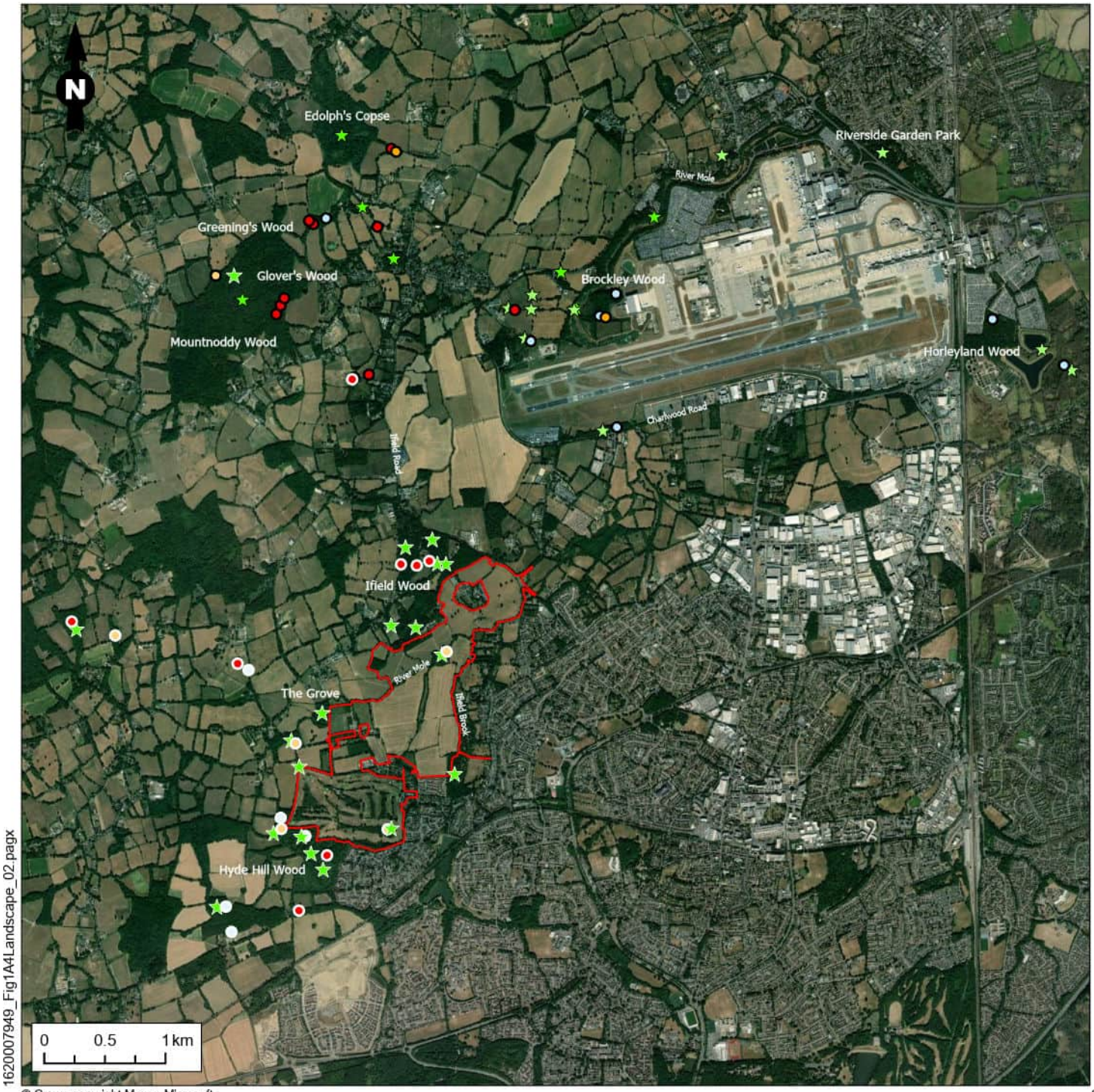


Legend

Land West of Ifield Survey Data

- Bechstein's Roost - Unknown
- Bechstein's Roost - Non-Maternity
- Bechstein's Roost - Maternity
- Bechstein's Core Foraging Area (Central Point)

Gatwick Airport Survey Data

- Bechstein's Roost - Unknown
- Bechstein's Roost - Non-Maternity
- Bechstein's Roost - Maternity
- Bechstein's Core Foraging Area (Central Point)

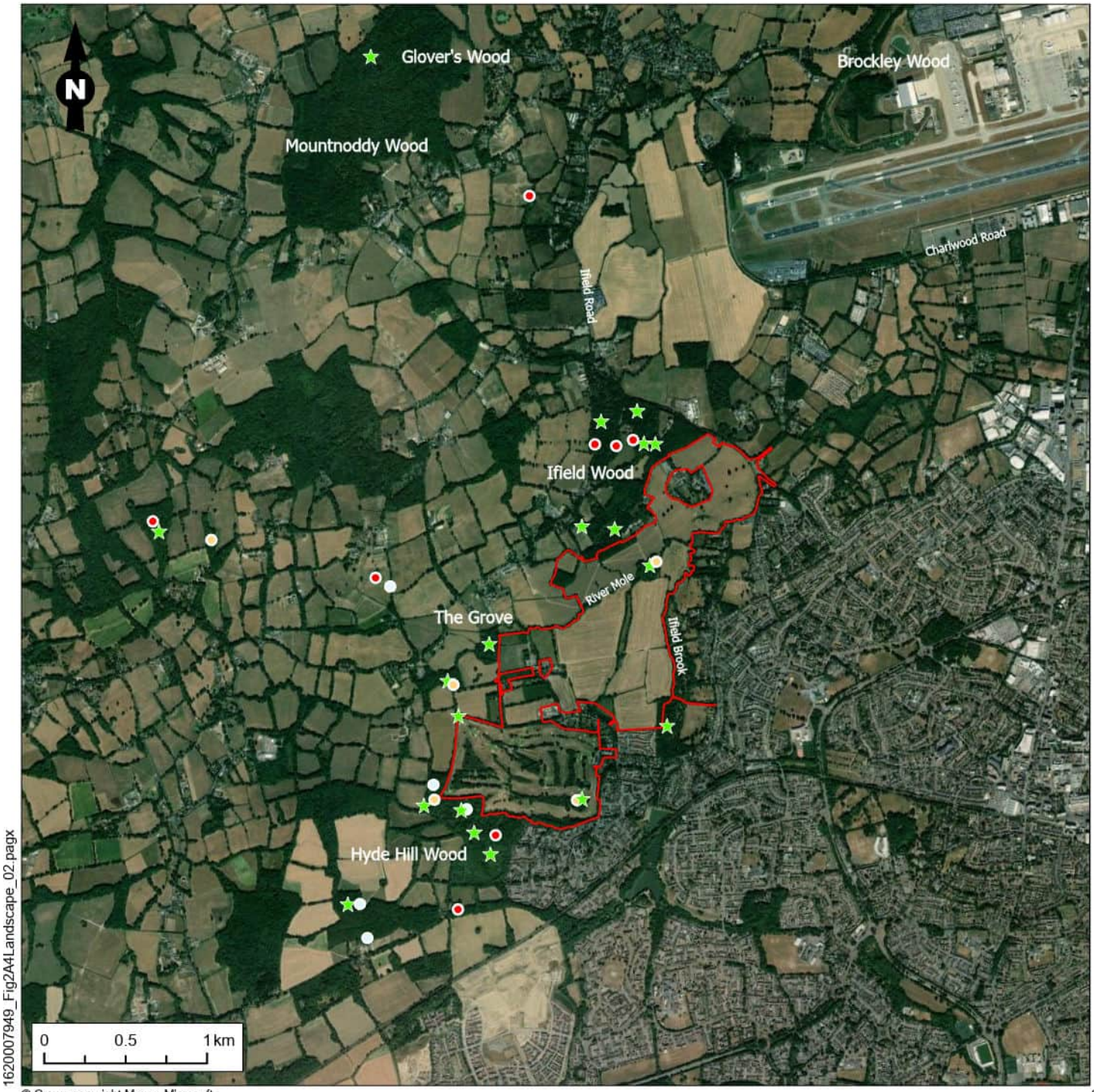
Land West of Ifield Red Line Boundary

Figure Title: Combined Advanced Survey Data (Bechstein's) - Land West of Ifield and Gatwick Airport		
Project Name: Land West of Ifield		
Project No.: 1620007949		
Date: February 2024	Figure No.: 1	Revision: 2
Prepared By: EF	Scale: 1:47,000 @A4	
Client: **Homes England**		

RAMBOLL

1620007949_Fig1A4Landscape_02.pagx

Coordinate System: British National Grid. Projection: Transverse Mercator. Datum: OSGB 1936.



Legend

Land West of Ifield Survey Data

- Bechstein's Roost - Unknown
- Bechstein's Roost - Non-Maternity
- Bechstein's Roost - Maternity
- Bechstein's Core Foraging Area (Central Point)
- Land West of Ifield Red Line Boundary

Figure Title: Advanced Survey Data (Bechstein's) - Land West of Ifield		
Project Name: Land West of Ifield		
Project No.: 1620007949		
Date: February 2024	Figure No.: 2	Revision: 2
Prepared By: EF	Scale: 1:35,000 @A4	
Client: **Homes England**		

RAMBOLL

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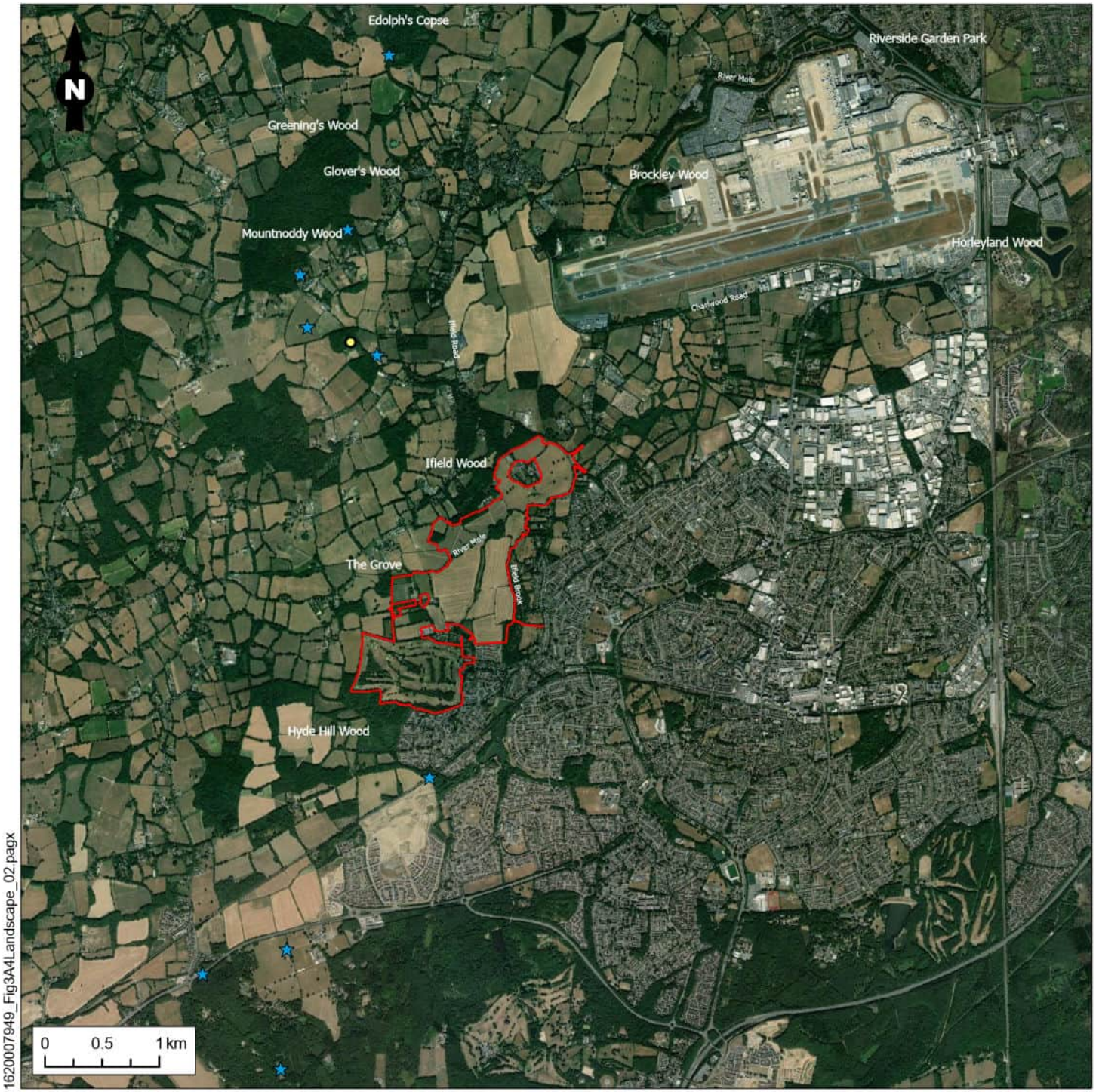

Legend

- Barbastelle Roost - Non-Maternity
- Barbastelle - Foraging Area
- Land West of Ifield Red Line Boundary

Figure Title: Combined Advanced Survey Data (Barbastelle) - Land West of Ifield amd Gatwick Airport		
Project Name: Land West of Ifield		
Project No.: 1620007949		
Date: February 2024	Figure No.: 3	Revision: 2
Prepared By: EF	Scale: 1:50,000 @A4	
Client: **Homes England**		

RAMBOLL

1620007949_Fig3A4Landscape_02.pagx

Coordinate System: British National Grid. Projection: Transverse Mercator. Datum: OSGB 1936.

Legend

- Bechstein's Roost - Unknown
- Bechstein's Roost - Non-Maternity
- Bechstein's Roost - Maternity
- Bechstein's Core Foraging (Central Point)
- Land West of Ifield Red Line Boundary

Figure Title

Survey Data within / adjacent to Land West of Ifield Red Line Boundary

Project Name

Land West of Ifield

Project No.

1620007949

Date	Figure No.	Revision
February 2024	4	1

Prepared By	Scale
EF	1:14,082 @A4

Client

Homes England

RAMBOLL

1620007949_Fig4A4Landscape_01.pagx

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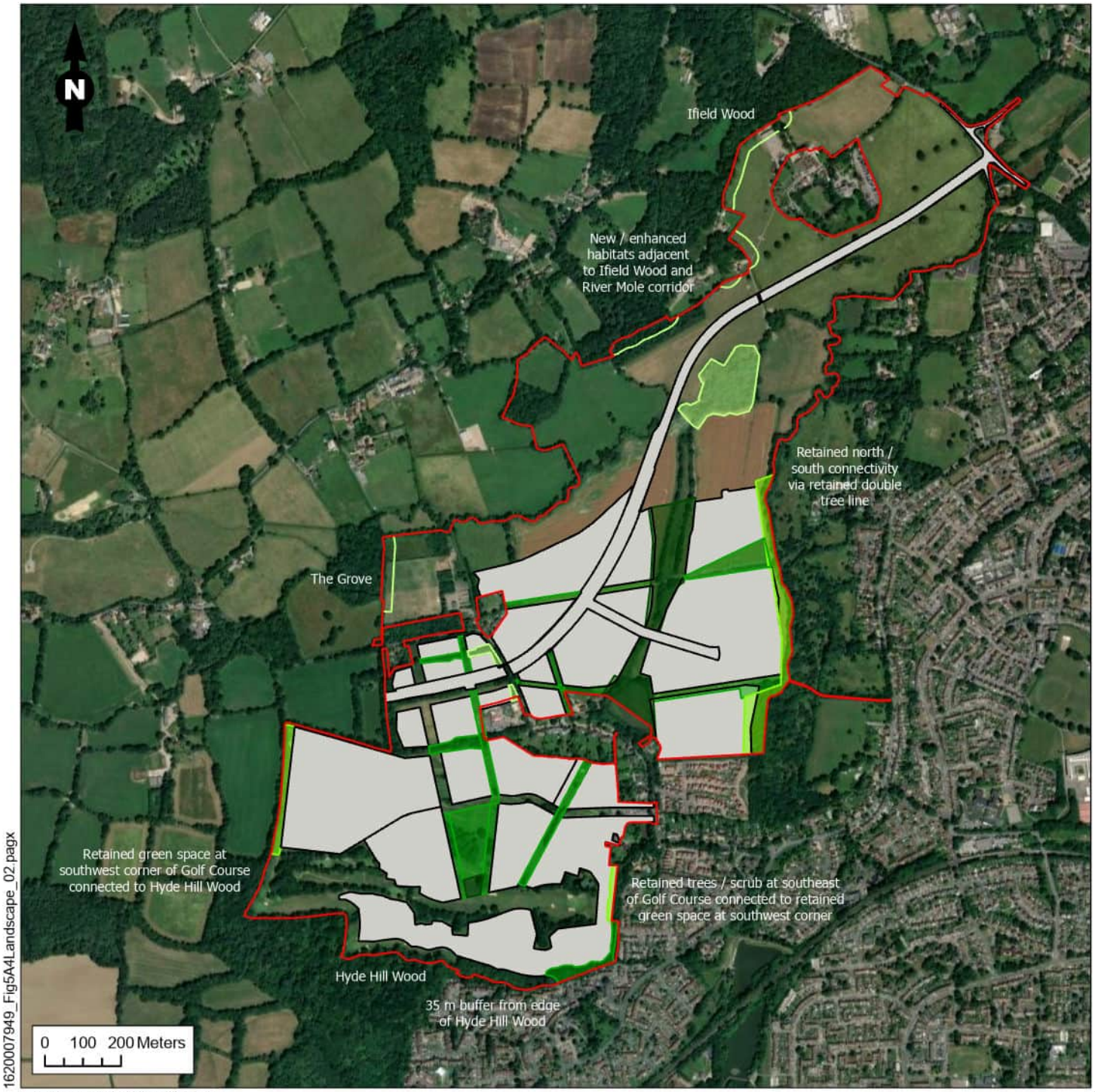


Legend

- Land West of Ifield Red Line Boundary
- Building Zone / Primary Roads
- Accessible Green Space
- Existing and Retained Landscape
- Green Corridors

NOTE: Landscape parameter plans are indicative only at this stage and may be subject to change

Figure Title

Design Concepts Integrated into Masterplan in Response to Bat Survey Results

Project Name

Land West of Ifield

Project No.		
1620007949		
Date	Figure No.	Revision
April 2024	5	2
Prepared By	Scale	
EF	1:15,000 @A4	

Client

Homes England

RAMBOLL

1620007949_Fig5A4Landscape_02.pagx

Coordinate System: British National Grid. Projection: Transverse Mercator. Datum: OSGB 1936.

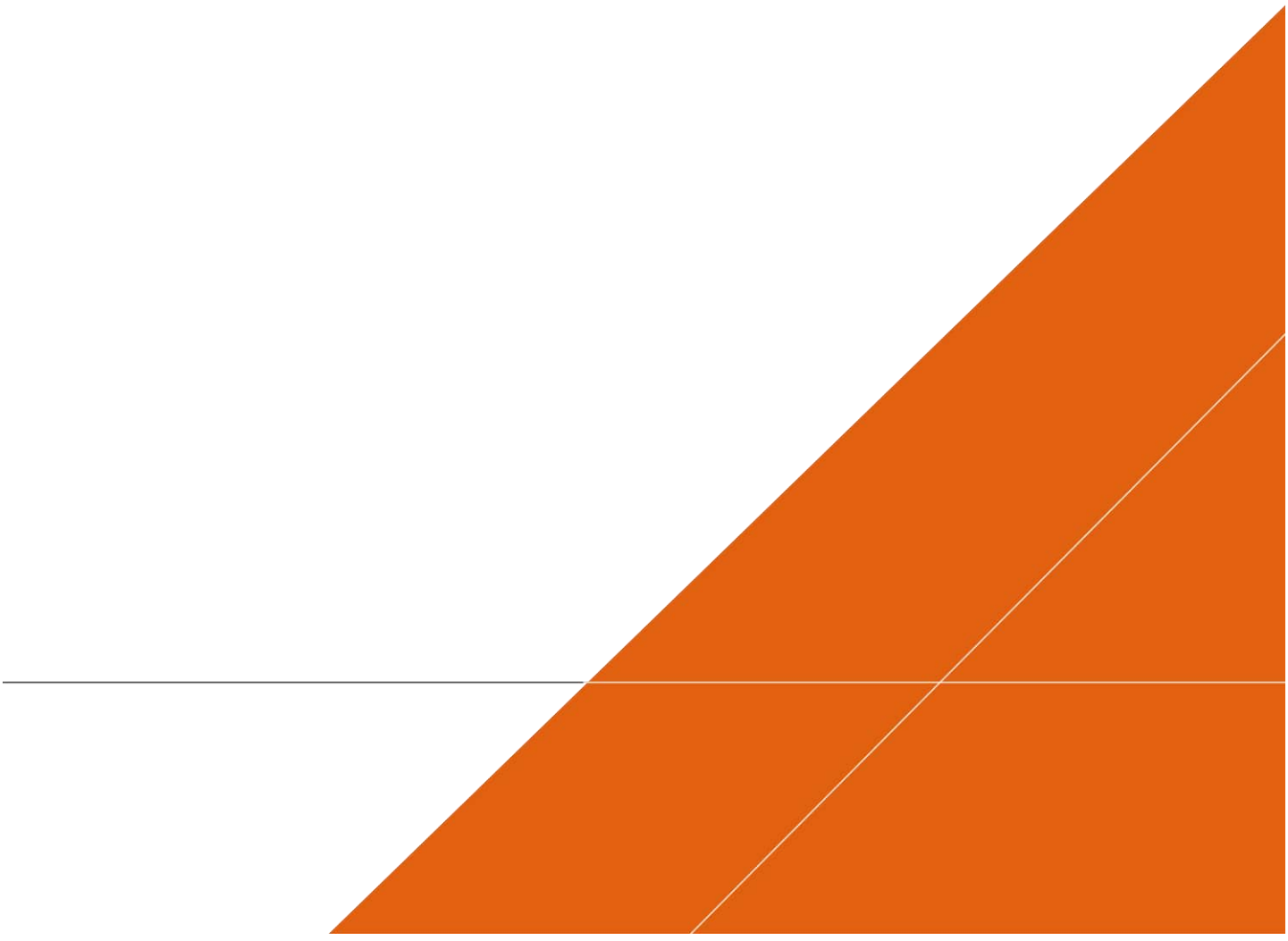
APPENDIX 8.29: LAND WEST OF IFIELD ENVIRONMENTAL STATEMENT – BAT SURVEY REPORT

ARCADIS Design & Consultancy for natural and built assets

LAND WEST OF IFIELD ENVIRONMENTAL STATEMENT

BAT SURVEY REPORT

NOVEMBER 2019



Land West of Ifield

Bat Survey Report

Author	Marielle James, Henry Gunning, Rob Regan
Checker	Brandon Murray
Approver	Samantha Walters
Report Reference	WOI-AUK-XX-WS-RP-EC-0013-01-Bat Survey Report

NOVEMBER 2019

VERSION CONTROL

Version	Date	Author	Changes
1	28.11.2019	BM	First Issue

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IMAGES

TABLES

APPENDICES

Executive summary

Arcadis Consulting (UK) Ltd was commissioned on behalf of Homes England to undertake a suite of bat surveys of land associated with a proposed housing development. The area is referred to as Land West of Ifield and is located to the west of Crawley and herein is referred to as the 'site'. This report has been prepared to inform a proposal for residential development.

The proposed development comprises the construction of approximately 3000 residential dwellings, three schools (two primary and one secondary) and associated infrastructure.

The site covers approximately 200ha in total and supports a range of habitats including semi-improved grassland, arable fields, amenity grassland, woodland, grazing pasture, a network of hedgerows and several ponds. The River Mole flows west to east through the north of the site, and Ifield Brook, runs flows south to north through the west of the site. Rusper Road passes through the south of the site. The site is situated to the north-west of the A23 (Crawley Avenue) and is bordered by residential properties to the east, farmland to the west and woodland to the north and south.

A detailed suite of bat surveys, detailed below, were undertaken between May 2018 and October 2019. These surveys and assessments included:

- Desk study;
- Habitat assessment;
- Static detector surveys;
- Activity transects;
- Bat building roost assessments; and
- Emergence / re-entry surveys.

The results summary of these assessments is as follows:

The site overall supports moderate to high bat potential habitats because of the presence of copse/pond/linear features. Most of the site is arable and of low value to bats. It is considered that enough surveys have been conducted to inform a characterisation of the bat usage of the site to inform the masterplanning process. The conclusions of each of the surveys conducted is presented below.

Static surveys

The static bat surveys and assessments conducted in 2018 revealed the following information:

- Overall, the site is likely to have a 'medium to high' activity level when compared to similar sites;
- The areas with the highest levels of activity were around the corridors of hedgerows and / or ditches across the site and south of the buildings in the north of the site. The intensively farmed areas and isolated hedgerows within and around the site had notably lower bat activity, as did areas to the west of the site.
- The assemblage of bats utilising the site comprises largely common species, the majority of passes were common and soprano pipistrelles, with a low level of activity of rarer bats including myotis bats and some 'big bats'. A low number of barbastelle passes were recorded (2 passes), and such a very low number of brief passes suggesting the site is not of importance for this species.
- Although the area south of the buildings in the north of the site had a high level of activity, there was a low proportion of rare and rarest bat passes in this area;
- Two locations with low levels of activity, in the south of the site on the golf course and in the east of the site had the highest proportion of calls of rarer bats.

Emergence surveys

A total of 31 buildings were assessed, of which 15 were assessed as having negligible roosting potential, 10 as having low roosting potential, two with moderate roosting potential and four having high roosting potential.

Of these 31 structures, a subset consisting of structures with low, moderate or high roosting potential was selected for emergence and re-entry surveys to identify any roosts present.

A total of 18 confirmed roosts were identified. All but one of these roosts, was a small roost of common or soprano pipistrelles, with one roost a likely maternity roost of brown long-eared bats (within building 21b).

The survey results will enable impacts to roosts from the proposed development to be assessed, and mitigation to be identified. Further surveys are likely to be required at an appropriate stage of the planning process to confirm the current status of the roosts to be confirmed, and suitable detailed mitigation to be developed.

Activity transects

The bat activity transects conducted in 2018 revealed the areas with the highest levels of activity were:

- Areas of woodland present in the north, centre and south east of the site;
- Corridors of hedgerows and/ or watercourses, notably Ifield Brook and the River Mole, present in the east and centre of the site; and
- High activity levels in close proximity to the cluster of buildings located in the north of the site, where common and soprano pipistrelle roosts and the maternity brown long-eared roost were recorded in 2019.

The assemblage of bat utilising the site comprises common species, in line with the bat distribution in Sussex, being largely formed of common and soprano pipistrelles, with a low level of activity of rarer bats including ‘big bats’ such as noctules and myotis species.

1 Introduction

1.1 Overview

Arcadis Consulting (UK) Ltd, working on behalf of Homes England, was instructed to undertake ecological surveys to inform a proposed masterplan for residential development on an area referred to as Land West of Ifield, West Sussex. Herein this area is referred to as 'the site'.

The Phase 1 habitat survey conducted in May and July 2018 identified habitats on site with the potential to support roosting and foraging/ commuting bats. Habitats identified as likely to support roosting bats included woodlands and scattered trees with numerous buildings across the site also identified as potentially suitable for use by bats.

The woodlands, hedgerows, watercourse, ponds, areas of scrub, ruderal vegetation, semi-improved grassland and field margins were identified as suitable habitat for commuting and foraging bats.

The aims of the surveys were:

- Identify key roosting features with potential to support roosting bats e.g. structures;
- to establish the presence/ likely absence of roosting bats within these identified features present within the site boundary and adjacent areas;
- identify the assemblage of bat species using the site;
- identify the nature of activity for different bat species, for example foraging, commuting and roosting;

This report presents the findings of these bat surveys.

1.2 Site location and setting

The proposed development site is located to the west of Ifield, Crawley (central grid reference - TQ 24133 37360) (see Image 1 for the site location and survey boundary).

The site which covers approximately 200 ha in total and supports a range of habitats including semi-improved grassland, arable fields, amenity grassland, woodland, grazing pasture, a network of hedgerows and several ponds. The River Mole flows west to east through the north of the site, and Ifield Brook, runs flows south to north through the west of the site. Rusper Road passes through the south of the site.

The site is situated to the north-west of the A23 (Crawley Avenue) and is bordered by residential properties to the east, farmland to the west and woodland to the north and south.

An aerial image illustrating the site surveyed is presented in Image 1.

Image 1: Aerial imagery of the site showing "site" boundary

1.3 Proposed development

The proposed development comprises the construction of approximately 3000 residential dwellings, three schools (two primary and one secondary) and associated infrastructure.

1.4 Bat biology

Within the UK there are 18 resident species of bats, of which 17 species are known to be breeding in the UK. All the UK species of bats eat insects and locate their prey utilising echolocation.

British bats occupy many habitat types. Habitats of importance for bats include, woodland, hedgerows, ponds, rivers, trees and structures, where they forage and/or roost. They require warm summer breeding roosts and temperature-stable, cool hibernation sites.

When the weather warms in spring, bats emerge to feed. UK bats mate in the Autumn and the females store the sperm until spring. Pregnant females tend to gather in maternity roosts, usually giving birth to one offspring per year. The females suckle the offspring for four to five weeks, until they are developed enough to fly.

The table below outlines basic ecological data on bat species recorded within the desk study or within the site.

Table 1: Basic ecological information on the bat species recorded on the site

Species / species group (common name)	Latin name	Light tolerance	Roost sites
Serotine	*Eptesicus serotinus*	Light tolerant. Will forage around artificial lights	Roosts in buildings in cavities and sometimes found in trees.

Species / species group (common name)	Latin name	Light tolerance	Roost sites
Daubenton's bat	*Myotis daubentonii*	Not tolerant of light. Artificial light may impact upon foraging and commuting.	Roosts in hollow trees, bridges and sometimes buildings close to water.
Natterers' bat	*Myotis nattereri*	Not tolerant of light. Artificial light may impact upon foraging and commuting.	Roosts in tree holes and different types of building.
Leisler's bat	*Nyctalus leisleri*	Light tolerant. Will forage around artificial lights	Roosts in trees, bat boxes, and buildings including houses.
Noctule	*Nyctalus noctule*	Light tolerant. Will forage around artificial lights	Roosts almost exclusively in tree holes.
Nathusius' pipistrelle	*Pipistrellus nathusii*	Light tolerant. Will forage around artificial lights	Hibernation roosts in hollow trees and crevices in cliffs.
Common pipistrelle	*Pipistrellus pipistrellus*	Light tolerant. Will forage around artificial lights	Maternity colonies usually found in buildings. Will roost in crevices. Males will roost in buildings and trees and in bat boxes.
Soprano pipistrelle	*Pipistrellus pygmaeus*	Light tolerant. Will forage around artificial lights	
Brown long-eared bat	*Plecotus auritus*	Not tolerant of light. Artificial light may impact upon foraging and commuting.	Maternity roosts found in trees, in the voids of large old buildings and in bat boxes in woodlands. Bats require enough space for unobstructed internal flight.
Barbastelle bat	*Barbastella barbastellus*	Light Averse	Predominantly tree roosting for maternity and hibernation. Some usage of structures for roosting and hibernation. Sometimes hibernates underground
Whiskered / alcathoe / brandt's bat	*Myotis mystacinus; Myotis alcathoe, Myotis brandti*	Light Averse	Can be found in trees or buildings. Usually hibernate in caves and tunnels.

1.5 Bat Legislation

This section provides an overview of the legislation applicable to bats, for further information the source legislation should be reviewed.

All bat species are afforded full protection under UK and European legislation, including the Wildlife and Countryside Act 1981 (as amended), the Countryside and Rights of Way Act (2000) and the Conservation of Habitats and Species Regulations 2017. Together, this legislation makes it illegal to recklessly, intentionally or deliberately:

- Take, kill or injure a bat;

- Damage, destroy, or obstruct access to, a bat roost; and,
- Disturb a bat occupying a roost.

A bat roost is defined in the legislation as “any structure or place which a bat uses for shelter or protection”.

Annexe II bats are those species listed on Annexe II of the Habitats Directive, which lists animal and plant species of Community interest whose conservation requires the designation of Special Areas of Conservation (SAC’s).

1.6 Policy

The loss of existing roost and foraging sites is an important factor in the decline in bat populations and national planning policy has been devised to halt or reverse this decline.

The NPPF (National Planning Policy Framework (2019)) (HMSO 2019), Paragraph 174, states that: *plans should:*

- *Identify, map and safeguard components of local wildlife-rich habitats and wider 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 national and local partnerships for habitat management, enhancement, restoration or creation; and;*
- *promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species, and identify and pursue opportunities for securing measurable net gains for biodiversity.*

Paragraph 175 states that: *When determining planning applications, local planning authorities should apply the following principles:*

- *If significant harm to biodiversity 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;*

In addition to the NPPF, the NERC Act 2006 (HMSO 2006) lists species of principal importance which are a material consideration within planning decisions, on Section 41 of the Act. Seven of the British bats are listed as species of principal importance. Species listed on Section 41 are presented in Table 2 below.

Table 2: Bat species listed on Section 41 of the NERC Act 2006

Common name	Scientific name
Barbastelle bat	*Barbastella barbastellus*
Bechstein`s bat	*Myotis bechsteinii*
Noctule	*Nyctalus noctula*
Soprano pipistrelle	*Pipistrellus pygmaeus*
Brown long-eared bat	*Plecotus auritus*
Greater horseshoe bat	*Rhinolophus ferrumequinum*
Lesser horseshoe bat	*Rhinolophus hipposideros*

1.7 Conservation status of bats

Bat populations have been in general decline since the 1950s. The main threats to bats in the UK are thought to include:

- Building and development work, leading to loss or damage of roosts;
- Loss of habitat through development and land use change; and

- The intensification of agriculture, inappropriate riparian management and changes in land use; leading to a decline of insect prey and loss of connectivity for feeding and commuting (BCT 2018).

Table 3: Conservation status of bat species potentially breeding in West Sussex and the UK (information obtained from Sussex Biodiversity Record Centre (SBRC) 2018

Common name	Scientific name	UK status	Sussex status
Greater horseshoe bat	*Rhinolophus ferrumequinum*	Native, very rare and endangered	Not considered present
Lesser horseshoe bat	*Rhinolophus hipposideros*	Native, rare and endangered	Not considered present
Whiskered bat	*Myotis mystacinus*	Native, locally distributed	Present
Brandt's bat	*Myotis brandtii*	Native, common in west and north England, rare or absent elsewhere	Present
Bechstein's bat	*Myotis bechsteinii*	Native, very rare	Present
Daubenton's bat	*Myotis daubentonii*	Native, common throughout much of the UK	Present
Natterer's bat	*Myotis nattereri*	Generally scarce	Present
Serotine	*Eptesicus serotinus*	Native, widespread in southern Britain	Present
Noctule	*Nyctalus noctula*	Native, generally uncommon, but more numerous in well- wooded areas	Present
Leisler's bat	*Nyctalus leisleri*	Native, widespread, scarce in GB, common in Northern Ireland	Present
Common pipistrelle	*Pipistrellus pipistrellus*	Native, common across the UK	Present (common)
Soprano pipistrelle	*Pipistrellus pygmaeus*	Native, common across the UK	Present (common)
Nathusius' pipistrelle	*Pipistrellus nathusii*	Native, rare	Present
Barbastelle	*Barbastella barbastellus*	Native, widespread but rare	May be present but no recent records
Brown long-eared bat	*Plecotus auritus*	Native, common	Present
Grey long-eared bat	*Plecotus austriacus*	Native, very rare	Not considered present
Alcathoe's bat	*Myotis alcathoe*	Native, uncertain distribution	May be present but no records

2 Approach and methodology

2.1 Introduction and overview

This report outlines the results of the bat surveys conducted across the site. This report includes the results of the following assessments:

- Desk study;
- Habitat assessment;
- Static bat detector surveys across the site;
- Bat activity transects conducted across the site; and
- Bat building assessments and emergence surveys.

2.2 Purpose of the surveys, proportionality and design

2.2.1 Desk study

A desk study was conducted to collate and review existing information regarding bats within the site and the surrounding area. This provides a baseline status of bats in and around the site, and informed the need for additional surveys.

2.2.2 Habitat assessment

In order to inform the survey design, a habitat assessment was undertaken to identify habitats and areas likely to be of value for bats. These assessments were utilised to design and scope the more focussed bat surveys.

2.2.3 Static detector surveys

The purpose of the static detector surveys was multi-faceted, namely:

- To allow the assemblage of bats utilising the site to be determined, including:
  - The overall assemblage of bats;
  - To determine the presence of species listed on ‘Annexe II’ of the Habitats Directive utilising the site (where possible); and
  - To determine the presence of notable or rare bats utilising the site.
- To provide a broad assessment of the bat activity within the site;
- To determine if any areas are of particular importance for bats.

2.2.4 Activity transects

The purpose of the transect surveys was threefold:

- To identify the assemblage of bats utilising the site (in conjunction with the static detector surveys);
- To identify the usage of the site by commuting and foraging bats, and to identify key, important areas;
- To identify any areas where bats are likely to be roosting (in conjunction with the bat building assessment and emergence and re-entry surveys. In particular, this applied to areas where access was not permitted. These surveys are not intended to identify individual roosts (unless these are incidentally observed during the surveys).

2.2.5 Bat building assessments and emergence surveys

The purpose of the building assessments and subsequent emergence and re-entry surveys was to identify key roosts within the zone of influence of the site. Only those buildings which are likely to be directly impacted by the development were surveyed. In addition, structures which were assessed as having low, moderate or high potential to support roosts were surveyed with emergence / re-entry surveys. Two buildings

(B21c and B21d, shown on Figure 1) which were assessed to have negligible bat roosting potential were surveyed with emergence / re-entry surveys as they were adjacent to buildings with higher roosting potential.

Internal inspections of the buildings were not conducted. Many of the structures assessed were in a poor state of repair or may have contained asbestos and it was considered a disproportionate health and safety risk to inform the masterplanning stage of the development process. However, it is considered that it would likely be appropriate to conduct internal inspections prior to the development of each phase in order inform detailed mitigation (for instance provision of alternative roosts).

Tree surveys or roosts were not undertaken as the masterplan design will seek to retain most of the trees within the site. In addition, bat tree roosts are not readily confirmed as bats move between multiple tree roosts throughout the year. Therefore, it will be more appropriate to conduct these surveys at a later stage in the planning process, if potential tree roosts are at risk.

In addition to identifying roosts, the emergence surveys also obtained the following information:

- Areas important for foraging bats;
- Areas important for commuting bats; and
- The assemblage of bats utilising the areas of the site where emergence and re-entry surveys were conducted.

2.3 Survey design and methodology

2.3.1 Habitat assessment

To inform the survey design, a habitat assessment was undertaken to identify habitats and areas likely to be of value for bats. This assessment was undertaken during May, June and July 2018 by Arcadis ecologists Porscha Thompson, Siân Carr and Julie Player, combined with an extended Phase 1 habitat survey. During this survey, key habitat areas, including likely commuting routes, foraging areas and roosting locations were identified. These assessments were used to design and scope the bat surveys.

2.3.2 Desk study

A desk study was conducted to collate and review existing information regarding bats within the site and the surrounding area. Records of bats were obtained from within 2km of the site and records of sites designated for bats was obtained from within 10km of the site.

A selection of resources was utilised to inform the desk study, including publicly available data sets, previous survey information regarding the site obtained from previous planning applications and from local record centres. The Sussex Biodiversity Record Centre (SBRC 2018) were consulted in May 2018 to check whether they held any records within 5km for bat species records. The following data was reviewed to inform the desk study:

- Aerial photography (e.g. google mapping);
- The Multi-Agency Geographic Information for the Countryside (MAGIC) (available at: https://magic.defra.gov.uk/MagicMap.aspx);
- Arcadis (2019) Land West of Ifield, Extended Phase 1 Habitat Survey Report;
- Chris Blanfrod Associates (2017) Gatwick NW Zone Hangar Project, Bat Survey Report;
- Applied Ecology Ltd (2011) Home Deliveries Distribution Centre, Crawley, Ecology Report;

2.3.3 Static detector surveys

2.3.3.1 Survey scope

The deployment of static detectors was based upon the prescriptions present within the relevant Bat Survey Guidelines (Collins 2016). The survey period was conducted between May and October 2018. At each static detector position, five nights of data were analysed for each deployment.

2.3.3.2 Static detector positioning

The number of static detector positions employed in 2018 was determined according to the parameters within the Bat Survey Guidelines (Collins, J. 2016). Two detectors were positioned per 'transect', with the number of transects required being based upon the size of the site. The locations of the static detectors were determined according to professional assessment of the site, as other, more randomised detector deployment strategies were not practicable. This was due to access limitations, risk of interference from the public and land usage (i.e. detectors had to be positioned where they would not interfere with industrial or farming uses of the site.
The positioning employed the following assessment considerations:

- Distributed across the site and transect areas to gain maximum area coverage;
- Positioned within or adjacent to a range of habitats present on and around the site, ensuring that all broad habitats received coverage from the detectors;
- A subset of the detectors were positioned on linear features considered likely to be of value for bats (in particular where it was considered that these areas may require traversing by roads etc.;
- Some detectors were positioned adjacent to inaccessible areas to record bats potentially emerging from these areas.

The detector microphones were positioned at 1 - 2m above the ground where possible, attached to landscape features (fence posts, trees, structures) with the microphones in a 45 degree downwards position. Where the microphones were positioned in linear features, the microphones were positioned at 90 degrees to the direction of the feature. Positioning of the microphones was selected to be in areas where vegetation etc would not interfere with the microphone. The locations of the detectors is presented on Figure 4, Figure 5 and Figure 6.

2.3.3.3 Static detector programming

The detectors were programmed to commence recording 30 minutes prior to sunset and continue recording throughout the night until 30 minutes after sunrise, in line with good practice guidelines (Collins, J. 2016). Details of the programming of the detectors is presented in Appendix D. Each detector was left recording for a minimum of five nights. Where more nights were recorded, only five consecutive nights of data was analysed. The dates to be analysed were selected to give as equal a time gap between the monthly deployments as was possible.

2.3.4 Details of recording times

Table 4 outlines the details of the deployments of the static detectors at each location, and the number of hours of recording from each detector which was analysed. The locations of the detectors is presented on Figure 4.

Table 4: Details of the deployment dates at each static detector position

Month	Position	Start Date	End Date	Total recording time (hours)
May	A	11/05/2018	16/05/2018	47.6
May	B	11/05/2018	16/05/2018	47.6
May	C	09/05/2018	14/05/2018	48.1
May	D	09/05/2018	14/05/2018	48.1
May	E	11/05/2018	16/05/2018	47.6
May	F	11/05/2018	16/05/2018	47.6
May	G	11/05/2018	16/05/2018	47.6
May	H	11/05/2018	16/05/2018	47.6

Month	Position	Start Date	End Date	Total recording time (hours)
June	A	18/06/2018	23/06/2018	42.2
June	B	18/06/2018	23/06/2018	42.2
June	C	19/06/2018	24/06/2018	42.2
June	D	19/06/2018	24/06/2018	42.2
June	E	21/06/2018	26/06/2018	42.2
June	F	21/06/2018	26/06/2018	42.2
June	G	18/06/2018	23/06/2018	42.2
June	H	18/06/2018	23/06/2018	42.2
July	A	24/07/2018	29/07/2018	46.8
July	B	24/07/2018	29/07/2018	46.8
July	C	24/07/2018	28/07/2018	37.4*
July	D	24/07/2018	29/07/2018	46.8
July	E	23/07/2018	28/07/2018	46.6
July	F	24/07/2018	29/07/2018	46.8
July	G	26/07/2018	28/07/2018	18.8*
July	H	26/07/2018	31/07/2018	47.3
August	A	23/08/2018	28/08/2018	55.2
August	B	24/08/2018	29/08/2018	55.5
August	C	21/08/2018	24/08/2018	31.3*
August	D	21/08/2018	26/08/2018	54.6
August	E	N/A	N/A	N/A*
August	F	24/08/2018	29/08/2018	55.5
August	G	25/08/2018	30/08/2018	55.8
August	H	21/08/2018	22/08/2018	10.8*
September	A	14/09/2018	19/09/2018	62.2
September	B	14/09/2018	19/09/2018	62.2
September	C	19/09/2018	24/09/2018	63.8

Month	Position	Start Date	End Date	Total recording time (hours)
September	D	16/09/2018	21/09/2018	75.6
September	E	10/09/2018	12/09/2018	24.2*
September	F	25/09/2018	30/09/2018	65.7
September	G	15/09/2018	23/08/2018	63.3**
September	H	18/09/2018	23/08/2018	63.5
October	A	24/10/2018	29/10/2018	73.9
October	B	24/10/2018	29/10/2018	73.9
October	C	24/10/2018	29/10/2018	73.3
October	D	24/10/2018	29/10/2018	73.3
October	E	24/10/2018	29/10/2018	73.9
October	F	24/10/2018	29/10/2018	73.9
October	G	18/10/2018	23/10/2018	73
October	H	18/10/2018	23/10/2018	73

*Possible error on SD card during recording

**Some dates missing during recording – collation of nearby dates used to form 5 nights of recording

2.3.4.1 Data analysis methodology

Due to the large amount of data that needed to be analysed (585,659 'passes' in total), an automated detector analysis protocol was required. The automated bat call analysis tool Kaleidoscope (Wildlife Acoustics 2019) was utilised to assess the data collected (hereafter referred to as Auto ID). It was necessary to manually verify the results of the analysis produced by Auto ID and modify how the data was handled in response to this verification process. Table 5 and Table 6 show how the verification process altered how certain calls were handled in the analysis. Full details of the verification process utilised to ensure the veracity of the Auto ID results is presented in Appendix E. In summary:

- Initially, four deployment records were fully analysed manually (by an experienced person), and this was compared with the results from Auto ID. In total 16,203 passes were manually assessed.
- This was used to inform the requirement for manual call identification. In summary:
  - Noise was almost always correctly identified by Auto ID (92% of the time identified correctly), this identification from the Auto ID was used and the data was removed from the dataset;
  - Common and soprano pipistrelles were almost always correctly identified (99.125% identified to the correct genus)
  - All other calls were not sufficiently reliably identified by Auto ID, these were manually identified for all deployments. These were calls Auto ID identified as:
    - Noctule
    - Nathusius' pipistrelle
    - Brandt's bat
    - Whiskered bat
    - No ID

- Daubenton's bat
- Barbastelle
- Serotine
- Brown long-eared bat.

The resulting data was used in all of the subsequent calculations and assessments.

Table 5: Bat auto ID results data classification

Auto ID Category	Meaning of Category	Findings	Data handling
No ID	Kaleidoscope could not identify	All bat passes were manually identified	Included in dataset once verified, where bats were identified. Noise removed. Those calls which could not be identified to a group were removed.
Noise	Identified as noise by Kaleidoscope	Over 92% of files were noise when manually reviewed	Removed from dataset
Common and soprano pipistrelles	Common and soprano pipistrelles	Over 99% correctly identified to genus. Where exact species was incorrect, this was always common or soprano pipistrelle.	All included in dataset, no further verification
All other species and No ID	Where kaleidoscope identified to a species level that was not common or soprano pipistrelle	All passes manually verified	Verified and corrected (where appropriate) assessment of bat species utilised.

Two levels of identification were used in the analysis, 'species group' – where bats were identified to the most accurate level which could be relied upon, and 'broad group' which was used where a broader assessment was most accurate. The groupings of the identified calls are presented in Table 6.

Table 6: Simplified species groups utilised within the static detector result analysis

Auto ID Category	Meaning of Category	Broad Group	Rarity
BARBAR	Barbastelle bat	Barbastelle	Rarest
MYOTIS	'Myotis' genus bat	Myotis	Rarer
MYODAU	Daubenton's bat		
MYOMYS	Whiskered Bat		
MYOBRA	Brandt's Bat		
MYOBEC	Bechstein's Bat		
MYONAT	Natterer's Bat		
NYCLEI	Leisler's bat	Big bat	

Auto ID Category	Meaning of Category	Broad Group	Rarity
NYCNOC	Noctule		
ENVSP	'Big Bat'		
EPTSER	Serotine		
PIPNAT	Nathusius' pipistrelle	Nathusius' pipistrelle	
PLEAUR / PLEESP	Brown / Grey long-eared bat	Brown long-eared bat*	Common
PLESP	'Plecotus' genus (long-eared bat)		
PIPPIP	Common pipistrelle	Common or Soprano Pipistrelles	
PIPPYG	Soprano pipistrelle		

* grey long-eared bats and horseshoe bats are not considered present in West Sussex

2.3.4.2 Valuation of 'bat rarity'

In order to subdivide the bats recorded during the static deployments into meaningful subsets, it was necessary to categorise the 'rarity' of species present (after Wray 2010). This categorisation is based upon the rarity of each species within its range. Table 7 lists the three bandings of rarity utilised within the assessment.

Table 7: Categorisation of bats according to Wray 2010

Rarity within range	Species	Notes on presence on site
Rarest (population under 10,000)	Greater horseshoe, Bechstein's, alcathoe, greater mouse-eared, barbastelle, grey long-eared.	None of these species were definitively recorded within the site
Rarer (population 10,000 – 100,000)	Lesser horseshoe, whiskered, Brandt's, Daubenton's, Natterer's, Leisler's, noctule, Nathusius' pipistrelle, serotine.	Myotis bats, Leisler's, noctule, Nathusius' pipistrelle and serotine recorded on the site.
Common (population over 100,000)	Common pipistrelle, soprano pipistrelle, brown long-eared.	All these species are present within the site

2.3.4.3 Activity Normalisation

Subsequent to each set of static data being analysed, the data was 'normalised' to allow activity levels between positions to be compared. This was conducted by dividing the number of passes recorded by the number of hours that a detector was recording.

2.3.4.4 Categorising activity levels

In order to enable different areas of the site to be analysed for relative activity levels, it was necessary to allocate the level of activity recorded to broad banding There is no formally accepted methodology for this, as bat survey methods, environmental factors and equipment used can have a significant effect upon the results. Two methods were used for determining the activity levels on site, these were compared to determine which would give a result that was sufficiently robust for the Project objectives and was broadly in line with the results of the other surveys on site and the observations from the ecologists in the field.

2.3.4.5 Activity assessment of deployments (within site)

This assessment involved reviewing the calculated activity levels and banding the results in to low, medium and high. This would give a relative activity level within the site, using only the data collected from within the site.

When the data was assessed, the detector locations were split into three broad groups, low, medium and high activity areas. These have been split as follows:

- low activity, 7.5 passes per hour average or less;
- medium activity, greater than 7.5 to 15 passes per hour; and
- high activity, greater than 15 passes per hour.

This split was based upon professional judgement after review of the data, in the absence of any published guidance.

2.3.4.6 Activity assessment of deployments (between site, using of 'Ecobat')

This assessment uses the Ecobat tool (Ecobat 2019), an emerging tool which uses a large dataset collated from the UK which forms the Ecobat database. For assessment using the tool, a subset of this database was chosen, within a 200km radius of the site, to give a comparative level of activity. This activity level is grouped into a percentile:

"Percentiles provide a numerical indicator of the relative importance of a nights' worth of bat activity. For example, activity data in the 70th percentile would indicate that the recorded data was in the top 30% of activity for the reference range." (Ecobat Website 2019).

For this assessment, the following parameters were used to compare the activity within the site to this 200km database:

- Recording sessions were grouped into monthly recordings;
- Pipistrelle species were used as a proxy for overall activity levels (as the vast number of passes were pipistrelle bats);
- Passes were averaged into an average 'passes per night'.

Once a percentile of activity level was obtained for each month, this was averaged between the months for each position to allow an average percentile to be utilised to give an activity assessment. The bandings utilised were as follows:

Table 8: Ecobat tool activity level bandings

Activity Level	Percentile
Low activity.	0-20th percentiles
Low to moderate activity	21st-40th percentiles
Moderate activity	41st-60th percentiles
Moderate to high activity	61st-80th percentiles
High activity	81st-100th percentiles.

2.3.4.7 Sensitivity of assessment methodology

Once the activity levels were calculated, these were also contextualised to the assessments of the ecologists conducting other bat surveys on the site, using professional judgement.

From this it was assessed that the Ecobat assessment is a useful assessment of bat activity within the south east of England, but not sensitive at the local or site level.

As a result, the following assessment was made:

- The site assessment would be used for assessing activity levels between locations within the site;
- The Ecobat assessment would be broadly used to assess activity levels across the site against comparable sites elsewhere within the country (in the south east of England within 200km).

2.3.5 Activity transects

2.3.5.1 Overview

Transect surveys are surveys where surveyors (in a two-person team) walk a predetermined route around the site, recording bat activity on a portable hand-held bat detector. During these surveys, Elekon Bat loggers were utilised. Throughout the transects, 'stops', locations where surveyors pause for 3-5 minutes are conducted. Within these surveys, the stops were based on professional judgement and selected to sample bat activity at key potential commuting and foraging locations. The number of stops was different for each transects. During the survey, in addition to recording bat activity on the detectors, notes are taken on the behaviour of the bats observed.

Dusk transects commence prior to sunset (up to 30 minutes before sunset) and proceed for up to two hours after sunset. Dawn transect commence approximately 2 hours prior to dawn and commence until sunrise.

The transect routes were initially proposed to fulfil the following requirements (requirements from bat survey good practice guidance and in order to fulfil the purpose of the surveys):

- Transect routes were designed to cover the broad habitat types present within the site;
- Transect routes followed features likely to be key bat commuting routes (where access was permitted);
- Transect routes were designed to be of a length whereby they could be walked in the two hours following sunset or prior to sunrise;
- Transects were designed to cover areas of the site likely to be of high value for bats, to obtain information on the assemblage of bats utilising the site.

These transects were conducted monthly between May and September 2018. On each visit the starting point of the transect was varied.

Full details of the dates, times and weather conditions during the surveys can be found within Appendix F. In total, over 61 hours of transect surveying were conducted across the site in 2018. The locations of the transects and the stop points are presented on Figure 7 to Figure 14.

The details of the key ecologists who conducted the surveys can be found within Appendix J.

2.3.5.2 Data analysis

Subsequent to the completion of the surveys, the recordings from the Elekon Bat loggers were analysed within the Elekon propriety software (Bat Explorer). This data analysis was completed by Neha Shrish Phansalkar. All outputs from Bat Explorer were manually reviewed and verified. The data from this analysis is utilised within the results tables assessing the bat assemblage data.

This analysed data was assessed alongside the manual 'in-the-field' notes from the surveyors, which contained visual observations to provide a more qualitative assessment of the data. This was used to infer information such as where bats are likely to be roosting, where important foraging areas are, and where it is likely that bats are commuting.

Prior to mapping, the analysed Batlogger data was reviewed, and where a number of passes were likely attributable to a single foraging bat (from reviewing the field data), this was reduced to a single point for the mapping, to allow analysis of the findings of the data.

2.3.6 Bat building assessments and emergence surveys

The assessment comprised an external inspection of the buildings within the study area (where access permitted) to identify features with potential to support roosting bats (Preliminary Roost Assessments – PRA).

Buildings on site were externally assessed from the ground for their potential to support roosting bats following the Bat Conservation Trust (BCT) Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins 2016). The buildings assessments were undertaken on 15 July 2019, by Arcadis ecologists Ewan Gibson and Rory Roche.

The external visual inspection assessed the buildings according to features present that may have the potential for use by bats. These included recording potential roosting features (PRF) such as holes, apertures and other opportunities for bats to roost including the type, quality and connectivity of the surrounding habitat.

These were then categorised according to their potential as detailed in the BCT guidelines. Categories as follows are presented in detail in Appendix A:

- negligible;
- low;
- moderate; and
- high.

Where possible, evidence of bat activity or features with roosting potential were confirmed by the presence of the following signs:

- bat droppings (these may accumulate under an established roost);
- insect wings (from feeding);
- oil (from fur) and urine stains;
- scratch marks;
- actual sightings (including corpses).

A hibernation potential assessment was also undertaken. This was a high-level assessment assessing each building's likelihood to support roosting bats. No internal inspections were undertaken on any structures due to access restrictions and health and safety concerns. In the absence of any definitive good practice guidance, bespoke assessment criteria were utilised to describe hibernation potential. This assessment was based upon the potential for the structure to offer areas of shelter with a stable temperature regime during the winter. This assessment should be viewed as a preliminary assessment only and further surveys will be required to inform detailed design.

Table 9: Details of the hibernation potential criteria utilised within the reporting.

Hibernation Category	Explanation
Negligible	Structure has no PRFs which are likely to offer a bat a location for shelter with a stable temperature regime, suitable for hibernation.
Unknown	The structure cannot be assessed at this time.
Potential	The structure may offer hibernation opportunities. This potential will likely need to be investigated at the appropriate stage of the planning process.

Following the building assessments, structures which were assessed as having low, moderate or high potential to support roosts were surveyed with emergence / re-entry surveys.

Table 10 below outlines the number of surveys conducted for buildings within each assessment category

Table 10: Number of emergence / re-entry or backtracking surveys conducted for structures of each roosting category.

Category	Number of surveys	Notes
Negligible	None*	No survey was required, and no surveys is likely to be required during the planning process.
Low	Minimum of one survey	Additional update surveys are likely to be required later in the planning process.
Moderate	Minimum of two surveys	Additional update surveys are likely to be required later in the planning process.
High	Minimum of three surveys	Additional update surveys are likely to be required later in the planning process.

* a subset of structures with 'negligible' roosting potential were surveyed as they were part of a larger set of buildings surveyed in a single visit.

2.3.7 Emergence / re-entry surveys

Emergence/ re-entry surveys on buildings were carried out by experienced surveyors strategically positioned to cover the main features identified during the initial assessments. An Elekon Batlogger, which is a hand-held device used to detect and record bats, was used across all surveys by each surveyor.

The dusk surveys began approximately 15 minutes before sunset and finished approximately 90 minutes after sunset. The dawn surveys began a minimum of 90 minutes before sunrise and finished 15 minutes after sunrise.

2.3.8 Data analysis

Where a roost or potential roost was identified, or particularly notable bat activity was recorded, the calls recorded on the bat detectors were analysed using Bat Explorer analysis software. Calls were assessed using the guidelines within the relevant guidance documents (Russ 2012).

2.4 Survey limitations

2.4.1 Static detector surveys

Within the survey design, it was not possible to deploy detectors to all locations simultaneously, due to the risk of interference by members of the public and financial considerations. However, due to the rotational deployment for the purposes of this study, considering the large amount of data collected, and the normalisation calculations applied (assessing 'passes per hour'), this issue is unlikely to have affected the veracity of the data.

Long-eared bats are difficult to record during bat detector surveys (due to the low sound volume of their calls). The usage of the site by this species will be extrapolated from the transect surveys and a precautionary approach. This is a limitation of all detector surveys using acoustic detectors, nevertheless, the manned transect surveys which include visual observations control the effect of this limitation.

It is difficult within automated survey data to determine a 'bat 'pass', as without visual observations, the same individual bat may pass multiple times or multiple bats may pass the detector. However, to address this issue, the same parameters for file partitioning were utilised on all detectors, and a single sound file was identified as a bat 'pass'. This allows a repeatable comparison of activity levels between static locations. It is not possible from this data (or any static (automated) detector data) to accurately assess the number of bats present in an area.

On a few occasions, the detectors failed to record for all or a proportion of the survey deployment due to technical issues. The causes of these issues are unknown but can consist of:

- Write errors on SD cards;
- Interference with detector recordings from adjacent equipment such as generators or signalling equipment;
- Low temperatures impacting upon battery output voltages;
- Damp ingress into detectors or microphones; and
- Interference from the public.

Issues with detectors occurred on six occasions. It is considered likely that on each occasion it was the result of equipment failure. These occasions are listed below:

- In the July placement at location H, only three nights of recordings were present.
- In the August placements at location H, only one night of recordings were present.
- In the July placement at location C, only four nights of recordings were present.
- In the August placements at location C, only three nights of recordings were present.
- In the August placements at location E, no recordings were present.
- In the September placements at location E, only two nights of recordings were present.

Despite these issues, the equipment functioned correctly on most of the surveys, with over 2445 hours of data were recorded and analysed from across the site. The equipment errors only led to a <15% reduction in survey nights, which is not considered to have adversely affected the survey results. Details of the hours of data analysed are presented in Appendix B.

In addition, in the analysis, all data was assessed using a 'passes per hour' manipulation/normalisation, to ensure that the effect of variations in the deployment period was minimised within the comparative results.

2.4.2 Activity transects

During the surveys a small number of limitations were encountered. These were not considered to have significantly affected the results of the surveys or subsequent analyses but are noted within this section for transparency.

The principal limitation of the reported surveys is that the numbers of passes recorded demonstrate only relative bat activity, and not bat numbers. Relative bat activity is therefore used to determine the comparative importance of different areas to bat species / species groups and cannot be used to infer where the greatest number of individuals may be found.

The detection rate of bats varies between species dependent upon the parameters of their echolocation passes. It is very important to recognise these differences in the inferences that are drawn from the raw data.

The walked activity survey in August was not undertaken for Transect 4 due to a change in scope of the proposed scheme. At the time it was determined that the Site of Importance to Nature Conservation located to the south east of the site, which Transect 4 surveyed, would not be impacted by the proposed development, therefore a survey would no longer be required.

Due to health and safety concerns, during the dusk survey on the 21 August, the dawn survey for Transect 3 was not conducted and was postponed as unknown vehicles (likely trespassing) were encountered by surveyors. The dawn survey for Transect 3 was undertaken on the 13 September 2018.

Transect surveys were undertaken for Transect 1, 3 and 4 during October 2018; however, due to sub-optimal survey conditions of rain and strong wind, it was not possible to conduct the walkover for Transect 2. The UK bat active period is generally considered to be between April to October, and surveys undertaken within October are dependent on local weather conditions. This limitation is not considered to have significant effects on the overall survey results as walked activity transects were undertaken from May to September for Transect 2 and it is considered that sufficient data was collected to identify the assemblage of bat species using the site and the nature and levels of activity, to form robust conclusions and recommendations.

2.4.3 Bat building assessments and emergence surveys

Of the 31 structures identified within the site, two (B24 an B25) could not be accessed during the 2019 surveys. However, multiple surveys were conducted in the vicinity of these buildings and this is not considered to have affected the characterisation of the site.

It can be difficult to determine definitively that a bat emerged from a structure, especially during the darker periods of the surveys. As such, when a surveyor recorded that an emergence / re-entry to a structure was 'probable', subsequent surveys were designed to cover this area. In some instances, it was still not possible to confirm a roost, an in these instances, it is advised that a precautionary assessment is undertaken, where 'probable' roosts are treated as confirmed roosts.

Within woodlands and below trees etc, due to their nature, it is very hard to observe a bat returning to a roost. Therefore, observations of activity (such as swooping behaviour indicative of a return to a roost) and activity early after sunset and early before dawn are recorded. This is used to determine the likelihood of roosts.

2.5 Analysis limitations

2.5.1 Static detector surveys

The detection rate of bats varies between species dependent upon the parameters of their echolocation passes. It is very important to recognise these differences in the inferences that are drawn from the raw data.

An extensive amount of data was collected, and the decision was made to use auto-identification software rather than to undertake identifications manually. While auto-identification is in its relative infancy and has its flaws, it is likely to be no less accurate overall than the subjective identification by a number of human observers over large volumes of data, even if a human is likely to be more accurate in dealing with small numbers of passes.

Despite the high quality of 'Kaleidoscope' data analysis, all detector software has a percentage of incorrect or uncertain identifications. To address this issue, a verification protocol was conducted, whereby a subset of the data was assessed for quality. The detailed methodology and results of this assessment can be seen presented in Appendix E. During this assessment, the success of Kaleidoscope species and group identification was largely found to be within acceptable parameters. This assessment did change how certain species identifications were handled. Table 5 and Table 6 show how the auto ID verification changed how certain bats were handled in the analysis.

The Ecobat tool doesn't provide database details and is not possible to interrogate. However, is was a useful contextualising tool for the site assemblage in comparison with the surrounding area (within 200km).

3 Results

3.1 Reporting outline

The results of the desk study, habitat assessment, static detector surveys, bat transects, building assessments, bat emergence / re-entry surveys and woodland back tracking are presented in this section. The following sections present this information

- Result of the desk study are presented in section 3.2;
- Results of the habitat assessment are presented in section 3.3;
- Results of the static detector surveys are presented in 3.4;
- Results of the bat transects are presented in section 3.5;
- Results of the bat emergence / re-entry surveys are presented in section 3.6.

3.2 Desk study

A desk study undertaken revealed that no Special Area of Conservation (SACs) where bats are a qualifying feature occur within 10km of the site.

The information from Sussex Biodiversity Record Centre returned records of 17 bat species/groups within 5km of the site. Table 11 below presents a summary of the desk study data obtained from the Sussex Biodiversity Record Centre. Due to the long lived and site loyal nature of bat species no time limit was placed on the data examined (all data received from Sussex Biodiversity Record Centre was reviewed, of which the oldest record was from 1982).

Table 11: Summary of desk study data

Species	Records (non-roost)	Records (Roosts)
'Bat'	79	19
Bechstein's Bat	7	1 (bat box inspection)
Brandt's Bat	2	0
Brown Long-eared Bat	46	36
Common Pipistrelle	364	64
Daubenton's Bat	13	0
Leisler's bat	1	0
Long-eared sp.	13	12
Myotis sp	83	0
Nathusius's Pipistrelle	2	0
Natterer's Bat	13	0
Noctule	103	1
Pipstrelle sp.	38	14

Species	Records (non-roost)	Records (Roosts)
Serotine	5	2
Soprano Pipstrelle	64	12
Barbastelle	2	0
Whiskered Bat	13	0
Whiskered/Brandt's	2	0

Multiple records of roosts were returned from within 5km of the site. No records were identified with the site boundary; however, numerous roosts have been identified close to the site and have been detailed in Table 12 below.

Table 12: Bat roosts recorded within the vicinity of the site

Roost Location	Species	Roost Type	Notes	Year recorded
House, Ifield Street TQ247376	Brown Long-eared Bat	Unknown	1 bat	2007
House, Lytton Drive TQ248372	Unknown	Unknown roost	1 bat	1994
House, Rusper Road TQ235374	Pipistrelle sp	Unknown	N/A	2006

In addition, information was also obtained from previous surveys conducted on and around the site in order to inform other planning decisions. The results of the assessments of previous planning applications are presented in Table 13.

Table 13: Data from other sources (previous planning applications)

Information Source	Data obtained
Chris Blanford Associates, Gatwick NW Zone Hangar Project	Ground level investigation, tree emergence and radio tracking surveys and bat transects were undertaken in both 2014 and 2016 west of Gatwick Airport (TQ26013584081465). Four tree roosts were found during radio tracking surveys and emergence surveys of which a single male Bechstein's bat, two soprano pipistrelle bats and one common pipistrelle were identified. ' A minimum of six species were recorded during the transect surveys. Species recorded were common pipistrelle; soprano pipistrelle; noctule; bats from the myotis genus; long-eared bat; and Leisler's bat. Frequent foraging by common and soprano pipistrelle bats was recorded A minimum of eight bat species have been positively identified within the site using static detectors. Species recorded were common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, bats from the Myotis genus, noctule, long-eared bat, Leisler's bat, serotine. Given the level of activity and number and diversity of species recorded, it was considered that the value of the bat assemblage within the site was of County Importance.

3.3 Habitat assessment for bats

The site has moderate to high bat potential habitats because of the presence of copse/pond/linear features. Most of the site is arable and of low value to bats. The habitats present on the site are described in full in the Extended Phase 1 Habitat survey associated with the site (Arcadis 2019).

The habitat assessment conducted during May, June and July 2018 identified multiple habitats with value for bats. These areas included:

- Hedgerows likely to be utilised for foraging and commuting;
- Trees and buildings suitable for roosting;
- Streams, rivers and ponds likely to be utilised for foraging and commuting;
- Woodlands likely to be valuable for foraging and roosting; and
- Grasslands and arable habitats likely to be utilised for foraging.

Overall, when the site was considered as a whole, it was assessed that it offers moderate habitat for bats consisting of good habitat connected to the wider landscape that could be used by bats, with large areas of lower value habitats (such as the intensively farmed arable fields). However, certain areas of the site offer higher value for bats, including the woodlands, river and tree lined stream corridors and water bodies.

The overall assessment of the value of the site was used to determine the required surveys required to inform the masterplan.

3.3.1 Building assessment results

During the assessment, 31 buildings were assessed for roosting potential. Details of the locations of the buildings is presented in Figure 1. Fifteen of these buildings were assessed as having negligible roosting potential, 10 were assessed as having low roosting potential, two were assessed as having moderate roosting potential and four were assessed as having high roosting potential. Full details of the assessments and the results are presented in Appendix IFigure 2 and illustrated in Figure 2. All building inspections were conducted in July 2019 and no internal inspections were undertaken.

3.4 Static bat detector results

3.4.1 Overview

This section of the report outlines the results of the static bat detector surveys conducted. The details of the number of hours of surveying conducted at each detector position is presented in Table 14. The locations of the detector positions referred to in this section are presented in Figure 3. Full details of the static detector results are presented in:

- Appendix A: Static survey - bat passes data
- Appendix B: Static survey - hours of data recording analysed
- Appendix C: Full results of bat static surveys
- Appendix D: Static survey - sm4 set up details
- Appendix E: Static survey - data verification results.

Table 14: Summary of data recorded

Position	May		June		July		August		September		October	
	Number of bat passes	Hours analysed	Number of bat passes	Hours analysed	Number of bat passes	Hours analysed	Number of bat passes	Hours analysed	Number of bat passes	Hours analysed	Number of bat passes	Hours analysed
A	2799	47.58	2191	42.18	2478	46.83	1703	55.18	5058	62.15	180	73.87

Position	May		June		July		August		September		October	
	Number of bat passes	Hours analysed	Number of bat passes	Hours analysed	Number of bat passes	Hours analysed	Number of bat passes	Hours analysed	Number of bat passes	Hours analysed	Number of bat passes	Hours analysed
B	1996	47.58	2653	42.18	3561	46.83	1998	55.50	5993	62.15	450	73.87
C	628	48.08	296	42.18	92	37.38*** *	52	33.25**	58	63.77	1320	73.30
D	862	48.08	839	42.18	316	46.83	209	54.60	406	75.55	1260	73.30
E	711	47.58	522	42.20	375	46.60	*	*	541	24.15**** *	87	73.87
F	156	47.58	101	42.20	103	46.83	60	55.50	59	65.68	339	73.87
G	3494	47.58	1045	42.18	448	47.30	495	55.82	95	63.25	2252	73.00
H	52	47.58	506	42.18	606	18.78**	16	10.80*	153	63.45	24	73.00

* No bat calls recorded – likely to be a technical equipment issue
** Only three nights of recordings. Likely to be a technical equipment issue
*** Only one night of recordings. Likely to be a technical equipment issue
**** Only four nights of recordings. Likely to be a technical equipment issue.
***** Only two nights of recordings. Likely to be a technical equipment issue.

3.4.2 Seasonal variation of call frequency (i.e. activity)

Overall, the seasonal distribution of passes was unusual, with most passes recorded within September and a notable reduction in passes in August. The distribution of passes recorded each month are presented in Image 2.

To account for the variation in the number of hours of survey conducted in each month (due to equipment error and varying night lengths, a normalised activity of ‘passes per hour’ was calculated. This is presented in Image 3. Once this normalisation was completed, the results showed that the highest level of activity was in May. There was a notable decline in passes in August and after September.

Image 2: Total number of passes recorded in each month.

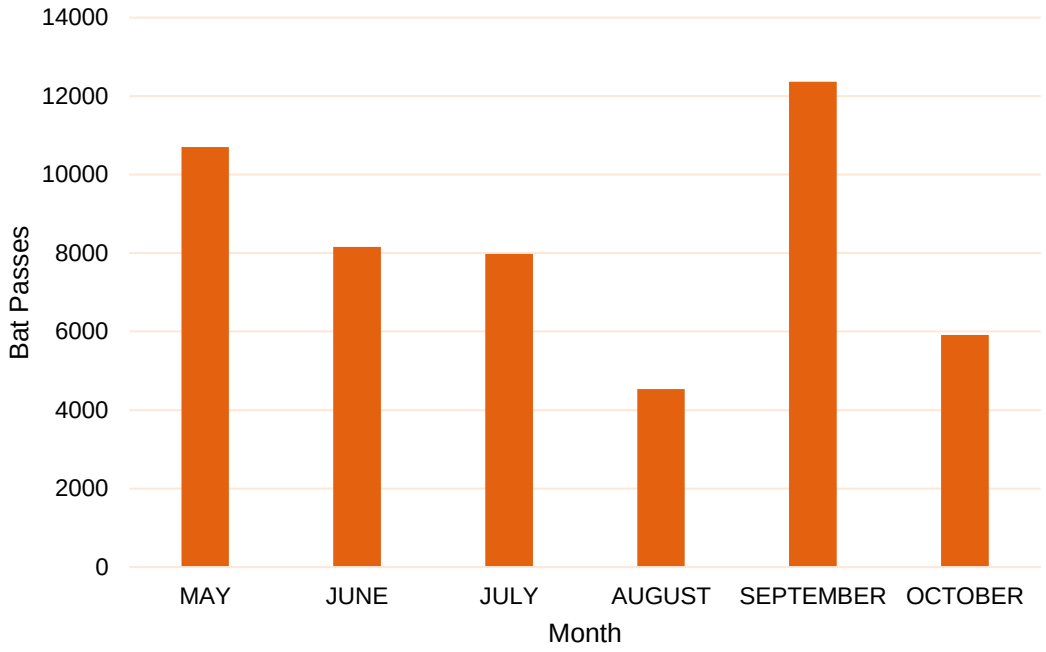
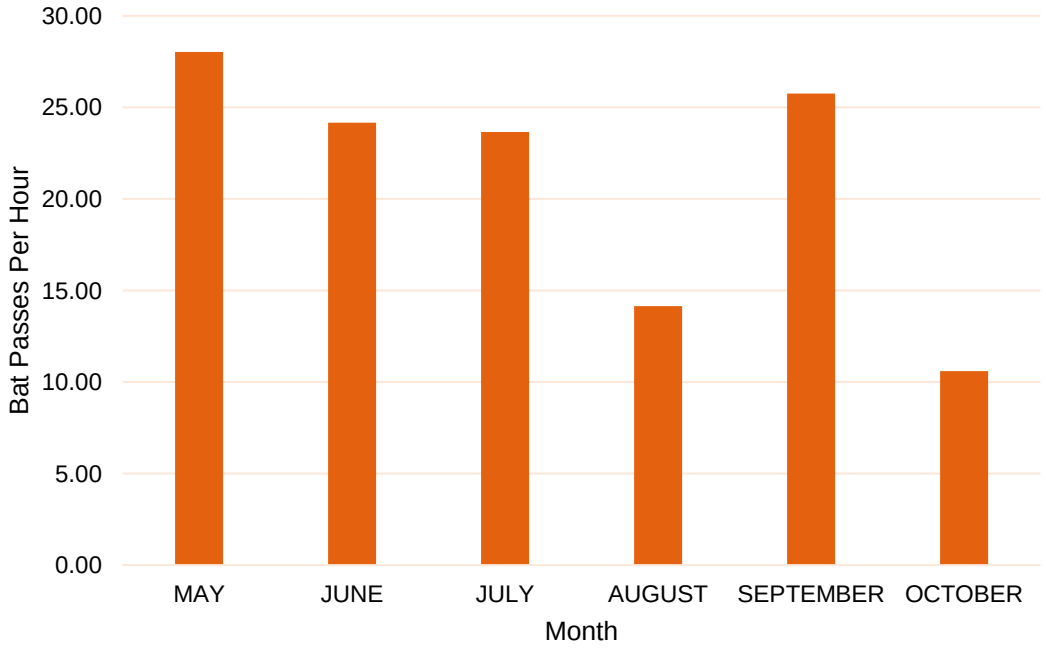


Image 3: Total number of bat passes recorded per hour



3.4.3 Bat activity assessments

3.4.3.1 Between site activity assessment

Overall, the average percentile activity for the site, as assessed by Ecobat was moderate to high activity (i.e 61st-80th percentiles), meaning the site is in approximately in the top 40% of activity levels for comparative sites. However, this needs to be assessed carefully as variations in surveying methodologies can create a skew in the results. Firstly, the static position points within the site were selected to cover notable habitat

types (i.e. the best habitats) and therefore are likely to have picked out heterogeneous habitats, which are likely to have a higher level of bat activity than randomly selected survey quadrants within the area.

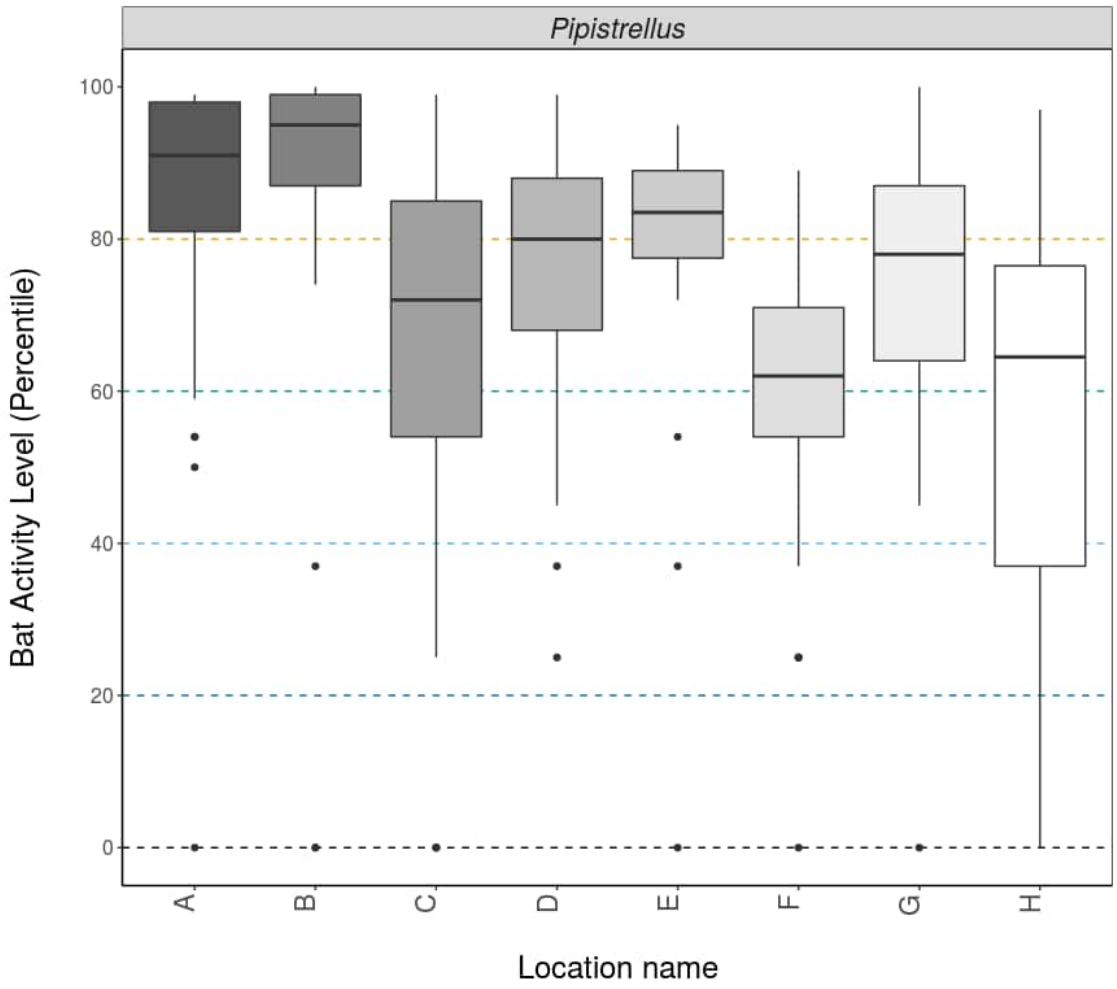
As a result, it is assessed that the Ecobat assessment may overvalue the activity levels within the site, which was backed up by professional judgement of the activity levels on the site.

The overview results from the Ecobat assessment are presented in Table 15. A visual presentation of the results of the assessment is shown in Image 4.

Table 15: Summary of Ecobat assessment of static data 2018

Location	Species Analysed	Nights of High Activity	Nights of Moderate/ High Activity	Nights of Moderate Activity	Nights of Low/ Moderate Activity	Nights of Low Activity	Median Percentile
A	*Pipistrellus*	30	2	4	0	1	91
B	*Pipistrellus*	28	3	0	1	2	95
C	*Pipistrellus*	9	10	4	3	3	72
D	*Pipistrellus*	17	11	3	2	0	80
E	*Pipistrellus*	14	7	1	1	1	84
F	*Pipistrellus*	2	19	6	5	1	62
G	*Pipistrellus*	16	13	5	0	1	78
H	*Pipistrellus*	6	8	3	4	3	65
Site summary	Between Moderate and high activity, on average 61st-80th percentile overall						

Image 4: Excerpt from the Ecobat analysis presenting the activity percentile for each deployment.



3.4.3.2 Within site activity assessment

Activity levels across the site varied greatly. Once the 2019 static detector data was normalised (to a passes per hour value), clear variations between the number of passes at each transect location became apparent. Table 16 below outlines the 'passes per hour' across the site at each sampling location, normalised for survey effort. An average activity presented in 'passes per hour' is presented in Table 17. Where no passes were recorded in August in position E, this month was removed from the analysis. The results presented in Table 17 are presented visually in Image 5.

Table 16: Average number of passes at each deployment location and assessment of activity level.

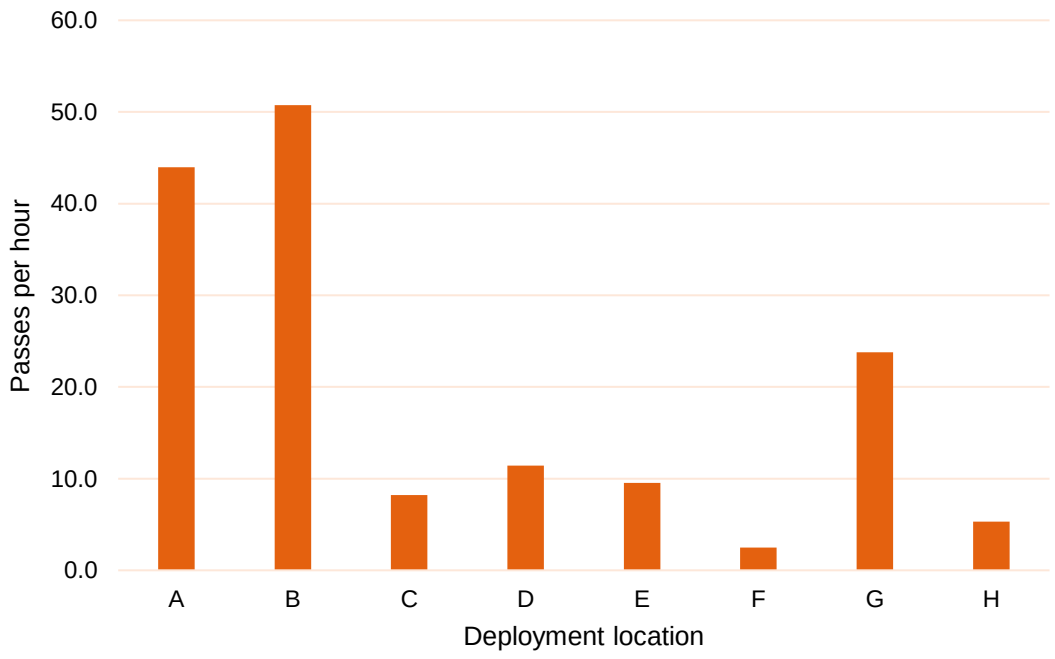
Position	May	June	July	August	September	October
A	58.8	51.9	52.9	30.9	81.4	2.4
B	42.0	62.9	76.0	36.0	96.4	6.1
C	13.1	7.0	2.5	1.6	0.9	18.0
D	17.9	19.9	6.7	3.8	5.4	17.2
E	14.9	12.4	8.0	*	22.4	1.2

Position	May	June	July	August	September	October
F	3.3	2.4	2.2	1.1	0.9	4.6
G	73.4	24.8	9.5	8.9	1.5	30.8
H	1.1	12.0	32.3	1.5	2.4	0.3
Average	28.1	24.2	23.8	12.0	26.4	10.1

Table 17: The number of passes and the number of passes per hour

Position	Total Number of passes	Hours Recording	Average activity (passes per hour)
A	14409	327.8	44.0
B	16651	328.1	50.7
C	2446	298.0	8.2
D	3892	340.5	11.4
E	2236	234.4	9.5
F	818	331.7	2.5
G	7829	329.1	23.8
H	1357	255.8	5.3

Image 5: Average activity (average passes per hour at each deployment location)



These results were used to allocate each of the deployment locations (and surrounding areas) into activity level bandings, as explained in section 2.3.4.5 above. The sections below outline the results of this banding.

3.4.3.2.1 Within site activity levels - low

Of detector positions A - H, two locations had 'low' levels of activity. This location is described in Table 18 below. The location of this detector is presented in in Figure 4 and Figure 5.

Table 18: Areas where 'low' activity was recorded.

Position	Activity (passes per hour)	Area description
F	2.5	This detector location is adjacent to a wooded stream (Ifield Brook) in the south east of the site. It was expected that this area would have a higher level of activity considering the heterogeneity of the area and nearby foraging area of the river. There is potential that the wooded surroundings of the detector will have reduced pass detection in this area, which may explain the low level of activity recorded.
H	5.3	This detector location is within the golf course at the south of the site. This area is heavily managed and offers limited foraging opportunities. The low level of activity in this area was as expected.

3.4.3.2.2 Within site activity levels - medium

Of detector positions A - H, three locations had 'medium' levels of activity. These locations are described in Table 19 below. The location of these detectors is presented in Figure 4 and Figure 5.

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Table 19: Areas where 'medium' activity was recorded

Position	Activity (passes per hour)	Area description
C	8.2	This detector was placed on the edge of an arable field, adjacent to a stream, the River Mole. There are multiple large mature trees nearby.
D	11.4	This detector was placed within a largely homogenous area in the centre of a number of arable fields adjacent to a tree and a ditch. This location is likely to be a commuting route due to the presence of a linear feature through this area, but there are limited opportunities for foraging in the surrounding area.
E	9.5	This detector was located in the west of the site within a homogenous area. There are many trees in this area, with rough grassland and streams also present.

3.4.3.2.3 Within site activity levels - high

Of detector positions A - H, three locations had 'high' levels of activity. These locations are described in Figure 5.

Table 20 below. The location of these detectors is presented in Figure 4 and Figure 5.

Table 20: Areas where 'high' levels of activity were recorded

Position	Activity	Area description
A	44.0	This detector deployment is adjacent to some large trees in the north of the site, within grazed pasture fields. The highest level of activity was recorded within this area, which is likely due to the identified presence of several roosts within the nearby buildings. In addition, there is good foraging habitat located around this area, including a small wet area and sections of a moat.
B	50.7	This detector was placed on the edge of a grazed pasture field, adjacent to a dich with contributes to the nearby River Mole. There are multiple large mature trees nearby. It is considered that this area is likely to constitute a commuting route to the woodland to the north of the site.
G	23.8	This detector was placed adjacent to a line of trees in the south of the site, adjacent to a hedgerow. There is some foraging habitat nearby; however, it is considered more likely that this boundary is a commuting route for bats.

3.4.4 Assemblage of species

3.4.4.1 Sitewide assemblage

This section of the report outlines the assemblage of species recorded during the static detector surveys.

Most of the passes recorded were common or soprano pipistrelles, these bats formed a total of 95% of the passes. The numbers of passes from each species group are presented in Table 21 (to species level if possible) and Table 22 (identified to 'group' as outlined in Table 6). This information is also presented visually in Image 6 below.

In addition to the common and soprano pipistrelle passes, several 'rarer' and 'rarest' bats were recorded. Two barbastelle passes (a 'rarest' bat) were recorded during the survey. These only made up <0.1% of the passes recorded. Nathusius' pipistrelle (a 'rarer' bat) was also recorded, forming 0.3% of the passes. No passes were definitively identified as being attributable to Bechstein's bat.

Big bats, including serotine, Leisler's and noctule bats were recorded. These made up 1.9% of the passes recorded.

Brown long-eared bats were also recorded. Only 284 passes were recorded (0.6% of passes); however, this bat is difficult to detect using acoustic detectors due to the low auditory volume of the passes.

Myotis bats were recorded, only Daubenton's and Natterer's bats could be identified to species level. Myotis bat passes were only 0.8% of the bat passes recorded.

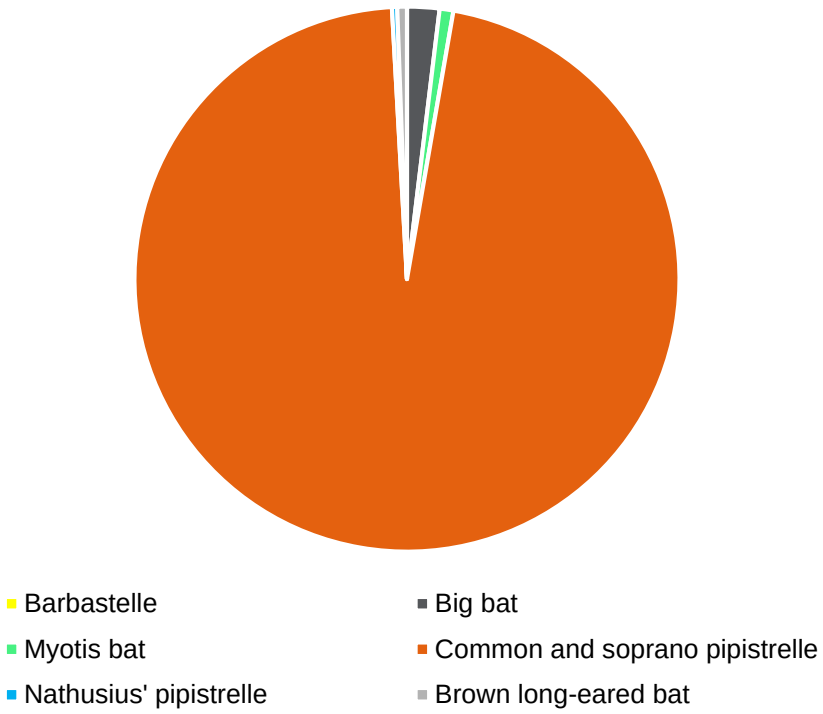
Table 21: Proportions of passes identified to each species group (all positions, all months).

Species Group (as accurate as can be reliably determined)	Count	% of passes (rounded to 1 decimal point)
Barbastelle	2	0.0
Big bat	208	0.4
Serotine	246	0.5
Myotis bat	379	0.8
Daubenton's bat	5	0.0
Natterer’s bat	20	0.0
Nyctalus species	21	0.0
Leisler's bat	24	0.0
Noctule	452	0.9
Pipistrelle species	963	1.9
Nathusius' pipistrelle	154	0.3
Common pipistrelle	46363	93.4
Soprano pipistrelle	517	1.0
Brown long-eared bat	284	0.6

Table 22: Proportions of passes identified to each species group (all positions, all months)

Species Group (Broad Groups)	Count	% of passes
Barbastelle	2	0.0
Big bat	951	1.9
Brown long-eared bat	284	0.6
Common and soprano pipistrelle	47843	96.4
Myotis bat	404	0.8
Nathusius' pipistrelle	154	0.3

Image 6: Proportion of bat passes of each species / species group



This assemblage assessment determined by the static surveys aligned with that of the transect surveys results.

3.4.4.2 Detector location assemblage

Across the site, the assemblage of bats utilising each area varies with location. The activity level alone does not necessarily represent the value of the area (i.e. an area where a common pipistrelle repeatedly forages may not necessarily be more valuable than a location where a varied assemblage of bats forages / commutes). To examine the diversity of the assemblage at each location, the proportion of bats which were 'rarer' or 'rarest' species was investigated

Table 23 shows the number of bat passes recorded as 'common', 'rarer' or 'rarest' species at each static location and Table 24 presents this as a percentage. This information is presented in the map in Figure 4. This is presented visually in Image 7 and Image 8. These results combined for all locations are presented in Table 25.

This information is translated into 'passes per hour' for both the common, rare and rarest groupings and species groups. This information is presented in Table 26 and Table 27. This is presented visually in Image 9, Image 10 and Image 11 and on Figure 6.

Table 23: Number of passes of 'common' and 'rarer' species of bats.

Position	Number of passes of common bats	Number of passes of 'rarer' bat species	Number of passes of 'rarest' bat species
A	14167	242	0
B	15993	658	0
C	2397	49	0

Position	Number of passes of common bats	Number of passes of 'rarer' bat species	Number of passes of 'rarest' bat species
D	3822	70	0
E	2161	75	0
F	756	62	0
G	7606	222	1
H	1225	131	1
TOTAL	48127	1509	2

Table 24: Percentage of passes of common and rare / rarer bats

Position	Percentage of common bats	Percentage of passes of 'rarer' bat species	Percentage of passes of 'rarest' bat species	Percentage of passes of 'rarer' and 'rarest' bat species combined
A	98.3	1.7	0.0	1.7
B	96.0	4.0	0.0	4.0
C	98.0	2.0	0.0	2.0
D	98.2	1.8	0.0	1.8
E	96.6	3.4	0.0	3.4
F	92.4	7.6	0.0	7.6
G	97.2	2.8	0.0	2.8
H	90.3	9.7	0.1	9.8

Table 25: Percentage of passes of 'common', 'rarer' and 'rarest' species of bats overall

Position	Number of bats	Percentage of bats
Common	48127	97.0
Rarer	1509	3.0
Rarest	2	<0.01

Image 7: Proportion of passes of common, rarer and rarest bat species

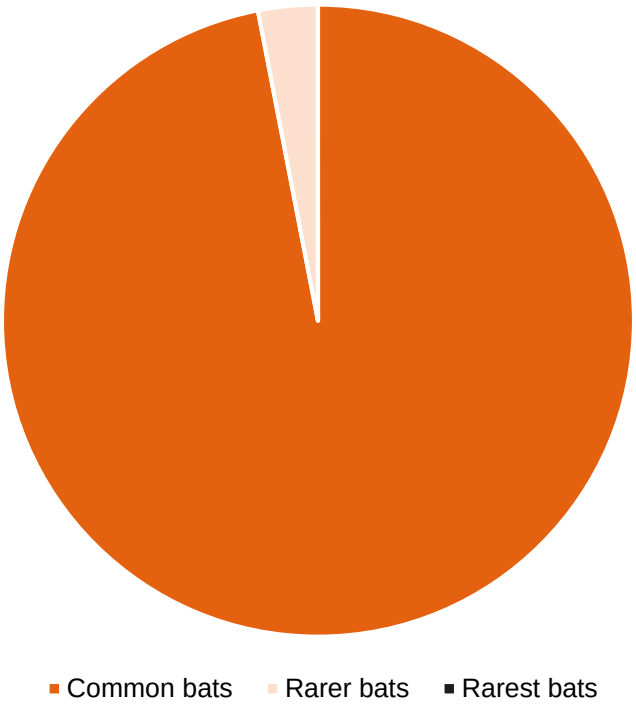


Image 8: Chart showing the percentage of passes of common, rarer and rarest bats

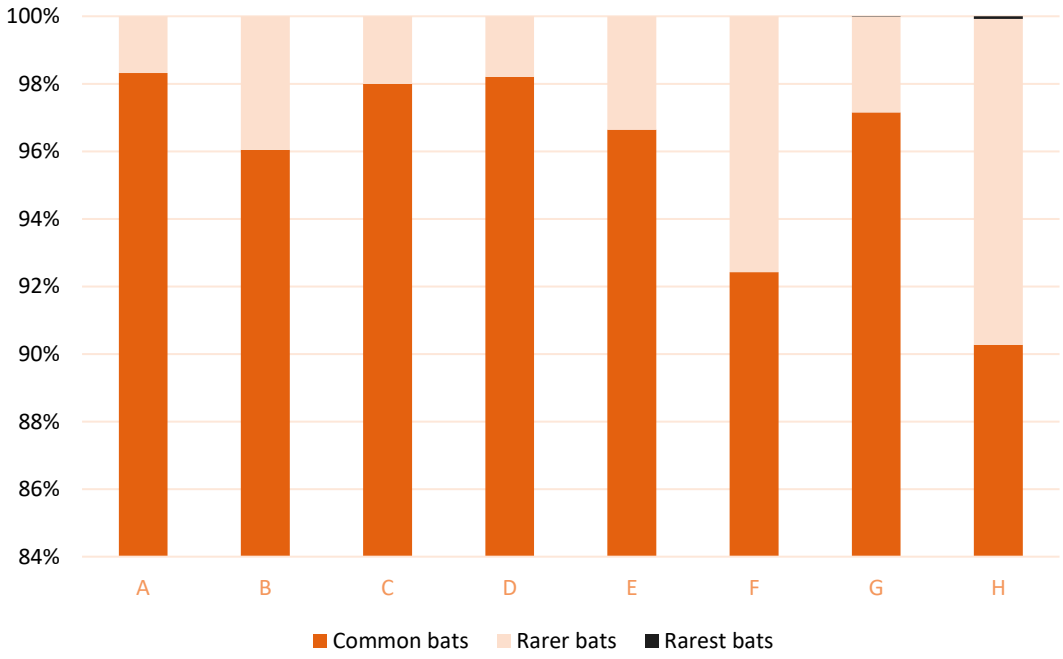


Table 26: Passes per hour at each position of common rare and rarest species of bats.

Position	Hours Recording	Passes per hour - Common	Passes per hour - Rarer	Passes per hour - Rarest
A	327.79	43.22	0.74	0.00
B	328.11	48.74	2.01	0.00
C	297.96	8.04	0.16	0.00
D	340.54	11.22	0.21	0.00
E	234.4	9.22	0.32	0.00
F	331.66	2.28	0.19	0.00
G	329.13	23.11	0.67	0.00
H	255.79	4.79	0.51	0.00

Table 27: Passes per hour at each position of the different species of bats

Position	Hours of survey	Barbastelle	Big bat	Brown long-eared bat	Common and soprano pipistrelle	Myotis bat	Nathusius' pipistrelle
A	327.79		0.25	0.05	43.17	0.27	0.22
B	328.11		1.69	0.39	48.36	0.30	0.02
C	297.96		0.10	0.04	8.01	0.04	0.02
D	340.54		0.11	0.01	11.22	0.05	0.04
E	234.4		0.24	0.02	9.20	0.03	0.04
F	331.66		0.14	0.00	2.28	0.05	0.01
G	329.13	0.00	0.23	0.16	22.95	0.39	0.05
H	255.79	0.00	0.27	0.27	4.52	0.14	0.10

Image 9: Average number of passes per hour of common rarer and rarest bats at each detector position

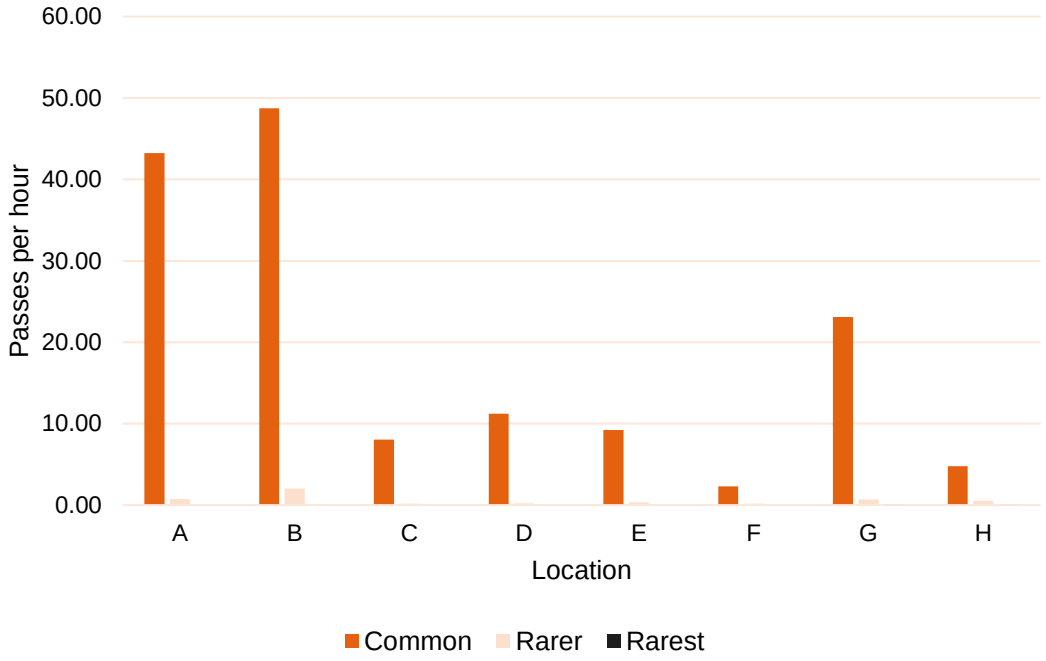
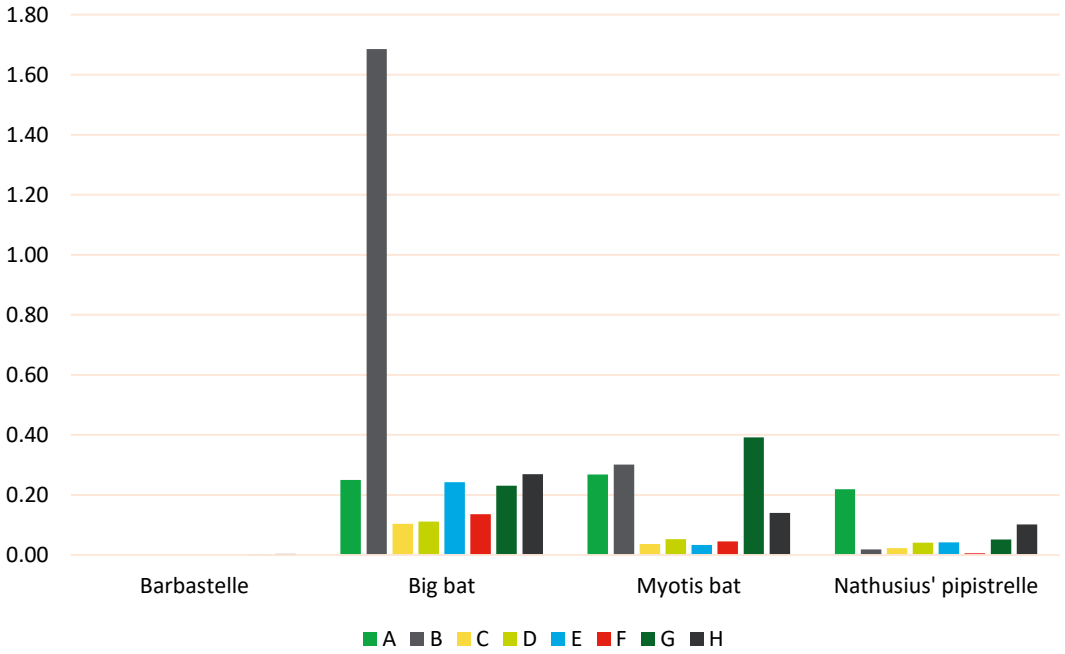
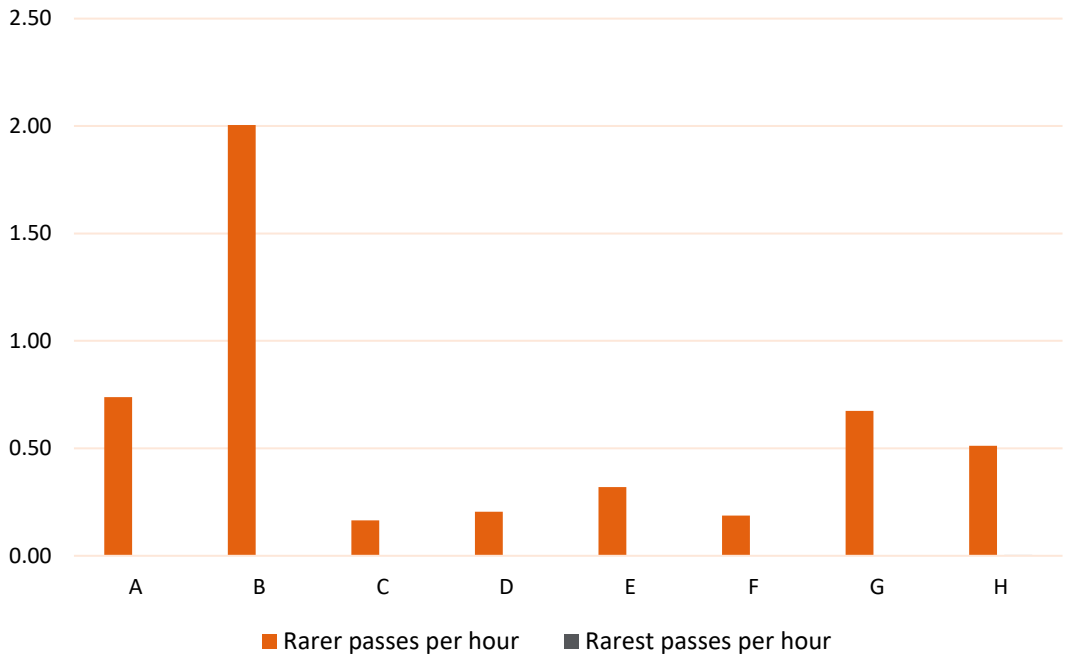


Image 10: Average number of passes per hour of rarer and rarest bats at each deployment location.



N.B – only two barbastelle calls were recorded, these are not visible within this image, but were recorded at positions G and H.

Image 11: Relative activity of bat species with common and soprano pipistrelles removed



3.5 Bat activity transect results

This section of the report outlines the results of the bat activity transects conducted in 2018. Table 28 presents the number of passes of each species recorded during each survey. This information is presented on the map along with the locations of each bat recorded in Figure 7 to Figure 14.
This information is normalised to passes per hour in Table 39. Overall, the passes per hour were comparable between the four survey routes across the site, with all of the activity recorded in the region of 50 – 70 passes per hour. The average passes per hour for each transect is presented in Table 30. The highest level of activity was along transect 3, although this is not considered notably higher than the other transects.
Between the months of transects, there was some variation in the level of activity recorded, with the highest activity levels being recorded in May, June and July with a decline in activity levels throughout August September and October. This is presented in Image 13
The distribution of species recorded in the transect surveys was comparable to the static detector surveys, with most passes being common and soprano pipistrelles (over 91% of the passes recorded). A comparable number of bat species were recorded in the transect surveys to the static detector surveys, and no species were recorded in the transect survey that were not recorded in the static detector surveys. The proportion of each species which was recorded is presented in Image 12.

Table 28: Bat passes detected during the transects conducted in 2018

TRANSECT	May				June				July				August					September					October			Grand Total
	1	2	3	4	1	2	3	4	1	2	3	4	1 Dawn	1 Dusk	2 Dawn	2 Dusk	3	1	2	3 Dawn	3 Dusk	4	1	3	4	
Myotis sp.	2	2	1	2		1	9	1	7	5	6	3		1	2		2	8			8	2				**62**
Myotis sp./ Long eared bat sp.													4													**4**
Nyctalus leisleri			14																		4					**18**
Nyctalus noctula	13		9		17	4		1	2	4	2	2	3	3		2	5	2	4		3	5	2			**83**
Nyctalus sp.	1	1					2	2	1			1						3	1		6		2			**20**
Eptesicus serotinus					1				1																	**2**
Big bat sp.			3						1	19	2	2	1	1			18					3			3	**53**
Pipistrellus nathusii											1															**1**
Pipistrellus pipistrellus	153	264	202	172	220	209	197	161	187	199	205	209	85	157	72	76	285	24	146		102	147	3	59	8	**3,542**
Pipistrellus pygmaeus					2		1					2				1	1				2	1		2		**12**
P.pipistrellus/ P. pygmaeus				4				9	3			12							8	2	1	10		1		**50**
P. pipistrellus/ P. nathusii								2																		**2**
Pipistrellus sp.								1														3				**4**
Pipistrellus sp. Social calls																			1		3		2			**6**
Plecotus auritus			8		1					1			8		1	3	7									**29**
Long eared bat sp.social calls													1													**1**
Grand Total	**169**	**267**	**237**	**178**	**241**	**214**	**209**	**177**	**202**	**228**	**216**	**231**	**102**	**162**	**75**	**82**	**318**	**37**	**160**	**2**	**129**	**171**	**9**	**62**	**11**	**3,889**

Table 29: Passes per hour detected during the 2018 transect surveys

Transect	May				June				July				August					September					October			Grand Total
	1	2	3	4	1	2	3	4	1	2	3	4	1 Dusk	1 Dawn	2 Dusk	2 Dawn	3	1	2	3 Dusk	3 Dawn	4	1	3	4	
Total of passes detected	**169**	**267**	**237**	**178**	241	214	209	177	202	228	216	231	162	102	82	75	318	37	160	129	2	171	9	62	11	**3,889**
Start Time	20:53	20:54	21:04	20:55	21:27	21:18	21:20	21:20	20:57	21:00	21:00	21:00	20:11	03:30	20:20	03:22	20:08	19:21	19:25	19:23	03:45	19:27	04:56	18:10	04:53	
End Time	23:33	23:32	23:30	23:00	23:45	00:16	00:07	23:52	23:28	23:18	23:45	23:49	22:42	05:58	22:26	05:58	22:45	21:35	21:29	22:05	06:31	21:43	07:30	19:30	07:30	
Decimal hours of survey	2.7	2.6	2.4	2.1	2.3	2.9	2.8	2.5	2.5	2.3	2.8	2.8	2.5	2.5	2.1	2.6	2.6	2.2	2.1	2.7	2.8	2.3	2.6	1.3	2.6	
Passes per hour	63.4	101.4	97.4	85.4	104.8	73.3	74.6	69.9	80.3	99.1	78.5	82.0	64.4	41.4	39.0	28.8	121.5	16.6	77.4	47.8	0.7	75.4	3.5	46.5	4.2	
Average monthly passes per hour	**86.9**				**80.6**				**85.0**				**59.0**					**43.6**					**18.1**			

Table 30: Average hourly passes per transect

Transect	Average passes per hour during transect surveys
1	53.5
2	59.9
3	66.7
4	63.3

Image 12: Proportion of passes of each species recorded during the transect surveys.

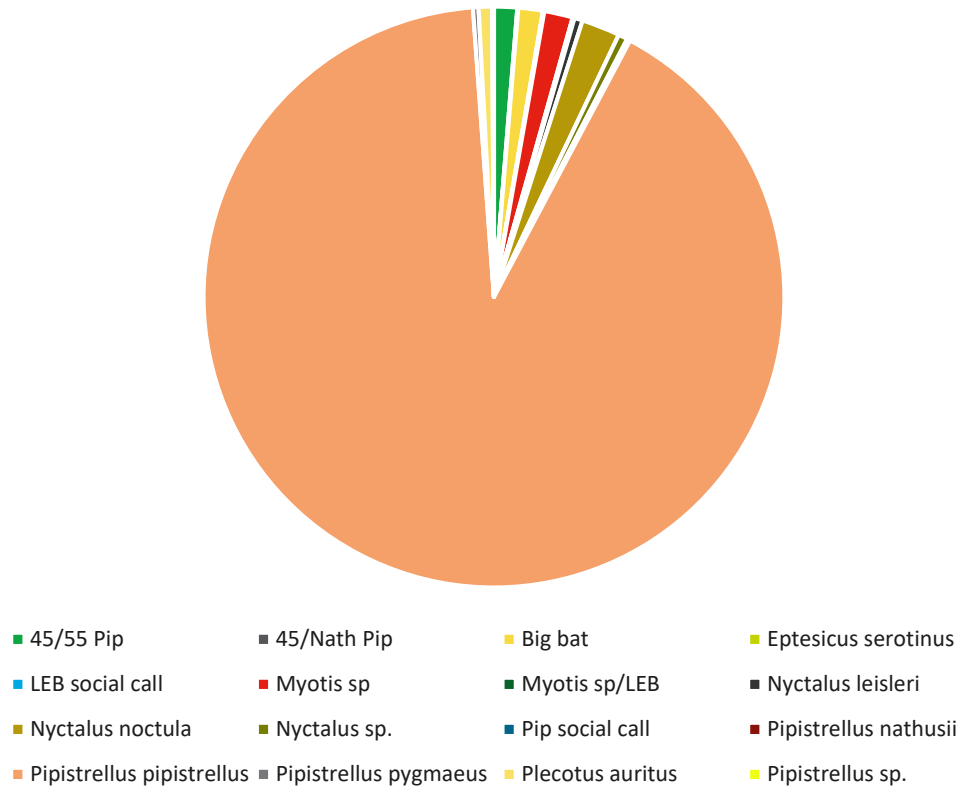
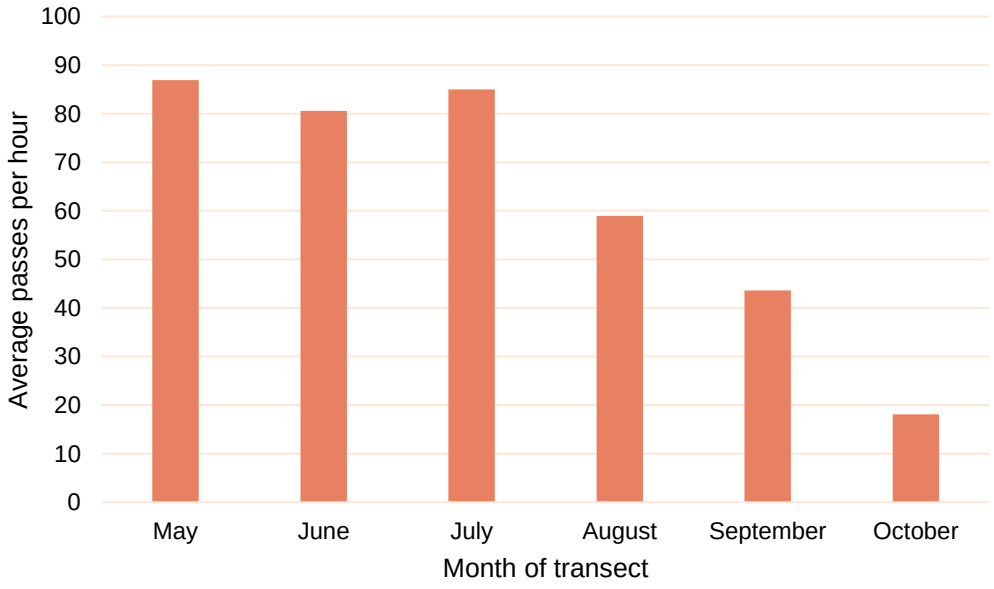


Image 13: Average activity during each month



3.6 Building assessment results

3.6.1 Introduction

During the assessment, 31 buildings were assessed for roosting potential. Details of the locations of the buildings is presented in Figure 1. Fifteen of these buildings were assessed as having negligible roosting potential, 10 were assessed as having low roosting potential, two were assessed as having moderate roosting potential and four were assessed as having high roosting potential. Full details of the assessments and the results are presented in Appendix I and the locations and assessment results are presented in Figure 1 and Figure 2 respectively. All building inspections were conducted in July 2019 and no internal inspections were undertaken. Detailed building assessment results are presented in Appendix IAppendix I.

3.6.2 Bat roosts

Emergence and re-entry surveys were conducted on a total of 13 individual buildings. The table below (Table 31) outlines the roosts found during these surveys. Details of the weather during the surveys is presented in Appendix G and Appendix H. Full results of the surveys conducted is presented in Figure 3.

Table 31: Summary of bat roosts found by Arcadis in 2017/2018 per area / cluster / building

Building	Initial roost potential assessment	Survey date(s)	Roosts found during survey
B1	Low	29/07/2019	No roost
B2 and B3	High	30/07/2019– 29/08/2019	Two common pipistrelle, two pipistrelle species and one soprano pipistrelle confirmed roosts
B4	Low	14/08/2019	No roost
B9	Low	14/08/2019 - 04/10/2019	One confirmed common pipistrelle roost
B13	Moderate	30/08/2019 - 10/10/2019	One confirmed common pipistrelle roost.
B17a	High	31/07/2019 - 28/08/2019	One common pipistrelle roost
B17b	Low	31/07/2019	No roost
B20	Low	14/08/2019	No roost
B21a	Moderate	01/08/2019 - 01/10/2019	Three common pipistrelle roosts
B21b	Low	15/08/2019 - 02/10/2019	Three common pipistrelle roosts One brown long-eared bat maternity roost
B21c	Negligible	15/08/2019 - 02/10/2019	No roost
B22	Low	14/08/2019 - 03/10/2019	One pipistrelle species roost
B27	High	30/07/2019 - 29/08/2019	One common pipistrelle roost

3.6.3 Bat activity and species assemblages recorded during the emergence surveys

During the Arcadis 2019 emergence and re-entry surveys, although observing the behaviour of bats and their usage of the site was not the primary purpose of the surveys, the following observations were made:

- The assemblage of bats observed during the surveys was as obtained during the transect and static surveys, with most passes and activity recorded being common and soprano pipistrelles. Lower numbers of bats of other species were observed; however, these were a small proportion of the calls and were limited to brown long-eared bats, noctule, serotine and myotis species bats. No additional species were recorded during the emergence / re-entry surveys that were not recorded during the transect and static surveys.
- Around buildings 1 - 4, there were large numbers of commuting and foraging common pipistrelle bats in a north / south direction. Key foraging areas were predominately around the trees to the north and east of the buildings, with bats observed commuting from north to south, along the vegetation to the east of buildings 2 and 3. No further key commuting routes or foraging areas were observed and foraging was considered widespread across the site. Noctule were heard within this area, but no commuting routes were identified.
- Around building 9, key foraging areas for pipistrelles (common and soprano) were observed around the pond to the west of the building.
- Around building 13, there was very low levels of foraging and commuting bats, only common pipistrelles observed.
- Around buildings 17a and 17b, foraging and commuting common pipistrelles were observed around the trees and hedgerows to the north and west of the buildings.
- Around buildings 20, 21a – 21d and 22, commuting and foraging of pipistrelle and brown long-eared bats were observed along the tree line to the north west and east of the buildings. Noctule were heard within this area, but no commuting routes were identified.
- Around building 27, there was foraging and commuting of pipistrelle bats, but no key commuting routes or foraging areas were observed. Noctule were heard within this area, but no commuting routes were identified.

Full results from the surveys are presented in Appendix G, Appendix H and Appendix I.

4 Discussion

4.1 Introduction

This section of this report outlines the status of the bat species present in the Land West of Ifield site. To facilitate navigation of this section of the report, the discussion is subdivided into the following sections:

- Activity levels within the site compared to other comparable sites;
- Activity levels within the site;
- Species assemblage within the site;
- Roosts within the site.

4.2 Activity levels within the site compared to other comparable sites

The Ecobat activity assessment tool uses the data from the site to provide a high-level comparison between 'similar sites'. Within the assessment conducted for this report, 'similar sites' were all sites within 200km of the surveyed site where a similar static detector approach had been employed.

Overall, the average percentile activity for the site was in the top 40% of activity levels for comparative sites, with all static detector locations being in the medium – high or high banding. The locations assessed were the most suitable bat habitats on site, therefore it is likely that overall assessment overvalues the activity levels on the site. However, when combined with the expert judgement of the ecologists who conducted the transect surveys on the site the site is assessed as having medium to high activity levels, with the high activity levels being in the most suitable habitats (linear features and around woodland and water bodies.)

4.3 Activity levels within the site

4.3.1.1 Areas with high levels of bat activity

The analysis of the results suggests that certain areas (and habitats) present on the site have high levels of activity for bats. The most valuable areas appeared to be the following areas:

- The corridors of hedgerows which offer commuting routes across the site, namely in detector locations B and G;

South of the buildings in the north of the site.

Within the transect surveys, the areas with the highest levels of activity were:

- Areas of woodland present in the north, centre and south east of the site;
- Corridors of hedgerows and/ or watercourses, notably Ifield Brook and the River Mole, present in the east and centre of the site; and
- Close to the cluster of buildings located in the north of the site, where a large number of common and soprano pipistrelle roosts and one maternity brown long-eared roost was recorded in 2019.

These findings were consistent in both the static detector surveys and transect surveys. The number of bats recorded in these areas was notably high in the transect surveys, and the static detectors with the two highest levels of activity were also in these areas (detector 1 and detector 3).

4.3.1.2 Areas with "rarest" bat activity

In addition to the areas where high levels of activity were recorded, it was deemed important to determine which areas of the site are of importance due to the assemblage of bats they support (i.e. support a significant number of the less recorded species of bats). In order to assess this, the 'rare' and 'rarest' bats were separated from the bats recorded within the static detector surveys. Overall, the activity levels of these bat species was very low, with only one static deployment position recording a call activity of over 1 call per hour of rarer and rarest bats (Static detector position B).

When the proportion of bat passes not attributable to common or soprano pipistrelles was assessed, only two locations had a notably higher proportion of rarer bats. These locations were static positions F and H, in

the east and south of the site respectively. Overall activity at these deployment locations was low, but it was noted that these areas may be of importance for the rarer species of bats.

4.4 Species assemblage recorded within the site

Overall, the assemblage recorded was as would be expected within heterogenous habitat areas in Sussex. Most passes recorded were common or soprano pipistrelles (over 95% of the passes recorded in the static surveys). Only one particularly notable species, barbastelle was recorded, this is discussed in more detail below. Within the survey, noctule, Leisler's bat, Nathusius' pipistrelle, brown long-eared and myotis species, Daubenton's and Natterer's bats were also recorded. None of these rarer bats were recorded in particularly high numbers and overall the assemblage of bats recorded is not considered particularly notable.

Barbastelle which are listed on Annexe II of the Habitats Directive and are one of the 'rarest' bats within the UK. Within the site this species of bat was only recorded on the static detector surveys. Within the static surveys only two passes of barbastelle bats were recorded, across the full survey period. The recorded barbastelle passes were in low numbers within the two static detectors within the golf course in the south of the site, one pass at each location in one month. This is indicative of very low numbers of bat commuting passes, and no sustained pattern of passes was recorded. This suggests that no areas are important for barbastelle foraging or commuting, with only a very low number of passes recorded.

4.5 Roosts within and adjacent to the site.

During the emergence and re-entry surveys 18 confirmed roosts were identified. All but one of these roosts were small roosts of common or soprano pipistrelles, with one roost being a likely maternity roost of brown long-eared bats (within building 21b).

The desk study identified roosts around the site (but outside of the redline boundary). These included a small pipistrelle roosts and a small brown long-eared roost within a residential house (only a single bat found in each property). The presence of these roosts will need to be accounted for in mitigation within the site and to ensure that connectivity for these bats within and across the site and foraging availability is not compromised.

5 Conclusions

The site overall has moderate to high bat potential habitats because of the presence of copse/pond/linear features. Most of the site is arable and of low value to bats. It is considered that sufficient surveys have been conducted to inform a characterisation of the bat usage of the site to inform the masterplanning process. The conclusions of each of the surveys conducted is presented below.

5.1.1 Static surveys

The static bat surveys and assessments conducted in 2018 revealed the following information:

- Overall, the site is likely to have a 'medium to high' activity level when compared to similar sites;
- The areas with the highest levels of activity were around the corridors of hedgerows and / or ditches across the site and south of the buildings in the north of the site. The intensively farmed areas and isolated hedgerows within and around the site had notably lower bat activity, as did areas to the west of the site.
- The assemblage of bats utilising the site is largely common, the majority of passes were common and soprano pipistrelles, with a low level of activity of rarer bats including myotis bats and some 'big bats'. A low number of barbastelle passes were recorded (two passes), but a such a very low number of brief passes suggesting the site is not of importance for this species.
- Although the area south of the buildings in the north of the site had a high level of activity, there was a low proportion of rare and rarest bat passes in this area;
- Two locations with low levels of activity, in the south of the site on the golf course and in the east of the site had the highest proportion of calls of rarer bats.

5.1.2 Emergence surveys

In summary a total of 31 buildings were assessed, of which 15 of these buildings were assessed as having negligible roosting potential, 10 were assessed as having low roosting potential, two were assessed as having moderate roosting potential and four were assessed as having high roosting potential.

Of these structures assessed, a subset consisting of those structures with low, moderate or high roosting potential was selected for emergence and re-entry surveys to identify any roosts present.

During these surveys a total of 18 confirmed roosts were identified. All but one of these roosts was a small roost of common or soprano pipistrelles, with one roost being a likely maternity roost of brown long eared bats (within building 21b).

The desk study identified roosts around the site (but outside of the redline boundary). These included a small pipistrelle roosts and a small brown long-eared roost within a residential house (only a single bat found in each property).

The survey results allow for impacts to roosts from the proposed development to be assessed, and mitigation outlined. Further surveys are likely to be required at an appropriate stage of the planning process to ensure that all roosts are identified, and suitable detailed mitigation can be implemented.

5.1.3 Activity transects

The bat activity transects conducted in 2018 revealed the areas with the highest levels of activity were:

- Areas of woodland present in the north, centre and south east of the site;
- Corridors of hedgerows and/ or watercourses, notably Ifield Brook and the River Mole, present in the east and centre of the site; and
- High activity levels were also observed close to the cluster of buildings located in the north of the site, where a large number of common and soprano pipistrelle roosts and one maternity brown long eared roost was recorded in 2019.

The assemblage of bat utilising the site is largely common, in line with the bat distribution in Sussex, being largely formed of common and soprano pipistrelles, with a low level of activity of rarer bats ‘big bats’ such as noctules and Myotis species.

6 References

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Figure 1: Locations of buildings assessed for bat roosting potential in 2019

B26
B21c
B22
B23
B24
B25
B21b
B21d
B19
B18
B17b
B17a
B21a
B20
B16
B15
B14
B13
B12
B11
B9
B8
B10
B7
B27
B6
B1
B2
B4
B3
B5

Metres
0 100 200

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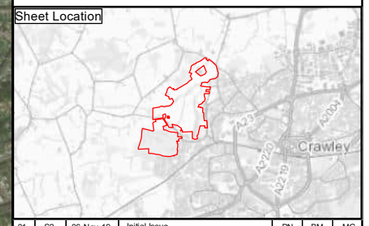

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Client: Homes England

Designer: ARCADIS
Registered office: Arcadis House, 34 York Way, London, N1 9AB
Coordinating office: 5th Floor, 401 Faraday Street, Birchwood, Warrington, WA3 6GA

Project: Land West of Ifield

Drawing Title: Figure 1 Locations of Bat Buildings Assessed by Arcadis in 2019

	Status: S2	Revision: 01	
Scale	1:10,000	Date	06-Nov-19
Drawn By	P. Nehete		
Checked By	B. Murrary		
Approved By	M. Girvan		
PINS No.			

Drawing number: HE P:N | Originator | Volume | Location | Type | Role | Number

Figure 2: Results of the initial bat roosting potential assessment

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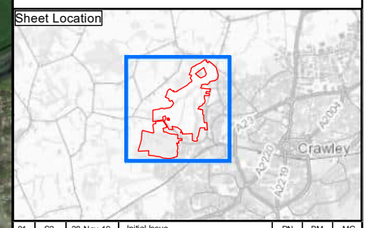

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Drawing Title

Figure 2
Building Insepctions Results, July 2019
(Page 1 of 7)

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Checked By	B. Murrary		
Approved By	M. Girvan		
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Legend

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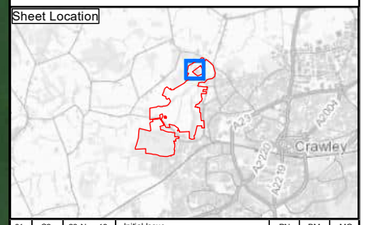

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Building Insepctions Results, July 2019
(Page 2 of 7)

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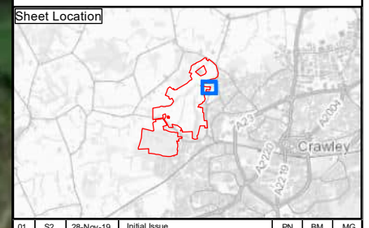

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Project: Land West of Ifield

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Building Insepctions Results, July 2019
(Page 3 of 7)

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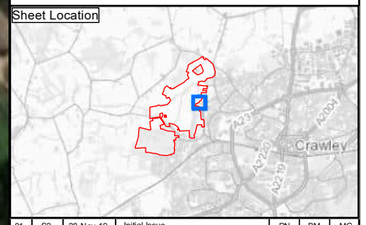

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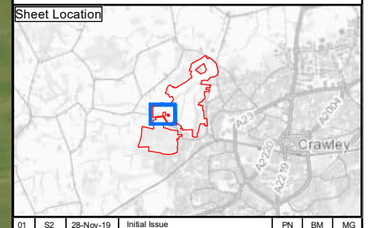

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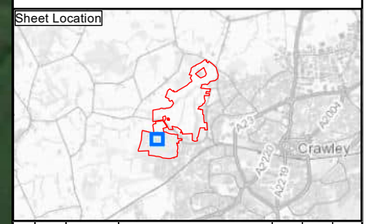

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(Page 6 of 7)

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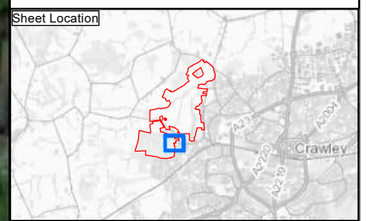

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Project: Land West of Ifield

Drawing Title: Figure 2 Building Insepctions Results, July 2019 (Page 7 of 7)

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Figure 3: Bat emergence / re-entry survey results

Legend

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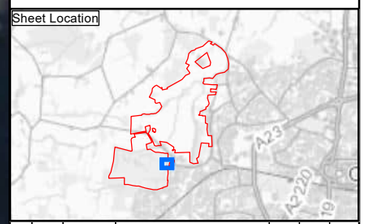
- Building
- Surveyor Start Position (indicative)
- Pipistrelle sp Commuting, Survey 1
- Pipistrelle sp Foraging, Survey 1

Sheet Location



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Project: Land West of Ifield

Drawing Title: Figure 3
Bat Emerence / Re-entry Survey Results
(Page 1 of 10)

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Approved By	M. Girvan	
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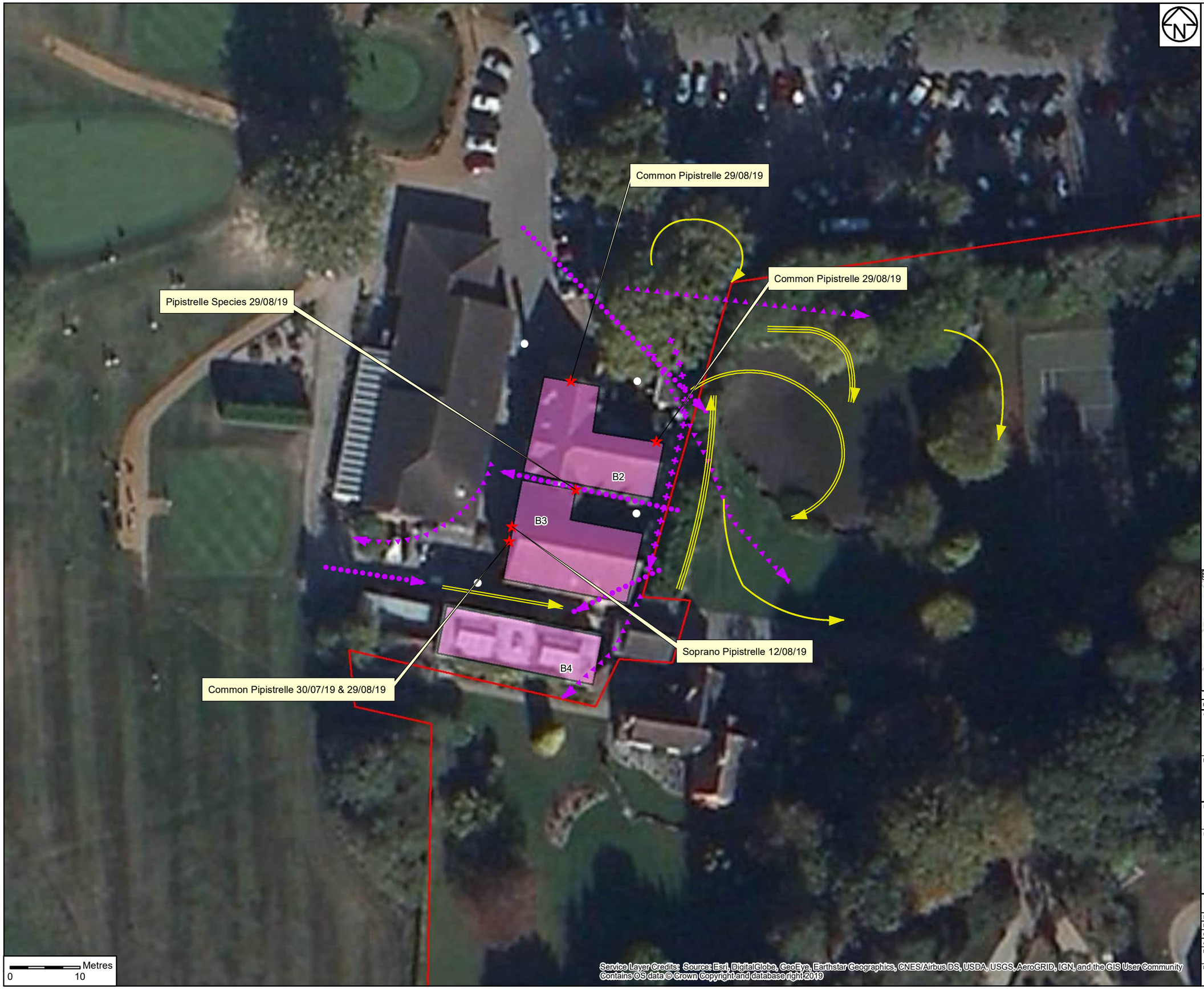

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Legend

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- Building
- Surveyor Start Position (indicative)

Roosts Identified

- Confirmed
- Pipistrelle sp Commuting, Survey 1
- Pipistrelle sp Commuting, Survey 2
- Pipistrelle sp Commuting, Survey 3
- Pipistrelle sp Foraging, Survey 1
- Pipistrelle sp Foraging, Survey 2
- Pipistrelle sp Foraging, Survey 3

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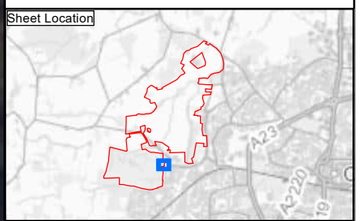

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Project: Land West of Ifield

Drawing Title: Figure 3
Bat Emerence / Re-entry Survey Results
(Page 2 of 10)

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Checked By	B. Murrary		
Approved By	M. Girvan		
PINS No.			

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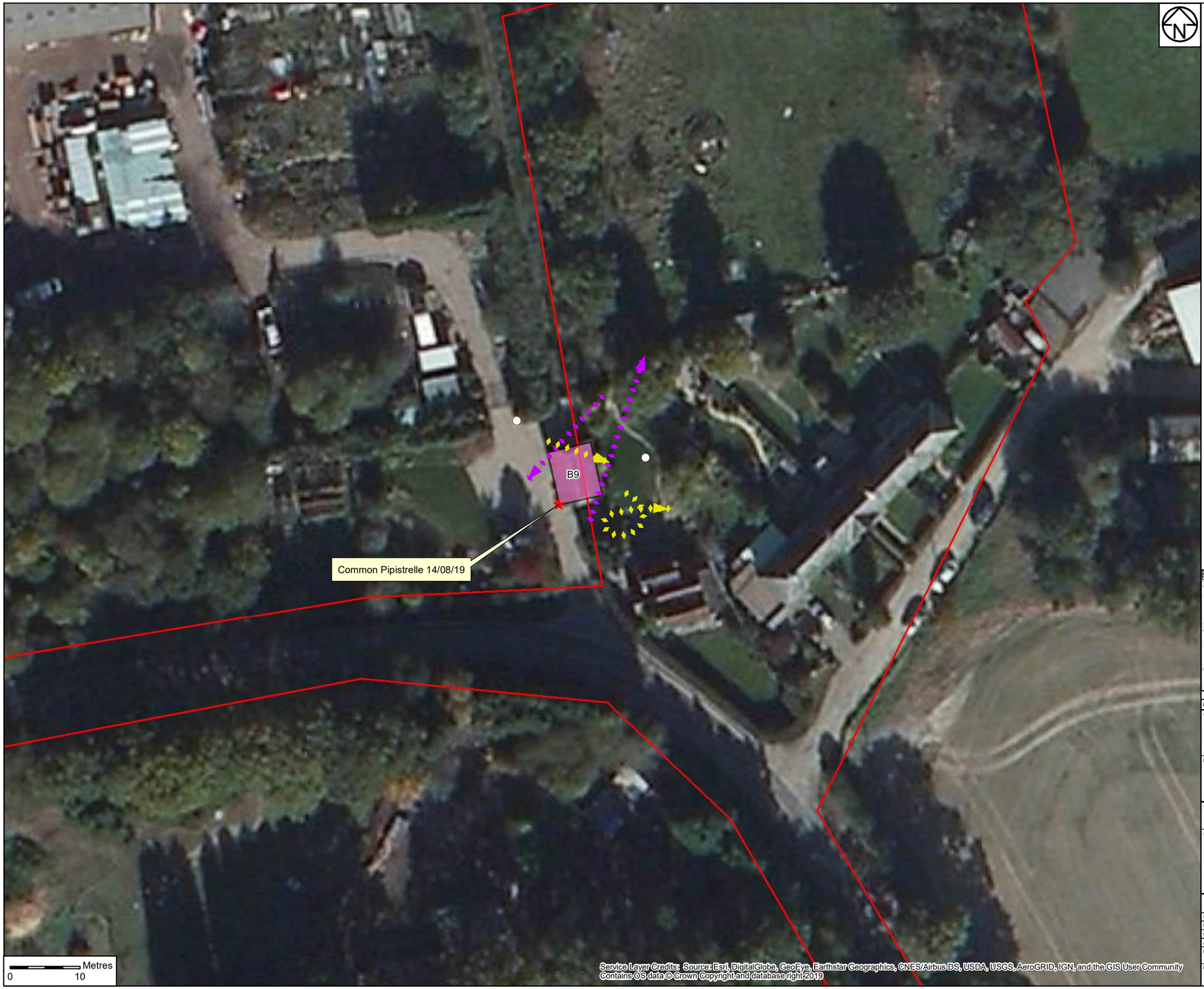


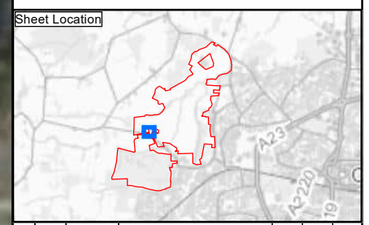
Legend

- Site Boundary
- Building
- Surveyor Start Position (indicative)

Roosts Identified

- Confirmed
- Pipistrelle sp Commuting, Survey 1-3
- Pipistrelle sp Foraging, Survey 1-3

Sheet Location



Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
01	S2	29-Nov-19	Initial Issue	PN	BM	MG

Client: Homes England

Designer: ARCADIS

Registered office: Arcadis House, 34 York Way, London, N1 9AB

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Project: Land West of Ifield

Drawing Title

Figure 3
Bat Emerence / Re-entry Survey Results
(Page 3 of 10)

	Status: S2	Revision: 01	
Scale	1:500	Date	29-Nov-19
Drawn By	P. Nehete		
Checked By	B. Murrary		
Approved By	M. Girvan		
PINS No.			

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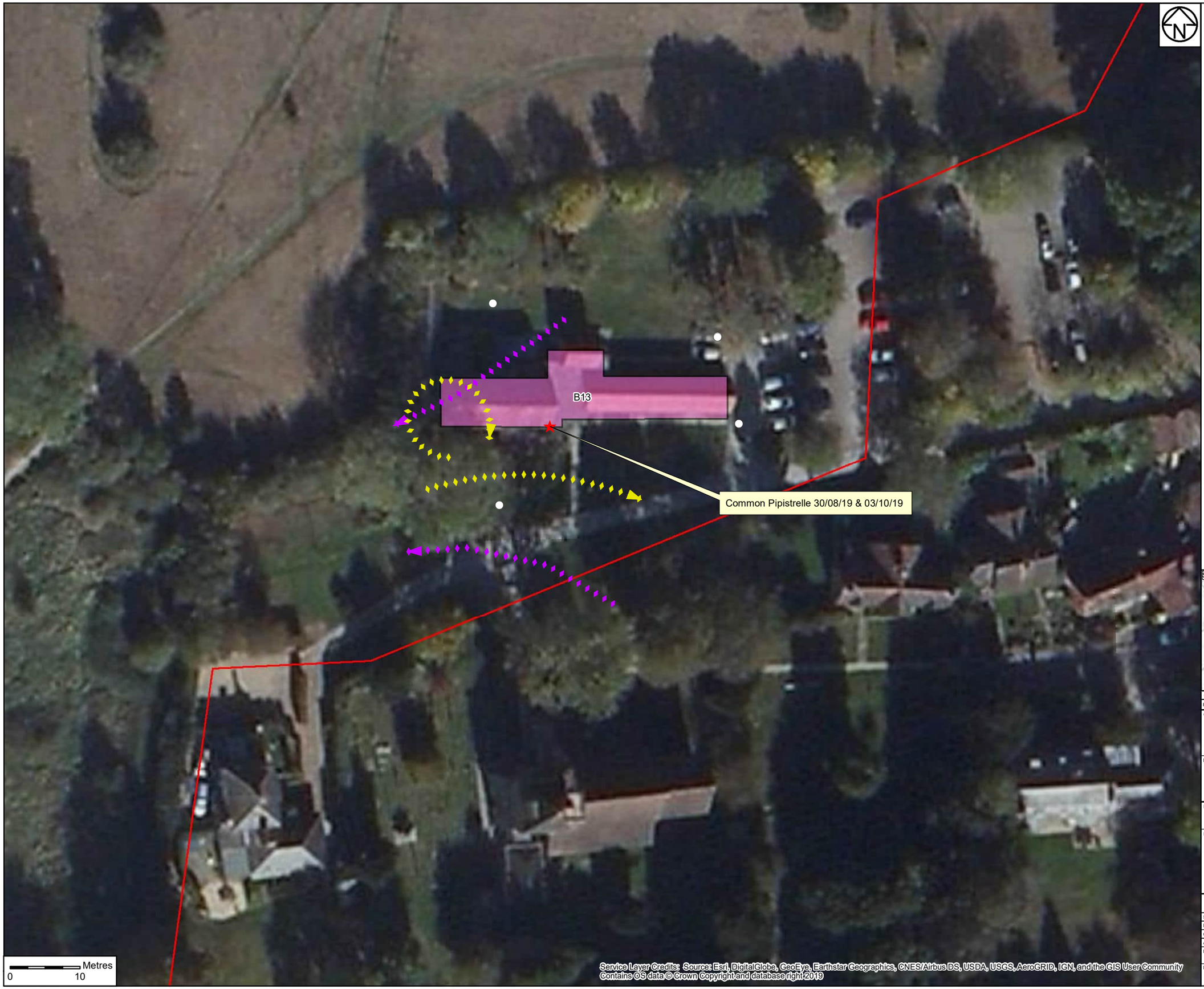


Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

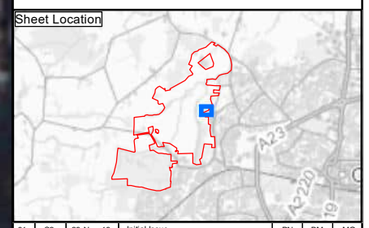
Legend

- Site Boundary
- Building
- Surveyor Start Position (indicative)

Roosts Identified

- Confirmed
- Pipistrelle sp Commuting, Survey 1-3
- Pipistrelle sp Foraging, Survey 1-3

Sheet Location



Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
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Warrington
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Project: Land West of Ifield

Drawing Title: Figure 3
Bat Emerence / Re-entry Survey Results
(Page 4 of 10)

	Status: S2	Revision: 01
Scale	1:500	Date: 29-Nov-19
Drawn By	P. Nehete	
Checked By	B. Murrary	
Approved By	M. Girvan	
PINS No.		

Drawing number: HE P:N | Originator | Volume | Location | Type | Role | Number

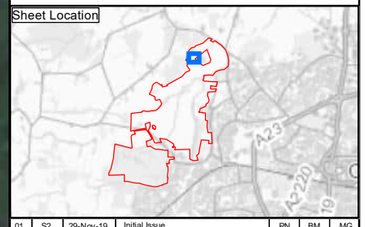
Legend

- Site Boundary
- Building
- Surveyor Start Position (indicative)

Roosts Identified

- Confirmed
- Pipistrelle sp Commuting, Survey 1-3
- Pipistrelle sp Foraging, Survey 1-3

Sheet Location



Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
01	S2	29-Nov-19	Initial Issue	PN	BM	MG

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WA3 6GA

Project: Land West of Ifield

Drawing Title: Figure 3
Bat Emerence / Re-entry Survey Results
(Page 5 of 10)

	Status: S2	Revision: 01	
Scale	1:500	Date	29-Nov-19
Drawn By	P. Nehete		
Checked By	B. Murrary		
Approved By	M. Girvan		
PINS No.			

Drawing number: HE P:N | Originator | Volume | Location | Type | Role | Number

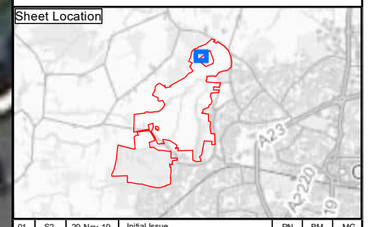
Legend

- Site Boundary
- Building
- Surveyor Start Position (indicative)

Roosts Identified

- Noctule HNS
- Brown Long-eared Bat Commuting, Survey 1
- Pipistrelle sp Commuting, Survey 1
- Pipistrelle sp Foraging, Survey 1

Sheet Location



Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
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Project: Land West of Ifield

Drawing Title

Figure 3
Bat Emerence / Re-entry Survey Results
(Page 6 of 10)

	Status: S2	Revision: 01	
Scale	1:500	Date	29-Nov-19
Drawn By	P. Nehete		
Checked By	B. Murrary		
Approved By	M. Girvan		
PINS No.			
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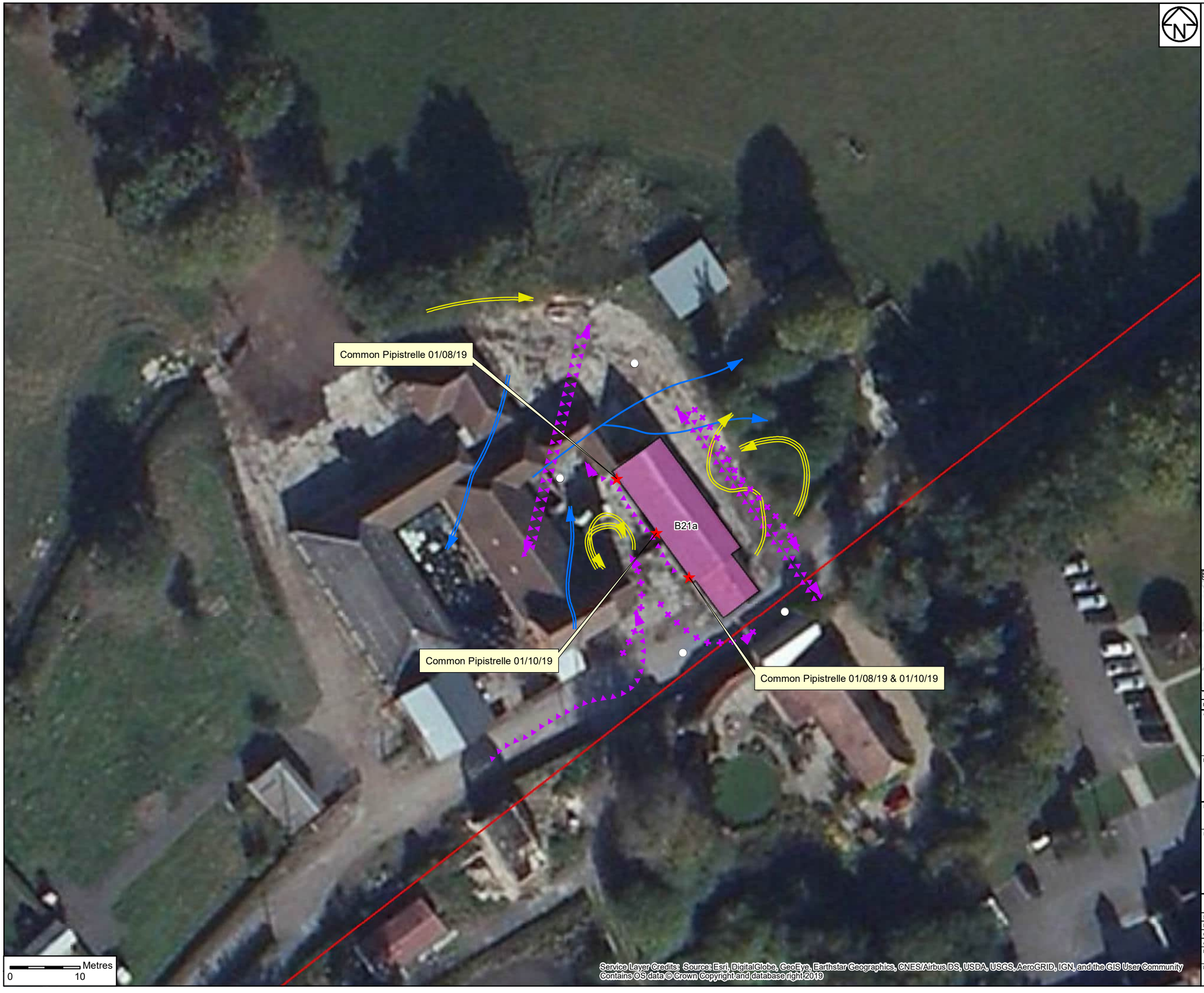


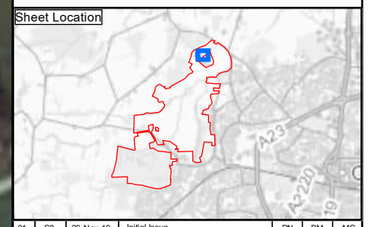
Legend

- Site Boundary
- Building
- Surveyor Start Position (indicative)

Roosts Identified

- Confirmed
- Brown Long-eared Bat Commuting, Survey 1
- Brown Long-eared Bat Commuting, Survey 2
- Pipistrelle sp Commuting, Survey 2
- Pipistrelle sp Commuting, Survey 3
- Pipistrelle sp Foraging, Survey 2
- Pipistrelle sp Foraging, Survey 3

Sheet Location



Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
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Project: Land West of Ifield

Drawing Title

Figure 3
Bat Emerence / Re-entry Survey Results
(Page 7 of 10)

	Status: S2	Revision: 01	
Scale	1:500	Date	29-Nov-19
Drawn By	P. Nehete		
Checked By	B. Murrary		
Approved By	M. Girvan		
PINS No.			

Drawing number: HE P:N | Originator | Volume | Location | Type | Role | Number

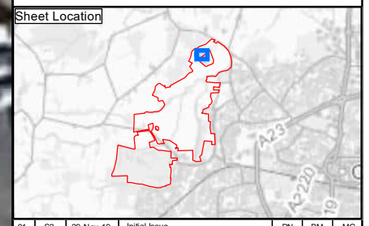
Legend

- Site Boundary
- Building
- Surveyor Start Position (indicative)

Roosts Identified

- Confirmed
- Possible
- Noctule HNS
- Brown Long-eared Bat Commuting, Survey 1
- Brown Long-eared Bat Commuting, Survey 2
- Brown Long-eared Foraging, Survey 1
- Brown Long-eared Foraging, Survey 2
- Pipistrelle sp Commuting, Survey 1
- Pipistrelle sp Commuting, Survey 2
- Pipistrelle sp Commuting, Survey 3
- Pipistrelle sp Foraging, Survey 1
- Pipistrelle sp Foraging, Survey 2
- Pipistrelle sp Foraging, Survey 3

Sheet Location



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Warrington
WA3 6GA

Project: Land West of Ifield

Drawing Title: Figure 3
Bat Emerence / Re-entry Survey Results
(Page 8 of 10)

	Status: S2	Revision: 01	
Scale	1:500	Date	29-Nov-19
Drawn By	P. Nehete		
Checked By	B. Murrary		
Approved By	M. Girvan		
PINS No.			

Drawing number: HE P:N | Originator | Volume | Location | Type | Role | Number

Legend

- Site Boundary
- Building
- Surveyor Start Position (indicative)

Roosts Identified

- Noctule HNS
- Pipistrelle Species HNS
- Brown Long-eared Foraging, Survey 2
- Pipistrelle sp Commuting, Survey 1
- Pipistrelle sp Foraging, Survey 1
- Pipistrelle sp Foraging, Survey 2

Sheet Location

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Drawing Title

Figure 3
Bat Emerence / Re-entry Survey Results
(Page 9 of 10)

	Status S2	Revision 01	
Scale	1:500	Date	29-Nov-19
Drawn By	P. Nehete		
Checked By	B. Murrary		
Approved By	M. Girvan		
PINS No.			

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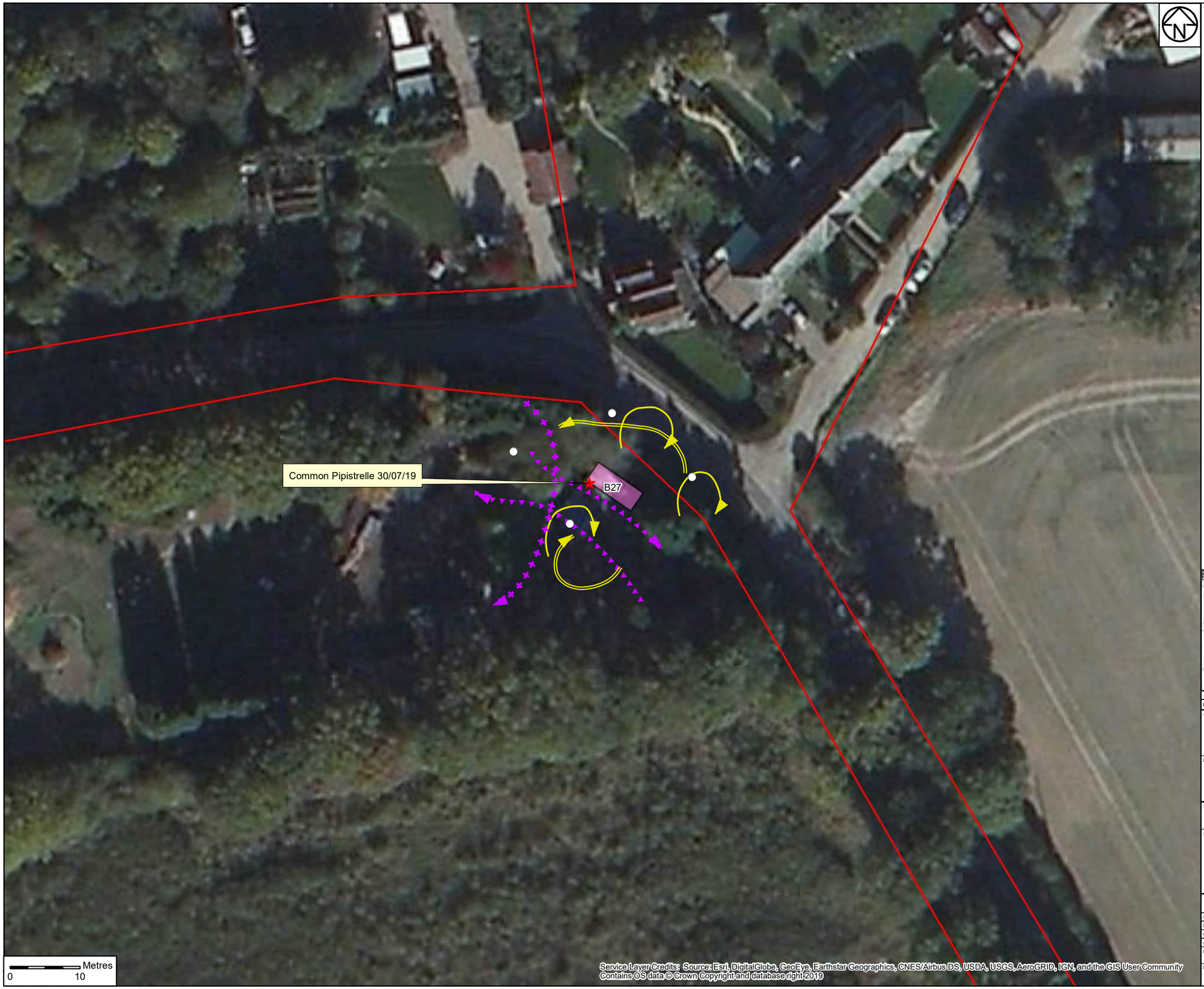


Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

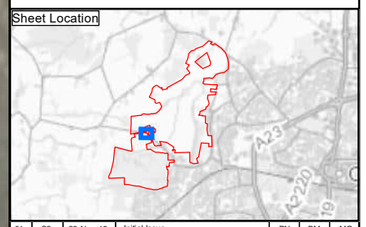
Legend

- Site Boundary
- Building
- Surveyor Start Position (indicative)

Roosts Identified

- Confirmed
- Pipistrelle sp Commuting, Survey 2
- Pipistrelle sp Commuting, Survey 3
- Pipistrelle sp Foraging, Survey 1
- Pipistrelle sp Foraging, Survey 2

Sheet Location



Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
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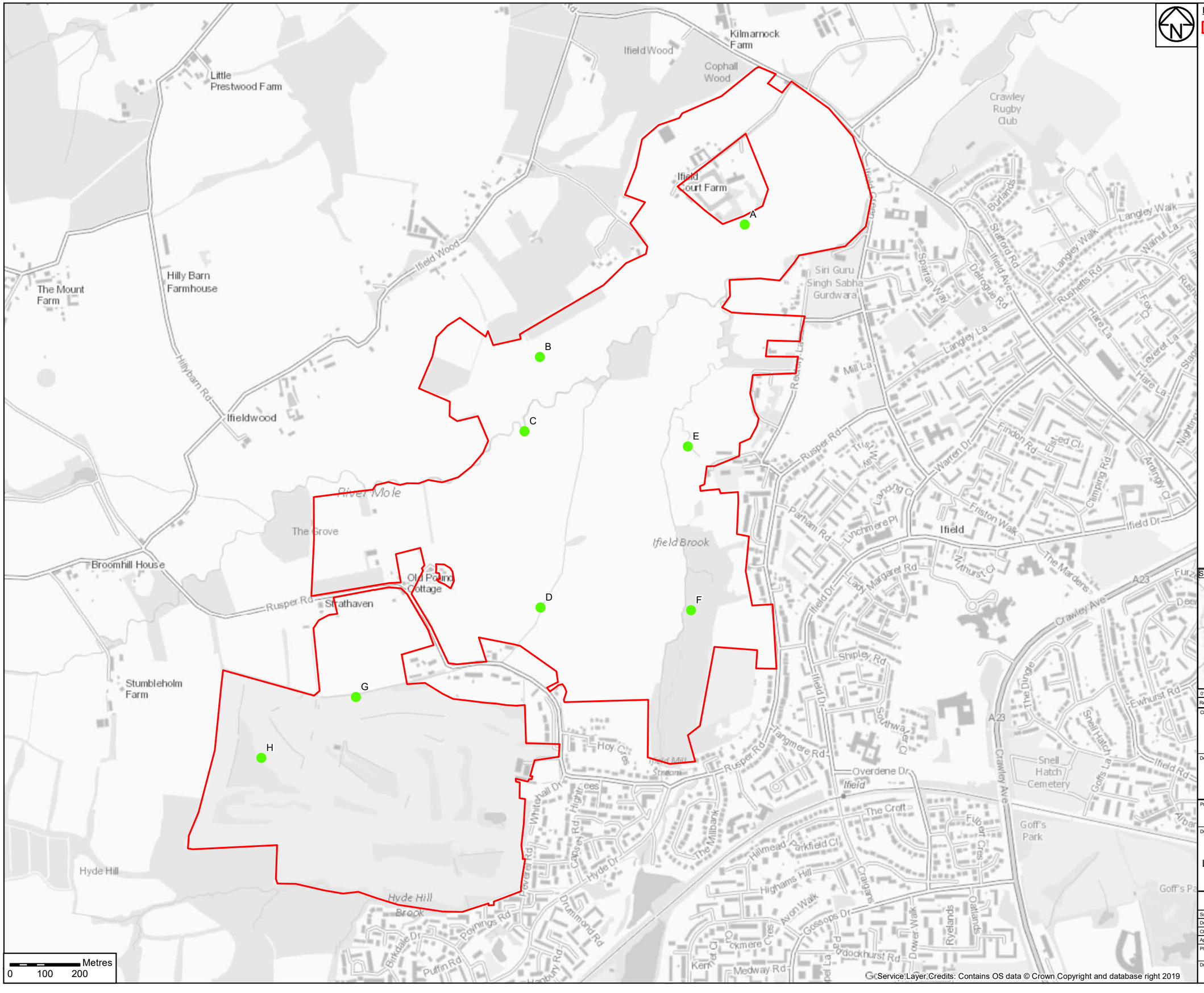
Project: Land West of Ifield

Drawing Title: Figure 3
Bat Emerence / Re-entry Survey Results
(Page 10 of 10)

	Status: S2	Revision: 01
Scale	1:500	Date: 29-Nov-19
Drawn By	P. Nehete	
Checked By	B. Murrary	
Approved By	M. Girvan	
PINS No.		

Drawing number: HE P:N | Originator | Volume | Location | Type | Role | Number

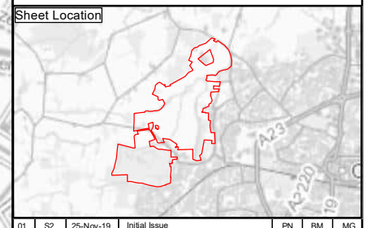
Figure 4: Locations of static bat detectors deployed in 2018



Legend

- Site Boundary
- Static Bat Detectors

Sheet Location



Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
01	S2	25-Nov-19	Initial issue	PN	BM	MG

Client: Homes England

Designer: ARCADIS

Registered office: Arcadis House, 34 York Way, London, N1 9AB
Coordinating office: 5th Floor, 401 Faraday Street, Birchwood, Warrington, WA3 6GA

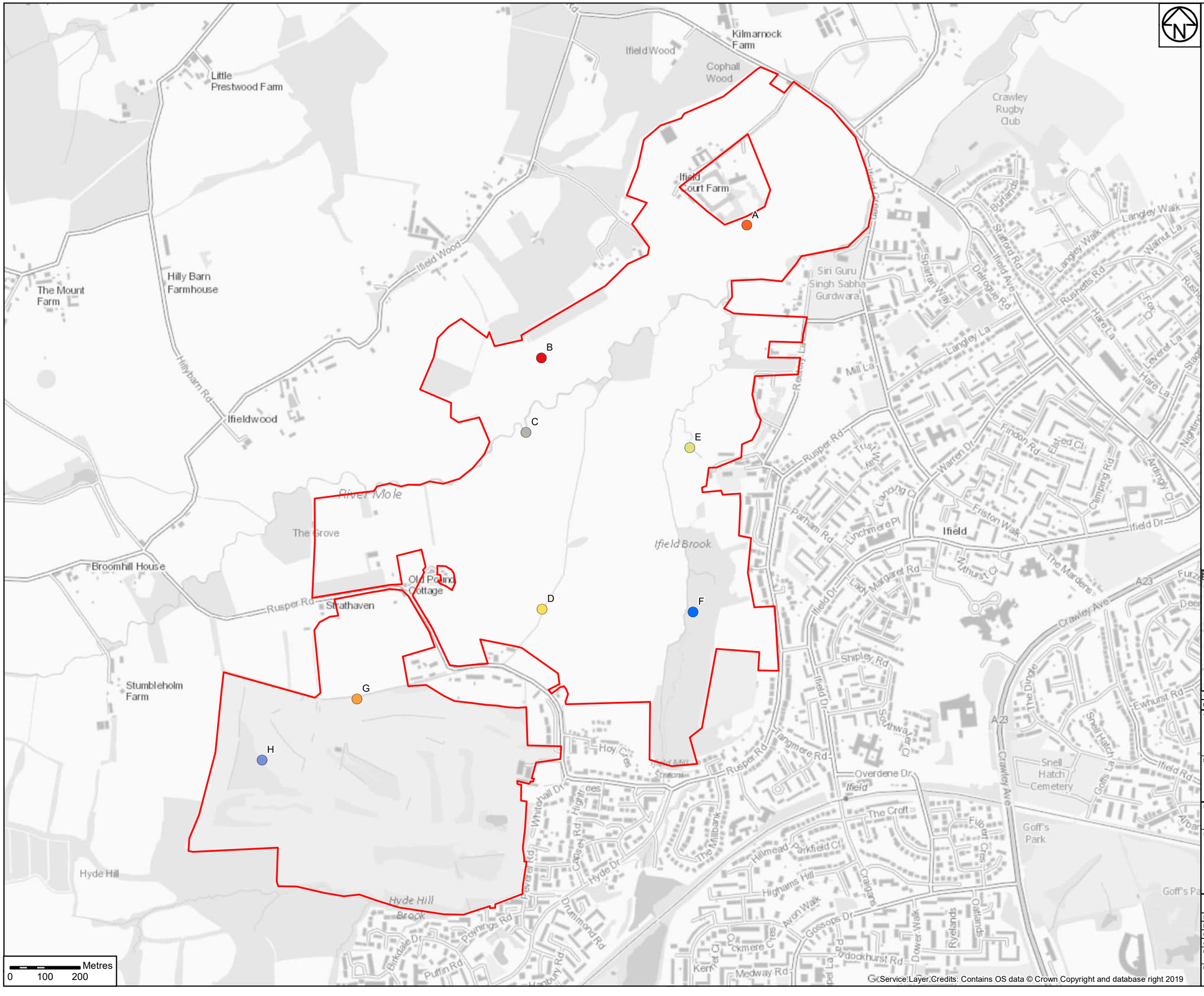
Project: Land West of Ifield

Drawing Title: Figure 4
Locations of Static Bat Detectors Deployed

	Status: S2	Revision: 01	
Scale	1:10,000	Date	25-Nov-19
Drawn By	P. Nehete		
Checked By	B. Murrary		
Approved By	M. Girvan		
PINS No.			

Drawing number: HE P:N | Originator | Volume | Location | Type | Role | Number

Figure 5: Normalised activity levels between static deployment positions



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Project: Land West of Ifield

Drawing Title: Figure 5 Normalised Activity Levels Between Static Detector Positions

	Status: S2	Revision: 01	
Scale	1:10,000	Date	26-Nov-19
Drawn By	P. Nehete		
Checked By	B. Murrary		
Approved By	M. Girvan		
PINS No.			

Drawing number: HE P/N | Originator | Volume | Location | Type | Role | Number

Figure 6: Static bat surveys, percentage of calls of ‘rarer’ ‘rarest species of bats

Legend

Site Boundary

Overall activity (qualitative Arcadis assessment)

High Activity (greater than 15 passes per hour)

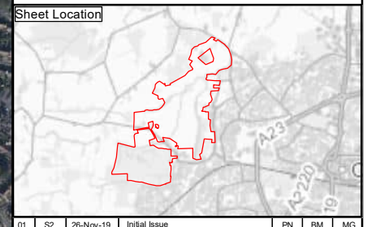
Medium Activity (greater than 7.5 to 15 passes

Low Activity (7.5 passes per hour average or

Percentage of Bat Calls of 'Rarer' and 'Rarest' Species

2
3
4
8
10

Sheet Location



Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
01	S2	26-Nov-19	Initial Issue	PN	BM	MG

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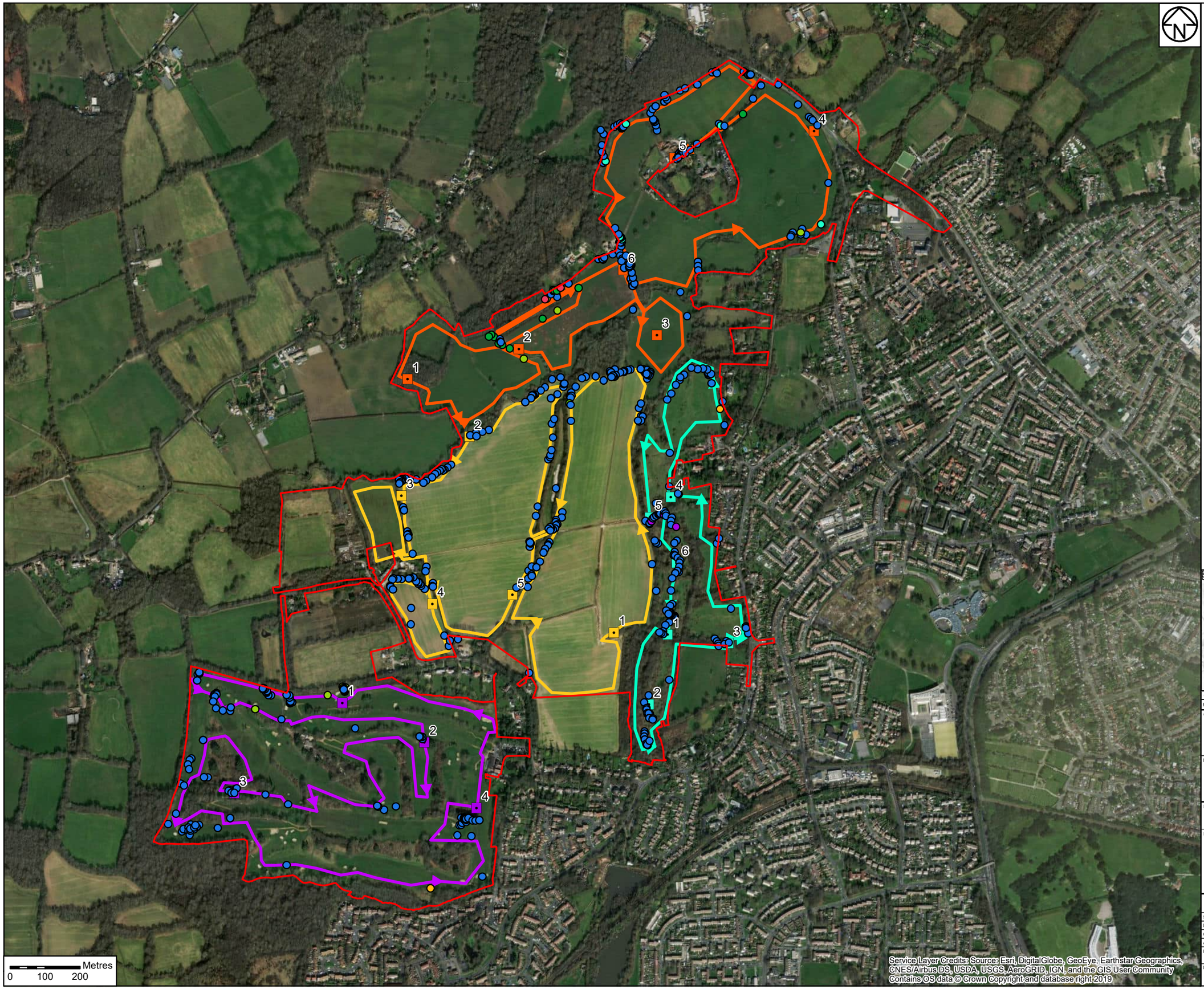
Project: Land West of Ifield

Drawing Title: Figure 6 Bat Static Detector Surveys - Percentage of Bat Calls of 'Rarer' and 'Rarest' Species

	Status: S2	Revision: 01	
Scale	1:10,000	Date	26-Nov-19
Drawn By	P. Nehete		
Checked By	B. Murrary		
Approved By	M. Girvan		
PINS No.			

Drawing number: HE P:N | Originator | Volume | Location | Type | Role | Number

Figure 7: Results of bat activity transects 1 – 4, May 2018



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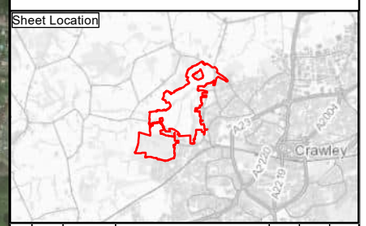

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Client: Homes England

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Project: Land West of Ifield

Drawing Title: Figure 7
Bat Activity Transects 1-4
May 2019

	Status: S2	Revision: 01	
Scale	1:10,000	Date	27-Nov-19
Drawn By	P. Nehete		
Checked By	B. Murrary		
Approved By	M. Girvan		
PINS No.			

Drawing number: HE P:N | Originator | Volume | Location | Type | Role | Number

Figure 8: Results of bat activity transects 1 – 4, June 2018

Legend

Site Boundary

Species

- 45/55 Pip
- 45/Nath Pip
- Eptesicus Serotinus
- Myotis Sp
- Nyctalus Noctula
- Nyctalus Sp.
- Pipistrellus Pipistrellus
- Pipistrellus Pygmaeus
- Pipistrellus Spec.
- Plecotus Auritus

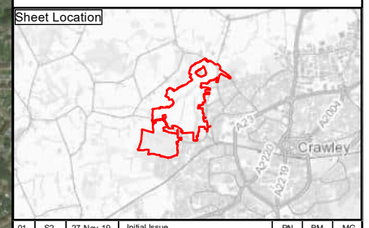
Stops

- Transect 1
- Transect 2
- Transect 3
- Transect 4

Bat Transect

- 1
- 2
- 3
- 4

Sheet Location



Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
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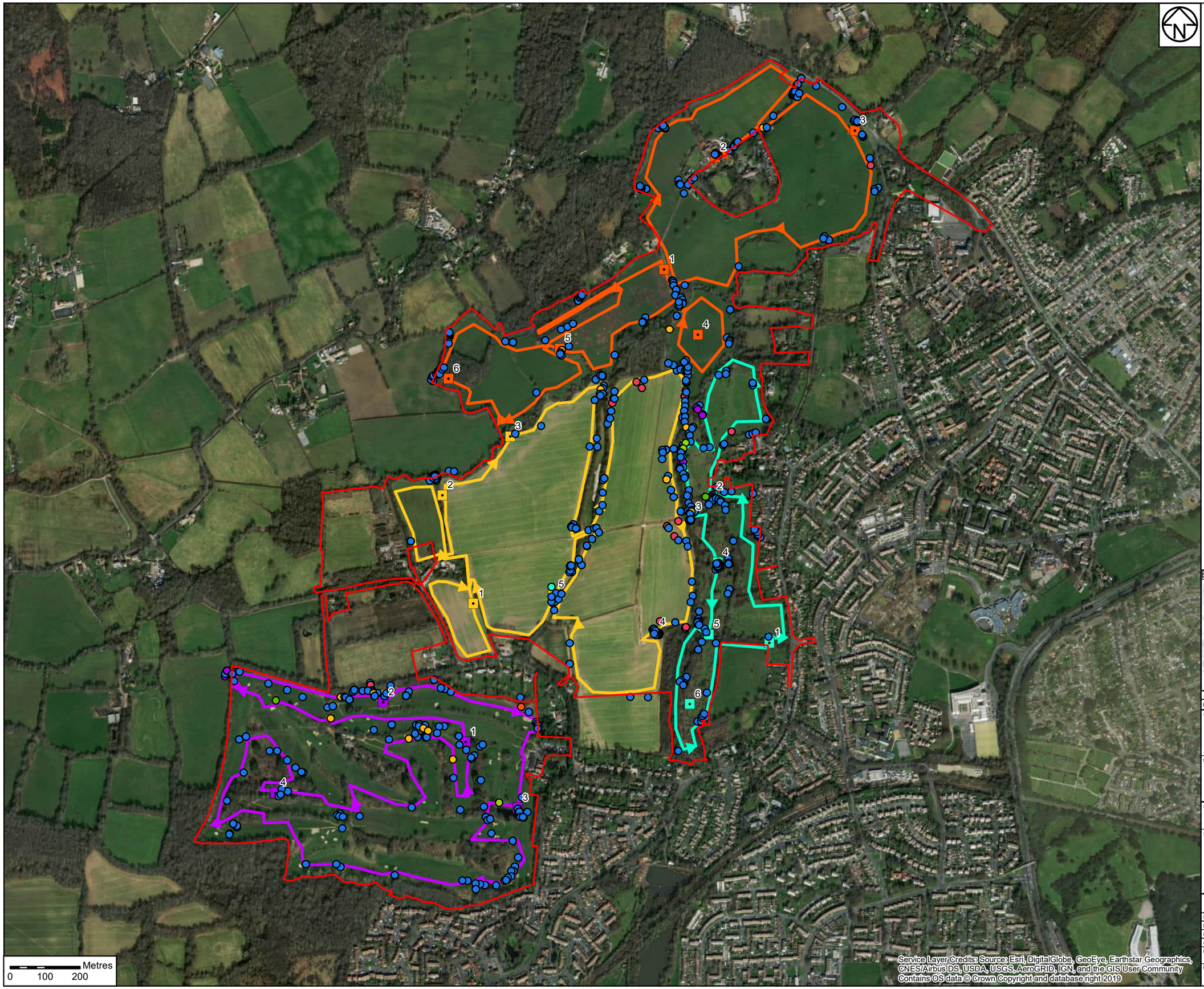
Drawing Title: Figure 8 Bat Activity Transects 1-4 June 2019

	Status: S2	Revision: 01	
Scale	1:10,000	Date	27-Nov-19
Drawn By	P. Nehete		
Checked By	B. Murrary		
Approved By	M. Girvan		
PINS No.			
Drawing number	HE P:N | Originator | Volume | Location | Type | Role | Number		

Metres
0 100 200

Figure 9: Results of bat activity transects 1 – 4, July 2018



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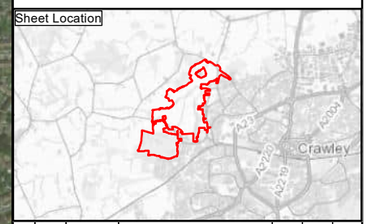

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Client: Homes England

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Drawing Title

Figure 9
Bat Activity Transects 1-4
July 2019

	Status: S2	Revision: 01
Scale	1:10,000	Date: 27-Nov-19
Drawn By	P. Nehete	
Checked By	B. Murrary	
Approved By	M. Girvan	
PINS No.		

Drawing number: HE P:\N | Originator | Volume | Location | Type | Role | Number

Figure 10: Results of bat activity transects 1 & 2, August (Dawn) 2018

Legend

Site Boundary

Species

- Big Bat
- LEB social call
- Myotis Sp
- Myotis Sp/LEB
- No bats recorded
- Nyctalus Noctula
- Pipistrellus Pipistrellus
- Plecotus Auritus

Stops

- Transect 1
- Transect 2

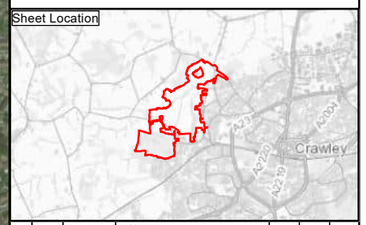
Bat Transect

- 1
- 2

NOTE:

No dawn surveys were undertaken on Transect 3 due to health & safety concerns. Access restrictions to Transect 4 meant that no dusk or dawn survey could be undertaken in August.

Sheet Location



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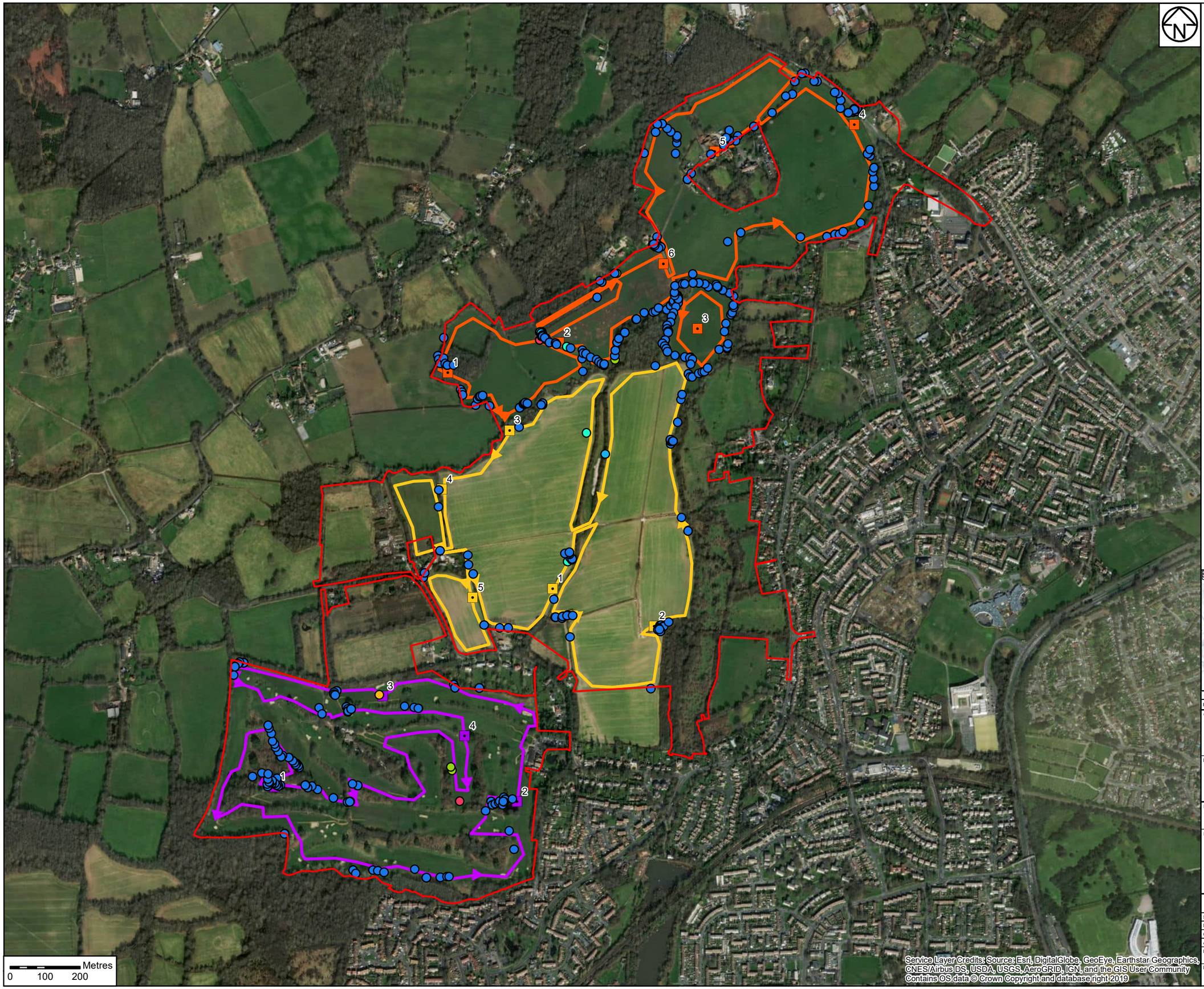
Drawing Title: Figure 10 Bat Activity Transects 1 & 2 August Dawn Surveys 2019

	Status: S2	Revision: 01	
Scale	1:10,000	Date	27-Nov-19
Drawn By	P. Nehete		
Checked By	B. Murrary		
Approved By	M. Girvan		
PINS No.			

Drawing number: HE P:N | Originator | Volume | Location | Type | Role | Number

Figure 11: Results of bat activity transects 1, 2 & 3, August (Dusk) 2018



Legend

Site Boundary

Bat Species Identified

- Big Bat
- Myotis Sp
- Nyctalus Noctula
- Pipistrellus Pipistrellus
- Pipistrellus Pygmaeus
- Plecotus Auritus

Stops

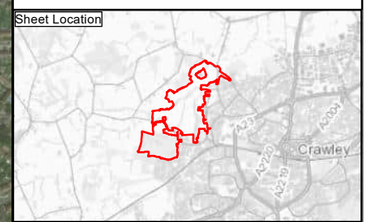
- Transect 1
- Transect 2
- Transect 3

Bat Transect

- 1
- 2
- 3

NOTE:
No surveys were undertaken on Transect 4 in August due to access restrictions.

Sheet Location



Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
01	S2	27-Nov-19	Initial Issue	PN	BM	MG

Client: Homes England

Designer: ARCADIS
Registered office: Arcadis House, 34 York Way, London, N1 9AB
Coordinating office: 5th Floor, 401 Faraday Street, Birchwood, Warrington, WA3 6GA

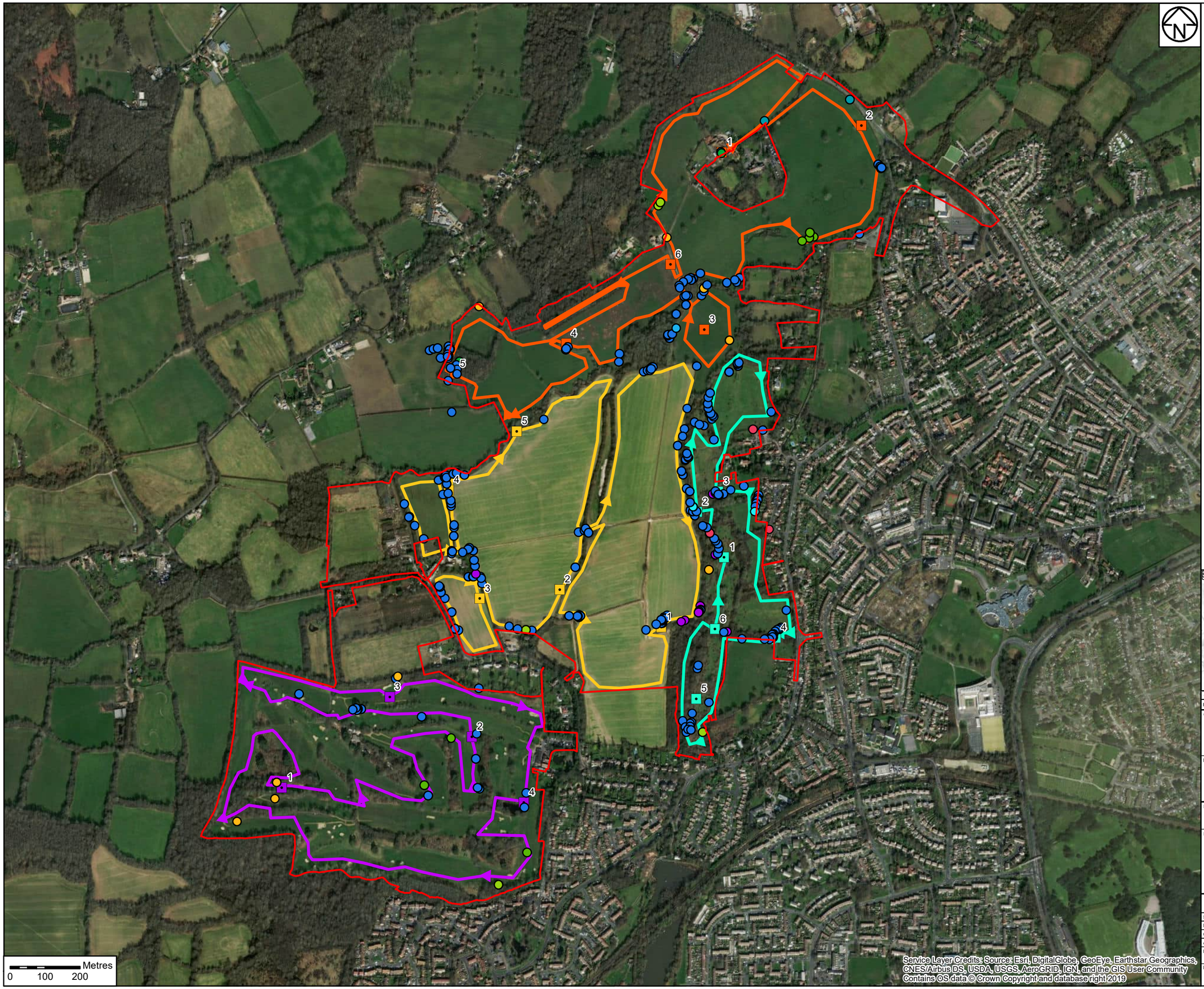
Project: Land West of Ifield

Drawing Title: Figure 11
Bat Activity Transects 1-3
August Dusk Surveys 2019

	Status: S2	Revision: 01
Scale	1:10,000	Date: 27-Nov-19
Drawn By	P. Nehete	
Checked By	B. Murrary	
Approved By	M. Girvan	
PINS No.		

Drawing number: HE P:N | Originator | Volume | Location | Type | Role | Number

Figure 12: Results of bat activity transects 1 - 4, September (Dusk) 2018



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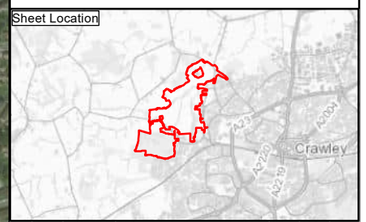


Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
01	S2	27-Nov-19	Initial Issue	PN	BM	MG

Client: Homes England

Designer: ARCADIS
Registered office: Arcadis House, 34 York Way, London, N1 9AB
Coordinating office: 5th Floor, 401 Faraday Street, Birchwood, Warrington, WA3 6GA

Project: Land West of Ifield

Drawing Title: Figure 12
Bat Activity Transects 1-4
September: Dusk Surveys 2019

	Status: S2	Revision: 01
Scale	1:10,000	Date: 27-Nov-19
Drawn By	P. Nehete	
Checked By	B. Murrary	
Approved By	M. Girvan	
PINS No.		

Drawing number: HE P:N | Originator | Volume | Location | Type | Role | Number

Figure 13: Results of bat activity transect 3, September (Dawn) 2018

Legend

Site Boundary

Bat Species Identified

45/55 Pip

Stops

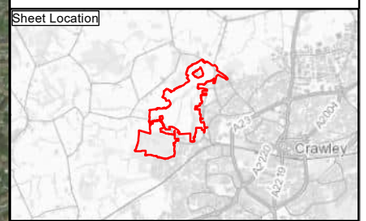
Transect 3

Bat Transect

3

NOTE:
A dawn transect survey was not conducted in August due to health & safetly concerns. The dawn survey was rescheduled and completed in September 2018

Sheet Location



Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
01	S2	27-Nov-19	Initial Issue	PN	BM	MG

Client: Homes England

Designer: ARCADIS

Registered office: Arcadis House, 34 York Way, London, N1 9AB

Coordinating office: 5th Floor, 401 Faraday Street, Birchwood, Warrington, WA3 6GA

Project: Land West of Ifield

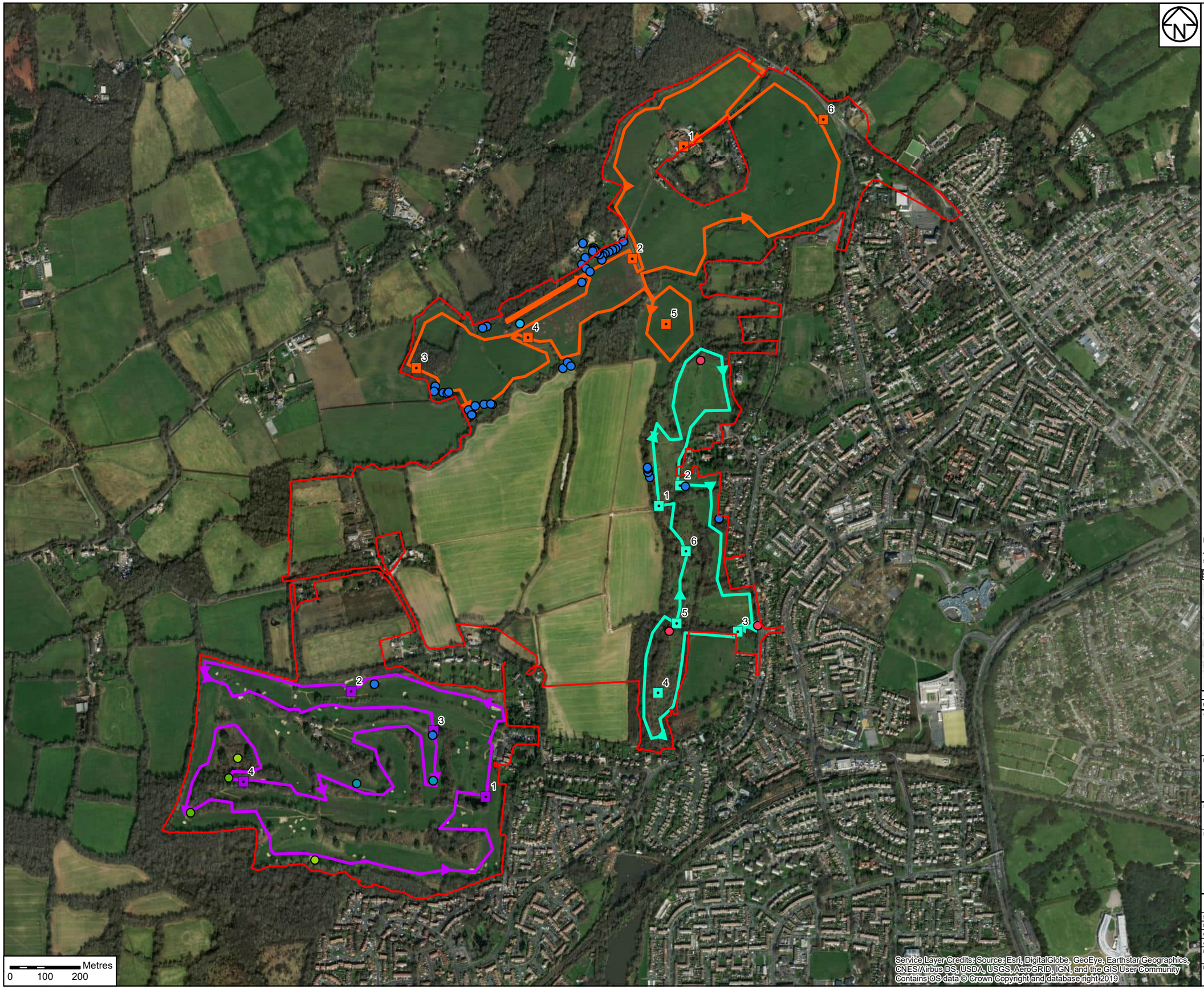
Drawing Title

Figure 13
Bat Activity Transect 3
September Dawn Survey 2019

	Status: S2	Revision: 01	
Scale	1:10,000	Date	27-Nov-19
Drawn By	P. Nehete		
Checked By	B. Murrary		
Approved By	M. Girvan		
PINS No.			

Drawing number: HE P:\N | Originator | Volume | Location | Type | Role | Number

Figure 14: Results of bat activity transects 1, 3 & 4, October 2018



Legend

Site Boundary

Bat Species Identified

- 45/55 Pip
- Big Bat
- Nyctalus Noctula
- Nyctalus Sp.
- Pip social Call
- Pipistrellus Pipistrellus
- Pipistrellus Pygmaeus

Stops

- Transect 1
- Transect 3
- Transect 4

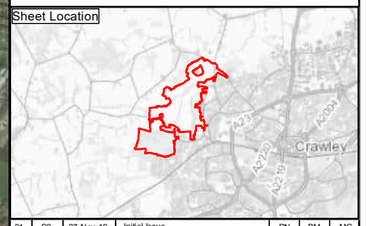
Bat Transect

- 1
- 3
- 4

NOTE:

A survey was not undertaken on Transect 2 due to sub-optimal weather conditions

Sheet Location



Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd
01	S2	27-Nov-19	Initial Issue	PN	BM	MG

Client: Homes England

Designer: ARCADIS

Registered office:
Arcadis House
34 York Way
London
N1 9AB

Coordinating office:
5th Floor, 401 Faraday Street
Birchwood
Warrington
WA3 6GA

Project: Land West of Ifield

Drawing Title: Figure 14
Bat Activity Transects 1, 3 & 4
October 2019

	Status: S2	Revision: 01	
Scale	1:10,000	Date	27-Nov-19
Drawn By	P. Nehete		
Checked By	B. Murrary		
Approved By	M. Girvan		
PINS No.			

Drawing number: HE P:N | Originator | Volume | Location | Type | Role | Number