surveys are provided in Appendix 2. A summary of activity recorded on each survey occasion is given in the sections below, in chronological order.

Bat calls rapidly deteriorate as they move through the atmosphere. Calls which are at a distance or of low intensity are particularly affected, and features key to species identification may be lost. Bat calls which cannot be reliably identified to taxon or species level have been recorded as “unidentified” bat species.

### 3.2.2. Building B15 - 10<sup>th</sup> May 2021 (dusk)

Three confirmed bat roosts were identified at soffits around the building. Four entry points were identified at roost one (R1), on the western gable. 128 common pipistrelles emerged from R1. Five emerged from roost two (R2) located at the northern gable, assumed to be common pipistrelle. One unidentified bat emerged from roost three (R3) located at the eastern gable, also assumed to be common pipistrelle. Continuous foraging and regular passes recorded by common pipistrelle.

### 3.2.3. Tree T3 – 11<sup>th</sup> May 2021 (dawn)

No bat roost identified. Infrequent passes by common pipistrelle and one individual common pipistrelle seen commuting past tree.

### 3.2.4. Building B4 – 11<sup>th</sup> May 2021 (dawn)

No confirmed bat roosts identified. Limited activity recorded, except infrequent passes by individual common pipistrelle.

### 3.2.5. Building B10 – 18<sup>th</sup> May 2021 (dusk)

At least one common pipistrelle emerged from roost (R1) in building, exiting from the west gable end near the apex of the roof. A metal fascia exists at this point. At least eight noctules (*Nyctalus noctula*) were recorded commuting southeast to northwest, high over the building between 21:27 and 21:45, and at least one common pipistrelle was foraging around the building from 21:48 onwards. One pass by a *Myotis* species was also recorded.

### 3.2.6. Building B9 – 19<sup>th</sup> May 2021 (dawn)

No confirmed bat roosts identified. No bat activity recorded, except one brief pass by an individual unidentified pipistrelle.

### 3.2.7. Building B1 – 19<sup>th</sup> May 2021 (dusk)

No bat roosts identified. Frequent passes from individual commuting common pipistrelle, from east to west over the building. Infrequent foraging also recorded by common pipistrelle around the building.

### 3.2.8. Building B2 – 19<sup>th</sup> May 2021 (dusk)

No confirmed bat roosts identified. Frequent passes by commuting common pipistrelle, flying from east to west over building. Occasional foraging observed around the building by common pipistrelle.

### 3.2.9. Building B8 – 20<sup>th</sup> May 2021 (dawn)

No confirmed bat roosts identified. Occasional passes, mostly heard not seen by individual common pipistrelle. Occasional commuting recorded by common pipistrelle from east to west and west to east, over the building.

### 3.2.10. Building B13 – 20<sup>th</sup> May 2021 (dawn)

No confirmed bat roosts identified. Infrequent calls, mostly heard and not seen, by individual common pipistrelle. Common pipistrelle seen flying over building, heading north.

### 3.2.11. Tree T3 – 25<sup>th</sup> May 2021 (dusk)

No confirmed bat roost. Limited activity was recorded. An individual common pipistrelle was recorded flying east to west passed the tree and one common pipistrelle was recorded foraging. Three potential Nathusius' pipistrelle (*Pipistrellus nathusii*) calls were recorded (peak frequency 40-42kHz). However, these were only a few pulses per recording, and the species identification is not conclusive.

### 3.2.12. Building B6 – 25<sup>th</sup> May 2021 (dusk)

No confirmed bat roosts identified. Occasional passes by commuting and foraging common pipistrelle. Common pipistrelle seen commuting over the car park from north west to east.

### 3.2.13. Building 3 – 25<sup>th</sup> May 2021 (dusk)

No confirmed bat roosts identified. Frequent passes from commuting common pipistrelle, heading towards nearby woodland to the west.

### 3.2.14. Building B15 – 26<sup>th</sup> May 2021 (dawn)

Three bat roosts were identified at soffits. Roost one (R1) was identified at the west gable, 11 common pipistrelles entered. Roost two (R2) was identified at the north aspect of the building. 15 common pipistrelles entered. Roost three (R3) was identified at the east gable. One common pipistrelle entered. Regular passes from commuting and foraging common pipistrelle was recorded. Swarming activity at both R1 and R2 by common was also recorded.

### 3.2.15. Building 6 – 7<sup>th</sup> June 2021 (dusk)

Up to three common pipistrelles were observed continuously foraging around B5, and hedgerow to the north. Occasional passes by noctule were also heard.

#### 3.2.16. Building 10 – 8<sup>th</sup> June 2021 (dawn)

No roosting activity observed. Occasional passes by common pipistrelle and noctules.

#### 3.2.17. Building 5 – 8<sup>th</sup> June 2021 (dusk)

No roosts were confirmed at the building. Constant foraging activity in the yard between the two doors was observed during most of the survey by common pipistrelle, with occasional noctule and unidentified bats. A barn owl was perched on the fence to the east of B5. A tawny owl (*Strix aluco*) was also heard calling.

#### 3.2.18. Building 5 – 9<sup>th</sup> June 2021 (dawn)

No roosts were confirmed at the building. Constant foraging activity in the yard between the two doors was observed during most of the survey by common pipistrelle, with occasional noctule and unidentified bats. A barn owl was sat on the field fence to the east of B5.

#### 3.2.19. Building B15 – 9<sup>th</sup> June 2021 (dusk)

Seven roosts were confirmed at the building at soffits. Constant foraging activity around the building along tree lines was observed during most of the survey, along with social calls, swarming and bats chasing each other. A barn owl was seen near B15.

#### 3.2.20. Building B10 – 21<sup>st</sup> June 2021 (dusk)

No bat roosting activity was observed. Noctules were seen foraging over the fields to the north. Occasional common pipistrelle activity. This survey was conducted for barn owls, and any bat observations were incidental. Nevertheless, the results are valid, and the survey constitutes the third one required for a confirmed roost by the survey guidelines (Collins, 2021). As it was costed as a barn owl survey, the session is not included in the 50 dusk/dawn surveyor sessions targeting bats.

### 3.3. Vantage Point Survey

#### 3.3.1. Building B15 – 22<sup>nd</sup> June 2021 (dusk)

The north position surveyor observed about 180 common pipistrelles emerging from their roost on the north gable end of B15, the vast majority of which flew around the west side of the building, and headed south. The second surveyor watching from just south of B15 recorded over 200 bats proceeding south, most of which are believed to have come from multiple roosts in B15. It is possible that a small number of additional bats following the same southward trajectory may have originated at different roost sites.

Only a few bats were observed travelling north by either surveyor, including two that emerged from the same roost as the southbound individuals. Accounting for a large overlap in the bats recorded by the two surveyors, approximately 230 bats were seen in total during the survey. Note that this is significantly large than the maximum count from the dusk/dawn surveys.

## 4. Baseline Ecological Conditions

Surveys have identified the presence of a common pipistrelle maternity roost in B15 (Probation Service offices), which is believed to support around 230 bats (peak count after two dusk and one dawn survey). A VPS identified that nearly all the bats commute south from B15 towards woodland (most likely Stanning's Folly to the south of HMP Garth). Hence, this is considered to be their most important commuting route and foraging habitat. Very few bats commute north.

Therefore, the woodland habitats within the new prison development to the north are not considered to be significant foraging or commuting resources for bats roosting in B15.

Surveys also identified a single occasional soprano pipistrelle day roost at B10. This was only detected on one out of three nocturnal surveys.

No confirmed bat roosts were identified in buildings B1-B6, B8, B9, B13, and tree T3.

Buildings B14 and B16-22 were not surveyed, as they are not affected by the proposed development.

Activity observed during the surveys was dominated by common pipistrelle, with occasional passes by noctule, and rarely a *Myotis* species.

A potential Nathusius' pipistrelle was recorded on one occasion, but the identification could not be confirmed, and could have been common pipistrelle. The habitat on site is not typical of Nathusius' pipistrelle, which is found near waterbodies. However, its presence within the site cannot be ruled out.

Climbed assessments and nocturnal surveys of woodland areas and individual trees affected by the new prison development are dealt with in a separate report (Gleed-Owen, 2021c).

## **5. Impact Assessment**

### **5.1. B15 maternity roost**

Building B15 will be retained in the site design. However, the new boiler house will be situated around 10m east of B15, and works are anticipated immediately adjacent the building. Construction activities have the potential to disturb the common pipistrelle maternity roost through dust, noise, vibrations, fumes, and artificial lighting. In addition, construction activities could result in accidental damage to building B15, such as machinery strikes and falling materials.

During operation, the new boiler house has the potential to disturb the common pipistrelle maternity roost through increased levels of artificial lighting, and disturbance from operational activities such as increased human presence and vehicle movements.

It is unlikely that loss of foraging habitat or disruption of commuting routes will occur though. The VPS showed that nearly all emerging bats use the tree canopies west of the building, and then commute south, most likely to woodland south of HMP Garth. Therefore, the development is not anticipated to impact commuting routes or foraging habitat for B15 bats.

Future maintenance of B15 has the potential to disturb, damage, obstruct, or destroy the roosts in B15. For example, roof and/or soffits works could block access to roosts. The roosts are most likely located in crevices and narrow voids in the roof apices.

Disturbance of, or damage to, the B15 common pipistrelle maternity roost could trap and harm bats, cause roost abandonment, and precipitate an increase in mortality of dependent young.

### **5.2. B10 day roost**

Building B10 is located outside of the development footprint, within the wider site area allocated for BNG enhancements. It is immediately adjacent to proposed woodland planting, around 30m north of the proposed new perimeter fence. Construction activities could cause disturbance through noise.

Operation could bring an increase in artificial lighting, albeit buffered by the perimeter fence. In due course, woodland establishment this will screen the roost from disturbance.

Building	Roost	Species	Max count	Type	Roosts	Potential impact
B10	R1	Common pipistrelle	1	Day roost	Soffit. Gable eaves, west elevation	Roost disturbance, possible abandonment
B15	R1	Common pipistrelle	128	Maternity roost	Soffit. Gable eaves, north elevation.	
	R2	Common pipistrelle	22		Soffit. Gable eaves, east elevation	
	R3	Common pipistrelle	4		Gable eaves, west elevation.	Disturbance

Table 2 – Bat roost identified, and potential impacts of development in the absence of mitigation.

## 6. Mitigation

### 6.1. B15 maternity roost

Construction activities at the new boiler house must be timed to avoid the May-August bat maternity period, in order to prevent any disturbance to bats during the maternity period. Bats will be emerging and entering the building in large numbers during the maternity period. This is a sensitive period for bats and their young, especially as the young emerge and practice flying.

B15 will be highlighted in the Construction Environmental Management Plan (CEMP), and contractors will be made aware of their duty to ensure that measures are put in place to prevent artificial lighting, noise, dust, fumes, and vibrations causing disturbance or damage to the roost. An exclusion zone will be established around B15, to prevent contractor and vehicle access to the building, parking, storage of materials.

A detailed lighting plan will be produced and reviewed by a licensed Suitably Qualified and Licensed Ecologist (SQLE) prior to the commencement of works. This will conform with accepted guidance (BCT & ILP, 2018). No artificial lighting will be used at the west aspect of the new boiler house, and light spill from other light sources onto B15 will be avoided.

Building maintenance and management will be made aware of the presence of the common pipistrelle maternity roost and their responsibility to engage with an SQLE where works will impact on the roof, soffits, or walls.

### 6.2. B10 day roost

Building B10 will be highlighted in the CEMP, and contractors will be made aware of their duty to ensure that measures are put in place to prevent artificial lighting, noise, dust, and vibrations causing disturbance of the roost.

A detailed lighting plan will be produced and reviewed by an SQLE prior to the commencement of works. It will be designed to be sensitive to bats roosting within B10.

Building maintenance and management will be made aware of the presence of the common pipistrelle day roost, and their responsibility to engage with an SQLE where works will impact this building.

## 7. Residual effects and enhancements

### 7.1. B15 maternity roost

Mitigation measures outlined above, notably the timing of works to avoid the maternity period, and the design of a sensitive lighting plan, will minimise the disturbance to the common pipistrelle maternity roost.

As the roost will be retained and protected during the construction and operational phases, no significant residual effect is anticipated.

The proposals will include BNG grassland enhancements over the wider site within the red line boundary, including large areas of reversion from improved sheep pasture to biodiverse neutral grassland. This will significantly enhance the foraging opportunities for bats using the maternity roost. New artificial roosts (batboxes) will be erected elsewhere on site to support the greater carrying capacity of the site following grassland restoration.

## 7.2. B10 day roost

Mitigation measures outlined above, notably the design of a sensitive lighting plan along the new north perimeter fence, will minimise the disturbance to the common pipistrelle day roost.

As the roost will be retained and protected during the construction and operational phases, no significant residual effect is anticipated.

The BNG proposals over the wider site will revert large areas of improved grassland to biodiverse neutral grassland. This will create significantly foraging habitat for bats.

## 8. References

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## **9. Appendices**

**Appendix 1 - Photographs**

**Appendix 2 - Emergence/re-entry survey results**

**Appendix 3 - Vantage Point Survey result**

## Appendix 1 – Photographs



Photo 1 – South gable of Building B1.



Photo 2 – Buildings B3 and B4



**Photo 3 – Underside of roof of Building B1.**



**Photo 4 – South aspect of Building B5.**



Photo 5 – North aspect of building B5.



Photo 6 – Internal room of Building B5.



**Photo 7 – North-west aspect of Building B6.**



**Photo 8 – South-west corner of Building B6.**



**Photo 9 – South aspect of Building B8.**



**Photo 10 – South aspect of Building B9.**



Photo 11 – North aspect of Building B9.



Photo 12 – South aspect of Building B10.



Photo 13 – North aspect of Building B10.



Photo 14 – North-east corner of Building B11.



**Photo 15 – Building B13.**



**Photo 16 – North gable of Building B15.**



**Photo 17 – North aspect of Building B15.**



**Photo 18 – Soffit at east gable of Building B15.**

## Appendix 2 – Emergence/Re-entry Survey Results

### Survey 1: Building B15 - 10<sup>th</sup> May 2021 (Dusk)

**Survey site:** CGO001 Building B15, Survey 1 (surveyor locations 15.1 (WS), 15.2 (RE) ,15.3 (ES))

**Date:** 10/05/2021

**Sunset/sunrise:** 20:58

**Start:** 20:40

**End:** 22:30

**Weather conditions:** 100% cloud cover, 3 BWS, light rain at start of survey, start/end temp: 12/10 °C

**Surveyors:** Will Steele (WS), Emma Sutton (ES) and Richard Else (RE)

**Equipment:** BatBox Duet; Petterson M500 & tablet; Anabat Express; Anabat Scout

**Survey summary:** Three confirmed bat roosts were identified at soffits around the building. Four entry points were identified at roost one (R1), on the western gable. 128 common pipistrelle emerged from R1. Five emerged from roost two (R2) located at the northern gable, assumed to be common pipistrelle. One unidentified bat emerged from roost three (R3) located at the eastern gable, also assumed to be common pipistrelle. Continuous foraging and regular passes recorded by common pipistrelle.

**Survey Constraints:** A brief heavy rain shower occurred during the first portion of the survey, stopping at 21:16, despite this bat activity was recorded during the rainfall and immediately after it ceased.

**Incidental observations:** Barn owl

**Table.1 All Bat Activity Recorded During Survey 1 (B15) 10/05/21 Refer to Figure 1, Photos 1 and 2.**

Time (24 Hrs)	Surveyor <sup>1</sup>	Species <sup>2</sup>	No. bats	Bat Activity	Map Annotation & Photos
20:55	ES	Ppip	1	1 bat emerged from gap located near to box end of gable (R1).	A
21:11	ES	Ppip	1	1 bat flying NW to SE	
21:12	ES	Ppip	2	2 flying SE from NW over gable	
21:13-21:14	ES	Ppip	5	5 bats emerge, from gaps in the soffit of the gable R1.	B
21:15	ES	Ppip	1	HNS	
21:15	WS	Unk	1	Emerged from eaves on the north aspect (R2) and went west	R2
21:16-21:18	ES	Ppip	25	Approx. 25 bats emerge at gap in the soffit of the gable R1.	C
21:18	ES	Ppip	3	3 bats emerge and fly SE (R1)	D
21:19	ES	Ppip	2	2 bats seen flying back and forth at corner of building.	E
21:20	ES	Ppip	5	5 bats emerge and fly SE (R1)	C
21:21	ES	Ppip	7	At least 7 bats emerge from R1	B
21:21	WS	Unk	2	Two bats emerged from R2 and went north.	R2
21:22	ES	Ppip	20	At least 20 bats emerge from gaps in the soffit of the gable (R1).	C
21:23	ES	Ppip	8	8 bats emerge from R1	C
21:23	RE	Ppip	1	Flying from west over building, disappeared behind building. Plus, social calls.	

<sup>1</sup> Emma Sutton (ES); Will Steele (WS); Ric Else (RE)

<sup>2</sup> HNS - Heard not seen; Unk - unknown species, Pip - *Pipistrellus* sp.; Ppip - common pipistrelle (*Pipistrellus pipistrellus*).

Time (24 Hrs)	Surveyor <sup>1</sup>	Species <sup>2</sup>	No. bats	Bat Activity	Map Annotation & Photos
21:24	ES	Ppip	3	3 bats emerge from R1	C, B
21:25	ES	Ppip	1	One bat flying SE to NW over the top of roof.	
21:25	WS	Ppip	1	East to north-west east to north-west	
21:25	ES	Ppip	15	At least 15 bats emerge from R1.	A, D
21:26 – 21:27	ES	Ppip	10	At least 10 emerge from R1.	A, D
21:27	WS	Ppip	1	HNS	
21:27	RE	Unk	1	Flying north to south over building.	
21:27 – 21:29	ES	Ppip	20	At least 20 emerge from R1	A, D,
21:28	WS	Ppip	1	Emerged from R2 and went north	R2, Figure 1
21:29	RE	Unk	1	Seen flying close to east gable apex before heading west.	
21:29	ES	Unk	Several	Several bats seen foraging in trees near building.	
21:29	ES	Ppip	2	2 bats emerge form R1	B
21:30	ES	Ppip	2	2 bats fly N to SE	
21:30	WS	Unk	1	Emerged from R2 and went north	R2
21:31	ES	Pip	1	1 bat seen flying SW	
21:31	RE	Ppip	1	Seen flying close to east gable apex before heading west. Plus, social calls.	
21:32	ES	Ppip	1	One bat emerged and flew SE (R1)	A
21:33	ES	Pip		HNS, foraging (feeding buzzes)	
21:33	ES	Ppip	2	2 bats seen foraging around trees near building.	F
21:35	RE	Unk	1	Seen flying close to east gable apex before heading west.	
21:35	ES	Ppip	1	One bat flying SE to NW over roof top.	
21:36	ES	Ppip	1	One bat seen foraging in trees near building.	F
21:36	RE	Ppip	1	HNS, social calls.	
21:38	ES	Ppip	3	3 bats emerge, flying SE (R1)	C
21:40	ES	Ppip	2	Foraging heard and two bats flying N to S over roof.	
21:41	RE	Unk	1	Flying south over building	
21:42 – 21:44	WS	Ppip	1	HNS, regular foraging passes	
21:42	ES	Ppip	1	Seen flying SE to N	
21:43	ES	Ppip	1	HNS	
21:44	ES	Ppip	1	HNS	
21:45	ES	Ppip	1	Foraging heard and seen around trees near to building	F
21:45	RE	Unk	1	One bat emerged from R3.	G
21:47	WS	Unk	1	HNS, foraging nearby	
21:48	ES	Ppip		Foraging, HNS	
21:49	ES	Ppip	1	One bat flying S From N	
21:49	WS	Unk	1	HNS, foraging nearby	
21:52	ES	Ppip		HNS	
21:52	WS	Unk	1	HNS, foraging nearby, 2 passes	
21:55	ES	Ppip		HNS	

Time (24 Hrs)	Surveyor <sup>1</sup>	Species <sup>2</sup>	No. bats	Bat Activity	Map Annotation & Photos
21:56	WS	Unk	1	HNS, commuting pass	
21:57-21:59	ES	Ppip	Several	HNS several bats foraging.	F
21:58	WS	Unk	2	HNS	
21:59 – 22:04	ES	Ppip	Several	Several bats heard and seen foraging in trees near building. One bat seen flying north over roof top.	F
22:00	WS	Ppip	1	HNS	
22:01	RE	Unk	2	Flying north over building.	
22:01 – 22:09	WS	Ppip	1	HNS, regular passes	
22:04-22:08	ES	Ppip	Multiple	Continuous foraging multiple bats.	
22:05	WS	Unk	1	Commuting east to west over building.	
22:07	RE	Ppip	1	HNS	
22:09	ES	Ppip	2	Two bats seen foraging near conifers trees. Continuous foraging continues.	F
22:10	RE	Ppip	1	HNS	
22:10 – 22:31	ES	Ppip	Multiple	Continuous foraging mostly HNS, multi bats.	
22:10 – 22:13	WS	Ppip	2	HNS. Regular to continuous activity.	
22:13	RE	Ppip	1	HNS	
22:14 – 22:28	WS	Ppip	1	HNS, near continuous distant activity.	
22:15	RE	Ppip	1	HNS, foraging	
22:16	WS	Nnoc	1	HNS	
22:16	RE	Nnoc	1	HNS	
22:16	RE	Ppip	1	Seen flying around R3, flew away over building.	
22:17	RE	Ppip	2	Seen flying around R3, flew away over building	
22:18	RE	Ppip	1	Social calling	
22:23	RE	Ppip	1	HNS	
22:29	RE	Ppip	1	HNS	

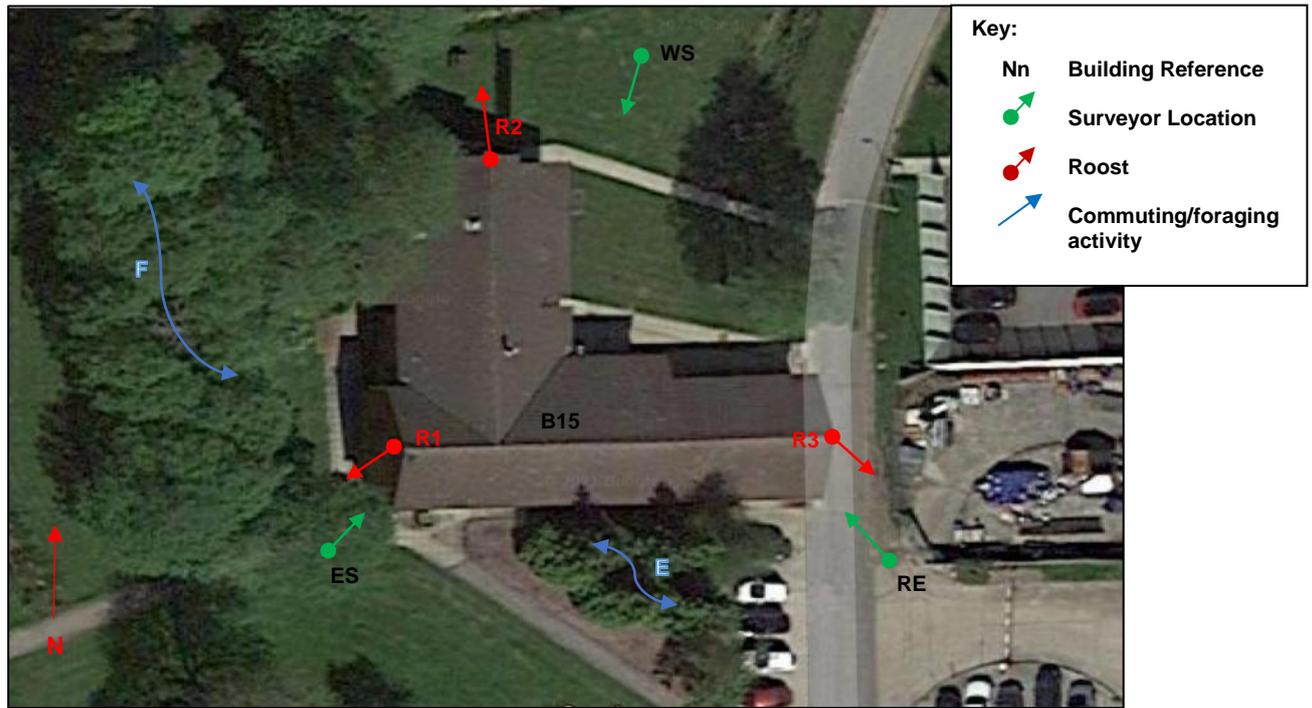
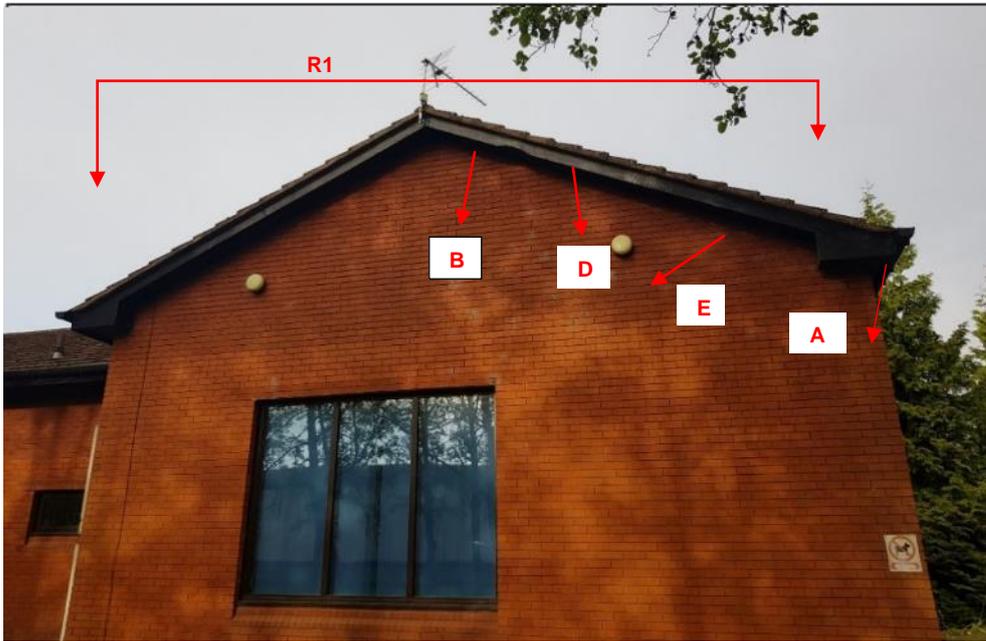


Figure 1 - Summary of bat activity recorded during the dusk emergence survey of B15 (Survey 1) on 10/05/21.

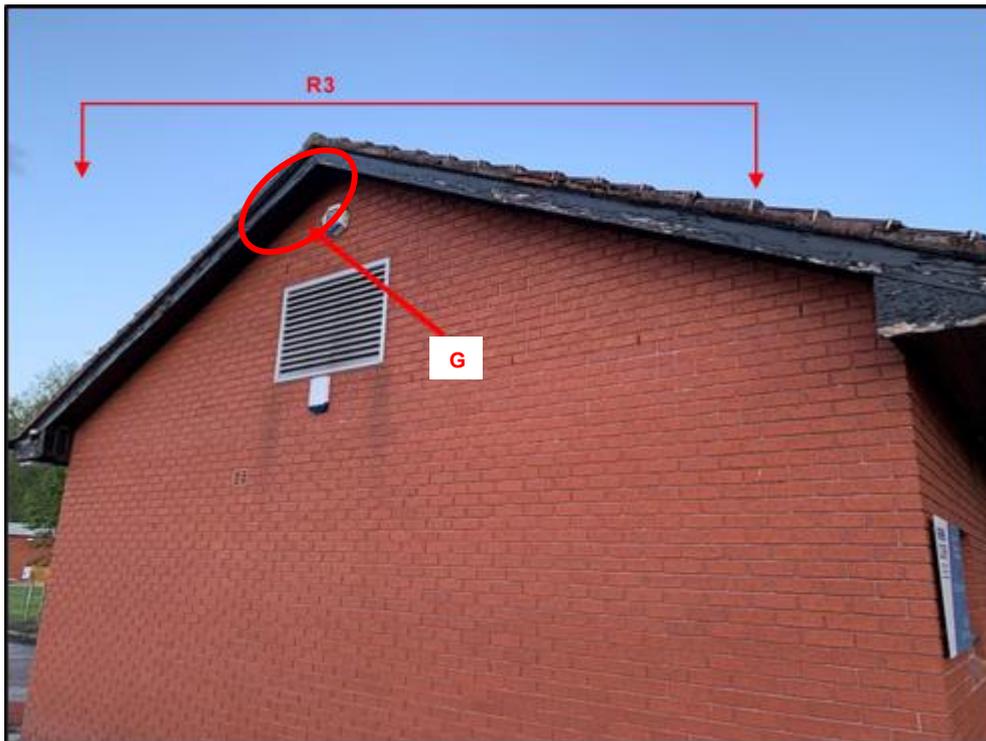
Table 2- Summary of Roosts Identified on 10/05/2021

Building Ref.	Roost Ref.	Species	Count	Roost location	Access Point
B15	R1	Common pipistrelle	128	Gable eaves, western Elevation	Soffit
	R2	Common pipistrelle	5	Gable eaves, north elevation.	Soffit
	R3	Common pipistrelle	1	Gable eaves, east elevation	Soffit

**Roost Photographs:**



**Photo 1 – B15, Location of Roost 1 (common pipistrelle.), at the eaves of B15 (West elevation).**



**Photo 2 – Location of emergence of one unknown bat from R3 at eaves of B15 (east elevation).**

## **Survey 1: Tree T3 – 11<sup>th</sup> May 2021 (Dawn)**

**Survey site:** CGO001 Tree T3, Survey 1 (T3.1 (WS))

**Date:** 11/05/2021

**Sunset/sunrise:** 05:16

**Start:** 03:45

**End:** 05:20

**Weather conditions:** dry, 0% cloud cover, 1 BWS, start/end temp:7/8 °C

**Surveyors:** Will Steele (WS)

**Equipment:** Pettersson M500 & tablet

**Survey summary:** No confirmed bat roost. Infrequent passes by common pipistrelle and one individual common pipistrelle seen commuting past tree.

**Table 3 - All Bat Activity Recorded During Survey 1 Tree 3 11/05/2021.**

Time (24 Hrs)	Surveyor <sup>3</sup>	Species <sup>4</sup>	No. bats	Bat Activity
03:53	WS	Ppip	1	HNS
03:57	WS	Ppip	1	HNS
04:07	WS	Ppip	1	HNS
04:09	WS	Ppip	1	HNS
04:11	WS	Ppip	1	HNS
04:19	WS	Ppip	1	HNS
04:20	WS	Ppip	1	Commuting past tree, north west to south east

## **Survey 1: Building B4 – 11<sup>th</sup> May 2021 (Dawn)**

**Survey site:** CGO001 Building B4 Survey 1 (surveyor locations 4.1 – south (RE), 4.2 – north (ES))

**Date:** 11/05/2021

**Sunset/sunrise:** 05:04

**Start:** 03:45

**End:** 05:10

**Weather conditions:** dry, 5% cloud cover, 3 BWS, start temp: 6.5°C

**Surveyors:** Emma Sutton (ES); Ric Else (RE)

**Equipment:** BatBox Duet; Petterson M500 & tablet; Anabat Scout

**Survey summary:** No confirmed bat roosts identified. Limited activity recorded, except infrequent passes by individual common pipistrelle.

**Survey Constraints:** None

**Table 4 - All Bat Activity Recorded During Survey 1 (B4) 11/05/21.**

Time (24 Hrs)	Surveyor <sup>5</sup>	Species <sup>6</sup>	No. bats	Bat Activity
04:03	ES	Ppip	1	HNS.one pass
04:05	ES	Ppip	1	HNS
04:23	ES	Ppip	1	Flying south east over roof
04:35	ES	Ppip	1	HNS

<sup>3</sup> Will Steele (WS);

<sup>4</sup> HNS - Heard not seen; Ppip - common pipistrelle (*Pipistrellus pipistrellus*)

<sup>5</sup> Emma Sutton (ES); Richard Else (RE).

<sup>6</sup> Ppip - common pipistrelle (*Pipistrellus pipistrellus*);

## Survey 1: Building B10 – 18<sup>th</sup> May 2021 (Dusk)

**Survey site:** CGO001 Building B10 Survey 1 (surveyor locations 10.1 (ES), 10.2 (HW), 10.3 (RE), 10.4 (RW))

**Date:** 18/05/2021

**Sunset/sunrise:** 21:11

**Start:** 20:40

**End:** 23:10

**Weather conditions:** dry, 0% cloud cover, 1 BWS, start/end temp: 11°C/10.5°C

**Surveyors:** Rachel Whitaker (RW); Richard Else (RE); Emma Sutton (ES); Hazel Watson (HW)

**Equipment:** Pettersson M500 & tablet; BatBox Duet x2; Anabat Scout; Echo Meter EM3

**Survey summary:** At least one Common Pipistrelle emerged from roost (R1) in building, exiting from the west gable end near the apex of the roof. At least eight Noctules were recorded commuting SE to NW high over the building between 2127 and 2145, and at least one Common Pipistrelle was foraging around the building from 2148 onwards. One pass by an myotis species was also recorded.

**Incidental observations:** One Barn Owl emerged from the south side of the building and quartered the adjacent fields.

**Survey constraints:** None

**Table 5 - All Bat Activity Recorded During Survey 1 (B10) 18/05/2021. Refer to Fig. 2.**

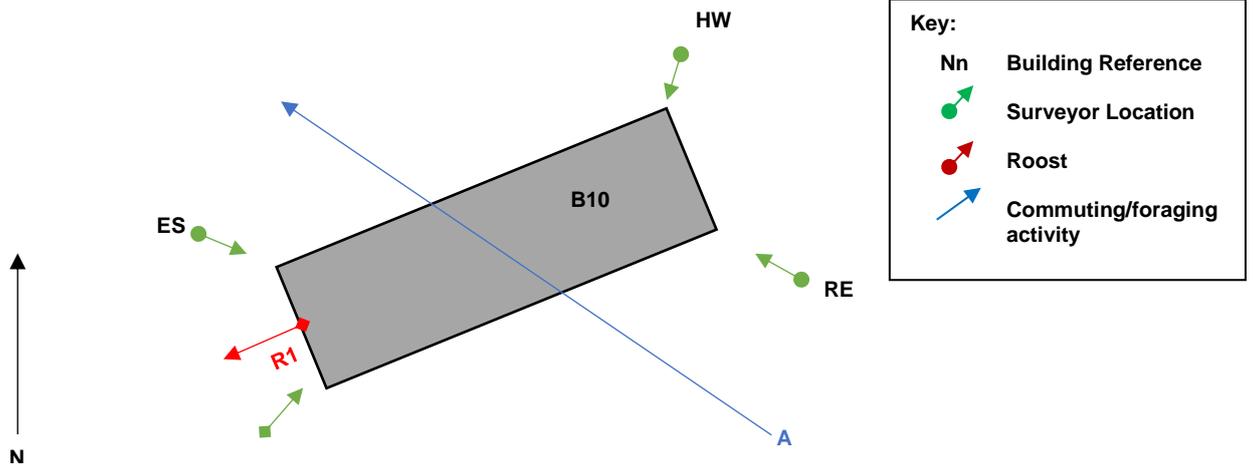
Time (24 Hrs)	Surveyor <sup>7</sup>	Species <sup>8</sup>	No. bats	Bat Activity	Map Annotation
21:27	RW	Nnoc	1	HNS, briefly	
21:31 – 21:33	all	Nnoc	4+	Commuting SE to NW overhead.	A
21:42	all	Nnoc	1	Commuting SE to NW overhead.	A
21:43	all	Nnoc	1	HNS	
21:45	RW, RE	Nnoc	1	Commuting SE to NW overhead	A
21:49	RE	Ppip	1	HNS	
21:49	RW	Ppip	1	Emerged from building. Exited from behind wooden board at apex on west gable end.	R1
21:48 – 21:57	all	Ppip	1	Likely same individual as above flying around close to building	
22:00	all	Ppip	1	Foraging around building	
22:05 – 23:06	all	Ppip	1+	Recorded foraging around building frequently from 2205 until end of survey.	
22:30	RW	Nnoc	1	HNS, briefly	
22:30	RE	Nnoc	1	HNS	
22:34	RW	Ppip	1	Foraging south of building over grassland	
23:10	RE	Myo	1	HNS, one pass	

**Table 6 - Summary of Roosts Identified 18/05/2020**

Building Ref.	Roost Ref.	Species	Count	Roost location	Access point(s)
B10	R1	Common Pipistrelle	1	Gable Eaves, west elevation.	Eaves

<sup>7</sup> Rachel Whitaker (RW); Emma Sutton (ES); Hazel Watson (HW); Richard Else (RE)

<sup>8</sup> HNS - Heard not seen; Nnoc - noctule (*Nyctalus noctula*); Ppip - common pipistrelle (*Pipistrellus pipistrellus*); Myo – *Myotis* sp.



**Figure 2-** Summary bat activity recorded during the dusk emergence survey of Building 10 (Survey 1) on 18/05/2021.

**Roost Photographs:**



**Photo 3 – Location of Roost R3 (Common Pipistrelle) in B10 (west elevation).**

## Survey 1: Building B9 – 19<sup>th</sup> May 2021 (Dawn)

**Survey site:** CGO001 Building B9, Survey 1 (surveyor locations 9.1 (RW),9.2 (ES), 9.3 (HW), 9.4 (RE))

**Date:** 19/05/2021

**Sunset/sunrise:** 05:03

**Start:** 03:20

**End:** 05:05

**Weather conditions:** dry, 5% cloud cover, 1 BWS, temp: 5°C

**Surveyors:** Rachel Whitaker (RW); Hazel Watson (HW) Emma Sutton (ES); Ric Else (RE).

**Equipment:** BatBox Duet; Petterson M500 & tablet; Anabat Scout; Echo Meter EM3.

**Survey summary:** No confirmed bat roosts identified. No bat activity recorded, except one brief pass, by an individual pipistrelle sp.

**Survey constraints:** None

**Table 7- All Bat Activity Recorded During Survey 1 (B9) 19/05/2021**

Time (24 Hrs)	Surveyor <sup>9</sup>	Species <sup>10</sup>	No. bats	Bat Activity
03:48	ES	Pip		HNS, faint
03:48	RW	Pip		HNS, brief and quiet



**Figure 3 –** Surveyor Locations during dawn emergence survey of Building 9 (Survey 1) on 19/05/2021.

<sup>9</sup> Rachel Whitaker (RW); Emma Sutton (ES); Ric Else (RE); Hazel Watson (HW)

<sup>10</sup> Pip - *Pipistrellus* sp.

## **Survey 1: Building B1 – 19<sup>th</sup> May 2021 (dusk)**

**Survey site:** CGO001 Building B1, Survey 1 (surveyor locations 1.1 (south-east; RE), 1.2 (north-west; ES))

**Date:** 19/05/2021

**Sunset/sunrise:** 21:13

**Start:** 20:40

**End:** 22:50

**Weather conditions:** dry, 5% cloud cover, 2 BWS, temp: 10°C

**Surveyors:** Emma Sutton (ES); Ric Else (RE)

**Equipment:** BatBox Duet; Petterson M500 & tablet; Anabat Scout

**Survey summary:** No bat roosts identified. Frequent passes from individual commuting common pipistrelle, from east to west over the building. Infrequent foraging also recorded by common pipistrelle around the building.

**Survey Constraints:** M500 malfunction and recordings lost.

**Table 8- All Bat Activity Recorded During Survey 1 (B1) 19/05/2021.**

<b>Time (24 Hrs)</b>	<b>Surveyor<sup>11</sup></b>	<b>Species<sup>12</sup></b>	<b>No. bats</b>	<b>Bat Activity</b>
21:34	ES	Ppip	1	HNS
21:34	RE	Ppip	1	Flying east to west.
21:35	ES	Ppip	2	Commuting east to west high over rooftop.
21:35	RE	Ppip	1	HNS
21:36	ES	Ppip	1	Commuting east to west, over rooftop.
21:37	ES	Ppip	1	HNS
21:37	RE	Ppip	1	Flying east to west
21:37	RE	Ppip	2	Flying east to west over building
21:38	ES	Ppip	1	Commuting from east to west
21:38	RE	Ppip	1	HNS
21:39	ES	Ppip	1	Commuting from east to west
21:39	RE	Ppip	2	HNS
21:40	RE	Ppip	1	Flying east to west north of building.
21:41	ES	Ppip	1	Commuting from east to west
21:41	ES	Ppip	1	Commuting from east to west, in front of north aspect.
21:42	RE	Ppip	1	Commuting east to west over building.
21:45	ES	Ppip	1	Commuting east to west, over rooftop
21:45	RE	Unk	1	Flying east to west, just north of building, not heard.
21:47	ES	Pip	1	HNS, briefly
21:47	RE	Ppip	1	HNS
21:50	ES	Ppip	1	Commuting north east to south west, over rooftop.
21:50	RE	Ppip	1	Flying east to west over building
21:57	ES	Ppip	1	Flying from north to south, low to ground.

<sup>11</sup>Emma Sutton (ES); Ric Else (RE)

<sup>12</sup> HNS - Heard not seen; Unk - unknown species; Pip - *Pipistrellus* sp.; Ppip - common pipistrelle (*Pipistrellus pipistrellus*); Ppyg)

Time (24 Hrs)	Surveyor <sup>11</sup>	Species <sup>12</sup>	No. bats	Bat Activity
21:59	ES	Ppip	1	Commuting east to west in front of north aspect.
22:00	ES	Pip	1	HNS, faint
22:00	RE	Ppip	1	Flying from east, seen foraging around building.
22:01	ES	Ppip	1	HNS, 3 bat passes
22:01	RE	Ppip	1	HNS
22:03	ES	Ppip	1	Commuting low to ground from east to west in front of north aspect.
22:05	RE	Ppip	1	Flying from east to west over building
22:10	RE	Ppip	1	Flying from east to west over building
22:11	ES	Pip	1	HNS, faint
22:13	ES	Pip	1	HNS
22:13	RE	Ppip	1	Flying from east to west over building
22:14	ES	Ppip	1	Commuting north to south, low to ground.
22:18	RE	Ppip	1	Flying west to east over building
22:26	ES	Unk	1	HNS, faint
22:26	RE	Ppip		HNS, brief
22:31	ES	Unk	1	HNS, brief and distant
22:31	RE	Ppip		HNS, faint
22:34	ES	Pip	1	HNS, Faint
22:34	RE	Pip		HNS, faint
22:35	ES	Ppip	1	HNS, one pass
22:38	RE	Pip		HNS, faint
22:51	ES	Ppip	1	Foraging, feeding buzzes heard.

## **Survey 1: Building B2 – 19<sup>th</sup> May (dusk)**

**Survey site:** CGO001 Building B2, Survey 1 (surveyor locations 2.1 (south-east; RW), 2.2 (north-west; HW))

**Date:** 19/05/2021

**Sunset/sunrise:** 21:13

**Start:** 20:40

**End:** 22:50

**Weather conditions:** dry, 5% cloud cover, 2 BWS, temp: 10°C

**Surveyors:** Rachel Whitaker (RW); Hazel Watson (HW)

**Equipment:** BatBox Duet; Petterson M500 & tablet; Echo Meter EM3.

**Survey summary:** No confirmed bat roosts identified. Frequent passes by commuting common pipistrelle, flying from east to west over building. Occasional foraging observed around the building by common pipistrelle.

**Incidental observations:** Notable species observed include barn owl and tawny owl.

**Survey Constraints:** None.

**Table 9 - All Bat Activity Recorded During Survey 1 (B2) 19/05/2021.**

<b>Time (24 Hrs)</b>	<b>Surveyor<sup>13</sup></b>	<b>Species<sup>14</sup></b>	<b>No. bats</b>	<b>Bat Activity</b>
21:34	RW	Ppip	1	Flying east to west, high above building.
21:34	HW	Ppip	1	HNS
21:35	RW	Ppip	1	Commuting east to west, flying south of the building.
21:36	RW	Ppip	1	Flying east to west, north of stables. High above stables.
21:36	HW	Ppip	1	Seen flying from east, across buildings.
21:37	RW	Ppip	1	Flying east to west, north of stables. High above stables.
21:38	RW	Ppip	2	Commuting east to west, south of building 2 and high above.
21:38	RW	Ppip	1	Commuting east to west, below building 2 rooflines.
21:39	RW	Ppip	2	Commuting east to west, below building 2 rooflines
21:40	RW	Ppip	1	Commuting east to west, north of building 2
21:40	HW	Ppip		Seen flying from east.
21:41	RW	Ppip	1	Commuting east to west, north of building 2
21:45	HW	Ppip	1	Bat seen flying around corner of building.
21:50	HW	Ppip	1	Seen flying from east, across buildings
21:50	RW	Ppip	1	Commuting east to west.
21:57	HW	Ppip	1	HNS
21:59	RW	Ppip	1	Foraging to the side of building 3
21:59	HW	Ppip	1	Flying between buildings and flew west.
22:00 – 22:01	HW	Ppip	1	Bat seen flying low over roof and between buildings, continuously.

<sup>13</sup> Rachel Whitaker (RW); Hazel Watson (HW)

<sup>14</sup> HNS - Heard not seen; Unk - unknown species; Nnoc - noctule (*Nyctalus noctula*); Pip - *Pipistrellus* sp.; Ppip - common pipistrelle (*Pipistrellus pipistrellus*)

Time (24 Hrs)	Surveyor <sup>13</sup>	Species <sup>14</sup>	No. bats	Bat Activity
22:00	RW	Ppip	1	Commuting east to west across the yard.
22:00	RW	Ppip	1	Flying north to south in front of building 2, before flying up and down buildings.
22:01	RW	Ppip	2	Seen foraging between building 1 and 2 and second bat flew east to west, south of building 1.
22:02	HW	Ppip	1	HNS
22:03	HW	Ppip	1	Seen flying between buildings and over roof, not heard.
22:03	HW	Ppip	1	HNS
22:03	RW	Ppip	1	Flying east to west, north of building 2.
22:03	RW	Ppip	1	HNS. brief
22:05	RW	Ppip	1	HNS, 5 passes
22:05	HW	Ppip	1	HNS
22:10	RW	Ppip	1	Flying south east to north west around building 2 and between building 1.
22:13	HW	Ppip		HNS
22:13	RW	Ppip	1	flying south east to north west around building 2 and between building 1.
22:13	RW	Ppip Nnoc	2	HNS
22:18	RW	Ppip	1	HNS, foraging
22:26	RW	Ppip	1	HNS
22:31	RW	Ppip	1	HNS
22:31	HW	Ppip	1	HNS, faint
22:34	RW	Ppip	1	HNS
22:35	RW	Ppip	1	HNS, faint
22:35	HW	Ppip	1	HNS, brief
22:38	RW	Pip	1	HNS
22:51	HW	Ppip	1	HNS, brief

## **Survey 1: Building B8 – 20<sup>th</sup> May 2021 (Dawn)**

**Survey site:** CGO001 Building B8 Survey 1 (surveyor locations 8.1 (south; RE) and 8.2 (north;ES))

**Date:** 20/05/2021

**Sunset/sunrise:** 05:02

**Start:** 03:30

**End:** 05:10

**Weather conditions:** dry, 5% cloud cover, 1 BWS, temp: 7°C

**Surveyors:** Rachel Whitaker (RW); Emma Sutton (ES)

**Equipment:** BatBox Duet; Petterson M500 & tablet

**Survey summary:** No confirmed bat roosts identified. Occasional passes, mostly heard not seen by individual common pipistrelle. Occasional commuting recorded by common pipistrelle from east to west and west to east, over the building.

**Survey constraints:** RW position, south west aspect slightly blocked by fence line, roofline visible. M500 malfunction and recordings lost for ES location, however all observed activity confirmed as common pipistrelle.

**Table 10 - All Bat Activity Recorded During Survey 1 (B8) 20/05/2021**

<b>Time (24 Hrs)</b>	<b>Surveyor<sup>15</sup></b>	<b>Species<sup>16</sup></b>	<b>No. bats</b>	<b>Bat Activity</b>
03:46	ES	Ppip	1	HNS, distant
03:49	RW	Ppip	1	HNS
03:50	ES	Pip	1	HNS, faint
03:51	ES	Ppip	1	HNS, one passes
03:54	ES	Ppip		HNS, briefly
03:54	RW	Pip		HNS, faint
03:59	RW	Ppip	1	HNS, two passes
04:01	RW	Ppip	1	Seen flying south east to north west close to building at roof height.
04:02	ES	Ppip		HNS
04:07	RW	Ppip	1	HNS, briefly
04:07	ES	Ppip	1	HNS, one pass
04:11	RW	Pip		HNS, faint
04:11	ES	Ppip		HNS
04:15	RW	Ppip	1	Commuting south east to south west, below roof height.
04:15	ES	Ppip	1	HNS
04:16	RW	Ppip	1	HNS
04:26	RW	Ppip	2	Appeared by north west aspect corner flying south east, followed by a second bat.
04:26	ES	Ppip	1	HNS, one pass
04:31	RW	Ppip	1	HNS
04:32	ES	Ppip	1	Commuting east to west, high above roof top.
04:39	ES	Ppip	1	Commuting west to east, over rooftop.
04:39	RW	Pip	1	Flying from south west to east, over rooftop.

<sup>15</sup> Rachel Whitaker (RW); Emma Sutton (ES)

<sup>16</sup> HNS - Heard not seen; Pip - *Pipistrellus* sp.; Ppip - common pipistrelle (*Pipistrellus pipistrellus*)

## **Survey 1: Building B13 – 20th May 2021 (Dawn)**

**Survey site:** CGO001 Building B13, Survey 1 (surveyor locations 13.1 (south; HW), 13.2 (north; RE))

**Date:** 20/05/2021

**Sunset/sunrise:** 05:02

**Start:** 03:25

**End:** 05:15

**Weather conditions:** dry, 5% cloud cover, 1 BWS, temp: 7°C

**Surveyors:** Ric Else (RE); Hazel Watson (HW)

**Equipment:** BatBox Duet; Anabat Scout; Echo Meter EM3.

**Survey summary:** No confirmed bat roosts identified. Infrequent calls, mostly heard and not seen, by individual common pipistrelle. Common pipistrelle seen flying over building, heading north.

**Table 11 - All Bat Activity Recorded During Survey 1 (B13) 20/05/2021**

<b>Time (24 Hrs)</b>	<b>Surveyor<sup>17</sup></b>	<b>Species<sup>18</sup></b>	<b>No. bats</b>	<b>Bat Activity</b>
03:49	HW	Ppip	1	HNS
03:54	HW	Ppip	1	HNS
03:54	RE	Ppip	1	HNS, one pass
03:55	HW	Unk	1	HNS
03:58	HW	Ppip	1	HNS
04:01	HW	Ppip	1	HNS
04:01	RE	Unk	1	HNS, brief
04:06	HW	Ppip	1	HNS
04:10	HW	Ppip	1	HNS
04:19	HW	Ppip	2	HNS
04:19	RE	Ppip	1	Flying north, east of building
04:22	RE	Ppip	1	Flying north, east of building
04:23	HW	Ppip	1	HNS
04:23	RE	Pip	1	Flying south over building
04:27	HW	Pip	1	HNS, faint
04:31	RE	Unk	1	Flying north, east of building, not heard.

## **Survey 2: Tree T3 – 25<sup>th</sup> May 2021 (Dusk)**

<sup>17</sup> Ric Else (RE); Hazel Watson (HW)

<sup>18</sup> HNS - Heard not seen; Unk - unknown species; Pip - *Pipistrellus* sp.; Ppip - common pipistrelle (*Pipistrellus pipistrellus*)

**Survey site:** CGO001 Tree T3 Survey 2 (surveyor location T3.1)

**Date:** 25/05/2021

**Sunset/sunrise:** 21:22

**Start:** 20:52

**End:** 22:50

**Weather conditions:** 80% CC, Dry, 1BWS, temp: 10°C

**Surveyors:** Ric Else (RE)

**Equipment:** Anabat Scout

**Survey summary:** No confirmed bat roost. Limited activity was recorded. An individual common pipistrelle was recorded flying east to west passed the tree and one common pipistrelle was recorded foraging. \*Three potential Nathusius' pipistrelle calls were recorded (Peak frequency 40-42kHz), however these were only a few pulses per recording and the species identification is not considered to be conclusive

**Survey constraints:** Approximately 15 minutes of light rain during survey. Unable to verify Nathusius pipistrelle calls, due to short duration length of calls recorded.

**Table 12 - All Bat Activity Recorded During Survey 2 (T3) 25/05/2021**

Time (24 Hrs)	Surveyor <sup>19</sup>	Species <sup>20</sup>	No. bats	Bat Activity
21:40	RE	Pnat*	1	Seen flying east to west passed tree
21:43	RE	Pnat*	1	Seen flying east to west passed tree
21:48	RE	Pnat*	1	Seen flying east to west passed tree
21:52	RE	Pip	1	HNS, seen flying east to west passed tree
22:00	RE	Ppip	1	Seen flying east to west passed tree
22:28	RE	Ppip	1	HNS
22:37	RE	Ppip	1	HNS, Foraging

<sup>19</sup> Richard Else (RE)

<sup>20</sup> HNS - Heard not seen; Unk - unknown species; Nnoc - noctule (*Nyctalus noctula*); Pip - *Pipistrellus* sp.; Ppip - common pipistrelle (*Pipistrellus pipistrellus*); Pnat – Nathusius' pipistrelle (*Pipistrellus nathusii*)

## **Survey 1: Building B6 – 25<sup>th</sup> May 2021 (Dusk)**

**Survey site:** CGO001 Building B6 Survey 1 (surveyor locations 8.1 north-west)

**Date:** 25/05/21

**Sunset/sunrise:** 21:22

**Start:** 21:03

**End:** 22:50

**Weather conditions:** dry, 80% cloud cover, 1 BWS, temp: 10°C

**Surveyors:** Will Steele (WS)

**Equipment:** Petterson M500 & tablet

**Survey summary:** No confirmed bat roosts identified. Occasional passes by commuting and foraging common pipistrelle. Common pipistrelle seen commuting over the car park from north west to east.

**Incidental observations:** A bluetit nest was observed between bricks to the right of the main air vent.

**Survey constraints:** Approximately 15 minutes of light rain during survey.

**Table 13- All Bat Activity Recorded During Survey 1 (B6) 25/05/2021**

<b>Time (24 Hrs)</b>	<b>Surveyor<sup>21</sup></b>	<b>Species<sup>22</sup></b>	<b>No. bats</b>	<b>Bat Activity</b>
21:40	WS	Ppip	1	HNS, very distant
21:43	WS	Ppip	1	HNS, very distant
21:47	WS	Ppip	1	Commuting over car park from north west to east.
21:48	WS	Ppip	1	HNS, distant
21:49 – 21:55	WS	Ppip	1	HNS, infrequent passes
22:08	WS	Ppip	1	Foraging
22:09 – 22:10	WS	Ppip	1	Foraging nearby, five passes.
22:12 - 22:28	WS	--	-	Light rain
22:25 – 22:34	WS	Ppip	1	HNS, distant and occasional
22:31	WS	Nyc	1	HNS, social calls
22:38	WS	Ppip	1	HNS, distant
22:47	WS	Ppip	1	HNS, two passes
22:52	WS	Ppip	1	HNS, two passes

<sup>21</sup> Will Steele (WS)

<sup>22</sup> HNS - Heard not seen; Unk - unknown species; Nyc – *Nyctalus* sp.; Nnoc - noctule (*Nyctalus noctula*); Ppip - common pipistrelle (*Pipistrellus pipistrellus*);

## **Survey 1: Building 3 – 25<sup>th</sup> May 2021 (Dusk)**

**Survey site:** CGO001 Building B3 Survey 1 (surveyor locations 3.1 (north-west; ES), 3.2 (south-east; RW))

**Date:** 25/05/2021

**Sunset/sunrise:** 21:22

**Start:** 21:02

**End:** 22:50

**Weather conditions:** dry, 90% cloud cover, 2 BWS, temp: 10°C

**Surveyors:** Rachel Whitaker (RW); Emma Sutton (ES)

**Equipment:** BatBox Duet; Pettersson M500 & tablet

**Survey summary:** No confirmed bat roosts identified. Frequent passes from commuting common pipistrelle, heading towards nearby woodland to the west.

**Survey constraints:** Light rain before the start of the survey. Stop/start light rain showers between 22:09 and the end of the survey.

**Table 14 - All Bat Activity Recorded During Survey 1 (B3) 25/05/2021.**

<b>Time (24 Hrs)</b>	<b>Surveyor<sup>23</sup></b>	<b>Species<sup>24</sup></b>	<b>No. bats</b>	<b>Bat Activity</b>
21:35	RW	Ppip	1	Flying from east to west, towards woodland
21:35	ES	Ppip	1	Commuting east to west
21:45	ES	Ppip	2	Commuting, east to west at roof top height.
21:46	RW	Ppip	2	Flying from direction of building 4, passing close by the north east corner of building 3.
21:46	RW	Noc	1	HNS
21:47	ES	Ppip	1	Commuting, east to west at roof top height.
21:47	RW	Ppip		Flying over building 3 at rooftop height, heading west towards woodland.
21:48	RW	Ppip	2	Flying west, along the north and south aspect of building 3.
21:48	ES	Ppip	2	Commuting, east to west at roof top height.
21:49	RW	Ppip	1	Flying west, around the north east corner of building 3.
21:49	ES	Ppip	1	Commuting from north to west, low to ground.
21:50	ES	Ppip	2	Commuting south east to west, rooftop height.
21:50	RW	Ppyg	1	Flying south to north west, in front of building 3.
21:50	RW	Ppip	1	Commuting west around the north east corner of building 3.
21:59	ES	Ppip	1	Commuting east to west at rooftop height.
21:59	RW	Ppyg	1	Flying east to west over yard.
22:09	RW	-	-	Stop/start light rain showers begin.
22:11	RW	Ppip	1	Flying east to west, towards woodland.

<sup>23</sup> Rachel Whitaker (RW); Emma Sutton (ES)

<sup>24</sup> HNS - Heard not seen; Unk - unknown species; Nnoc - noctule (*Nyctalus noctula*); Pip - *Pipistrellus* sp.; Ppip - common pipistrelle (*Pipistrellus pipistrellus*); Ppyg - soprano pipistrelle (*Pipistrellus pygmaeus*)

Time (24 Hrs)	Surveyor <sup>23</sup>	Species <sup>24</sup>	No. bats	Bat Activity
22:11	ES	Ppip	1	Three passes, flying north to south over rooftop.
22:11	RW	Ppip	1	Two passes around front of building 3 and west gable and back.
22:13	RW	Unk	1	Seen and not heard, flying between building 3 and 4.
22:13	ES	Ppip	1	HNS, one pass
22:28	RW	Ppip		HNS
22:28	ES	Ppip	1	Foraging (feeding buzz), flying east to west.
22:33	ES	Unk		HNS, brief
22:33	RW	Nnoc	1	HNS
22:35	RW	Ppip	1	HNS, briefly and faint
22:35	ES	Ppip	1	HNS, commuting
22:39	ES	Pip	1	HNS, two passes

### **Survey 2: Building B15 - 26<sup>th</sup> May 2021 (Dawn)**

**Survey site:** CGO001 Building B15, Survey 2 (surveyor locations 15.1 (north; RE), 15.2 (east; ES), 15.3 (south-west;RW))

**Date:** 26/05/2021

**Sunset/sunrise:** 04:54

**Start:** 02:54

**End:** 05:25

**Weather conditions:** dry, 100% cloud cover, 1 BWS, temp: 8°C

**Surveyors:** Rachel Whittaker (RW); Emma Sutton (ES); Ric Else (RE)

**Equipment:** BatBox Duet; Pettersson M500 & tablet; Anabat Scout;

**Survey summary:** Three bat roosts were identified at soffits. Roost one (R1) was identified at the west gable, 11 common pipistrelles entered. Roost two (R2) was identified at the north aspect of the building, 15 common pipistrelles entered. Roost three (R3) was identified at the east gable, one common pipistrelle entered. Regular passes from commuting and foraging common pipistrelle was recorded. Swarming activity at both R1 and R2 by common was also recorded.

**Table 15 - All Bat Activity Recorded During Survey 2 (B15) 26/05/2021. Refer to Fig. 4, Photos 4, 5 and 6**

Time (24 Hrs)	Surveyor <sup>25</sup>	Species <sup>26</sup>	No. bats	Bat Activity	Map Annotation & Photos
03:00	RW	Unk	1	Seen not heard during setting up of equipment.	
03:00	RE	Unk	1	HNS	
03:03	ES	Ppip	2	HNS	
03:04	ES	Ppip	1	HNS, faint	
03:05	ES	Ppip	1	HNS	
03:06	RW	Ppip	1	Seen foraging around trees close to building.	A
03:06 – 03:07	RE	Ppip	1	HNS	
03:06	ES	Ppip	1	HNS, 1 bat pass	
03:07	RW	Ppip	1	Seen foraging around trees close to building.	A
03:08	RW	Ppip	1	HNS	

<sup>25</sup> Rachel Whitaker (RW); Emma Sutton (ES); Ric Else (RE)

<sup>26</sup> HNS - Heard not seen; Unk - unknown species; Pip - *Pipistrellus* sp.; Ppip - common pipistrelle (*Pipistrellus pipistrellus*); Ppyg - soprano pipistrelle (*Pipistrellus pygmaeus*);

Time Hrs) (24	Surveyor <sup>25</sup>	Species <sup>26</sup>	No. bats	Bat Activity	Map Annotation & Photos
03:08	ES	Ppip		HNS 3 bat passes	
03:08	RE	Ppip	1	HNS	
03:09	RW	Ppip	2	Seen flying west away from building	
03:09	ES	Ppip	1	HNS, faint and distant	
03:09 – 03:14	RW	Ppip		Continuous bat passes, possible circling at gable.	B
03:11	ES	Ppip	1	Flying from north west towards western gable box end, turned and flew back north west.	
03:13	RE	Ppip	1	HNS	
03:13	ES	Pip	1	HNS, faint	
03:15 – 03:21	RW	Ppip	6	Swarming at gable, continuous.	B
03:16 - 03:17	RE	Ppip	1	HNS, activity for one minute.	
03:18	ES	Pip	1	HNS, distant and faint	
03:21	ES	Ppip	1	HNS, 1 bat pass	
03:21 – 03:22	RW	Ppip	2	Swarming at gable, continuous	B
03:22	RE	Ppip	1	HNS, activity for one minute, foraging	
03:23	RE	Ppip	1	Activity for one minute.	
03:23	RW	Ppip	2	Swarming at gable, continuous	B
03:24	RW	Ppip	2	Swarming at gable, continuous	B
03:25	RW	Ppip	3	Swarming at gable, continuous	B
03:25	ES	Ppip	1	HNS, 1 bat pass.	
03:25	RE	Ppip	2	HNS	
03:26	ES	Ppip		Seen flying from east to west, commuting, roof top height.	
03:27	RE	Ppip	2	HNS	
03:28 – 03:40	RW	Ppip	5	Swarming activity at gable, continuous and at least five enter roost (R1).	C
03:29	ES	Ppip	1	Flying from west, flew back and forth towards gable, then flew north west over rooftop.	
03:29 - 03:31	RE			HNS, activity for 2 minutes.	
03:30	ES	Ppip	1	Flying from north west over rooftop, flew around west gable end.	
03:32 - 03:39	RE	Ppip	1	Seen foraging over building, continuous	
03:33	ES	Ppip	1	HNS, 2 passes	
03:34 – 03:36	ES	Ppip	1	Seen flying back and forth towards the eastern gable eave intermittently, not seen entering.	
03:37 – 03:38	ES	Ppip	2	HNS, intermittently	
03:39	ES	Ppip	1	Seen flying back and forth towards the eastern gable eave, not seen entering.	
03:40 – 03:42	RE	Ppip	1	HNS, continuous foraging	
03:41	RW	Ppip	2	Flying around the west elevation	
03:42	RW	Ppip	1	Flying towards gable then flew south.	
03:41 – 03:42	ES	Ppip		HNS, Foraging intermittently	
03:44	RW	Ppip	2	Seen flying east along south aspect	
03:44	RE	Ppip	1	HNS, brief	
03:45	RE	Ppip	1	HNS, brief	
03:45	RW	Ppip	1	Flew north over building looped back south of building, then flew north.	
03:48	RW	Ppip	2	Seen flying from west to east, along building	

Time Hrs) (24	Surveyor <sup>25</sup>	Species <sup>26</sup>	No. bats	Bat Activity	Map Annotation & Photos
03:48	RW	Ppip	3	Seen flying from west to east, along building	
03:48	RE	Ppip	1	HNS	
03:49	ES	Ppip	1	HNS	
03:49 - 03:51	RE	Ppip	2	Seen flying around building, continuous activity for 2 minutes.	
03:49	ES	Ppip	1	HNS, intermittently	
03:50	RW	Ppip	3	Seen flying north from south along building.	
03:50	RW	Ppip	4	Seen flying from west to east, along building.	
03:51	RW	Ppip	3	Seen flying from west to east, along building.	
03:53	ES	Ppip	1	Seen flying east to west, commuting	
03:53	RW	Ppip	5	Seen flying from west to east, along building.	
03:53 – 04:02	RE	Ppip	2	Seen flying around building	
03:55	ES	Ppip	1	HNS, commuting	
03:58	ES	Ppip	1	HNS	
04:00	ES	Ppip	1	One seen entering north gable (R3).	D
04:01	RW	Ppip	7	Seen flying from west to east, along building	
04:03 - 04:09	RE	Ppip	~6	At least 6 bats seen repeatedly flying up to R2 entry point and chasing around for 6 minutes.	E
04:03	ES	Ppip	1	HNS, faint and distant	
04:04	ES	Ppip	1	Flying north to east over rooftop	
04:06 – 04:09	ES	Pip		HNS, faint, intermittent	
04:10	RE	Ppip	~3	At least 3 bats seen repeatedly approaching entry point for R2 and flying away again (hard to see).	E
04:13	RE	Ppip	2	Seen repeatedly approaching R2 entry point	E
04:15	RW	Ppip	10	Seen flying from west to east, along building.	
04:16	ES	Ppip	1	HNS, one pass	
04:17	RE	Ppip	4	At least 4 bats seen repeatedly flying up to R2.	E
04:18	RE	Ppip	4	At least 4 bats seen entering R2.	F
04:18	RW	Ppip	2	Seen flying north, along east facing building.	
04:19	ES	Ppip	1	HNS, one pass	
04:19 – 04:21	RE	Ppip	5	At least 5 bats seen flying up to R2 before entering. With social calls	E, F
04:20	RW	Ppip	10	Seen flying north, along east facing building.	
04:21	RE	Ppip	2	Seen entering behind soffit, on the north elevation (R2).	F
04:22	ES	Ppip	1	HNS, distant	
04:23	RE	Ppip	1	Seen entering behind soffit, on the north elevation (R2).	F
04:24	RE	Ppip	1	Seen entering behind soffit, on the north elevation (R2).	F
04:25	RE	Ppip	1	Seen flying out of R2 and back in again.	
04:25	RW	Ppip	2	Seen flying from west to east, along building.	
04:26	RW	Ppip	1	Seen entering behind the soffit on the west elevation (R1).	G
04:26	RE	Ppip	1	Seen entering behind soffit on the north elevation (R2).	F
04:27	RW	Ppip	2	Entered R1	R1

Time Hrs)	(24	Surveyor <sup>25</sup>	Species <sup>26</sup>	No. bats	Bat Activity	Map Annotation & Photos
04:28		RW	Ppip	1	Seen entering at the eaves, on west elevation (R1).	R1
04:32		RW	Ppip	1	Seen entering behind soffit at the apex (R1).	H
04:34		RW	Ppip	1	Seen flying around building, before entering roost 1	R1,

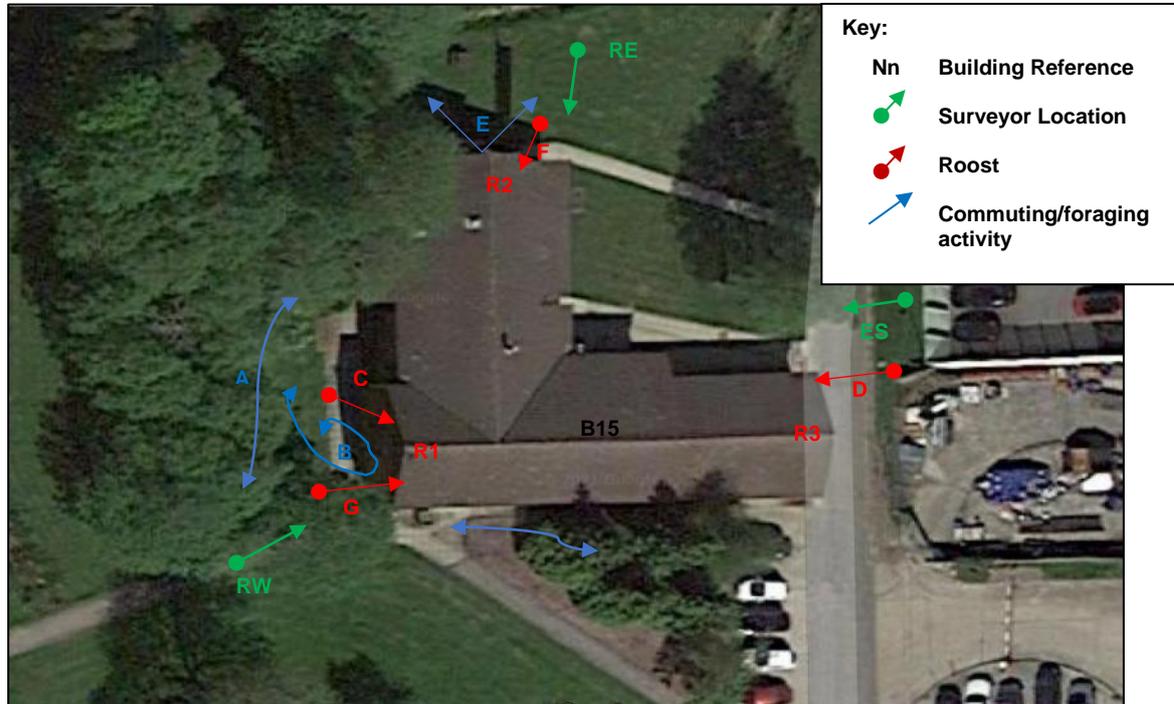
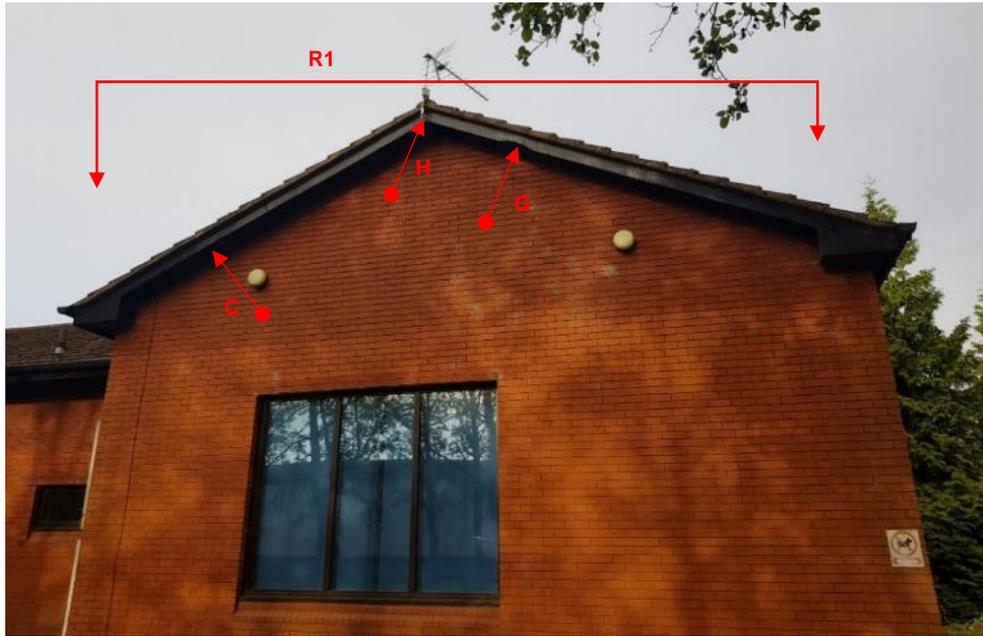


Figure 4 - Summary of bat activity recorded during the dawn emergence survey of B15 (Survey 2) on 26/05/21.

Table 16 - Summary of Roosts Identified B15 (Survey 2) - 26/05/2021

Building Ref.	Roost Ref.	Species	Count	Roost location	Access Point
B15	R1	Common Pipistrelle	6	Gable Eaves, West Elevation	soffit
	R2	Common Pipistrelle	15	Eaves North Elevation	Soffit
	R3	Common Pipistrelle	1	Gable Eaves, East Elevation	Gable box end

**Roost Photographs:**



**Photo 4 – B15, Location of Roost 1 (Pipistrelle sp.), at the eaves of B15 (West elevation).**



**Photo 5 – B15, Location of Roost 3 (Pipistrelle sp.), at the eaves of B15 (East elevation).**



Photo 6 – B15, Location of Roost 2 (Pipistrelle sp.), at the eaves of B15 (North elevation).

## Survey 1: Building 6 – 7<sup>th</sup> June 2021 (dusk)

**Survey site:** CGO001 B6 Survey 1 (surveyor locations 6.2 (north-east; RE), 6.3 (south-east; HW), 6.4 (south-west; ES), 6.5 (west; RW))

**Date:** 07/06/2021

**Sunset/sunrise:** 21:37

**Start:** 21:07

**End:** 23:37

**Weather conditions:** dry, 30% cloud cover, 1 BWS, 16°C

**Surveyors:** Rachel Whitaker (RW); Emma Sutton (ES); Richard Else (RE); Hazel Watson (HW).

**Equipment:** BatBox Duet; Pettersson M500 & tablet; Anabat Scout; Echo Meter EM3

**Survey summary:** Up to three common pipistrelles were observed continuously foraging around B5, and hedgerow in the north. Occasional passes by noctule were also heard.

**Incidental observations:** N/a

**Survey constraints:** Part of the south aspect view, was restricted by a portakabin.

**Table 17 - All Bat Activity Recorded During Survey 1 (B6) 07/06/2021.**

Time (24 Hrs)	Surveyor <sup>27</sup>	Species <sup>28</sup>	No. bats	Bat Activity	Map Annotation & Photos
22:03	HW	Unk	1	HNS, briefly	
22:05	ES	Ppip	1	HNS, two passes.	
22:05	RW	Ppip	1	HNS, briefly and quietly.	
22:06	RE	Ppip	1	Flew from SW across the car park.	
22:07	RE	Ppip	2	Foraging around the car park.	
22:07	RW	Ppip	1	HNS	
22:08	ES	Ppip	1	HNS, two passes.	
22:08	HW	Pip	1	HNS, faintly	
22:08	RW	Ppip	1	Flew East to west around the north-west (NW) corner of B6, below roof height.	
22:09 – 22:10	ES	Ppip	1	HNS, three passes.	
22:11	RE	Ppip	1	Foraging around car park.	
22:11	ES	Ppip	1	HNS, one pass.	
22:11	HW	Ppip	1	HNS, faintly	
22:13	HW	Unk	1	Bat flew from the south towards the building, below roof height.	
22:15	RE	Ppip	1	HNS	
22:16	ES	Ppip	1	HNS, brief, two passes.	
22:16	HW	Pip	1	Bat seen flying around the building	
22:17	RE	Ppip	1	Flew east to west over the B6.	
22:17	RW	Ppip	2	Flying back and forth under the overhang on the south aspect.	
22:17	RE	Pip	1	HNS.	
22:17 – 22:27	HW	Pip	1	Bat flying around B6.	
22:18	RE	Ppip	1	HNS, foraging.	
22:19	RW	Ppip	1	HNS	
22:20	RE	Ppip	1	HNS, foraging.	
22:20	RW	Ppip	1	Flew around the NW corner of B6 to the south toward position 2.	
22:21	ES	Pip	1	Flying low, south from the tree line, to the west	
22:21	ES/RW	Nnoc	1	HNS, one pass	
22:21	RE	Nnoc	1	Flying low overhead NW	

<sup>27</sup> Rachel Whitaker (RW); Richard Else (RE); Emma Sutton (ES); Hazel Watson (HW)

<sup>28</sup> HNS - Heard not seen; Unk - unknown species; Nnoc - noctule (*Nyctalus noctula*); - *Pipistrellus* sp.; Ppip - common pipistrelle (*Pipistrellus pipistrellus*); Ppyg - soprano pipistrelle (*Pipistrellus pygmaeus*)

Time (24 Hrs)	Surveyor <sup>27</sup>	Species <sup>28</sup>	No. bats	Bat Activity	Map Annotation & Photos
22:22	RW	Ppip	1	Flying around NW corner of B6 under the overhang.	
22:22	ES	Pip	1	Flying low, south from the tree line to the west.	
22:22 – 22:31	RE	Ppip	1	Foraging around the car park	
22:23	ES	Ppip	1	Foraging west to south, low towards tree line.	
22:24	RW	Ppip	1	Flying north to south under the overhang, close to B6.	
22:26	RW	Ppip	1	HNS briefly.	
22:27 – 22:29	ES	Ppip	1	HNS, foraging intermittently.	
22:30 – 22:34	HW	Ppip	1	Bat seen flying around B5.	
22:31	RW	Ppip	3	Two commuting north to south, 1 HNS foraging. With social calls	
22:32	RW	Ppip	1	HNS intermittently.	
22:32	ES	Ppip	1	Flying from the west to south towards tree line.	
22:34	ES/RE	Ppip	1	HNS, 1 pass	
22:35	RW	Ppip	1	HNS, intermittently.	
22:36	HW	Unk	1	Bat seen flying around B5.	
22:37	ES	Ppyg	1	HNS, foraging	
22:37 – 22:43	RW	Ppip	1	HNS, foraging continuously.	
22:40	HW	Pip	1	Bat seen flying around B5.	
22:41	ES	Pip	1	Flying from south along the tree line towards the building,	
22:41	ES	Pip	1	Flying west to east over the top of B6.	
22:41	RE/RW	Nnoc	1	HNS	
22:42 – 22:44	RE	Ppip	1	HNS	
22:43	ES	Ppyg	1	HNS foraging	
22:45	RW	Ppip	1	Commuting north to south over the bowling green, with social calls.	
22:45	ES	Ppip	1	HNS, one pass.	
22:45	HW	Ppip	1	Bat seen flying around B5.	
22:45	RE	Ppip	1	Foraging around car park	
22:47	RW	Ppip	1	Foraging along the hedge, north of B5, before flying east.	
22:47 – 22:50	RE	Ppip	1	Foraging around car park	
22:48	ES	Ppip	1	Flying west to south, towards treeline.	
22:49	HW	Ppip	1	Flying overhead.	
22:50	ES/RW	Ppip	1	HNS, Foraging	
22:51	ES	Ppip	1	HNS, commuting.	
22:53	RE	Ppip	1	Flew from the SW direction.	
22:53	RW	Ppip	1	HNS	
22:55	ES	Ppip	1	Flying at west aspect, then flew south, heard foraging.	
22:55	HW	Unk	1	Flying overhead.	
23:00	HW	Pip	1	HNS.	
23:00	RE	Ppip	1	HNS	
23:01	RW	Ppip	1	HNS, briefly.	
23:03	RE	Ppip	1	HNS	
23:05	RW	Ppip	1	HSN	
23:08	RE	Ppip	1	HNS	
23:10	RE/ RW	Ppip	1	HNS	
23:11	ES/HW/RW	Pip	1	HNS, with social calls.	
23:12	HW	Unk	1	HNS	
23:12	RE	Ppip	1	HNS	
23:13	ES/RW	Pip	1	HNS 1 pass	

Time (24 Hrs)	Surveyor <sup>27</sup>	Species <sup>28</sup>	No. bats	Bat Activity	Map Annotation & Photos
23:16 – 23:19	HW	Ppip	1	HNS, briefly.	
23:17	RE/ RW	Ppip	1	HNS	
23:18	ES/RW	Pip	1	HNS, one pass, with social calls.	
23:21	RW	Pip	1	HNS, briefly	
23:24	ES	Unk	1	HNS	
23:25	All	Pip	1	HNS, 1 Pass	
23:26	RW	Unk	1	HNS.	
23:27	RW	Ppip	1	HNS, briefly.	
23:28	HW	Unk	1	HNS, faintly	
23:30	RE	pip	1	HNS	
23:30	RW	Ppyg	1	HNS	
23:31	HW	Ppip	1	HNS.	
22:31	RW	Ppip	1	HNS with social calls.	
23:32	ES	Pip	1	HNS, commuting.	
23:32	RW	Unk	1	HNS, passed close by	
23:33	RE/RW	Ppyg	1	HNS	
23:35	RE	Ppip	1	HNS	

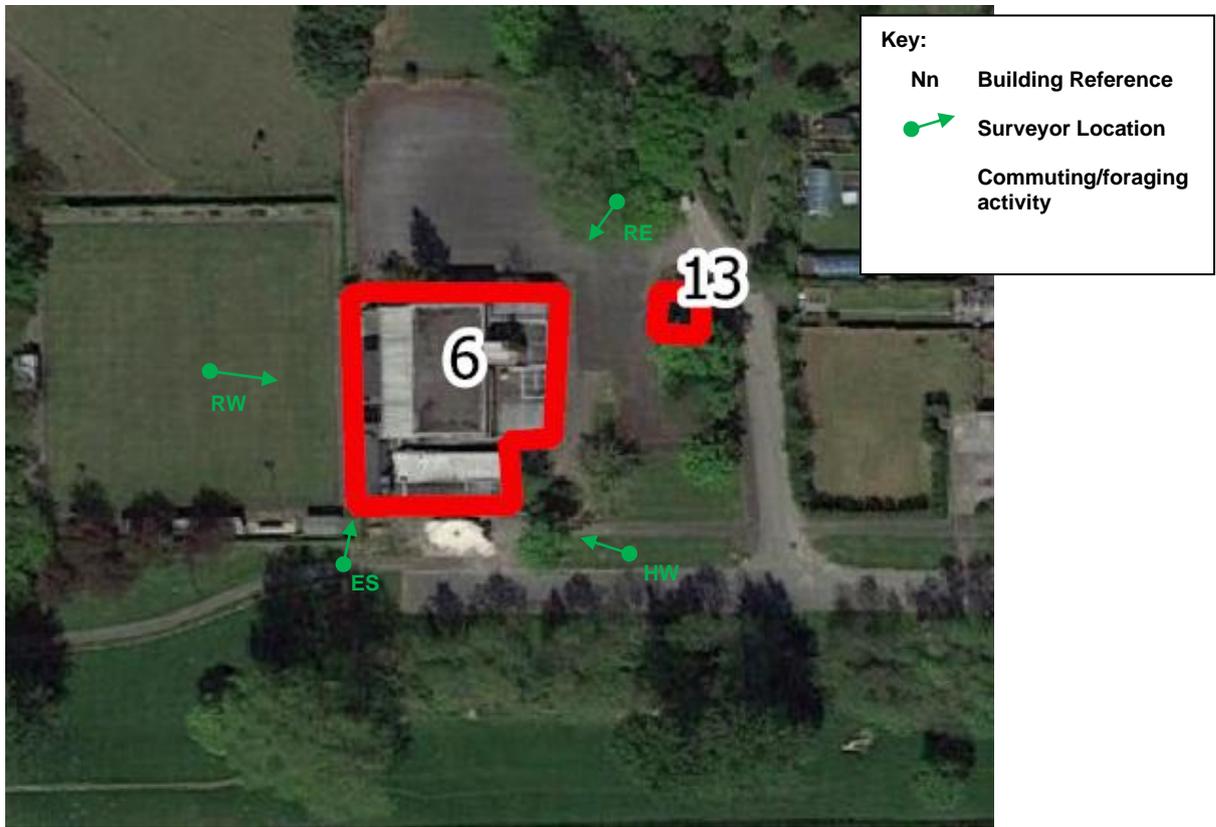


Figure 5 - Summary of bat activity recorded during the dawn emergence survey of B6 (Survey 1) on 07/06/21.

## **Survey 2: Building 10 – 8<sup>th</sup> June 2021 (Dawn)**

**Survey site:** CGO001 B10 Survey 2 (surveyor locations 10.1 (north-west; ES), 10.2 (south-west; RW), 10.3 (south-east; RE) 10.4 (north-east; HW))

**Date:** 08/06/2021

**Sunset/sunrise:** 04:42

**Start:** 02:42

**End:** 04:42

**Weather conditions:** dry, 10% cloud cover, 1 BWS, 11 °C

**Surveyors:** Rachel Whitaker (RW); Emma Sutton (ES); Richard Else (RE); Hazel Watson (HW).

**Equipment:** BatBox Duet; Pettersson M500 & tablet; Anabat Scout; Echo Meter EM3

**Survey summary:** No roosting activity observed, the occasional pass by common pipistrelle and noctules was recorded.

**Incidental observations:** A barn owl was seen entering B10, through a gap in the roof on the south aspect. Two further barn owls were seen carrying rodents, south and north of B10, possibly to a building in the south-east.

**Survey constraints:** N/a

**Table 18 - All Bat Activity Recorded During Survey 1 (B10) 05/06/2021**

<b>Time (24 Hrs)</b>	<b>Surveyor<sup>1</sup></b>	<b>Species<sup>2</sup></b>	<b>No. bats</b>	<b>Bat Activity</b>
03:03	HW/ RE	Ppip	1	HNS, briefly
03:05	ES/ HW/ RW	Ppip	1	HNS, one pass.
03:13	ES/HW/RW	Ppip	1	HNS, commuting
03:20	ES	Ppip	1	Flying east to west along B10
03:20	HW/RW	Ppip	1	HNS
03:22	ES	Pip	1	HNS, briefly.
03:32	RW	Ppip	1	Commuting west to east close to B10, lost site once reached the building.
03:32	RE	Ppip	1	HNS
03:42	ES/ RW	Ppip	1	HNS, 1 brief pass.
03:59	RW	Nnyc	1	HNS
04:05	ES	Ppip	1	HNS, briefly.
04:05	RW	Nnyc	1	Commuting high above B10, west to east.
04:06	RW	Nnyc	1	HNS
04:08	RW/HW	Nnyc	1	HNS

## Survey 1: Building 5 – 8<sup>th</sup> of June (Dusk)

**Survey site:** CGO001 B5 Survey 1 (surveyor locations 5.3 (south-west; ES), 5.4 (south; RW) and 5.5 (north; HW))

**Date:** 08/06/2021

**Sunset/sunrise:** 21:38

**Start:** 21:08

**End:** 23:38

**Weather conditions:** dry, 20% cloud cover, 2 BWS, Temp:17 °C

**Surveyors:** Rachel Whitaker (RW); Emma Sutton (ES); Hazel Watson (HW).

**Equipment:** BatBox Duet; Pettersson M500 & tablet; Echo Meter EM3

**Survey summary:** No roosts were confirmed at the building. Constant foraging activity in the yard between the two doors was observed during most of the survey by common pipistrelle, with occasional noctule and unidentified bats.

**Incidental observations:** A barn owl was sat on the field fence to the east of B5. A tawny owl was also heard calling.

**Survey constraints:** The view between the two stable buildings was restricted by two large metal doors in the north and south. A security light was present on the southern aspect which also restrict part of the view.

**Table 19 - All Bat Activity Recorded During Survey 1 (B5) 08/06/2021.**

Time (24 Hrs)	Surveyor	Species	No. bats	Bat Activity	Map Annotation & Photos
22:19	HW	Ppip	1	HNS	
22:31	ES	Ppip	1	Flying west to east close to the north elevation.	
22:38	RW	Pip	1	HNS	
22:39	ES	Ppip	1	Flying from NE to south over the top of B5.	
22:40	HW	Ppip	1	HNS	
22:40	ES	Ppip	1	Flying east to west.	
22:41	RW	Ppip	1	Flew over the metal door and looped back.	
22:41	ES	Ppip	2	One seen foraging and one commuting north.	
22:41	ES	Ppip	1	Flying south to east, from rooftop.	
22:43	ES	Ppip	1	Commuting east to west,	
22:43	HW	Unk	1	HNS	
22:43	RW	Ppip	2	Flying west to east below the roofline, and foraging back and forth between the two buildings	
22:44	ES	Ppip	1	HNS, foraging.	
22:45 – 22:46	RW	Ppip	1	Commuting north to south between the two buildings, then east Infront of B5	
22:46	HW	Unk	1	HNS	
22:46	ES	Ppip	1	Commuting east to west.	
22:48	ES	Ppip	1	Flying from the west, heading south along the wall.	
22:48	HW	Unk	1	HNS	
22:50	All	Ppip	1	HNS, 1 pass.	
22:51 – 22:57	RW	Ppip	1	Foraging between the two building, going back and forth in the yard.	
22:52	HW	Unk	1	Bat seen flying over the top of B5.	
22:53	ES	Ppip	1	Seen at gate in the north, looped back and flew south.	
22:54	ES	Ppip	1	Flying from north to south over the gate.	
22:56	HW	Unk	1	HNS	

22:56 – 22:59	ES	Ppip	1	Foraging in front of the north elevation, seen flying round intermittently.
22:56	RW	Ppip	1	Flew over the door to the west, turning north-east over B5.
22:58 – 23:02	RW	Ppip	1	Foraging back and forth between the two building continuously.
23:00	ES	Ppip	1	Flying north to south, along east elevation of B5.
23:00	ES	Ppip	1	Flying north to south, close to the gate.
23:00 – 23:02	HW	Unk	1	HNS
23:01	ES	Ppip	1	Flying west to east.
23:01	ES	Ppip	1	Foraging around the north elevation.
23:02	RW	Ppip	1	Flew over the door and then west.
23:02	ES	Nnyc	1	HNS
23:03	RW	Nnyc	1	Commuting high above B5, west to east.
23:03	ES	Ppip	1	HNS.
23:05	ES	Pip	1	HNS, foraging.
23:05 – 23:30	RW	Ppip	1	Foraging continuously between the two buildings.
23:06	ES	Ppip	1	HNS, 1 pass
23:10	RW	Nnyc	1	HNS
23:10	HW	Unk	1	HNS
23:12	HW	Unk	1	HNS
23:12	RW	Ppip	2	Flying west to east and looping back close to B5, and circling at the SW corner.
23:14	ES	Unk	1	HNS
23:16	ES	Ppip	1	HNS, foraging.
23:23 – 23:25	HW	Unk	1	HNS
23:23	RW	Ppip	1	Passed east to west in front of B5
23:23	ES	Unk	1	HNS, very faintly.
23:25	RW	Ppip	1	Passed east to west in front of B5
23:25	ES	Ppip	1	HNS, two passes.
23:27	ES	Ppip	1	HNS, one pass.
23:28	RW	Ppip	1	Flew south to north over the west side of B5.
23:29 – 23:31	HW	Unk	1	HNS, multiple passes
23:29	ES	Ppip	1	HNS, commuting.
23:30	ES	Ppip	1	HNS, one pass
23:32	ES/RW	Pip	1	HNS
23:33	HW	Unk	1	HNA
23:33	RW	Ppip	1	HNS
23:34	ES	Ppip	1	HNS
23:35	RW	Ppip	1	HNS, probably still foraging between the two buildings.

## Survey 2: Building 5 – 9<sup>th</sup> of June 2021 (Dawn)

**Survey site:** CGO001 B5 Survey 1 (surveyor locations 5.1 (north-west; ES), 5.4 (south-east; RW) and 5.5 (south-west; HW))

**Date:** 09/06/2021

**Sunset/sunrise:** 04:42

**Start:** 03:12

**End:** 04:42

**Weather conditions:** dry, 30% cloud cover, 1 BWS, Start temp:14°C

**Surveyors:** Rachel Whitaker (RW); Emma Sutton (ES); Hazel Watson (HW).

**Equipment:** BatBox Duet; M500 & tablet; and Echo Meter EM3

**Survey summary:** No roosts were confirmed at the building. Constant foraging activity in the yard between the two doors was observed during most of the survey by common pipistrelle, with occasional noctule and unidentified bats.

**Incidental observations:** A barn owl was sat on the field fence to the east of B5.

**Survey constraints:** The view between the two stable building were restricted by two large metal doors in the north and south. A security light was present on the southern aspect which also restrict part of the view.

**Table 20 - All Bat Activity Recorded During Survey 1 (B5) 09/06/2021.**

Time (24 Hrs)	Surveyor <sup>29</sup>	Species <sup>30</sup>	No. bats	Bat Activity	Map Annotation
03:07	HW	Ppip	1	HNS	
03:08	All	Ppip	1	HNS	
03:09	ES	Ppip	1	HNS, 1 pass.	
03:13	RW/ ES	Ppip	1	HNS, briefly	
03:17	HW / ES	Ppip	1	HNS	
03:18	RW	Ppip	1	HNS	
03:21	RW/HW	Ppip	1	HNS	
03:22	RW	Unk	1	SNH, flying over B5 roof into the field in the east. Not pick up by M500.	
03:22	HW/ ES	Ppip	1	Flying west to east over B5	
03:23	ES	Ppip	1	HNS, briefly.	
03:24	ES	Ppip	1	Seen flying in front of B5 north aspect, west to east.	
03:24	HW	Ppip	1	Flying west to east over B5 and back again.	
03:24	RW	Ppip	1	HNS	
03:26	RW	Ppip	1	HNS	
03:27	RW	Ppip	1	HNS	
03:29	RW/ HW	Ppip	1	HNS, briefly	
03:30	HW	Ppip	1	SNH, Flying west to east over B5.	
03:30	RW	Ppip	1	Foraging between the two buildings.	
03:32	RW	Ppip	1	HNS	
03:36	RW	Pip	1	HNS, briefly	
03:45	HW	Nnoc	1	HNS	
03:46	RW	Ppip	1	Commuting, west to east over the field.	
03:46	HW	Nnoc	1	HNS	
03:47	RW	Nnoc	1	HNS	
03:50	RW	Ppip	1	Flying north to south over the grassland, before turning east to west, flying close to B5 below roof height. Could not see the bat past the second window in the east, may have re-entered building.	

<sup>29</sup> Rachel Whitaker (RW); Emma Sutton (ES); Hazel Watson (HW).

<sup>30</sup> HNS - Heard not seen; SNH – Seen not heard; Unk - unknown species; Nnoc - noctule (*Nyctalus noctula*); Pip - *Pipistrellus* sp.; Ppip - common pipistrelle (*Pipistrellus pipistrellus*); Ppyg - soprano pipistrelle (*Pipistrellus pygmaeus*)

Time (24 Hrs)	Surveyor <sup>29</sup>	Species <sup>30</sup>	No. bats	Bat Activity	Map Annotation
03:50	HW	Unk	1	Flying between the two buildings from the east. Not picked up by EM3.	
03:51	HW	Ppip	1	Bat seen flying east to west in front of B5, before looping back east.	
03:53	RW	Ppip	1	Commuting west to east before turn to fly north to south.	
03:56	ES	Ppip	1	Commuting west to east, towards the trees	

### **Survey 3: Building B15 – 09<sup>th</sup> June 2021 (Dusk)**

**Survey site:** CGO001 B15 Survey 3 (surveyor locations 15.1 (HW), 15.2 (ES), 15.3 (RW))

**Date:** 09/06/2021

**Sunset/sunrise:** 21:39

**Start:** 21:09

**End:** 23:39

**Weather conditions:** dry, 100% cloud cover, 2 BWS, Temp:19 °C

**Surveyors:** Rachel Whitaker (RW); Emma Sutton (ES); Hazel Watson (HW).

**Equipment:** BatBox Duet; Pettersson M500 & tablet; Echo Meter EM3

**Survey summary:** Seven roosts were confirmed at the building at soffits. Constant foraging activity around the building along tree lines was observed during most of the survey, along with social calls, swarming and bats chasing each other.

**Incidental observations:** A barn owl was seen near B15.

**Survey constraints:** The view of the south aspects was restricted due to vegetation adjacent the building. Features of the building became hard to see 45 minutes after sunset.

**Table 21 - All Bat Activity Recorded During Survey 3 (B15) 09/06/2021. Refer to Fig. 6, photo 7, photo 8 and photo 9.**

Time (24 Hrs)	Surveyor <sup>31</sup>	Species <sup>32</sup>	No. bats	Bat Activity	Map Annotation
21:49	HW	Ppip	1	Flying close to B15, from the east heading west towards the trees.	
21:50	RW	Ppip	1	Flying around the trees and close to B15 in front of the west elevation.	
21:53	RW	Ppip	1	Possible emergence from the eaves, did not see location, circled the trees in the west before flying south.	
21:54	RW	Ppip	1	Flying east to west, below roof height along the south elevation.	
21:55	RW	Ppip	1	Emerged from behind the soffit on the west elevation (R1) and flew south east.	A
21:59	RW	Ppip	1	Foraging south to north around the trees at roof height.	
21:59	HW	Ppip	2	Two bats entered R2	B
22:00	RW	Ppip	1	Foraging north to south around the trees.	1
22:02	RW	Ppip	1	Emerged from behind the soffit, then flew SW.	A
22:04	HW	Ppip	5	Five bats emerged from R2.	B
22:03 – 22:04	RW	Ppip	2	Foraging around the trees and flying back and forth to R1	A, 1
22:05	HW	Ppip	1	HNS	

<sup>31</sup> Rachel Whitaker (RW); Emma Sutton (ES); Hazel Watson (HW)

<sup>32</sup> HNS - Heard not seen; Unk - unknown species; Nnoc - noctule (*Nyctalus noctula*); Pip - *Pipistrellus* sp.; Ppip - common pipistrelle (*Pipistrellus pipistrellus*); Ppyg - soprano pipistrelle (*Pipistrellus pygmaeus*)

Time (24 Hrs)	Surveyor <sup>31</sup>	Species <sup>32</sup>	No. bats	Bat Activity	Map Annotation
22:05 – 22:07	RW	Ppip	1	Foraging around the trees in the west, plus social calls.	1
22:06	ES	Ppip	1	HNS, social calls.	
22:07 – 22:13	HW	Ppip	10	Ten bats emerged from R2. Continuous swarming activity around R2.	B
22:07 – 22:09	RW	Ppip	2	Continuously foraging around the trees in the west.	1
22:09	RW	Ppip	1	Emerged from behind the soffit on the west elevation and flew SW.	A
22:10	RW	Ppyg	1	Flew south to north, west of B5.	
22:10	RW	Ppip	3	Two bats emerged from R1. A third bat is seen swarming outside R1.	C
22:11	RW	Ppip	1	Emergence from R1	C
22:11	ES	Unk	1	SNH, emerged from behind soffit on east elevation (R3) and flew south west.	D
22:12	HW	Ppip	1	HNS	
22:12 – 22:22	RW	Ppip	6	Foraging around the trees in the west and circling outside R1, touching the building.	1
22:13	HW	Ppip	1	Circling overhead	
22:14	ES	Ppip	2	SNH, emerged from behind soffit on east elevation (R3) and flew south west.	D
22:14	HW	Ppip	3	Three bats emerged from R2.	B
22:14	RW	Ppip	2	Two emergences at R1.	C
22:15	ES	Pip	1	Flying south to north over B15.	
22:15	HW	Pip	1	HNS, brief	
22:16	ES	Pip	1	HNS, brief and distant.	
22:16	HW	Ppip	2	HNS, one pass	
22:17	ES	Ppip	1	HNS, one pass.	
22:17	HW	Ppip	1	HNS	
22:18 – 22:27	HW	Ppip	2	Continuous foraging activity around nearby grassland and trees.	1
22:22	ES	Ppip	1	Seen flying south to northwest	
22:23	RW	Ppip	1	Seen flying around trees in the south.	
22:24	RW	Ppip	1	Bat appeared from B15 roofline in the south before flying north-west.	
22:24 – 22:40	RW	Ppip	~10	Continuous foraging around B15 and trees in the west. Swarming activity outside R1, with several bats seen touching the wall. Bats seen chasing each other. Plus, social calls.	1
22:25	ES	Ppip	1	Commuting over B15, flying from south to northeast.	
22:25 - 22:26	ES	Ppip	1	HNS, intermittently.	
22:28	RW	Nnyc	1	HNS	
22:29	ES	Ppip	1	Flying south to west over B15.	
22:29 – 22:33	HW	Ppip	2	Continuous foraging activity.	
22:34 – 22:36	HW	Unk	3	Circling close to B15,	
22:34	ES	Ppip	1	HNS, two passes.	
22:35	ES	Ppip	1	Appeared from around the corner of east elevation and flew west.	
22:36	ES	Ppip	1	Seen repeatedly flying back and forth towards R3, but did not enter, flew SW	E
22:36 – 22:43	HW	Unk	3	Circling activity close to B15.	
22:38	ES	Ppip	1	Flying from south to west over B15	

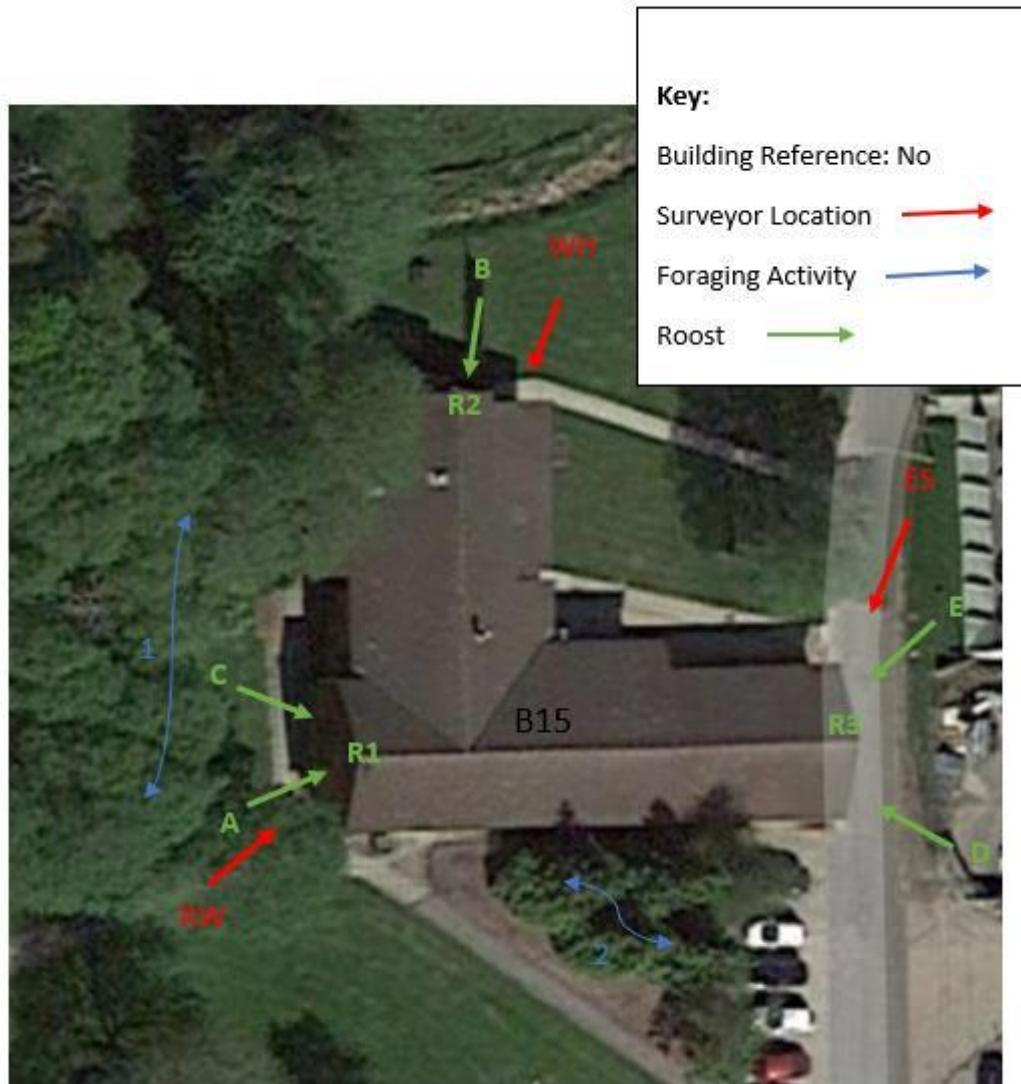
Time (24 Hrs)	Surveyor <sup>31</sup>	Species <sup>32</sup>	No. bats	Bat Activity	Map Annotation
22:40 – 22:42	ES	Ppip	1	HNS, foraging intermittently.	
22:40 – 22:50	RW	Ppyg	3	Foraging activity continues around B15 and trees	1,2
22:44 – 22:56	HW	Unk	~3	Continuous bat activity	
22:45	ES	Ppip	1	HNS, social calls	
22:46	ES	Ppip	1	HNS, two passes.	
22:47 – 22:48	ES	Ppip	1	HNS, intermittent foraging	
22:50	RW	Ppip	1	Possibly seen re-entering R1.	C
22:50	ES	Ppip	1	HNS, one pass	
22:50 – 22:57	RW	Ppip	1	Intermittent foraging around B15.	
22:54	ES	Unk	1	SNH, entering R3.	D
22:55	ES	Ppip	1	Seen flying from west to north-east	
22:56 – 23:01	HW	Unk	1	Intermittent bat activity	
22:59	ES	Pip	1	HNS, briefly.	
23:02	ES	Ppip	1	HNS, two passes.	
23:05	ES	Ppip	1	HNS, one pass.	
23:05	RW	Ppip	2	Foraging around B15	1,2
23:06	ES	Ppip	1	HNS, one pass.	
23:07	ES	Nnoc	1	HNS	
23:07	RW	Nnoc	1	HNS	
23:09	HW	Unk	1	HNS, social calling	
23:09	RW	Nnyc	1	HNS faintly.	
23:09	ES	Nnyc	1	HNS	
23:10	RW	Ppip	1	HNS, foraging nearby.	1,2
23:11	RW	Unk	1	SNH, flying around in front of the west elevation at roof height.	
23:12 – 23:14	RW	Ppip	1	HNS, foraging nearby.	1,2
23:14	ES	Ppip	1	HNS, commuting	
23:14 – 23:16	RW	Ppip	2	Foraging around the west elevation, plus, social calls.	1
23:15	ES	Ppip	1	HNS, two passes.	
23:16	ES	Ppip	1	Flew over top of B15, east to west.	
23:16 – 23:39	RW	Ppip	1	Foraging around B15 below roof height.	1,2
23:17	HW	Unk	1	HNS, continuous activity	
23:17 – 23:19	RW	Unk	1	SNH, circling around the west gable's corner	
23:19- 23:22	ES	Pip	1	HNS, intermittently with multiple passes.	
23:21	RW	Ppip	2	Flew from the north towards R1 and possibly re-entered the roost.	C
23:21	HW	Unk	2	Circling repeatedly together close to R2. Plus, chasing behaviour.	
23:23	RW	Ppip	2	Flew from the roofline of the south elevation towards the north.	
23:23	ES	Ppip	1	Seen flying back and forth towards R3, but did not enter.	D
23:24	RW	Unk	2	SNH, Circling outside R1.	
23:24	ES	Ppip	1	HNS, foraging.	
23:27	ES	Ppip	1	HNS, foraging	
23:29	ES	Ppip	1	Flew towards apex of east gable (R3), touched the wall repeatedly then flew southwest.	
23:31	ES	Ppip	1	Flew towards apex of east gable (R3) touched the wall repeatedly then flew southwest	
23:32	ES	Ppip	1	HNS	

Time (24 Hrs)	Surveyor <sup>31</sup>	Species <sup>32</sup>	No. bats	Bat Activity	Map Annotation
23:34 – 23:40	HW	Unk	3	Circling adjacent B15 near security light. With the occasional visit back and forth to R2.	
23:34 – 23:35	ES	Ppip	1	HNS, intermittently.	
23:36	ES	Ppip	1	Emerged from R3	E
23:36	ES	Ppip	1	Seen flying toward R3 then flew north west	
23:40	ES	Ppip	1	Flew back and forth towards R3, then flew south west.	
23:41 – 23:43	ES	Ppip	1	Seen flying around trees close to north elevation.	
23:44	ES	Ppip	1	Flew back and forth towards R3, then flew south west.	

**Table 22 - Summary of Roosts Identified B15 (Survey 3) 09/06/21**

Building Ref.	Roost Ref.	Species	Count	Roost location	Access Point
B15	R1	Common Pipistrelle	10	Gable Eaves, West Elevation	Soffit
	R2	Common Pipistrelle	22	Eaves North Elevation	Soffit
	R3	Common Pipistrelle	4	Gable Eaves, East Elevation	Soffit

**Figure 6 - Summary of surveyor location, identified roost locations and annotated bat activity during the dusk emergence survey on building 15 (Survey 3) 09/06/21.**



**Roost Photographs:**

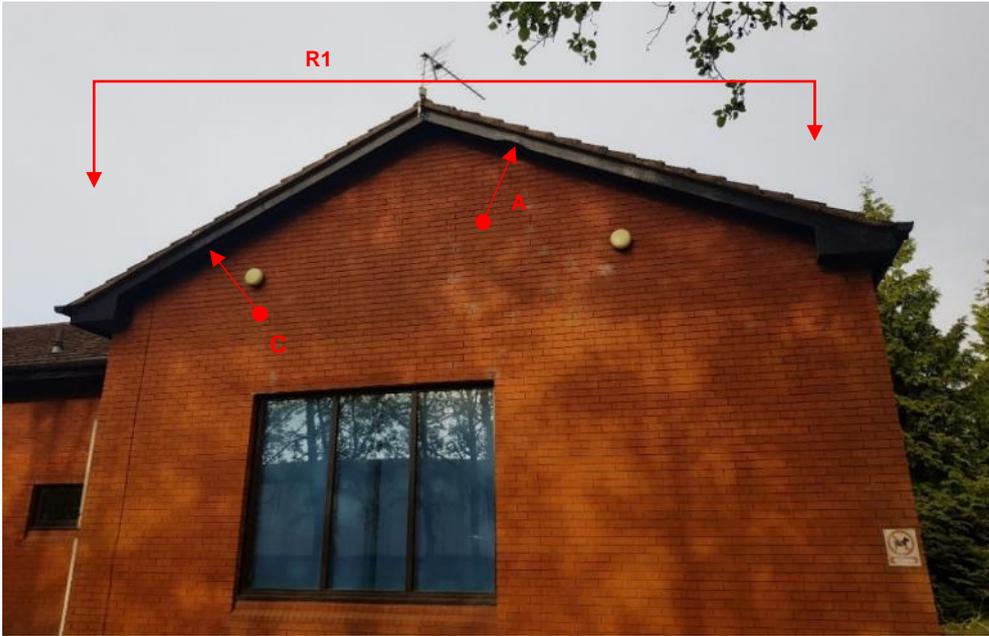


Photo 7 – B15, Location of Roost 1 (Common Pipistrelle), at the eaves of B15 (West elevation).

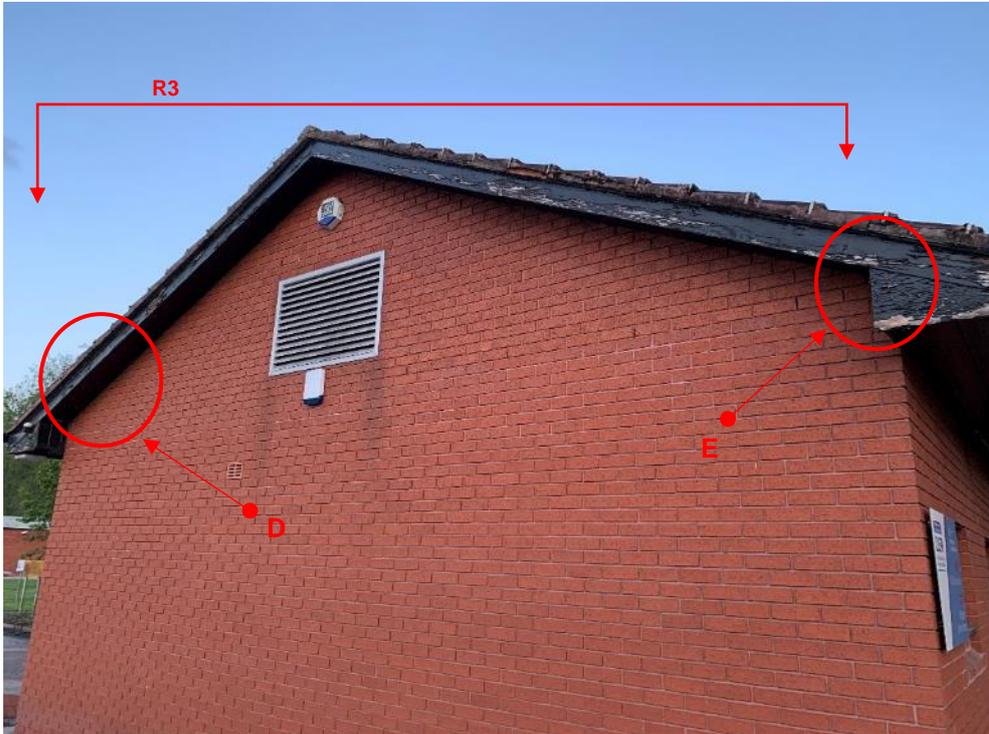


Photo 8 – B15, Location of Roost 3 (Common Pipistrelle), at the eaves of B15 (East elevation).



Photo 9 – B15, Location of Roost 2 (Common Pipistrelle), at the eaves of B15 (North elevation).

## Appendix 3 – Vantage Point Survey Results

### Building B15 – 22nd June 2021

**Survey site:** CGO001 Building B15

**Date:** 22/06/21

**Sunset:** 2145

**Start:** 2115

**End:** 2245

**Weather conditions:** dry, 0% cloud cover, BWS 0, start/end temp: 17°C

**Surveyors:** Karl Harrison (KH), Will Steele (WS)

**Equipment:** 2X Pettersson M500 & tablet

**Survey summary:** Previous emergence and re-entry surveys had shown that Building 15 contained a significant bat roost. A commuting survey was undertaken on 22nd June 2021 to establish the behaviour and direction of travel of bats after leaving the roost, and to identify important commuting routes for the bats at this site. About 180 Common Pipistrelles were observed emerging from their roost on the north gable end of Building 15, the vast majority of which flew around the west side of the building and headed south. A second surveyor watching from just south of the building recorded over 200 bats proceeding south, most of which were presumably those that had come out of the building, although a small number of additional bats following the same southward trajectory may have originated at different roost sites (either in the same building or elsewhere). Only a few bats were observed travelling north by either surveyor, including 2 that emerged from the same roost as the majority of southbound individuals. Accounting for a large overlap in the bats recorded by the two surveyors, approximately 230 bats were seen in total during the survey.

**Incidental observations:** None

**Survey constraints:** None

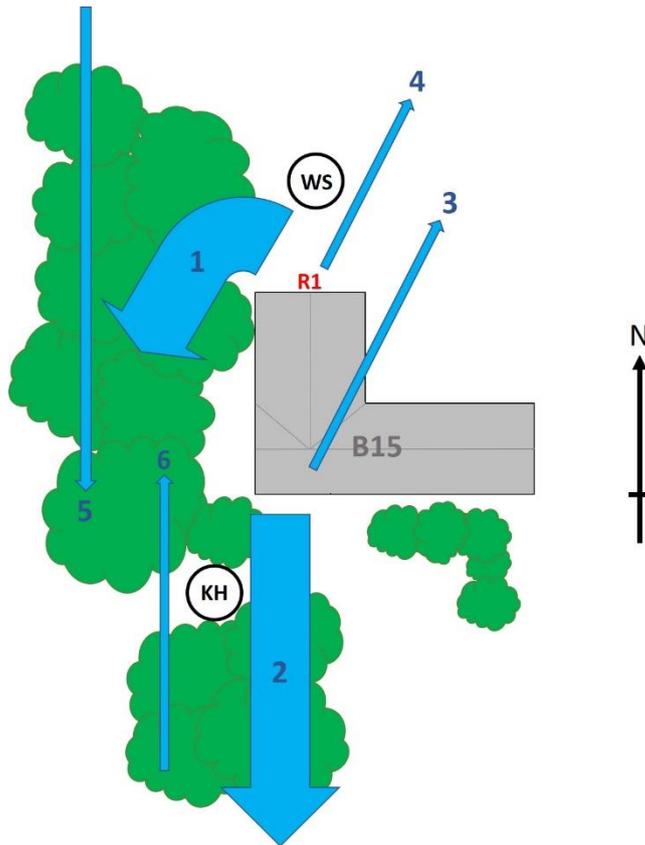
**Table 1 - All Bat Activity Recorded During Survey (B15) 22/06/2021. Refer to Fig. 1.**

Time (24 Hrs)	Surveyor <sup>1</sup>	Species <sup>2</sup>	No. bats	Bat Activity	Map Annotation
2130	KH	Ppip	1	Flew off to south	2
2131	KH	Ppip	1	Flew off to south	2
2141	KH	Ppip	2	Came out from north, flew off to south	2
2144	KH	Ppip	1	Flew off to south	2
2145	WS	Ppip	2	Emerged from R1 and flew south or into trees to W of building	1
2145	KH	Ppip	4	Flew off to south	2
2146	WS	Ppip	3	Emerged from R1 and flew south or into trees to W of building	1
2146	KH	Ppip	1	Flew off to south	2
2147	KH	Ppip	7	Flew off to south	2
2147	KH	Ppip	1	Flew south to north	6
2148	WS	Ppip	7	Emerged from R1 and flew south or into trees to W of building	1
2148	KH	Ppip	3	Flew off to south	2
2148	KH	Ppip	1	Flew north	6
2149-2218	WS	Ppip	167	Emerged from R1 and flew south or into trees to W of building	1
2149	KH	Ppip	1	Heard not seen	
2149	KH	Ppip	4	Flew off to south	2
2150	KH	Ppip	5	Flew off to south	2

<sup>1</sup> Will Steele (WS); Karl Harrison (KH);

<sup>2</sup> HNS - Heard not seen; Ppip - common pipistrelle (*Pipistrellus pipistrellus*)

Time (24 Hrs)	Surveyor <sup>1</sup>	Species <sup>2</sup>	No. bats	Bat Activity	Map Annotation
2151	KH	Ppip	14	Flew off to south	2
2152	KH	Ppip	5	Flew off to south	2
2153	KH	Ppip	6	Flew off to south	2
2154	KH	Ppip	4	Flew off to south	2
2155	KH	Ppip	14	Flew off to south	2
2156	KH	Ppip	21	Flew off to south	2
2157	KH	Ppip	17	Flew off to south	2
2158	KH	Ppip	8	Flew off to south	2
2158	KH	Ppip	1	HNS	
2159	KH	Ppip	5	Flew off to south	2
2200	KH	Ppip	6	Flew off to south	2
2200	KH	Ppip	1	Flew north	6
2201	KH	Ppip	11	Flew off to south	2
2202	KH	Ppip	9	Flew off to south	2
2203	KH	Ppip	6	Flew off to south	2
2203	KH	Ppip	1	Flew north	6
2204	KH	Ppip	2	Flew off to south	2
2205	KH	Ppip	13	Flew off to south	2
2205	WS	Ppip	1	Emerged from R1 and flew north	4
2206	KH	Ppip	7	Flew off to south	2
2207	KH	Ppip	6	Flew off to south	2
2207	WS	Ppip	1	Flew northeast over building	3
2207	WS	Ppip	1	Commuting south past building	5
2208	KH	Ppip	6	Flew off to south	2
2209	KH	Ppip	1	Flew off to south	2
2209	WS	Ppip	2	Emerged from behind fascia left of main roost	1
2210	KH	Ppip	5	Flew off to south	2
2214	KH	Ppip	5	Flew off to south	2
2214	KH	Ppip	1	Flew north	6
2215	KH	Ppip	2	Flew off to south	2
2215	KH	Ppip	1	Flew north	6
2215	KH	Ppip	2	HNS	
2215	WS	Ppip	1	Flew south past building	5
2217	KH	Ppip	1	Flew off to south	2
2217	KH	Ppip	2	HNS	
2217-2229	WS	Ppip	1	Foraging in trees to west of building	
2218	KH	Ppip	3	Flew off to south	2
2219	KH	Ppip	3	Flew off to south	2
2222	KH	Ppip	1	Over roof	
2225	KH	Ppip	2	Flew off to south	2
2225	KH	Ppip	1	Flew north	6
2228	KH	Ppip	1	Flew off to southwest	2
2229	KH	Ppip	1	Foraging overhead briefly	
2230	KH	Ppip	2	Flew off to south	2
2232	KH	Ppip	1	Flew off to south	2
2232	KH	Ppip	1	HNS	
2235	KH	Ppip	1	HNS	
2239	KH	Ppip	1	Flew off to south	2
2239	KH	Ppip	1	Flew north	6
2241	KH	Ppip	1	Flew off to south	2
2241	KH	Ppip	1	Flew north	6



**Figure 1.** Diagram of Building 15 including positions of surveyors (WS = Will Steele, KH = Karl Harrison) during the bat survey on 22/06/2021. R1 indicates the roost site in the building from which bats were seen emerging. Numbered blue arrows denote observed directions of bat travel, as referenced in Table 1. The broad arrows (1 and 2) represent the main trajectories observed being taken by bats.