



ENVIRONMENTAL STATEMENT
VOLUME 2
APPENDIX 9.2 – BAT SURVEY REPORT



Great Wolf Resorts

BAT SURVEY REPORT

Bicester Golf Course





Great Wolf Resorts

BAT SURVEY REPORT

Bicester Golf Course

TYPE OF DOCUMENT (VERSION) CONFIDENTIAL

PROJECT NO. 70042711

OUR REF. NO. 005

DATE: APRIL 2019

Great Wolf Resorts

BAT SURVEY REPORT

Bicester Golf Course

WSP

Mountbatten House

Basing View

Basingstoke, Hampshire

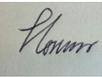
RG21 4HJ

Phone: +44 1256 318 800

Fax: +44 1256 318 700

WSP.com

QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Remarks	Draft for comment			
Date	April 2019			
Prepared by	Sophie Connor			
Signature	 Connor, Sophie 2019.04.30 14:35:19 +01'00'			
Checked by	Rosie Pope			
Signature	 Digitally signed by Pope, Rosie DN: cn=Pope, Rosie, ou=Guildford (London Square), email=Rosie.Pope@wsp.com Date: 2019.04.30 12:24:52 +01'00'			
Authorised by	Luke Roberts			
Signature	 Roberts, Luke 2019.05.22 16:57:52 +01'00'			
Project number	70042711			
Report number	70042711-005			
File reference	\\uk.wspgroup.com\central data\Projects\700427xx\70042711 - DP9 Bicester\02 WIP\EC Ecology\03 Document\Technical Studies\05 Bats			



CONTENTS

EXECUTIVE SUMMARY	1
1. INTRODUCTION	2
1.1. PROJECT BACKGROUND	2
1.2. ECOLOGICAL BACKGROUND	2
1.3. BRIEF AND OBJECTIVES	3
2. METHODS	4
2.1. PRELIMINARY BAT ROOST ASSESSMENT	4
2.2. BAT ACTIVITY SURVEY	5
MANUAL TRANSECT SURVEY	5
AUTOMATED DETECTOR SURVEY	5
2.3. DATA ANALYSIS	6
ECOBAT	6
2.4. DATES OF SURVEY AND PERSONNEL	7
2.5. EVALUATION	8
2.6. NOTES AND LIMITATIONS	8
3. RESULTS	10
3.1. PRELIMINARY BAT ROOST INSPECTION	10
3.2. BAT ACTIVITY SURVEY	10
MANUAL TRANSECT SURVEY	10
AUTOMATED DETECTOR SURVEY	11
3.3. EVALUATION OF THE SITE FOR BATS	17
OVERVIEW	17
4. IMPLICATIONS FOR DEVELOPMENT	23

4.1.	OVERVIEW	23
4.2.	LEGAL COMPLIANCE	23
4.3.	PLANNING POLICY COMPLIANCE	25
5.	RECOMMENDATIONS	26
<hr/>		
5.1.	AVOIDANCE AND MITIGATION MEASURES	26
	BAT ROOSTS	26
	FORAGING AND COMMUTING HABITAT	26
	SENSITIVE LIGHTING	27
5.2.	ECOLOGICAL ENHANCEMENT MEASURES	27
6.	CONCLUSIONS	28
7.	REFERENCES	29
<hr/>		
7.1.	PROJECT REFERENCES	29
7.2.	TECHNICAL REFERENCES	29
	FIGURES	30
<hr/>		

TABLES

Table 1 – Suitability of habitat features for bats adapted from good practice guidelines (Collins, 2016)	4
Table 2 - Dates for bat activity survey visits	7
Table 3 – Summary of results	10
Table 4 – Soundfiles recorded by each species/species group per walked transect per month	11
Table 5 - Summary of soundfiles recorded by each species/species group at each location per month during automated detector surveys	13
Table 6 – Nights at Ecobat activity level by species	16
Table 7 – Summary of Evaluation of Site for Bats by Species	18



FIGURES

Figure 1 - Site Location Plan

Figure 2 – Preliminary Bat Roost Assessment Results

Figure 3 - Activity Survey: Transect & Automated Detector Locations

Figure 4a-f - Activity Survey: Transect Results



EXECUTIVE SUMMARY

Great Wolf Resorts is proposing to construct a new 500-bedroom all-inclusive resort hotel on land to the north-west of the Bicester Hotel and Spa, Oxfordshire, hereafter referred to as the 'Proposed Development'.

WSP has undertaken a suite of bat surveys in line with published guidance (Collins, 2016) at location of the Proposed Development (the 'Site') and its surrounds (the 'Survey Area') in order to assess the likely impacts upon this species group, and to inform the design accordingly. The Proposed Development will be subject to a planning application which will be supported by this report and its recommendations.

The surveys covered the Site and extended to the Survey Area beyond, comprising the rest of the golf course, having been triggered by an extended Phase 1 habitat survey and desk study undertaken at the site by WSP which identified the potential for bats to be affected.

A Preliminary Bat Roost Assessment (PBRA) was undertaken of all trees within the Site which would be affected by the works. This identified a single tree of low bat roost suitability (T17).

Each month between May and October inclusive a walked transect survey was undertaken at dusk or dawn on a single night, and four automated detectors were deployed to record bat activity for five consecutive nights. Evaluation was supplemented by the use of EcoBat to give geographical context.

The results of the activity surveys indicate that the Site is of most value to noctule bat, with call levels indicating it is of District-County level value. The Site is also of up to Local level value to Myotis bats, common pipistrelle, soprano pipistrelle and brown long-eared bat. Other species recorded but for which the Site is of Zone-of-Influence level value or below includes barbastelle, serotine, Leisler's, Nathusius' pipistrelle and brown long-eared bat.

Activity (and therefore value) was concentrated in linear vegetated areas at the Site and Survey Area boundaries, other areas of vegetation (trees, scrub) and around waterbodies.

The Proposed Development may affect bats through direct loss of potential roosts (T17), direct loss of foraging and commuting habitat and through degradation of habitat and connectivity via other means such as lighting, pollution or disturbance.

In order to comply with relevant legislation and planning policy, a range of avoidance and mitigation measures are recommended including retention of existing habitat of value (trees, scrub and waterbodies), any necessary pre-works checks, precautionary felling methods, compensation for any habitat lost, and sensitive lighting design. In order to further enhance the value of the Site for bats, potential enhancement measures are also detailed including further habitat creation and bat box installation.

1. INTRODUCTION

1.1. PROJECT BACKGROUND

- 1.1.1. Great Wolf Resorts (GWR) is planning the redevelopment of land to the north-west of the Bicester Golf Hotel and Spa off the A4095. The 'Proposed Development' includes a redevelopment of land in the north west of the golf course comprising:
- the creation of a 500-bed all-inclusive resort hotel, with an indoor pool and leisure complex, targeted at families and golf enthusiasts; and
 - the creation of an access road to be taken from A4095 road.
- 1.1.2. The land which will be directly affected by the Proposed Development is hereafter referred to as 'the Site' and is shown on Figure 1.
- 1.1.3. It is understood that a planning application will be submitted for the Proposed Development prior to any works.

1.2. ECOLOGICAL BACKGROUND

- 1.2.1. The Site is located within the boundary of the Bicester Golf Course, Bicester, Oxfordshire, OX26 1TH, within the authority of Cherwell District Council (CDC). A 'Survey Area' was defined comprising the golf course and associated buildings, as shown at Figure 1. The Survey Area is approximately 52ha in area and located at Ordnance Survey (OS) Grid Reference SP551214.
- 1.2.2. A range of ecological surveys were undertaken by WSP in 2018 which included a Preliminary Ecological Appraisal (PEA), comprising an ecological desk study of notable and protected species, including bats within 2km of the Survey Area and an extended Phase 1 habitat survey.
- 1.2.3. The desk study provided records of two bat species within 2km of the Survey Area, common pipistrelle *Pipistrellus pipistrellus* and brown long-eared bat *Plecotus auritus*. Both of these species have been recorded roosting within a building 60m west of the Site, with a second common pipistrelle roost identified approximately 150m north of the Survey Area.
- 1.2.4. Planning application documents for nearby a development, immediately east of the Survey Area, revealed a moderate diversity of bat species to the east of the Survey Area, which included soprano pipistrelle *Pipistrellus pygmaeus*, noctule *Nyctalus noctula* and barbastelle *Barbastella barbastellus*.
- 1.2.5. The habitat assessment noted that habitats within the Survey Area and along its boundary were assessed as providing moderately suitable habitat for foraging and commuting bat species. This includes plantation woodlands, scattered trees, hedgerows and waterbodies. Structures, and semi-mature and mature trees located throughout the Survey Area and within the woodlands, hedgerows and scattered trees may also provide suitable roosting opportunities for bat species.
- 1.2.6. Recommendations were made in the PEA to undertake a Preliminary Bat Roost (PBRA) of trees within the Survey Area, and undertake bat activity surveys, to include the use of automated detectors and walked, manual transect surveys (WSP, 2018a).



1.3. BRIEF AND OBJECTIVES

1.3.1. Great Wolf Resorts commissioned WSP to complete the recommended bat surveys. The brief was to:

- Complete an external inspection of all trees within the Site;
- Complete a bat activity survey comprising repeated manual transect surveys and the deployment of automated bat detectors to identify the species of bat active within the Survey Area, and provide an indication of relative activity levels;
- Evaluate the Site for bats and make recommendations as to how proposals should account for bats with respect to legislation, planning and biodiversity policy.

1.3.2. The results of these surveys, and subsequent recommendations, are included within this report.

2. METHODS

2.1. PRELIMINARY BAT ROOST ASSESSMENT

- 2.1.1. A visual inspection of the trees within the Site was completed using binoculars to search for Potential Roost Features (PRFs) which may provide suitable roosting opportunities for bats in accordance with good practice guidelines (Collins, 2016). Where suitable features were noted, their location and a brief description of their character were recorded. Additionally, each feature was visually inspected, where possible, for evidence indicating use by roosting bats such as droppings, urine staining and characteristic staining from fur oils. Inspected trees were categorised in line with descriptions in Table 1 as having negligible, low, moderate or high suitability for bat roosts. The location of trees which were assessed to have potential to support roosting bats was recorded using a handheld GPS device and marked on a plan of the Site.
- 2.1.2. Trees were grouped where they were identified to have similar potential roost features and were within close proximity to each other. Trees with PRFs of higher roosting potential were recorded individually.
- 2.1.3. Inspections were undertaken on 30 July 2018.

Table 1 – Suitability of habitat features for bats adapted from good practice guidelines (Collins, 2016)

Suitability	Description of Roosting Habitats	Description of Commuting and Foraging Habitats
High	A tree with one or more potential roost features that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	<p>Continuous, high quality habitat that is well connected to the wider landscape that it is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines or trees and woodland edge.</p> <p>High quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined water courses and grazed parkland.</p> <p>Site is close to and connected to known roosts.</p>
Moderate	A tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only- the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	<p>Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens.</p> <p>Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.</p>

Suitability	Description of Roosting Habitats	Description of Commuting and Foraging Habitats
Low	A tree of sufficient size and age to contain PRFs but with none seen from the ground or features with only very limited roosting potential.	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerows or a vegetated stream, but isolated, e.g. not very well connected to the surrounding landscape by other habitat. Suitable but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.

2.2. BAT ACTIVITY SURVEY

MANUAL TRANSECT SURVEY

- 2.2.1. A series of manual transect surveys were undertaken within the Survey Area between May and October 2018. Each month a walked transect survey was completed at dusk, with a pre-dawn survey undertaken in August. The activity transect surveys were carried out taking into account current good practice guidance (Collins, 2016). Each month a pre-defined transect was walked by two surveyors to record levels of bat activity, the direction and starting point was varied between months to avoid temporal bias in the results.
- 2.2.2. Each dusk walked transect began at least 15 minutes before sunset and continued for approximately 120 minutes afterwards. The pre-dawn survey commenced 120 minutes before sunrise and continued for approximately 90 minutes afterwards (discussed further in Section 2.6).
- 2.2.3. During each transect the surveyors noted the bat species heard and seen, including the time, location, and, where possible behaviour type and direction of flight. Surveyors were equipped with Echo Meter 3 (EM3) bat detectors to listen to and record bat activity. Calls registered by the bat detectors were recorded for later analysis using specialist computer software Analook W and Kaleidoscope. Details are provided in Section 2.3 below.
- 2.2.4. A plan showing the transect routes walked during the survey is provided in Figure 2. Dates and times of each of the transect survey visits are provided in Table 2 and weather conditions during the survey visits are provided in Table 2.

AUTOMATED DETECTOR SURVEY

- 2.2.5. In combination with the walked transect surveys, additional bat activity data was gathered using automated bat detectors. Automated (static) bat detectors Song Meter 2+ (SM2+) were installed within the Survey Area in pre-determined locations during each of the survey months May – October (inclusive). The location of the automated detectors is shown on Figure 2.
- 2.2.6. A total of four detectors were deployed in each month guidance i.e. for a minimum of five nights in each month, twice that required by published guidance (Collins, 2016). The automated detectors

were set to commence recording at least 30 minutes before sunset and cease recording 30 minutes after sunrise.

- 2.2.7. Calls registered by the static bat detectors were recorded for later analysis using specialist computer software BatClassify and Kaleidoscope. Details are provided in Section 2.3 below.

2.3. DATA ANALYSIS

- 2.3.1. The recordings of bat echolocation calls collected during the surveys were analysed using specialist computer software BatClassify and Kaleidoscope. The analysis enables confirmation of species or species group based on call parameters, and the relative activity of different species of bats by counting the minimum number of bats recorded within discrete sound files. Once triggered by ultrasound, the SM2+ and EM3 detectors record sound files with a duration of 15 seconds, which may contain a number of individual bat calls (or passes), or discrete groups of ultrasound 'pulses'. The assessment of relative bat activity between species is based on the relative abundance of recorded calls of each species within each survey period (i.e. each walked transect survey or period of static monitoring per month) and across the combined study period.

- 2.3.2. It should be recognised that a series of separate sound files may represent a series of different bats commuting within the range of an automated detector, or a smaller number of bats repeatedly triggering the detector (e.g. bats making repeated foraging passes within the range of a detector).

- 2.3.3. Where possible, bat calls are identified to species level. However, species of the genus *Myotis* are grouped together in most cases as their calls are similar in structure and have overlapping call parameters, making species identification problematic (Russ, 2013). For *Pipistrellus* species the following criteria based on measurements of peak frequency are used to classify calls:

- Common pipistrelle ≥ 42 and <49 KHz;
- Soprano pipistrelle ≥ 51 KHz;
- Nathusius' pipistrelle *Pipistrellus nathusii* <39 KHz;
- Common/soprano pipistrelle ≥ 49 and <51 KHz; and
- Common/Nathusius' pipistrelle ≥ 39 and <42 KHz.

- 2.3.4. In addition, the following categories are used for calls which cannot readily be identified with confidence due to the overlap in call characteristics between species or species groups:

- *Myotis/Plecotus* sp.;
- *Nyctalus* sp. (either Leisler's bat *Nyctalus leisleri* or noctule);
- Serotine *Eptesicus serotinus* /Leisler's ; and
- Serotine/*Plecotus* sp.

ECOBAT

- 2.3.5. The automated detector data, once analysed, was then input to Ecobat, an online analysis tool for objectively assessing bat activity levels. This tool places the data within a percentile for the level of activity, based on the number of passes per species per night, allowing for variables such as location, weather, date and immediate surroundings. Passes were defined as the presence of a species within a single 15 second sound file. Data were compared to other local data sets (i.e. within 100km of the Site). Ecobat defines activity as low-high as follows:

- Low activity: 0-20th percentiles;
- Low to moderate activity: 21st-40th percentiles;

- Moderate activity: 41st-60th percentiles;
- Moderate to high activity: 61st-80th percentiles; and
- High activity: 81st-100th percentiles.

2.3.6. Ecobat does not currently allow for the inclusion of unidentified *Pipistrellus* spp., *Nyctalus* spp. and *Nyctaloid* spp. as individual groups, and therefore these groups were excluded from the Ecobat analysis, although the raw data from these groups has been analysed in Section 3.2.

2.4. DATES OF SURVEY AND PERSONNEL

2.4.1. The bat surveys were led by an experienced surveyor, who has over 8 years’ experience of ecological survey, including extensive bat survey experience. The dates of the bat activity surveys are summarised in Table 2 below.

Table 2 - Dates for bat activity survey visits

Month	Date of Transect Survey	Weather Conditions Summary (transect survey)	Dates of Automated Survey	Weather Conditions Summary (automated survey)
May	31 May 2018	16-17 degrees, 100% cloud, wind Beaufort scale 0, no rain.	31 May 2018 – 8 June 2018	Dry with winds between 5-15mph Night-time temperatures between 10°C-16°C.
June	25 June 2018	20 – 22 degrees, 10-15% cloud, wind Beaufort scale 0, no rain.	25 June 2018 – 3 July 2018	Dry with winds between 2-23mph Night-time temperatures between 10°C-16°C.
July	30 July 2018	19 – 20 degrees, 75% cloud, wind Beaufort scale 1-3, no rain.	30 July 2018 – 02 August 2018	Dry with winds between 6-14mph Night-time temperatures between 11°C-17°C.
August	24 August 2018	10 – 11 degrees, 20 – 30% cloud, wind Beaufort scale 0, no rain.	24 August 2018 – 28 August 2018	Dry with winds between 4-30mph. Night-time temperatures between 7-16 °C.
September	25 September 2018	11 – 13 degrees, 10 – 15% cloud, wind Beaufort scale 2, no rain.	25 September 2018 – 30 September 2018	Dry with winds between 3-20mph. Night-time temperatures between 4-13 °C.
October	23 October 2018	13 degrees, 50% cloud, wind Beaufort scale 6-9, no rain.	23 October 2018 – 27 October 2018	Generally dry with winds between 9-37mph. Night-time temperatures between 2-12 °C.

2.5. EVALUATION

- 2.5.1. The evaluation of the bat populations using the Site and Survey Area has been based on CIEEM guidance (CIEEM, 2018). This guidance recommends that the evaluation is made with reference to a geographical frame of reference as follows:
- International;
 - UK;
 - National (England);
 - Regional (South-East England);
 - County (Oxfordshire);
 - District (Cherwell);
 - Local (Bicester area); and
 - Within zone of influence only (i.e. at a Survey Area level - within the confines of the Survey Area boundary).
- 2.5.2. To inform the assessment in this report, the level of activity of each bat species identified, the frequency of records made during the surveys, the abundance of the species at the national level, the quality of the habitat present and the geographical range of the species concerned have been considered, based on published accounts (Collins, 2016; Harris *et al.*, 2008).
- 2.5.3. In evaluating the relative importance of the Site and Survey Area to different bat species, consideration is given to the relative frequency of each species (based on the survey results) in the context of their UK status and population estimates. The following categories for relative frequency (in terms of results of this survey) have been used:
- Very frequent – recorded on all or most surveys with high numbers of calls/levels of activity;
 - Frequent – recorded on all or most visits but with medium numbers of calls/levels of activity;
 - Regular – recorded on most visits but with low numbers of calls/levels of activity;
 - Infrequent – scattered records through the survey programme, generally low numbers of calls;
 - Very infrequent – very few calls recorded on a low number of occasions; and
 - No confirmed activity – no confirmed bats of this species recorded in this Survey Area.
- 2.5.4. Consideration has also been given to which habitats/parts of the Survey Area are of highest value to bats based on the survey data. For example, this may include regular commuting flight lines or areas most frequently used by foraging bats.

2.6. NOTES AND LIMITATIONS

- 2.6.1. Trees on along the western and northern boundary (adjacent to the M40 and A4095) could not be fully inspected during the PBRA due to their proximity to the road, as shown on Figure 3. However, these trees were observed as largely immature specimens and trees along the northern boundary had been subject to recent management. As such it is considered unlikely that these trees are able to support bat roosts and so the lack of data on these trees is unlikely to be a serious limitation in this report.
- 2.6.2. The PBRA survey was undertaken in July, when many of the trees within the Site were in leaf. There is some limited potential for obstruction of PRFs within branches and/or on tree trunks to occur when

a tree is in leaf. However, given the semi-mature nature of trees at the Site, this is unlikely to be a significant limitation to the findings. As a precaution it is advised that that prior to clearance, a pre-felling inspection is carried out.

- 2.6.3. Weather data during automated detector recording nights was not recorded directly at the time of survey (except when a transect occurred on the same night), but was instead sourced via a freely available historical weather resource. This resource uses data from a network of local weather stations, so resolution of information varies. The closest weather station was located at Luton airport, approximately 60km east of the Survey Area. Due to this distance, the weather data may not be completely accurate for any given automated detector night, but it sufficient to give an indication of the prevailing weather conditions during the periods in which the detectors were deployed.
- 2.6.4. Data for *Plecotus* spp. have been interpreted with caution as these species have low detectability and have been subsequently nationally under-recorded. This species generally uses low intensity calls and is therefore rarely detected unless it passes within 5m of the detector, and even then, not always as the genus does not always use echolocation when foraging (Swift, 1998). However, this is not considered to be a significant limitation to the analysis and this has been taken into account during the evaluation.
- 2.6.5. On several occasions technical failures meant that automated detectors failed to record data for full or partial nights. This is a common fault with remote sensing equipment and surveys are designed with a degree of effort redundancy to make sure enough survey data is gathered for purpose. In this instance the total number of 'detector nights' with no data amounted to 29, achieving 91 detector nights of successful data collection. Given that Collins (2016) only recommends deployment of two detectors for sites of this suitability, achieving 60 detector nights of data, it is considered that sufficient information has been obtained to be able to draw the relevant analyses and conclusions. In addition, one dawn walked transect in August concluded 45 minutes before sunrise. This is not considered to be a significant limitation given activity levels throughout the survey had been extremely low (1 pass).

3. RESULTS

3.1. PRELIMINARY BAT ROOST INSPECTION

- 3.1.1. The trees within the main body of the Survey Area are dominated by young to semi-mature specimens of relatively recent origin, likely planted during landscaping for the golf course complex. Some more mature specimens are present at the peripheries.
- 3.1.2. Within the Survey Area one tree with low bat roosting suitability was noted, T17 (as numbered on the arboricultural constraints report (WSP, 2018b)).
- 3.1.3. The remaining trees were assessed as having negligible potential. Details of the results is provided in Table 4 below and the location can be seen on Figure 3.

Table 3 – Summary of results

Tree number	Species	Approx. height (m)	Description of potential roosting features (PRFs)	Roost Potential	Photograph
T17	Poplar sp.	12m	Rotten limb on the north-west aspect with two holes, approximately 3-4m high which may lead to a cavity or crevices.	Low	

3.2. BAT ACTIVITY SURVEY

MANUAL TRANSECT SURVEY

- 3.2.1. A least five bat species were recorded within the Survey Area during the manual transect surveys. The confirmed species or species groups include:

- Common pipistrelle;
- Noctule;
- Serotine; and
- Soprano pipistrelle;

3.2.2. The following genera (not identifiable to species level) were also recorded;

- *Myotis* spp.;
- *Nyctalus* spp.;
- *Nyctaloid* spp. (not a strict genus, but includes Serotine with *Nyctalus* in one group); and
- *Pipistrellus* spp.;

3.2.3. The calls recorded during the transect surveys each month are summarised in Table 5 below. Locations of bats encountered during the transect surveys are shown on Figure 4a-f.

Table 4 – Soundfiles recorded by each species/species group per walked transect per month

Month	Bat	<i>Pipistrellus</i> spp.	Common pipistrelle	Soprano pipistrelle	<i>Myotis</i> spp.	<i>Nyctalus</i> spp.	<i>Nyctaloid</i> spp.	Noctule	Serotine	Grand Total
May	5	-	9	4	2		-	4	-	24
June	4	-	4	5	4	3	1	11	1	33
July	-	1	7	8	3	1	-	6	1	27
August (Dawn)	-	-	-	-	1	-	-	-	-	1
September	-	4	7	5	2	1	-	3	-	22
October	-	-	4	3	-	-	-	3	-	10
Grand Total	9	5	31	25	12	5	1	27	2	117
% Total	7.7	4.3	26.5	21.4	10	4.3	0.9	23.1	1.7	100.0

3.2.4. Three species were frequently identified recorded over the survey period, common pipistrelle, soprano pipistrelle and noctule, constituting between one fifth and a quarter of all recorded passes. The most active months were June and July, with the quietest being August.

3.2.5. Spatially, calls were recorded in different locations in different months with few discernible patterns. Most activity was concentrated around wooded or shrubbed areas, and notably more around the waterbodies near to the existing buildings in the centre of the Survey Area. Species distribution was varied throughout the months.

AUTOMATED DETECTOR SURVEY

3.2.6. A total of eight bat species were recorded within the Site during the automated detector survey component of the activity survey. These species were as follows:

- Barbastelle;

- Brown long-eared bat;
- Leisler's bat;
- Noctule;
- Serotine;
- Common pipistrelle;
- Soprano pipistrelle; and
- Nathusius' pipistrelle

3.2.7. The following genera (not identifiable to species level) were also recorded;

- *Myotis* spp.;
- *Nyctalus* spp.;
- *Nyctaloid* (not a strict genus, but includes Serotine with *Nyctalus* in one group); and
- *Pipistrellus* spp.;

3.2.8. The bat data recorded during the static monitoring periods each month are summarised in Table 5 overleaf.

3.2.9. Species-specific emergence¹ time ranges were compared in Ecobat with recorded bat passes from 15 minutes before to 90 minutes after sunset, at each location, over the recording period. This comparison was used to highlight the potential presence of a nearby roost of particular species. The species likely to have roost in close proximity based on this analysis are noctule at Location A, common pipistrelle at Location C and *Myotis* spp. at Location A and D.

¹ Emergence time is the time period when bats leave a roost to go foraging, and varies characteristically between species.



Table 5 - Summary of soundfiles recorded by each species/species group at each location per month during automated detector surveys

Month/ Location	Barbastelle	Brown long-eared	Myotis spp	Noctule	Leisler's	Nyctalus sp	Serotine	Nyctaloid sp.	Nathusius' Pipistrelle	Pipistrelle sp. (40khz)	Pipistrelle sp. (50khz)	Common Pipistrelle	Soprano Pipistrelle	Grand Total
May														
Location A	-	2	2	246	-	15	2	-	-	17	-	270	-	554
Location B	1	-	-	308	-	10	-	-	-	6	-	498	-	823
Location C	-	-	-	-	-	-	-	-	-	2	-	737	-	739
Location D	2	3	5	100	-	35	47	-	-	8	-	186	-	386
Total	3	5	7	654	-	60	49	-	-	33	-	1,691	-	2,502
June														
Location A	2	-	312	549	1	4	31	1	-	2	1	104	1,780	2,787
Location B	-	-	9	19	-	11	5	-	-	2	-	15	30	91
Location C	-	-	58	1,131	-	129	35	-	-	24	9	684	166	2,236
Location D	-	-	16	651	-	15	15	1	-	-	-	44	71	813
Total	2	-	395	2,350	1	159	86	2	-	28	10	847	2,047	5,927

Month/ Location	Barbastelle	Brown long-eared	Myotis spp	Noctule	Leisler's	Nyctalus sp	Serotine	Nyctaloid sp.	Nathusius' Pipistrelle	Pipistrelle sp. (40khz)	Pipistrelle sp. (50khz)	Common Pipistrelle	Soprano Pipistrelle	Grand Total
July														
Location A	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Location B	1	-	8	76	-	11	1	-	-	-	-	379	832	1,308
Location C	-	-	1	1	-	-	2	-	-	-	1	8	8	21
Location D	1	-	17	74	-	11	15	-	-	-	-	79	79	276
Total	2	-	26	151	-	22	18	-	-	-	1	466	919	1,605
August														
Location A	2	10	20	142	-	7	18	1	-	-	5	159	453	817
Location B	-	-	7	10	2	5	3	-	-	-	-	13	22	62
Location C	-	-	1	-	-	-	-	-	-	-	-	74	129	204
Location D	-	8	28	99	-	28	6	-	-	-	-	273	146	588
Total	2	18	56	251	2	40	27	1	-	-	5	519	750	1,671
September														
Location A	-	-	9	118	2	-	3	-	1	1	-	31	208	373
Location B	-	-	-	-	-	-	-	-	-	-	-	-	4	4



Month/ Location	Barbastelle	Brown long-eared	Myotis spp	Noctule	Leisler's	Nyctalus sp	Serotine	Nyctaloid sp.	Nathusius' Pipistrelle	Pipistrelle sp. (40khz)	Pipistrelle sp. (50khz)	Common Pipistrelle	Soprano Pipistrelle	Grand Total
Location C	1	-	597	40	-	23	2	2	-	1	-	80	58	804
Location D	-	-	86	43	-	6	2	1	-	-	-	90	504	732
Total	1	-	692	201	2	29	7	3	1	2	-	201	774	1,913
October														
Location A	1	-	5	6	-	1	-	-	-	-	-	29	6	48
Location B	3	-	8	2	-	3	2	-	1	-	5	9	5	38
Location C	-	-	8	2	-	-	-	-	-	-	-	9	5	24
Location D	1	-	10	-	-	4	29	-	-	-	-	62	21	127
Total	5	-	31	10	-	8	31	-	1	-	5	109	37	237
Grand Total	15	23	1,207	3,617	5	318	218	6	2	63	21	3,833	4,527	13,855
% Total	0.11	0.17	8.71	26.11	0.04	2.30	1.57	0.04	0.01	0.45	0.15	27.67	32.67	100

- 3.2.10. The species recorded were dominated by *Pipistrellus* spp., common and soprano pipistrelles with very few Nathusius', together accounting for 61% of the registrations recorded. The next most common species was noctule, accounting for 26% of the registrations overall, *Myotis* spp. accounted for 9% of the registrations. The remaining 4% being made up of the other species or genera recorded.
- 3.2.11. June was the busiest month, recording 5,927 calls accounting for 43% of all registrations recorded, followed by May with 2,502 calls and September with 1,913 calls. July and August had an average 1,665 calls, October was comparatively quiet recording only 237 calls.
- 3.2.12. The analysis using Ecobat allows a more sophisticated assessment of the results by fitting them into percentiles (low-high) based on the species abundance in the region (100km radius). Table 6 shows the total nights recorded by level, as well as the number of nights when no activity was recorded for that species.

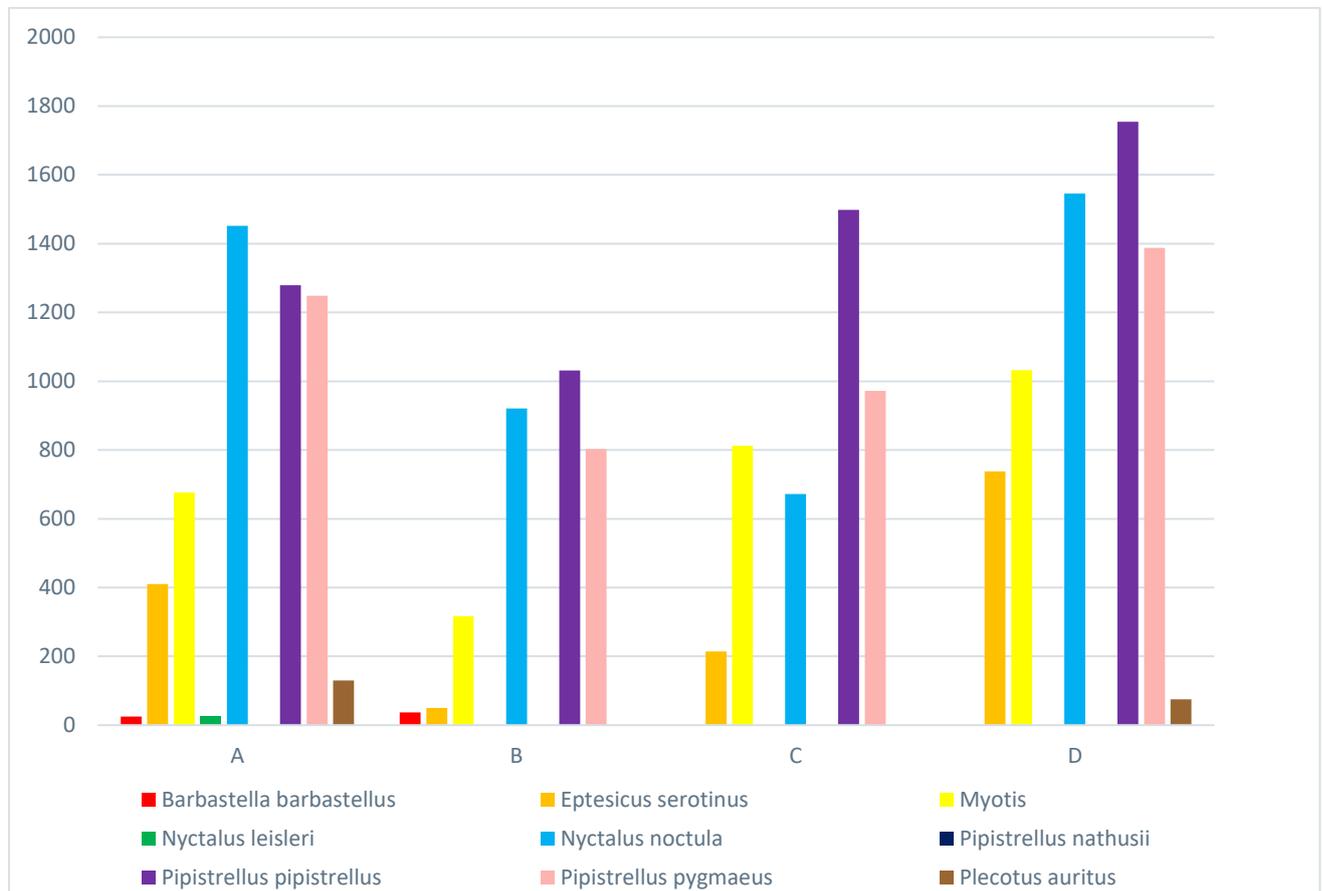
Table 6 – Nights at Ecobat activity level by species

Species	Nights						Grand Total
	High	Medium/ High	Medium	Low/ Medium	Low	No activity	
Barbastelle	-	-	-	2	10	108	120
Serotine	-	8	10	12	21	69	120
Myotis spp.	6	11	20	17	15	51	120
Leisler's bat	-	-	-	1	3	116	120
Noctule	20	33	6	8	6	47	120
Nathusius' pipistrelle	-	-	-	-	2	118	120
Common pipistrelle	26	31	16	9	8	30	120
Soprano pipistrelle	16	28	16	6	8	46	120
Brown long-eared bat	-	-	2	4	4	110	120
Grand Total	68	111	70	59	77	695	1080
% Total	6.30	10.28	6.48	5.46	7.13	64.35	100

- 3.2.13. Activity levels were high for *Myotis* spp., noctule and common and soprano pipistrelle, on six, 20, 26 and 16 detector nights respectively. Medium/high levels of activity were then also recorded for serotine and medium levels of activity for brown long-eared bat. Barbastelle and Leislers' were recorded in low/medium and low numbers on 2 and 10 and 1 and 3 detector nights respectively. Nathusius' pipistrelle were recorded in low numbers on two nights.

3.2.14. A breakdown of the activity levels (Ecobat percentile score sum, the unit on which activity level is graded) by locations is provided in Chart 2. This shows whether particular locations were of value for particular species/groups in comparison to other sites during the same time period.

Chart 1 EcoBat Activity Levels for Species by Location (Percentile Sum)



3.2.15. Location D was of the most value for the most frequently recorded species; common pipistrelle, soprano pipistrelle, noctule, brown long-eared bat and serotine. The species/groups which were recorded very infrequently were also not recorded at Location D, rather at Location A and B (Leisler’s, barbastelle and Nathusius’ pipistrelle). Location A was of the most value for brown-long eared bats of the two locations it was recorded at.

3.3. EVALUATION OF THE SITE FOR BATS

OVERVIEW

- 3.3.1. The results of the activity surveys suggest that the value of the Site for bats is non-uniform, with the majority of high and medium/high activity being concentrated in the north-east of the Site (Locations A & D), with species assemblages dominated by *Pipistrellus* spp. and noctule.
- 3.3.2. The evaluation of bat species using the Site has been made using Ecobat analysis, as set out in Section 2.3 and the CIEEM geographic frames of reference as set out in Section 2.5. The summary of this evaluation is shown in Table 7 below.

Table 7 – Summary of Evaluation of Site for Bats by Species

Species	UK Status ²	County Status ³	Est. UK Pop ⁴	Observation	Relative frequency in Site	Likely Site Value
Barbastelle	Rare	Uncommon, Widespread	5,000	Low/medium and low levels of activity have been observed by this species. No activity was recorded on 108 of the 120 recording nights. Remaining nights were calculated as low/medium or low activity levels by Ecobat.	Very infrequent	Zone of Influence
Serotine	Scarce	Uncommon, Widespread	10,000	218 calls were observed over 51 nights. Serotine was recorded at all locations with over half (52%) of all recorded calls observed at Location D. This species was observed twice during the manual walked transect, once in June and once in July. Medium/high level of activity were observed on 8 nights (7% of all calls), medium activity levels were observed on 10 nights (17%). No activity was recorded on 69 nights (58%) of the 120 recording nights.	Infrequent	Zone of Influence
Myotis spp.	Varied	Varied	Varied	1,207 calls were recorded over 69 nights. <i>Myotis</i> spp. were recorded at all locations but 50% of all calls were recorded at Location C in September. This genus was recorded during all manual transect surveys but the October survey. 5% of all nights had high activity, 9% had medium/high, and 17% had medium activity observed. No activity was recorded on 42% of the 120 recording nights. Ecobat results suggest that a <i>Myotis</i> spp. roost may potentially be present in close proximity to the Site, specifically near	Infrequent	Local

² UK Status is based on the National Bat Monitoring Programme (NBMP) Population Trends 2015 (Collins, 2016)

³ County Status based on data held by the Oxfordshire Bat Group (Oxfordshire Bats, 2018)

⁴ Estimated UK Population Based on Battersby (2005) or Harris *et al.* (2008).

Species	UK Status ²	County Status ³	Est. UK Pop ⁴	Observation	Relative frequency in Site	Likely Site Value
				Location A and Location D. The habitats within the Site are suitable for bats using this roost.		
Noctule*	Uncommon	Uncommon, Widespread	50,000	<p>3,615 calls were recorded over 73 nights. Noctule were recorded at all locations with Location A and C recording approximately 30% of all calls respectively. This species was recorded during all manual transect surveys but the dawn survey undertaken in August.</p> <p>High levels of activity were observed on 17% of all nights, and medium/high activity observed on 28%. No activity was recorded on 39% of the 120 recording nights.</p> <p>Ecobat results also suggest that a noctule roost is present in close proximity to the Site, specifically near to Location A in the north of the Site. The habitats within the Site are suitable for bats using this roost.</p>	Very frequent/ Frequent	District - County
Leisler's*	Scarce	Uncommon, Widespread	10,000	<p>Five calls were recorded over four nights at Location A and B in June, August and September. This species was not recorded during the manual transect survey.</p> <p>One low/medium night and three nights of low activity have been observed. No activity was recorded on 97% of the 120 recording nights.</p>	Very Infrequent	Zone of Influence
Nathusius' Pipistrelle	Rare, Widespread	Rare	16,000	<p>Two calls were recorded over two nights, one at Location A in September and one at Location B in October. This species was not recorded during the manual transect surveys.</p> <p>Low levels of activity were observed on 2 nights. No activity was recorded on 98% of the 120 recording nights.</p>	Very Infrequent	Zone of Influence
Common Pipistrelle**	Common	Common, Widespread	2.43 million	Common pipistrelle was the second most abundant species accounting for 28% of the automated detector results, and 25% of the calls during the walked transects.	Very Frequent	Local

Species	UK Status ²	County Status ³	Est. UK Pop ⁴	Observation	Relative frequency in Site	Likely Site Value
				<p>3,833 calls were recorded over 90 nights, common pipistrelle was recorded at all locations and was recorded during all the manual transect survey but the dawn survey undertaken in August.</p> <p>High levels of activity have been observed on 22% of the recording nights. The highest activity levels were at Location C but the most activity was recorded at Location D as calculated by Ecobat.</p> <p>Ecobat results also suggest that a common pipistrelle roost is present in close proximity to the Site, specifically near to Location C in the south of the Site. The habitats within the Site are suitable for bats using this roost.</p>		
Soprano Pipistrelle**	Common	Common, Widespread	1.3 million	<p>The most abundant species recorded was soprano pipistrelle, accounting for 33% of all recorded calls during the automated detector surveys and 23% of all calls recorded on walked transects</p> <p>4,527 calls were observed over 75 nights. Soprano pipistrelle was recorded at all locations with 54% of all observed calls recorded at Location A. This species was observed during all the manual transect survey but the dawn survey undertaken in August.</p> <p>High levels of activity have been observed on 16 nights (13% of all calls observed). Medium/high levels of activity were recorded on 28 nights (23%). No activity was recorded on 45 (38%) of the 120 recording nights.</p>	Very Frequent	Local
Brown long-eared	Common	Relatively common, Widespread	245,000	23 brown long-eared calls were recorded over 10 nights at Locations A & D in May and August. This species was not recorded during the manual transect surveys.	Very Infrequent (Overall <i>Plecotus</i>)	Local

Species	UK Status ²	County Status ³	Est. UK Pop ⁴	Observation	Relative frequency in Site	Likely Site Value
				<p>Low levels of activity have been observed by this species. No activity was recorded on 92% of the 120 recording nights. The six nights on which brown long-eared were recorded were also considered to be medium levels of activity or below.</p> <p>A roost occupied by brown long-eared bats has previously been recorded immediately adjacent to the Site and a maternity roost identified in 2013 was located 60m east of the Site boundary. Brown long-eared bats were observed at Locations A and D during the automated detector surveys. It is likely that individuals from the nearby roosts use the Site to forage.</p> <p>It is likely that long-eared bat activity across the Site has been unrecorded and as such is higher than was recorded during the activity and automated detector surveys (see Section 2.6).</p>	Very Infrequent)	
Grey long-eared	Rare	No county records	1000-3000	<p>Not observed on Site.</p> <p>Grey long-eared bats have never been recorded in Oxfordshire, and as such it is considered absent from the Site. Overall the Site appears to be of value at a Local level of <i>Plecotus auritus</i>, with this value concentrated in the north-eastern extent.</p>	No confirmed activity (Overall <i>Plectous</i> Very Infrequent)	Negligible

* 318 *Nyctalus* spp. (genus including Noctule and Leisler's) calls were observed over 61 nights, at all locations, across all six recording months. This genus was recorded in during the manual walked transect in May – July (inclusive) and September. Nearly half (48%) of calls were observed at Location C, 31% at Location D, 13% at Location B and 8% at Location A. Half of all recorded calls were observed in June, October observed the lowest number of calls with only 8 calls recorded (3% of total).

Nyctaloid bats (not a strict genus but includes Serotine with *Nyctalus* spp. in one group). were recorded six times in total, at Location A in June and August, Location C in September and Location D in June and September. This group was recorded one time in June in the south-west of the Survey Area during the manual walked transect.

** Unidentified pipistrelle *Pipistrellus* spp. (recorded to the nearest 10kHz) calls accounted for a further 0.46% (calls at 40 kHz) and 0.15% (calls at 50 kHz) of the total recorded automated detector calls respectively.

4. IMPLICATIONS FOR DEVELOPMENT

4.1. OVERVIEW

- 4.1.1. In the absence of mitigation the Proposed Development has potential to affect bats through removal or degradation of habitat used by foraging and commuting bats on Site. A single tree of low bat roost potential is present within the Site which will be lost. There is therefore a risk of direct adverse effects upon bats through loss of roosts. Measures to avoid and mitigate this risk are detailed at Section 5.1.
- 4.1.2. Indirect effects could occur upon bat roosts could occur due to removal of suitable foraging habitat and commuting links however. In particular, removal of boundary vegetation on the northern and western boundaries where noctule activity was concentrated, could affect this species. Other species which could be subject to elevated adverse effects include common pipistrelle, soprano pipistrelle, brown long-eared and Myotis sp., for which the Site is considered to be of value at a Local level.
- 4.1.3. The legislation and planning policy relevant to bats set out below is therefore relevant. Recommendations as to how the legislation and planning policy may be satisfied are set out in Section 5.

4.2. LEGAL COMPLIANCE

- 4.2.1. Bats and their roosts are afforded a high level of protection under the Conservation of Habitats and Species Regulations 2017 (as amended) (the 'Habitat Regulations'), the legislation means that it is an offence to:
- 'Deliberately capture, injure or kill a wild bat;
 - Deliberately disturb wild bats; 'disturbance of animals includes in particular any disturbance which is likely:
 - (a) to impair their ability -
 - (i) to survive, to breed or reproduce, or to rear or nurture their young; or
 - (ii) in the case of animals of a hibernating or migratory species, to hibernate or migrate; or
 - (b) to affect significantly the local distribution or abundance of the species to which they belong.'
 - Damage or destroy a breeding site or resting place used by this species.'
- 4.2.2. Protection is also afforded under the Wildlife and Countryside Act 1981 (as amended) with respect to disturbance of animals when using places of shelter, and obstruction of access to places of shelter.
- 4.2.3. Due to the high level of protection afforded to bats and their habitat, mitigation for this species is governed by a strict licensing procedure administered by Natural England (normally, planning permission must be obtained before a licence can be sought
- 4.2.4. Certain species of bats including the noctule bat, brown long-eared bat and soprano pipistrelle bat are also listed as a Species of Principal Importance (SPI) for the Conservation of Biodiversity in England under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Under Section 40 of the NERC Act (2006) public bodies (including local planning authorities) have a

duty to have regard for the conservation of SPI when carrying out their functions, including determining planning applications.

4.3. PLANNING POLICY COMPLIANCE

- 4.3.1. At the national level the National Planning Policy Framework (2019) forms the basis for planning system decisions with respect to conserving and enhancing the natural environment, including bats; the Office of the Deputy Prime Minister (ODPM) circular 06/2005 also provides supplementary guidance, including confirmation that ‘the presence of a protected species is a material consideration when a planning authority is considering a development proposal’.
- 4.3.2. The NPPF sets out, to protect and enhance biodiversity, plans should:
- *“Identify, map and safeguard components of local wildlife-rich habitat and wider ecological networks, including e 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.”*
- 4.3.3. A list of principles which local planning authorities should follow when determining planning applications is included in the NPPF, and includes the following:
- *“If significant harm resulting from a development cannot be avoided...adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;*
 - *...opportunities to incorporate biodiversity improvements in and around development should be encouraged, especially where this can secure measurable net gains for biodiversity”.*
- 4.3.4. At a local level, Cherwell local plan 2011-2031; Cherwell Policy ESD 10 – Protection and Enhancement of Biodiversity and the Natural Environment states (Cherwell District Council 2015):
- *“Development proposals will be expected to incorporate features to encourage biodiversity and retain and where possible enhance existing features of nature conservation value within the site. Existing ecological networks should be identified and maintained to avoid habitat fragmentation, and ecological corridors should form an essential component of green infrastructure provision in association with new development to ensure habitat connectivity.”*
 - *“Relevant habitat and species surveys and associated reports will be required to accompany planning applications which may affect a site, habitat or species of known or potential ecological value.”*
- 4.3.5. Mitigation, compensation and enhancement measures are recommended in Section 5 to enable the Proposed Development to be compliant with the above legislation and planning policy.

5. RECOMMENDATIONS

5.1. AVOIDANCE AND MITIGATION MEASURES

BAT ROOSTS

- 5.1.1. A single tree of low bat roost potential (T17) is to be lost to the Proposed Development. Whilst no further survey is required, precautionary methods of felling should be employed to further minimise the risk to this species group.
- As T17 is not likely to offer hibernation potential to bats, felling works should be undertaken in the winter (November – March depending on weather conditions) where possible, when bats can reasonably be assumed to be absent.
 - If clearance during April-October is unavoidable then the PRF should be ‘soft-felled’. This involves lowering the whole section of branch with the PRF to the ground, not cross-cutting or fracturing it. The PRF section should then be placed in a suitable location (e.g. within retained woodland) and should be left overnight, with the PRF facing upwards, with free routes of dispersal, for any bats to disperse naturally.
- 5.1.2. In the unlikely event that any bats are encountered, felling works should cease and an ecologist should be contacted for advice.
- 5.1.3. To avoid a reduction in roosting opportunities available to bats in the future, recommendations to enhance habitat provision on Site are provided in Section 5.2 below.
- 5.1.4. In order to minimise the potential disturbance to bats during the construction phase, and to avoid a reduction in value of the Site for foraging and commuting bats, a selection of measures is detailed below.
- 5.1.5. Furthermore, as noted in Section 2.6, it is recommended that a pre-clearance inspection is undertaken of trees not subject to a PBRA due to their proximity to the roads, should these trees be scheduled for removal.

FORAGING AND COMMUTING HABITAT

- 5.1.6. It is recommended that habitat shown to be of value for foraging and commuting bats is retained as far as possible within the designs. This includes vegetated habitats, particularly the bands of trees and scrub at the Site edges, and the waterbodies.
- 5.1.7. Any such habitat lost must be compensated for in line with national planning policy to achieve. It is recommended that the size and nature of compensatory habitat creation required is informed by the Biodiversity Net Gain (BNG) assessment being undertaken, in the first instance compensatory habitat will achieve no-net-loss, whilst a net gain will be achieved by the enhancement measures detailed in Section 5.2 below.
- 5.1.8. Compensatory habitat (and ideally enhancement habitat) should be provided prior to clearance of existing habitat to make sure bats continue to be able to forage and commute during the works. Ideally compensatory and/or enhancement habitat should be installed at least one year prior to removal of the habitat it is replacing to allow establishment and growth.

SENSITIVE LIGHTING

- 5.1.9. Lighting both during the construction phase and operational phase of the Proposed Development could have a negative effect upon bat activity on Site.
- 5.1.10. It is recommended that the lighting strategy for the Site seeks to:
- Avoid completely lighting retained habitats of value for foraging and commuting bats (trees, scrub, waterbodies). Where construction and operational stage lighting is unavoidable, the below recommendations should be followed;
 - Use the minimum light levels necessary for the relevant task / function, this may equate to reducing light intensity, and/or using the minimum number or light sources or minimum column height;
 - Use hoods, louvres or other luminaire design features to avoid light spill onto retained and newly created areas of vegetation likely to be used by foraging and commuting bats. This also applies to light spill coming from within buildings such as the hotel lobby or rooms;
 - Use narrow spectrum light sources where possible to lower the range of species affected by lighting, specifically avoiding shorter wave length blue light, using instead warm/neutral colour temperature <2,700 kelvin lighting (BCT, 2018); and,
 - Use light sources that emit minimal ultra-violet light to avoid attracting night-flying invertebrate species which in turn may attract bats to the light.
- 5.1.11. Where possible, consideration should also be given to varying the lighting levels in particularly ecologically valuable areas (retained and new vegetation and waterbodies). For example, it may be possible to reduce lighting levels or perhaps even switch installations off after certain times e.g. between 00:00 and sunrise in the vicinity of tree lines of proposed landscaping. This use of “adaptive lighting” can tailor the installation to suit human health and safety as well as wildlife needs (BCT, 2014).

5.2. ECOLOGICAL ENHANCEMENT MEASURES

- 5.2.1. Planning policy promotes the inclusion of ecological enhancement, and ultimately biodiversity net gain. Accordingly it is recommended that consideration is given to the following enhancement measures:
- Inclusion of nectar-rich plant species in soft landscaping areas that are attractive to night-flying insects to enhance foraging opportunities for bats;
 - Creation of linear vegetation (tree-lines and hedgerows) within the landscaping scheme to provide additional commuting corridors across the Site for bats;
 - Provision of standing water-bodies to provide an additional foraging resource for bats using the site, which may benefit *Myotis* and *Nyctalus* bats in particular, for which the Site is of particular value; and
 - Installation of bat bricks or bat tubes into the fabric of any new buildings and/or installation of additional bat boxes to suitable retained trees to increase the roosting opportunities on Site for bats. The siting, orientation and style of bat box should be selected in consultation with an ecologist, and ideally included within the Construction Environment Management Plan (CEMP) for the Proposed Development. Any new boxes should be suitably maintained and monitored.

6. CONCLUSIONS

- 6.1.1. WSP has undertaken a suite of bat surveys at the location of a proposed new hotel in Bicester, Oxfordshire in order to assess the likely impacts upon this species group, and to inform the design accordingly. The Proposed Development will be subject to a planning application which will be supported by this report and its recommendations.
- 6.1.2. The results of the activity surveys indicate that the Site is of most value to noctule bat, with call levels indicating it is of District-County level value. The Site is also of up to local level value to *Myotis* bats, common pipistrelle, soprano pipistrelle and brown long-eared bat. A single tree of low bat roost potential was also identified.
- 6.1.3. In order to comply with relevant legislation and planning policy, a range of avoidance and mitigation measures are recommended including retention of existing habitat of value (trees, scrub and waterbodies), any necessary pre-works checks, precautionary felling of bat potential trees, compensation for any habitat lost, and sensitive lighting design. In order to further enhance the value of the site for bats, enhancement measures are also detailed including further habitat creation and bat box installation.

7. REFERENCES

7.1. PROJECT REFERENCES

- WSP (2018a) Great Wolf Resorts, Bicester Golf Course PEA Report.
- WSP (2018b) Great Wolf Resorts, Bicester Arboricultural Constraints Report.

7.2. TECHNICAL REFERENCES

- Battersby, J. (2005) UK Mammals: Species Status and Population Trends. First Report by the Tracking Mammals Partnership. JNCC/Tracking Mammals Partnership, Peterborough.
- Bat Conservation Trust (2014) Artificial Lighting and Wildlife – Interim Guidance: Recommendations to help minimise the impact of artificial lighting.
- Bat Conservation Trust and Institution of Lighting Professionals (2018) Guidance Note 08/18 - Bats and artificial lighting in the UK, Bats and the Built Environment Series.
- Department for Communities and Local Government (2019) National Planning Policy Framework. Department for Communities and Local Government, London.
- Harris, S. & Yalden, D. 2008. Mammals of the British Isles: Handbook, 4th edition. The Mammal Society. 328-331
- Her Majesty's Stationary Office (HMSO) (1981) Wildlife and Countryside Act (as amended by the Countryside and Rights of Way Act 2000)
- HMSO (2005) Biodiversity and Geological Conservation – Statutory Obligations and Their Impact Within the Planning System. Office of the Deputy Prime Minister (ODPM) Circular 06/2005 HMSO, Norwich.
- HMSO (2006) Natural Environment and Rural Communities Act.
- HMSO (2010) The Conservation of Habitats and Species Regulations 2017 (as amended) (the Habitat Regulations).
- Oxfordshire Bat Group (2018). Oxfordshire Bats. Available at: <http://www.oxfordshirebats.org/oxfordshire-bats.php> [Accessed: April 2019].
- Russ, J (2013) British Bat Calls a Guide to Species Identification. Pelagic Publishing.

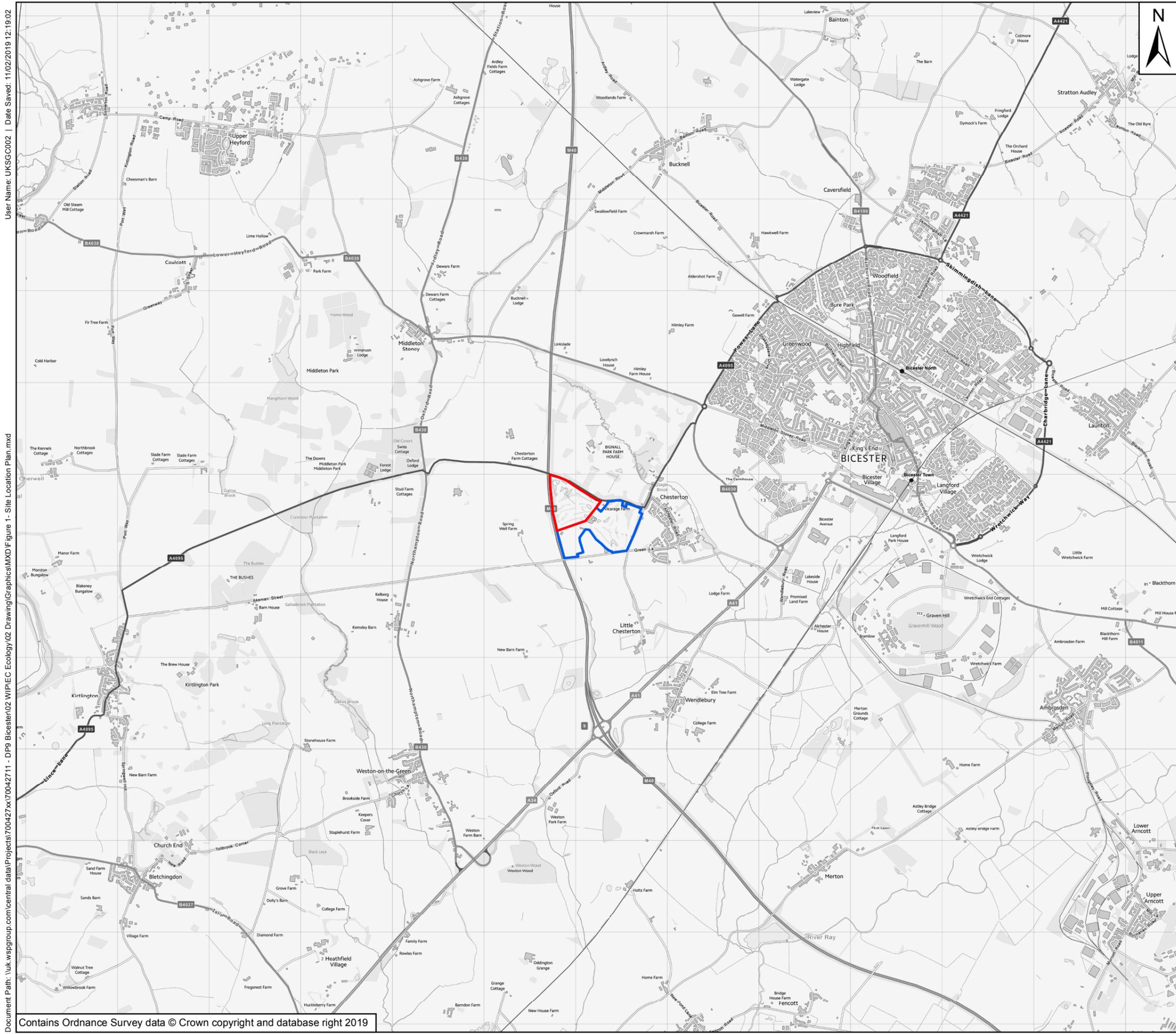
FIGURES

Figure 1 - Site Location Plan

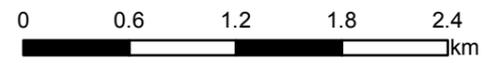
Figure 2 – Preliminary Bat Roost Assessment Results

Figure 3 - Activity Survey: Transect & Automated Detector Locations

Figure 4a-f - Activity Survey: Transect Results



Key
 Site
 Survey Area



Client:	Great Wolf Resorts	
Project:	Bicester	
Title:	Site Location Plan	

Drawing No:	Figure 1	Drawn:	SC
Date:	April 2019	Checked:	RP
Scale:	40,000 @ A3	Approved:	LR