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Heyford Park

Bat Baseline Report

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Contents

1 Introduction

Background to Commission

1.1 Dorchester Living Limited is bringing forward a proposal for the redevelopment of part of the former RAF Upper Heyford airfield and buildings. The boundary of this site (hereafter referred to as 'the Application Site') is shown in Figure 1.

1.2 In order to develop a baseline to inform the Ecological Impact Assessment which is to be carried out for this proposed development and reported on in the Ecology chapter of the Environmental Statement, BSG Ecology was commissioned in February 2017 to carry out a number of ecology surveys. These included a full suite of bat surveys.

Site description

1.3 The Application Site measures 455.5 ha located largely to the north of the town of Upper Heyford, Oxfordshire (Central grid reference SP514267). It comprises large areas of grassland habitats around an airfield with numerous hangars and other large buildings. Small woodland plots are present in isolation around the Application Site.

1.4 The Application Site is surrounded by agricultural land in the wider landscape, though the town of Upper Heyford borders much of the southern part of the Application Site.

Aims of study

1.5 The main aims of the study were to:

- identify levels of bat activity across the Application Site;
- identify if any buildings within the Application Site, that might be affected by the proposed development, support roosting bats; and
- confirm the location of any trees with bat roost potential within areas of the Application Site that might be affected by the proposed development.

Legislation

1.6 All UK bat species and their roosts are strictly protected under the provisions afforded to species listed on Schedule 5 of the 1981 Wildlife and Countryside Act (WCA) and Annex IV of the Habitats and Species Directive. Some species, such as brown long-eared *Plecotus auritus*, noctule *Nyctalus noctula*, and soprano pipistrelle *Pipistrellus pygmaeus*, are also Species of Principal Importance (SPIs) as defined under Section 41 of the NERC Act (2006). Further details about the relevant legislation and policy are given in Appendix 1.

2 Methods

Desk Study

2.1 As part of the baseline information gathering exercise, a desk study was carried out comprising a data search with the Thames Valley Environmental Records Centre (TVERC) for bat records at the Application Site or within 2km of its boundary.

2.2 Available interactive mapping[1] was consulted for contextual information relating to European Protected species licences pertaining to bats granted in the vicinity of Application Site. This information is given only at low resolution, however it provides useful contextual information.

Building Surveys

Daytime inspection

2.3 All buildings within the Application Site which are to be potentially affected by demolition or refurbishment were subject to day time inspections to assess their potential to support roosting bats. Daytime external surveys were carried out following a method which considered relevant industry standard guidance (Collins (ed.), 2016). The exterior of all buildings were searched from the ground using a high powered torch and close focusing binoculars (where necessary) for:

- Features which could provide bats with access into roosting spaces or provide roosting spaces (such as gaps under roofing tiles, gaps in ridge tiles, gaps in soffit boxes, gaps under lead flashing and cracks or crevices in the stonework); and
- Evidence of the presence of bats such as bat droppings on windows, windowsills, walls and the ground, or scratch marks or staining from bat's fur around possible roost access/egress points.

2.4 In some instances, internal inspections were also carried out where access was possible. In this case, similar notes to those listed above were made with regard to spaces available for use by bats (such as roof voids or cavities within the building).

2.5 Buildings were assigned a category for their potential for roosting bats according to factors such as roosting opportunities, features and habitat connectivity as summarised in Table 1. These categories also apply to the potential for bats to roost in trees and therefore described in combination here.

Table 1: Buildings and trees: suitability for roosting bats (adapted from Collins (2016))

Suitability	Description of roosting habitat
Negligible	Negligible habitat features likely to be used by roosting bats.
Low	A building or tree with one or more potential roost sites that could be used by individual bats opportunistically. Unlikely to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).
Moderate	A building or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

[1] MAGIC website maps. Accessed 12 September 2017.

2.6 The initial daytime inspections were carried out by Stephen Beal ACIEEM. Those buildings where suitable features were recorded were subject to a further visit by Helen Simmons ACIEEM (Natural England licence number 2015-10061-CLS-CLS).

Dusk emergence surveys

2.7 Where buildings were identified as having bat potential from the daytime inspection and to be potentially affected by the Proposed Development (demolition or refurbishment), dusk emergence / dawn re-entry surveys were used to confirm presence or likely absence of roosting bats. The buildings thus covered are shown in Figure 2.

2.8 In the case of Heyford Grange, though the buildings were assessed as between Negligible and Moderate suitability to support bats, further surveys were not carried out as this area is likely to be unaffected by the Proposed Development[2]. Where bats were present, these surveys also provided evidence to allow characterisation of the roost(s).

2.9 The survey effort employed followed a method which considered industry standard guidance (Collins, 2016) as summarised in Table 2.

Table 2: Recommended minimum survey effort for presence/absence surveys

Low roost suitability	Moderate roost suitability	High roost suitability
One survey visit. One dusk emergence or dawn re-entry survey.	Two separate survey visits. One dusk emergence and a separate dawn re-entry survey.	Three separate survey visits. At least one dusk emergence and a separate dawn re-entry survey. The third visit either dusk or dawn.

2.10 The emergence surveys were conducted by a range of experienced personnel. In each case, a licenced bat ecologist was present as well as experienced bat surveyors. The dusk surveys started 15 minutes before sunset and continued until 1.5 hours after sunset based on current industry standard guidance (Collins, 2016). Table 3 lists the buildings surveyed during 2017 together with survey dates, personnel initials and a summary of weather conditions.

2.11 Surveyors were equipped with frequency division (Batbox Duet) and full spectrum bat detectors (either AnaBat SD1 or Anabat Express), which allowed them to record bat calls for later analysis. Surveyors were positioned around the buildings so that all elevations and potential bat access points could be observed concurrently.

Table 4: Weather conditions and key personnel for emergence / re-entry surveys

Date	Building/s	Personnel	Weather[3]
12 July 2017	89a	Stephen Beal	Temperature: 14^{o}C. Cloud cover: 6/8. Calm. Dry.
1 August 2017	157	Karen Lunan and Sarah Joscelyne	Temperature: 16^{o}C. Cloud cover 6/8. Light breeze. Dry.
1 August 2017	171	Hannah Smith and Stephen Beal	Temperature: 13^{o}C. Cloud cover 8/8. Calm. Dry.
12 July 2017	357	Hannah Smith and Jessica Kent	Temperature: 16^{o}C. Cloud cover 7/8. Light breeze. Dry.
15 August 2017	370	Rosie Sparks and Stephen Beal	Temperature: 16^{o}C. Cloud cover 1/8. Light wind. Dry.

[2] As a precaution, avoidance measures will be included in the final design of the Proposed Development to avoid potential impacts.

[3] Wind strength is given in the Beaufort scale. This is an empirical measure that relates wind speed to observed conditions at sea or on land. Cloud cover is measured in oktas, ranging from 0 oktas (completely clear sky) through to 8 oktas (completely overcast).

Date	Building/s	Personnel	Weather[3]
15 August 2017	3204	Jessica Kent and Jamie Peacock	Temperature: 18°C. Cloud cover 1/8. Light wind. Dry.

Potential Roost Feature in trees survey

2.12 A ground based assessment was undertaken for all trees within the Application Site to identify any Potential Roost Features (PRF) in trees. The survey was carried out on 7 July 2017 by Stephen Beal. The surveys were undertaken during suitable (dry) weather conditions. During the survey, trees or groups of trees were assessed from the ground, using binoculars and a high-powered torch as necessary.

2.13 The following information was recorded for each tree deemed to have potential to support bats: tree species; description and aspect of PRF(s) such as woodpecker holes, rot holes, splits or cracks, dead limbs, ivy cover and/or flaking bark and trunk diameter at chest height.

2.14 The locations of the trees included in the assessment were mapped (Figure 2) and photographs were taken of suitable features. In addition, a search was made for evidence of the use of these features by bats, such as characteristic staining, scratch marks and droppings.

2.15 The Bat Conservation Trust (BCT) has developed a survey protocol (Collins, 2016) which categorises the potential for trees to support roosting bats. These are given in Table 1 above.

2.16 Subsequently, any trees which were identified as supporting PRFs were subject to a climbing inspection. This was carried out by Karl Lofthouse on 6 and 7 September 2017. The PRFs identified previously were inspected for signs of use and to gain a more accurate baseline of information as to their suitability for bats.

Bat activity transects

2.17 Bat activity transects were carried out following a method which considered the relevant industry standard guidance: Hundt (2012), Collins (2016) and Mitchell-Jones (2004). As a whole, the Application Site was treated as being of overall 'low' suitability for commuting and foraging bats. There are some areas (such as woodland plots) which may be of moderate value, however a large proportion of the Application Site supports open exposed grassland or relatively high ground, resulting in an overall low value for this species group. Therefore, based on industry guidance (Collins (ed), 2016), the Site was subject to three activity survey visits in May, July and September 2017.

2.18 During each visit, two transects (shown in Figure 3) were walked by pairs of surveyors. On each survey visit, the starting points and direction of travel (of the transect route) were changed to ensure that different parts of the Application Site were surveyed at different times of the night.

2.19 Surveys covered the bat emergence period and the period of most intense foraging activity when invertebrate prey is most abundant (Altringham, 2003), from up to 15 minutes before sunset until two hours after sunset. The transect routes were designed to sample habitat features identified on Site that may be used by bats. The focus of transects was to determine the location of areas of high bat activity, such as foraging areas and/or commuting routes. Surveys were undertaken on warm (sunset temperature >10 °C), still evenings, that provide optimal conditions for insect activity and subsequently bat foraging (wherever possible).

2.20 Bat activity was recorded using an AnaBat SD1 and / or EM3 full spectrum detectors. These automatically record all bat passes they detect, which significantly reduces the chances that bats could be missed due to human error. Wherever possible, surveyors recorded the observed behaviour and numbers of bats onto a standard field forms. This was to aid identification and also to provide additional detail on the behaviour of observed bats such as direction of flight and type of activity (e.g. foraging or commuting). Field notes included a record of the time of each bat encounter, allowing results to be cross-referenced with the recorded data.

2.21 Each transect was led by a licenced bat surveyor or an ecologist with at least two years of bat survey experience. Details of the walked transect surveys are summarised in Table 5.

Table 5 – Dates and weather conditions recorded during the bat activity transects.

Date (Sunset time)	**Transect**	**Personnel**	**Time**		**Rain**	**Cloud cover (Oktas 0-8)**	**Temperature**	**Wind (Beaufort scale)**
			Start	End				
25 May 2017 (21:07)	1	Sarah Joscelyne and Hannah Smith	21 :07	23:07	None	0	20	2 - 1
25 May 2017	2	Karen Lunan and Stuart Elsom	21 :07	23:07	None	0	20	2 - 1
19 July	1	Stephen Beal and Jamie Peacock			None	8		1
11 August 2017 (20:38)	2	Stephen Beal and Rosie Parks	20:38	22:55	None			
14 September 2017 (19:25)	1	John Baker and Gareth Clay	19:10	21:25	None	2	13	2-0
14 September 2017 (19:25)	2	Jamie Peacock and Rosie Sparks	19:10	21:25	None	2	13	2-0

Automated detectors

2.22 In addition to the transect surveys, automated detector surveys were conducted using Wildlife Acoustics Song Meter 2 (SM2) and Song Meter 4 (SM4) bat detectors. These detectors are full spectrum detectors that are triggered automatically to record bat echolocation calls. These detectors can be deployed and left to remotely record bat activity for a period of several nights.

2.23 Automated bat detectors were deployed in May, July and September at six pre-defined locations within the Application Site. The survey effort was determined with regard to industry standard guidance (Collins, 2016) which recommends that five nights of data per location should be obtained. Due to a malfunction with the equipment in September, only one night of data was gathered in September at Location 2, although five and seven nights of data were obtained from this location in May and July respectively. Therefore, a total of 13 nights of data were used to inform the baseline of bat activity in this area. For the remaining locations, a total of 17 nights of data were obtained, with the exception of Location 1 for which 16 were obtained.

2.24 The six locations were selected so as to provide adequate coverage of the entire area of the Application Site, and to reflect the main habitats present. These locations are described below and shown on Figure 3.

Limitations to methods

2.25 The lower survey effort at Location 2 (13 nights rather than 15 with only one in September) occurred as a result of technical issues with the detector. However, given that a total of 13 nights of data were obtained for this location already, it is considered that a robust baseline of information was thus gained and this is not a significant limitation to the study.

3 Results and Interpretation

Desk Study

3.1 TVERC returned 25 records of bats for the search area. The majority of these relate to an area north of Somerton (1.4 km northwest of the Application Site). The species recorded in that area included common pipistrelle *Pipistrellus pipistrellus,* soprano pipistrelle, brown long-eared bat and noctule. One record of common pipistrelle was however received from adjacent to the western boundary of the Application Site.

3.2 The desk study using available online interactive mapping revealed that two licences have been granted pertaining to the ongoing redevelopment of the areas south of Camp Road. These covered the removal of resting places of brown long-eared bat, common and soprano pipistrelle and Natterer's bat *Myotis nattereri* and the removal of breeding places of brown long-eared and common pipistrelle. They covered the period between 2013 and 2021 and 2013 and 2016 respectively. A third licence was granted on 2013 and is now expired for the removal of resting places of common and soprano pipistrelle and brown long-eared bats in an area approximately 900 m to the south of the Application Site.

Field Survey

Building daytime inspections

3.3 The daytime inspection of the buildings within the Application Site highlighted a total of five buildings which were assessed as having low suitability to support roosting bats. The buildings at Heyford Grange also supported a number of features suitable for bats. The building reference numbers (as shown in Figure 2) and the features noted are given in Table 6.

Table 6 – Results of the daytime building inspections.

Building Reference	Description of features	Suitability
89a	Some potential roost features noted associated with soffits and ridge tiles. The building is connected to a line of trees, however there is low level lighting present in the area.	Low.
157	Potential access to roost features was noted associated with facia boarding and gaps at the eaves. It is poorly connected, with trees on one side only and artificial lighting is present.	Low.
171	Potential features identified included a hole in the wall on the western aspect and a hole in a door and window on the eastern side. This building is however poorly connected.	Low.
357	Potential access to features noted associated with soffit boxes on the northern and southern sides. An open window on the northern aspect and a hole in a wall on the southern aspect were also recorded. This building is poorly connected and artificial lighting is present.	Low

370	Suitable features associated with two towers were noted. Only moderately well connected to suitable habitats.	Low
3204	This building was found to support open eaves and was moderately well connected to suitable connective habitat. A single bat dropping was found in the loft, though a complete inspection was not possible due to access constraints.	Low
Heyford Grange	Heyford Grange was found to support a number of suitable roost features including missing or slipped roof tiles, gaps at the eaves and soffit boxes, and gaps in the wooden cladding.	Medium to Low (depending on buildings)

3.4 On this basis, Buildings 89, 157, 171, 357, 370 and 3204 were subject to further surveys in the form of dusk emergence or dawn re-entry surveys. Building 3204 may have been used at very low levels in the past, but given the results of the 2017 emergence surveys revealed that it is not currently in use.

3.5 The remainder were assessed as having negligible potential to support roosting bats and therefore not considered for further assessment.

Dusk emergence

3.6 During the dusk emergence surveys of the buildings targeted for further surveys, no emergence by bats was recorded.

3.7 It is therefore concluded that these buildings are not used or used only very sporadically by bats.

Tree surveys

Ground level assessment

3.8 Of the trees inspected during the ground-level tree inspection, nine individual trees were assessed as being of low/moderate or moderate suitability to support bats. A further four trees were assessed as having low potential to support roosting bats. Table 7 summarises the PRFs observed and the locations of these are shown on Figure 2.

Table 7 – Results of the ground level tree inspections.

Building Reference	**Description of features**	**Suitability**
T2	Large ash *Fraxinus excelsior*, with a woodpecker hole at 3 m of height, a rot hole at 3 m of height, a rotten/broken branch at 3.5 m of height, and a rot hole at 2.5 m of height.	Moderate
T2a	Large ash adjacent to T2 which supports a number of suitable features similar to T2.	Moderate
T9	A beech *Fagus sylvatica* with a rot hole at 3 m of height and ivy *Hedera helix* coverage on the lower half.	Low

T10	A Scot's pine *Pinus sylvestris* with ivy growth on southern side which offers suitable crevices.	Low
T13	An ash with a rot hole at 3 - 4 m of height.	Low / Moderate
T16	An ash with a possible cavity where a branch has become detached.	Low
T17	An ash with a possible cavity where a branch has become detached.	Low
T20	An ash with a woodpecker cavity of unknown depth.	Low / Moderate
T21	An ash with a cavity where a branch has become detached.	Low / Moderate
G9	A sycamore *Acer pseudoplatanus* with a rot hole with further signs of woodpecker damage.	Low
T22	A poplar *Populus* sp. with two woodpecker holes at 4 m of height and a further woodpecker hole at 10 m of height.	Moderate
T23	A poplar with a woodpecker hole at 10 m of height.	Low / Moderate
T24	A sycamore with a rot hole at 2 m of height.	Low / Moderate

PRF inspection

3.9 The aerial inspection of the PRFs allowed certain features identified above to be inspected in more detail. All trees other than G9 and T10 were climbed. Table 8 below summarises the findings in relation to the trees as identified in Table 7.

Table 8 – Results of the aerial tree inspections.

Building Reference	**Description of features**	**Revised Suitability**
T2 and T2a	Access not possible so assessment unchanged.	Moderate
T9	The rot hole at 3 m of height is approximately 10 cm wide and has a 20 cm rise, increasing its potential as a roosting location	Moderate
T13	A cavity is present in the stem at 3 m which is 10 x 5 cm in size. Ivy partially obscuring entrance of this 15 cm deep hole. A small cavity/area present above and behind the callous roll. This feature increases the potential for roosting. Three other potential features where recorded, however these were found to not be suitable on closer inspection: • A cavity in the main stem at 5 m of height, but this	Moderate

	is a decaying old branch stub, no real feature present. • A longitudinal branch split at 5 m. This is 1.2 m long on the top side of the branch, but no real feature present. • A stem cavity at 10 m at the location of a decaying old branch stub.	
T16	Cavity and woodpecker holes at 10 m on southernmost limb. There are staggered holes 10 cm apart on opposite sides of the branch into the features. The cavity is approximately 60 cm deep with an old birds nest found at the base. These features increase the roosting potential of this tree.	Moderate
T17	A branch cavity is present at 6 m on the southwestern aspect. This is 10 x 5 cm in size and 10cm deep with a 10cm rise. Two other potential features present were not thought to be suitable on closer inspection (A branch failure/stub at 5 m and a branch failure/stub). No change to the assessment required.	Low
T20	A stem cavity with woodpecker hole present at 5 m on the southern aspect. This is 5 x 5 cm in size and 12 cm deep, It is horizontal and dry, with no rise/fall present. This reduces the potential for roosting.	Low
T21	A stem cavity with woodpecker holes is present at 9 m on the eastern aspect, with two staggered holes (both about 7 x 7 cm) are present 30 cm apart on opposite sides of the branch. The cavity rises above the highest hole and polished edges were observed. A small area of woodpecker activity can be seen approx. 30cm above the highest hole – suggesting the internal decay (and potentially the cavity) rises considerably. This increases the potential for roosting.	High
T22	Three features were found: a stem cavity at 5 m on the eastern aspect, which was 15cm deep with a 10 cm fall, a stem cavity at 5.5 m on the eastern aspect which was 5cm deep with no rise and a stem cavity at 8 m on the northern aspect which was horizontal and 7 cm deep but filled with woodlice. This reduces the potential for roosting.	Low
T23	A stem cavity at 12 m was recorded. This whole stem is hollow with an active bird nest within it. The opening is very large (30 x 50 cm) and the cavity is very open and draughty, reducing its potential as a roosting site	Low
T24	Stem cavity at 2.5 m in height. This is 10 x 10 cm with a slight cavity behind the callous roll but was slug and cobweb filled, reducing the potential for roosting.	Low

3.10 The final assessment of the trees is that five have been assessed as being of moderate suitability to support bats roosts, and one has been assessed as being of high suitability. However, despite close inspection from climbing surveys no evidence of use was recorded and none of the trees are

confirmed as roost sites. The remaining trees within the Application Site are either low (six) or of negligible suitability to support roosting bats.

3.11 Although no roosts have been confirmed, trees with moderate or high roosting potential may be used by low numbers of bats from time to time and roosting cannot be discounted. However, given the location of these trees within an area where the activity surveys have only recorded common and widespread species and that the dominant habitats within the Application Site are of low suitability for foraging, it is considered that if used by bats, the trees would most likely be used by small numbers of fairly widespread and common species. It is also likely that these would be mostly light-tolerant species given the presence of artificial light in most areas of the Application Site. As such, the assessment of these trees as bat roosts should be kept under review so that prior to felling or tree management works an up to date assessment of use and the need for licences and mitigation measures is determined. The further assessment should be carried out with consideration of current guidance at the time of the surveys.

Incidental observations

3.12 During the surveys to the Application Site, a Schwegler 1FW Bat Hibernation Box was noted in a large sycamore near the Location 3. This appeared to be of recent origin, potentially part of mitigation works associated with the licensed activities in this area. Due to the timing constraints, no checks of the levels of use in winter of this box have been completed. This would be necessary to accurately determine its likely value. Given its likely inclusion in the EPSM licence for the development site nearby to the west, it may already be monitored regularly, and therefore the information can be gained via desk study in future.

Bat activity surveys

3.13 A very limited number of bat passes were recorded on Transect 1. In May, a total of three passes by common pipistrelle were recorded. Five common pipistrelle passes and a single noctule pass were recorded during the July visit. In September the only observation was of one common pipistrelle foraging in a more sheltered area on the southern section of the transect route. The activity recorded on this transect route overall was mostly concentrated in the vicinity of the south-eastern corner of the area covered, adjacent to Chilgrove Drive. In terms of timings, the earliest registrations on Transect 1 were of common pipistrelles at 45 minutes after sunset.

3.14 Slightly higher levels of activity were recorded on Transect 2 in May compared to Transect 1, with ten common pipistrelle passes recorded, including multiple individuals foraging at the same location. This was around the eastern end of the area being surveyed. At least one noctule was recorded foraging in this same area. A Leisler's bat *Nyctalus leisleri* was also recorded later during this visit, just to the south. The August visit recorded similar levels of activity. The species recorded were mainly common pipistrelle, though a small number of soprano pipistrelles were recorded and a possible serotine *Eptesicus serotinus*. During the September survey, a total of five common pipistrelle registrations were made. All these were thought to be foraging, with registrations mainly around the central part of the area covered by the transect. A possible soprano pipistrelle was also recorded foraging. The earliest registration on Transect 2 was of a common pipistrelle during the September visit recorded 25 minutes after sunset. The earliest registrations during the previous two transects were much later (42 minutes after sunset).

3.15 The results above would suggest that the Application Site supports very few foraging bats of largely widespread species. Very few early registrations were made (i.e. those that might suggest a roost is present in the vicinity of the transects) other than in September on Transect 2. It is likely therefore, as reflected by the assessments of the roosting potential of the Application Site, that very few if any, roosts are present in the vicinity.

Automated detectors

May

3.16 The findings of the May deployment period are summarised in Tables 9 and 10 included in Appendix 1. These set out the number of passes for each species recorded at each detector location and the period of the night during which the passes for each species were recorded. These data show that the species for which most passes were recorded in May was common pipistrelle, with the highest number of passes at Locations 3 and 6. The next most numerous species in terms of passes recorded was noctule. These peaked at 863 passes at Location 2. The numbers of noctule passes at the other locations were lower compared to this, but Locations 3 to 6 are also suggestive of relatively high usage compared to rest of the Application Site. A number of passes of this species, mostly from Location 2, were also recorded during the early night period (within 20 minutes of sunset), suggesting the presence of a roost in the vicinity. A single soprano pipistrelle pass was also recorded 15 minutes after sunrise, suggesting a very late returning individual. Other species recorded included a small number of passes by brown long-eared bat, serotine *Eptesicus serotinus*, and a single pass by barbastelle bat *Barbastella barbastellus*.

July

3.17 The data gathered from the July deployment are summarised in Table 11 and 12. This differs slightly from the May findings with far fewer noctule passes (a total of 188 at all locations). These peaked at Location 4 with 60 passes. The most numerous species was again common pipistrelle, with a peak of 783 passes at Location 5 and 713 at Location 6. This location also had the highest number of soprano pipistrelle passes. In terms of early or late recordings during the night, again several early and late passes were recorded for noctule (within 20 minutes of sunset). One pass which could not be attributed with certainty to common or soprano pipistrelle was recorded 19 minutes before sunset.

September

3.18 The September data is summarised in Tables 13 and 14. The vast majority of the passes recorded in September were of common pipistrelle (89% of total passes). These included 87 passes which were recorded during the period between sunset and 20 minutes after sunrise. However of these 51 were on the same night at Location 3 all recorded within a 7 minute period and a further 23 were on the same night at Location 4 all within an 8 minute period, suggesting that they originate from a single or small number of individuals foraging in the vicinity of the detector, rather than regular dispersal from a nearby roost. A total of 21 barbastelle passes were recorded from two locations which are close to each other at the south-east end of the Application Site: 13 from Location 4 and eight from Location 6. Ten of these passes occurred on the 12 September during the middle period of the night. None of the recordings from one location was simultaneous to those at the other location, suggesting this area is used by a very small number or a single individual of the species opportunistically.

Overview

3.19 Overall, the static detectors have revealed that the highest levels of activity have been recorded from Location 6, accounting for 6,095 of the 14,291 passes detected. Common pipistrelle accounted for 4,982 of these passes and soprano pipistrelle for a further 733 passes. Eight barbastelle passes were also recorded from this location. This number of passes by all species suggests that the hedgerow along which this detector is deployed may form an important linear feature connecting the eastern edge of the Application Site and the woodland to the southeast of the junction of Camp Road and Chilgrove Drive and habitats in the wider area.

3.20 Given the relatively low number of passes recorded at Location 5 overall, it is possible that bats use the Chilgrove Drive linear feature for foraging and then proceed or arrive from the linear features formed by plantation woodland blocks along the eastern edge of the Application Site or continue onto the habitats associated with the off site ponds at Letchmere Farm. This is in part supported by the numbers of passes recorded at Location 4 (almost twice as many as from

Location 5). A total of 2,113 passes were recorded from this location, including 1,381 common pipistrelle passes, 271 noctule passes, 135 passes by Myotis species and 13 passes by barbastelle.

3.21 Location 3 accounted for a further 3,419 passes. Of these 3,023 were of common pipistrelle. The number of noctule passes (222) at this location also contributed to the total. Therefore, despite the habitats in the vicinity being dominated by arable and recent residential development, this location is also likely to be relatively important in the context of the Application Site.

3.22 With regard to individual species, common pipistrelle, as noted above, accounted for the highest number of species overall (75% of passes). This reflects the species' status (widespread and common) as well as its wide range of habitat preferences.

3.23 The next highest number of passes was from noctule: 1,698 passes. Of these 878 were from Location 2. The majority of the passes of this species were recorded in May (1,459), suggesting the Application Site, and especially Location 2 (which accounted for 863 of the May passes) is used primarily during the early part of the season, which either reflects a seasonally available prey resource or the distribution of the species at this time.

3.24 Soprano pipistrelle accounted for 991 passes with 733 from Location 6. Overall Myotis species were recorded frequently but in relatively low numbers (227 passes). Long-eared bats were even less frequent with 58 definite passes through the survey period. These were largely from Locations 5 and 6, reflecting the species' preference for darker areas and low tolerance of artificial light.

4 References

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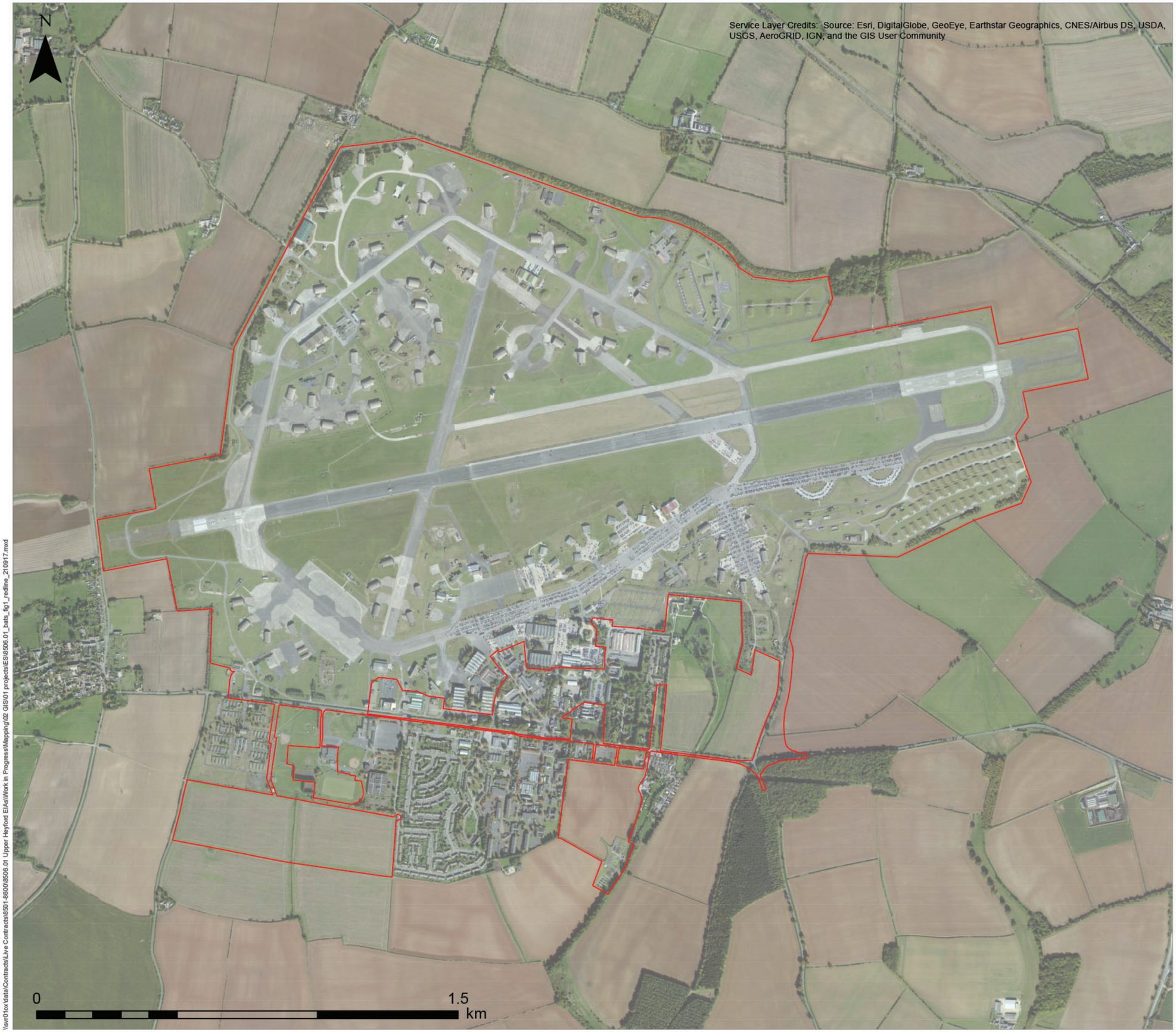
5 Figures

(overleaf)



LEGEND

Application Site

\\svr01ox\data\Contracts\Live Contracts\8501-8600\8506.01 Upper Heyford EIA\sWork in Progress\Mapping\02 GIS\01 projects\ES\8506.01_bats_fig1_redline_210917.mxd

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JOB REF: 8506.01

PROJECT TITLE

HEYFORD PARK

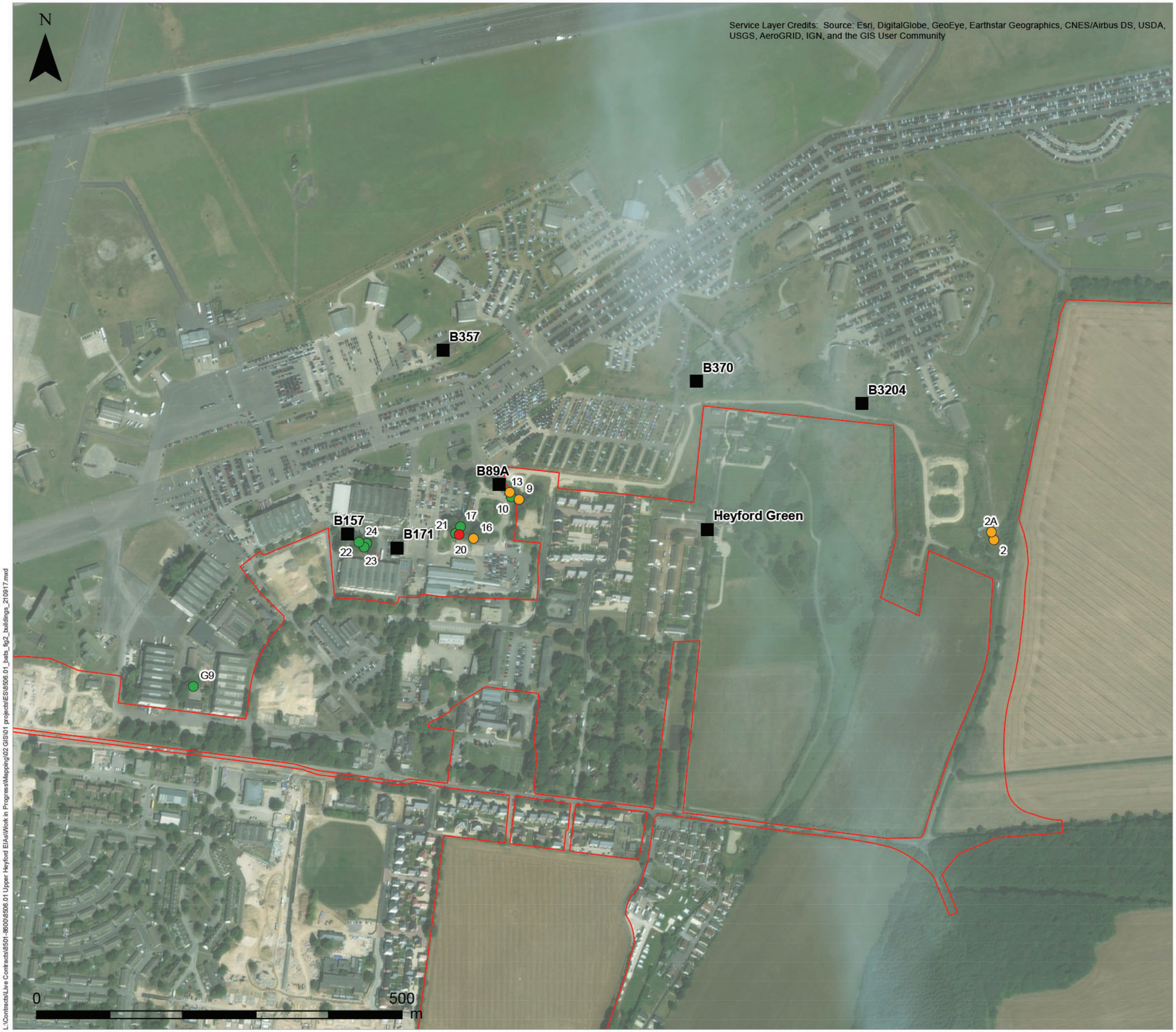
DRAWING TITLE

Figure 1: Application Site boundary

DATE: 25.09.2017 CHECKED: JB SCALE: 1:13,000

DRAWN: COH APPROVED: PS STATUS: FINAL

Sources: BSG Ecology survey data



LEGEND

- Application Site
- Building with potential to support roosting bats

Trees with potential to support roosting bats

- High suitability
- Moderate suitability
- Low / moderate suitability
- Low suitability

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PROJECT TITLE

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DRAWING TITLE

Figure 2: Buildings and trees with potential roost features

DATE: 09.10.2017 CHECKED: JB SCALE: 1:5,000

DRAWN: COH APPROVED: PS STATUS: FINAL

Sources: BSG Ecology survey data

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LEGEND

- Application Site
- Route of walked bat transect
- Location of static bat detector

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PROJECT TITLE

HEYFORD PARK

DRAWING TITLE

Figure 3: Bat transect routes and static locations

DATE: 21.09.2017 CHECKED: JB SCALE: 1:8,000

DRAWN: COH APPROVED: PS STATUS: FINAL

Sources: BSG Ecology survey data

\\svr01ox\data\Contracts\Live Contracts\8501-860\08506.01 Upper Heyford EIAs\Work in Progress\Mapping\02 GIS\01 projects\ES\8506.01_bats_fig3_transects_210917.mxd

Appendix 1: Summaries of Relevant Policy, Legislation and Other Instruments

This section briefly summarises the legislation, policy and related issues that are relevant to the main text of the report. The following text does not constitute legal or planning advice.

National Planning Policy Framework (England)

5.1 The Government published the National Planning Policy Framework (NPPF) on 27th March 2012. Text excerpts from the NPPF are shown where they may be relevant to planning applications and biodiversity including protected sites, habitats and species.

5.2 In conserving and enhancing the natural environment, the NPPF (Paragraph 109) states that 'the planning system should contribute to and enhance the natural and local environment' by:

a. Recognising the wider benefits of ecosystem services;

b. Minimising impacts on biodiversity and providing net gains in biodiversity, where possible contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;

c. Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability.

5.3 In paragraph 111, the NPPF refers to brownfield land as follows: 'planning policies and decisions should encourage the effective use of land by re-using land that has been previously developed (brownfield land), provided that it is not of high environmental value.'

5.4 Paragraph 117 refers to how planning policies should aim to minimise impacts on biodiversity, to: 'identify and map components of the local ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity, wildlife corridors and stepping stones that connect them and areas identified by local partnerships for habitat restoration or creation;' and to 'promote the preservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species populations, linked to national and local targets, and identify suitable indicators for monitoring biodiversity in the plan.'

5.5 Paragraph 118 of the National Planning Policy Framework advises how, when determining planning applications, local planning authorities should aim to conserve and enhance biodiversity by applying the mitigation hierarchy. The mitigation hierarchy advises that if significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused.

5.6 Where proposals or activities require planning permission, the NPPF states that '…local planning authorities should aim to conserve and enhance biodiversity by applying the following principles:

d. Proposed development on land within or outside a Site of Special Scientific Interest likely to have an adverse effect on a Site of Special Scientific Interest (either individually or in combination with other developments) should not normally be permitted. Where an adverse effect on the site's notified special interest features is likely, an exception should only be made where the benefits of the development, at this site, clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of Sites of Special Scientific Interest;

e. Development proposals where the primary objective is to conserve or enhance biodiversity should be permitted;

f. Opportunities to incorporate biodiversity in and around developments should be encouraged;

g. Planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss; and

h. The following wildlife sites should be given the same protection as European sites:

i. potential Special Protection Areas and possible Special Areas of Conservation

ii. listed or proposed Ramsar sites; and

iii. sites identified, or required, as compensatory measures for adverse effects on European sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.'

5.7 In respect of protected sites, the NPPF requires local planning authorities to make 'distinctions…between the hierarchy of international, national and locally designated sites so that protection is commensurate with their status and gives appropriate weight to their importance and the contribution that they make to wider ecological networks.'

5.8 In paragraph 125 the NPPF states that 'by encouraging good design, planning policies and decisions should limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.' This applies to protected species that are a material consideration in the planning process including bats and may also apply to other light sensitive species.

Government Circular ODPM 06/2005 Biodiversity and Geological Conservation (England only)

5.9 Paragraph 98 of Government Circular 06/2005 advises that "the presence of a protected species is a material consideration when a planning authority is considering a development proposal that, if carried out, would be likely to result in harm to the species or its habitat. Local authorities should consult Natural England before granting planning permission. They should consider attaching appropriate planning conditions or entering into planning obligations under which the developer would take steps to secure the long-term protection of the species. They should also advise developers that they must comply with any statutory species' protection provisions affecting the site concerned..."

5.10 Paragraph 99 of Government Circular 06/2005[4] advises that "it is essential that the presence or otherwise of protected species, and the extent that they may be affected by the proposed development, is established before the planning permission is granted, otherwise all relevant material considerations may not have been addressed in making the decision. The need to ensure ecological surveys are carried out should therefore only be left to coverage under planning conditions in exceptional circumstances, with the result that the surveys are carried out after planning permission has been granted".

Standing Advice (GOV.UK - England only)

5.11 The GOV.UK website provides information regarding protected species and sites in relation to development proposals: 'Local planning authorities should take advice from Natural England or the Environment Agency about planning applications for developments that may affect protected species.' GOV.UK advises that 'some species have standing advice which you can use to help with planning decisions. For others you should contact Natural England or the Environment Agency for an individual response.'

[4] *ODPM Circular 06/2005. Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impacts within the Planning System* (2005). HMSO Norwich.

5.12 The standing advice (originally from Natural England and now held and updated on GOV.UK[5]) provides advice to planners on deciding if there is a 'reasonable likelihood' of protected species being present. It also provides advice on survey and mitigation requirements.

5.13 When determining an application for development that is covered by standing advice, in accordance with guidance in Government Circular 06/2005, Local planning authorities are required to take the standing advice into account. In paragraph 82 of the aforementioned Circular, it is stated that: 'The standing advice will be a material consideration in the determination of the planning application in the same way as any advice received from a statutory consultee…it is up to the planning authority to decide the weight to be attached to the standing advice, in the same way as it would decide the weight to be attached to a response from a statutory consultee.'

Natural Environment and Rural Communities (NERC) Act 2006 – Habitats and species of principal importance (England)

5.14 The Natural Environment and Rural Communities (NERC) Act came into force on 1st October 2006. Sections 41 (S41) of the Act require the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. The list has been drawn up in consultation with Natural England as required by the Act. In accordance with the Act the Secretary of State keeps this list under review and will publish a revised list if necessary, in consultation with Natural England.

5.15 The S41 list is used to guide decision-makers such as public bodies, including local authorities and utilities companies, in implementing their duty under Section 40 of the NERC Act 2006, to have regard to the conservation of biodiversity in England, when carrying out their normal functions, including development control and planning. This is commonly referred to as the 'Biodiversity Duty.'

5.16 Guidance for public authorities on implementing the Biodiversity Duty[6] has been published by Defra. One of the key messages in this document is that 'conserving biodiversity includes restoring and enhancing species populations and habitats, as well as protecting them.' In England the administration of the planning system and licensing schemes are highlighted as having a 'profound influence on biodiversity conservation.' Local authorities are required to take measures to "promote the preservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species. The guidance states that 'the duty aims to raise the profile and visibility of biodiversity, clarify existing commitments with regard to biodiversity, and to make it a natural and integral part of policy and decision making.'

5.17 In 2007, the UK Biodiversity Action Plan (BAP) Partnership published an updated list of priority UK species and habitats covering terrestrial, freshwater and marine biodiversity to focus conservation action for rarer species and habitats in the UK. The UK Post-2010 Biodiversity Framework[7], which covers the period from 2011 to 2020, now succeeds the UK BAP. The UK priority list contained 1150 species and 65 habitats requiring special protection and has been used as a reference to draw up the lists of species and habitats of principal importance in England.

5.18 In England, there are 56 habitats of principal importance and 943 species of principal importance on the S41 list. These are all the habitats and species found in England that were identified as requiring action in the UK BAP and which continue to be regarded as conservation priorities in the subsequent UK Post-2010 Biodiversity Framework.

European protected species (Animals)

5.19 The Conservation of Habitats and Species Regulations 2010 (as amended) consolidates the various amendments that have been made to the original (1994) Regulations which transposed the EC Habitats Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Council Directive 92/43/EEC) into national law.

[5] https://www.gov.uk/protected-species-and-sites-how-to-review-planning-proposals#standing-advice-for-protected-species
[6] Defra, 2007. *Guidance for Public Authorities on Implementing The Biodiversity Duty*. (http://www.defra.gov.uk/publications/files/pb12585-pa-guid-english-070516.pdf)
[7] JNCC and Defra (on behalf of the Four Countries' Biodiversity Group). 2012. *UK Post-2010 Biodiversity Framework*. July 2012. (http://jncc.defra.gov.uk/page-6189)

5.20 "European protected species" (EPS) of animal are those which are present on Schedule 2 of the Conservation of Habitats and Species Regulations 2010 (as amended). They are subject to the provisions of Regulation 41 of those Regulations. All EPS are also protected under the Wildlife and Countryside Act 1981 (as amended). Taken together, these pieces of legislation make it an offence to:

a. Intentionally or deliberately capture, injure or kill any wild animal included amongst these species

b. Possess or control any live or dead specimens or any part of, or anything derived from a these species

c. deliberately disturb wild animals of any such species

d. deliberately take or destroy the eggs of such an animal, or

e. intentionally, deliberately or recklessly damage or destroy a breeding site or resting place of such an animal, or obstruct access to such a place

5.21 For the purposes of paragraph (c), disturbance of animals includes in particular any disturbance which is likely—

a. to impair their ability—

i. to survive, to breed or reproduce, or to rear or nurture their young, or

ii. in the case of animals of a hibernating or migratory species, to hibernate or migrate; or

b. to affect significantly the local distribution or abundance of the species to which they belong.

5.22 Although the law provides strict protection to these species, it also allows this protection to be set aside (derogated) through the issuing of licences. The licences in England are currently determined by Natural England (NE) for development works and by Natural Resources Wales in Wales. In accordance with the requirements of the Regulations (2010), a licence can only be issued where the following requirements are satisfied:

a. The proposal is necessary 'to preserve public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment'

b. 'There is no satisfactory alternative'

c. The proposals 'will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

Definition of breeding sites and resting places

5.23 Guidance for all European Protected Species of animal, including bats and great crested newt, regarding the definition of breeding and of breeding and resting places is provided by The European Council (EC) which has prepared specific guidance in respect of the interpretation of various Articles of the EC Habitats Directive.[8] Section II.3.4.b) provides definitions and examples of both breeding and resting places at paragraphs 57 and 59 respectively. This guidance states that 'The provision in Article 12(1)(d) [of the EC Habitats Directive] should therefore be understood as aiming to safeguard the ecological functionality of breeding sites and resting places.' Further the guidance states: 'It thus follows from Article 12(1)(d) that such breeding sites and resting places also need to be protected when they are not being used, but where there is a reasonably high probability that the species concerned will return to these sites and places. If for example a certain cave is used every year by a number of bats for hibernation (because the species has the habit of returning to the same winter roost every year), the functionality of this cave as a hibernating site should be protected in summer as well so that the bats can re-use it in winter. On the other hand, if a certain cave is used only occasionally for breeding or resting purposes, it is very likely that the site does not qualify as a breeding site or resting place.'

[8] Guidance document on the strict protection of animal species of Community interest under the Habitats Directive 92/43/EEC. (February 2007), EC.

Appendix 2: Activity survey data tables.

Table 9 – Bat passes per species and location - May.

Species	Location						
	1	**2**	**3**	**4**	**5**	**6**	**Total**
Barbastelle bat	1						**1**
Common pipistrelle	155	5	1197	300	201	2587	**4445**
Leisler's bat		5	3	5	1	3	**17**
Long eared bat sp.		4		1		6	**11**
Nathusius' pipistrelle						4	**4**
Noctule	10	863	188	196	124	78	**1459**
Serotine		1			1		**2**
Serotine / Nyctalus sp.				19	4	1	**24**
Soprano pipistrelle	6	1	79	29		577	**692**
Common / soprano pipistrelle	31		7	6	3	18	**65**
Myotis sp.	12		3	17		7	**39**
Nyctalus species	1	3	3	36	14	19	**76**
Common /	3		2	3		10	**18**

Nathusius pipistrelle							
Brown long eared / Nyctalus sp.				1	1		**2**
Grand Total	**219**	**882**	**1482**	**613**	**349**	**3310**	**6855**

Table 10. Bat passes per night period – May

Species	**Time period**													
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
Barbastelle bat								1						
Leisler's bat					2	8	1			1	3	1		1
Long eared bat sp.					1	1	1	2		1	5			
Nathusius' pipistrelle						1	2	1						
Noctule		7	89	116	193	71	26	124	34	66	299	358	75	1
Serotine							1				1			
Serotine / Nyctalus sp.				1	2	8	3	7	1		2			
Soprano pipistrelle	1		3	9	14	9	1	484	17	44	95	14	1	
Common / soprano pipistrelle		1	2	11	5	2	1	28	3		6	5	1	
Myotis sp.				6	5		2	21		2	1	2		
Nyctalus species			1	2	11	9	4	39	3	2	1		2	2
Common / Nathusius pipistrelle						1	4	9	4					

Brown long eared / Nyctalus sp.								2						
Grand Total		**16**	**152**	**313**	**330**	**156**	**218**	**3584**	**296**	**377**	**710**	**578**	**120**	**4**

Table 11 – Bat passes per species and location - July

Species	**Location**						
	1	**2**	**3**	**4**	**5**	**6**	**Total**
Common pipistrelle	225	11	224	409	783	713	**2365**
Leisler's bat	1	1		2	1		**5**
Long eared bat sp.	9		8	1	11	7	**36**
Myotis species	7	3	8	24	4	15	**61**
Noctule	4	9	29	60	46	40	**188**
Serotine	1			2		1	**4**
Serotine / Nyctalus sp.						1	**1**
Soprano pipistrelle	11	1	25	42	4	132	**215**
Common / soprano pipistrelle	9		3	21	12	12	**57**
Nyctalus sp.	1	5	6	18	14	23	**67**
Common / Nathusius' pipistrelle	1			2			**3**
Brown long eared /					1		**1**

Nyctalus sp.							
Grand Total	**269**	**30**	**303**	**581**	**876**	**944**	**3003**

Table 12. Bat passes per night period – July

Species	**Time period**													
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
Common pipistrelle		3	78	105	170	261	261	1151	86	88	74	63	24	1
Leisler's bat				1	1			3						
Long eared bat sp.					2	1	5	25	2	1				
Myotis species			1	8	1	2	2	34	3	3	5	2		
Noctule		5	48	19	31	27	11	37	1	4			4	1
Serotine						1	1	2						
Serotine / Nyctalus sp.						1								
Soprano pipistrelle		1	10	9	9	19	2	138	4	5	6	6	6	
Common / soprano pipistrelle	1		3	9	8	4	5	15	2	1	2	5	2	
Nyctalus sp.		1	1	3	7	16	4	27	3	3	2			
Common / Nathusius' pipistrelle						1		2						
Brown long eared / Nyctalus sp.								1						

Grand Total	**1**	**10**	**141**	**154**	**229**	**333**	**291**	**1435**	**101**	**105**	**89**	**76**	**36**	**2**

Table 13 – Bat passes per species and location - September

Species	**Location**						
	1	**2**[9]	**3**	**4**	**5**	**6**	**Total**
Common pipistrelle	1	6	1602	672	6	1682	**3969**
Myotis species	1		11	93		21	**126**
Noctule	8	6	5	15	7	10	**51**
P-50			1	75		84	**160**
(blank)							
Soprano pipistrelle			15	44	1	24	**84**
Long-eared species				1	4	6	**11**
Serotine				3	1		**4**
Barbastelle				13		8	**21**
Noctule or Leisler's				3	2	2	**7**
Long-eared or Myotis species				2		2	**4**
Grand Total	**10**	**12**	**1634**	**921**	**21**	**1839**	**4437**

[9] One night of data only

Table 14. Bat passes per night period – September

Species	**Time period**													
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
Common pipistrelle		87	458	415	406	322	361	1795	4	5	46	51	19	
Myotis species			17	10	4	13	6	37	5	7	10	17		
Noctule		19	7	11	2			10		2				
P-50		13	19	35	7	44	4	31		1	3	2	1	
(blank)														
Soprano pipistrelle		13	13	15	4	6	4	17			4	2	6	
Long-eared species				2	1	1		7						
Serotine				2				2						
Barbastelle							1	20						
Noctule or Leisler's			1	1				5						
Long-eared or Myotis species					1			3						
Grand Total		**132**	**515**	**491**	**425**	**386**	**376**	**1927**	**9**	**15**	**63**	**72**	**26**	

Table 15 – Bat passes per species and location – WHOLE SURVEY PERIOD

Species	Location						
	1	**2**	**3**	**4**	**5**	**6**	**Total**
Common pipistrelle	381	22	3023	1381	990	4982	**10779**
Leisler's bat	1	6	3	7	2	3	**22**
Noctule	22	878	222	271	177	128	**1698**
PI-40	4		2	5		10	**21**
PI-50	40		8	100	9	113	**270**
Serotine		1		3	1		**5**
Soprano pipistrelle	17	2	119	115	5	733	**991**
Serotine / Nyctalus sp.				12	3	2	**17**
Nathusius' pipistrelle						4	**4**
Myotis sp.	20	3	22	135	4	43	**227**
Noctule or Leisler's	2	8	9	57	29	47	**152**
Long-eared bat sp.	9	4	8	3	15	19	**58**
Pipistrelle sp.			3	2	5	1	**11**
Serotine / Leisler's				7	1		**8**
Noctule, Leisler's or long-eared				1	2		**3**

Barbastelle	1			13		8	**22**
Long-eared or Myotis sp.				2		2	**4**
Grand Total	**497**	**924**	**3419**	**2113**	**1243**	**6095**	**14291**

Table 16. Bat passes per night period – WHOLE SURVEY PERIOD

Species	**Time period**													
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
Common pipistrelle		98	593	686	674	630	794	5812	324	354	418	311	84	1
Leisler's bat				1	3	8	1	3		1	3	1		1
Noctule		31	143	147	225	98	38	171	35	72	299	358	79	2
PI-40						2	4	11	4					
PI-50		14	24	53	20	48	10	70	4	1	10	12	4	
Serotine				2				2			1			
Soprano pipistrelle	1	14	26	33	27	34	7	639	21	49	105	22	13	
Serotine / Nyctalus sp.				1	1	7	2	4			2			
Nathusius' pipistrelle						1	2	1						
Myotis sp.			18	24	10	15	10	93	8	12	16	21		

Noctule or Leisler's	3	1	3	6	18	25	8	70	6	5	3		2	2
Long-eared bat sp.				2	4	3	6	34	2	2	5			
Pipistrelle sp.	1			2		2		3	1	1	1			
Serotine / Leisler's					1	2	1	3	1					
Noctule, Leisler's or long-eared								3						
Barbastelle							1	21						
Long-eared or Myotis sp.					1			3						
Grand Total	**5**	**158**	**807**	**957**	**984**	**875**	**884**	**6942**	**406**	**497**	**863**	**725**	**182**	**6**