

Land at North End Road, Yapton, West Sussex

July 2020

Land at North End Road, Yapton, West Sussex

Bat Activity Survey

Client:	Dandara Ltd (Southern)	
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Abbreviations

BPPH	Bat passes per hour
CHS	Conservation of Habitats and Species Regulations 2017
ECoW	Ecological Clerk of Works
EPS	European Protected Species
LNR	Local Nature Reserve
NERC	Natural Environment and Rural Communities Act 2006
PEA	Preliminary Ecological Appraisal
PRA	Preliminary (bat) Roost Assessment
PRF	Potential (bat) Roost Feature
SAC	Special Area for Conservation
SSSI	Site of Special Scientific Interest
SxBRC	Sussex Biological Records Centre
TN	Target Note
TP	Transect Point
WCA	Wildlife & Countryside Act 1981 (as amended)

0 Executive Summary

0.1 Introduction

- 0.1.1 Bat activity surveys were undertaken for the site of a proposed residential development on Land at North End Road in Yapton, West Sussex (Grid Reference: 497671, 103689). The study was undertaken to establish the baseline assemblage and relative abundance of bat species using the site, and the types and locations of bat activity, to identify and evaluate potential impacts of development on foraging and commuting bats, and make recommendations accordingly.

0.2 Results

- 0.2.1 The desk study data search returned 39 records of eleven species of bat from within 2km of the survey area. There are no designated sites notified for important populations of bats within 10km of the survey area.
- 0.2.2 Two bat activity surveys were carried out, one each in August and October 2019. Species diversity recorded during the bat activity surveys included up to six species. The majority (>67%) of bat calls recorded during automated monitoring were from pipistrelle bats, with common pipistrelles *Pipistrellus pipistrellus* registering 34.2% of calls, and soprano pipistrelles *P. pygmaeus* registering 32.8%. Of the remaining bat passes, those of noctule *Nyctalus noctula* were the next most frequently recorded (28.6%), followed by *Myotis spp.* (2.8%) and finally serotine *Eptesicus serotinus* bats (1.4%). One Western barbastelle was recorded during the August transect survey. This means that 95.7% of all bats recorded during automated monitoring were of the genus *Eptesicus*, *Nyctalus* or *Pipistrellus*. The highest levels of bat activity, albeit still low to moderate, were recorded within the south-west of the site in August 2019.
- 0.2.3 A third survey was scheduled for spring 2020. However, by April 2020 a "lockdown" had been declared to prevent the spread of the coronavirus outbreak. The result is that early season bat activity data has not been obtained for the site. However, taking account of the geographic location of the site in relation to range of UK bat species, the low suitability of site habitats, and the species recorded in 2019, the authors consider it unlikely that a significantly different species assemblage, abundance or distribution within the site would have been recorded in spring 2020.

0.3 Evaluation

- 0.3.1 Low to moderate levels (relative to the survey area) of bat activity were recorded in the south-western section of the survey area in August 2019 (1.1 bat passes per hour; BPPH), and very low levels of bat activity (4 calls in total/0.06 BPPH) were recorded to the north-eastern boundary of the survey area in October 2019. The October 2019 transect survey, although recording a low

level of foraging and commuting activity, recorded the most activity along the central-eastern edge of the site. The proposals include the construction of c.108 dwellings, across the majority of the site together with parking, access, landscaping, and retention of the some of existing grassland as a wildflower meadow. The majority of boundary hedgerows would be retained and protected during construction activities, but c.46.5m of hedgerow H4 would be removed to facilitate site access. This would be offset by native species-rich hedgerow creation and enhancement as part of the landscaping strategy for the development as a whole. The majority (>67%) of bats recorded on site were pipistrelles which are frequently found foraging in residential areas. No significant impacts to foraging or commuting bats are predicted to result from the proposed land use change.

- 0.3.2 The impact of light on foraging and commuting bats is classified as low for *Eptesicus serotinus* and individuals of the genus *Nyctalus* and *Pipistrellus* – which includes 95.7% of all bats recorded during passive monitoring at the site. These species are unlikely to be significantly affected by proposals for the site. Light intolerant species recorded at the site, including individuals of the genus *Myotis*, together comprised 4.3% (3 bat passes) of activity recorded during passive monitoring. Use of the site by these species may be reduced by the development proposals, however, it is likely that the overall development quanta proposed can be accommodated without significant impacts on the abundance and distribution of bats within the survey area, or adverse effects on the conservation status of local bats populations within their natural range.

0.4 Recommendations

- 0.4.1 It is concluded that there is no requirement for avoidance and mitigation measures additional to those already provided in the Preliminary Ecological Appraisal. The mitigation proposals are considered likely to be adequate despite the lack of a third survey. The recommendations contained in the PEA (UEEC, 2020) continue to apply, including those for achieving an overall net gain for biodiversity in line with the requirements of local and national policy and guidance. Those relating to bats and their habitats are summarised in Table 0.1.

Table 0.1: Summary of recommendations

#	Summary of recommendations
Ecological protection measures	
R5	The hedgerow priority habitats within the survey should where possible be retained and protected during construction, and could also provide a focus for ecological enhancement measures.
R6	Standard site procedures to prevent impacts on trees should be adhered to during construction.
R7	The use of external lighting should be avoided or minimised to prevent impacts to nocturnal species such as bats. Lighting should not be directed towards the boundary hedgerows.
Ecological net gain	
R11	Green spaces should be sown with a locally-sourced native wildflower and grass seed mix.
R12	Hedgerow creation and enhancement should use a range of native fruit, seed, nut and nectar-

#	Summary of recommendations
	bearing species shrub species of local provenance.
R15	The value of the site for bats could be enhanced by installing a range of artificial roost boxes onto new buildings and retained trees.

0.5 Conclusions

- 0.5.1 The proposed development is unlikely to result in significant impacts to foraging and commuting bats. Mitigation measures are recommended to reduce and offset residual impacts on a proportionate basis.

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1 Introduction

1.1 Purpose of this Report

- 1.1.1 A Preliminary Ecological Appraisal (PEA) was carried out in March 2019 for the site of a proposed residential development at Land at North End Road in Yapton, West Sussex (Grid Reference: 497671, 103689). It was recommended that further surveys should be carried out for foraging and commuting bats due to the presence of favourable habitats.

1.2 Objectives and Approach of the Study

- 1.2.1 The study was commissioned to fulfil the following objectives:
- ❖ To identify features of importance to foraging and commuting bats, record the species assemblage and assess the relative abundance of bats within the survey area;
 - ❖ To identify and evaluate the potential impacts of development on foraging and commuting bats; and
 - ❖ To outline the measures required for avoiding and mitigating negative impacts to foraging and commuting bats, and make recommendations for ecological net gain.
- 1.2.2 To meet these objectives the survey approach involved:
- ❖ A desk study involving a review of bat species records from the local area (2km radius from the centre of the proposed development);
 - ❖ A review of information from the Preliminary Ecological Appraisal¹ regarding the habitats present within the site boundary and wider area; and
 - ❖ Field surveys using standard techniques to record the presence, distribution and relative abundance of target species within the survey area, with reference to current industry guidelines.

1.3 Survey Area

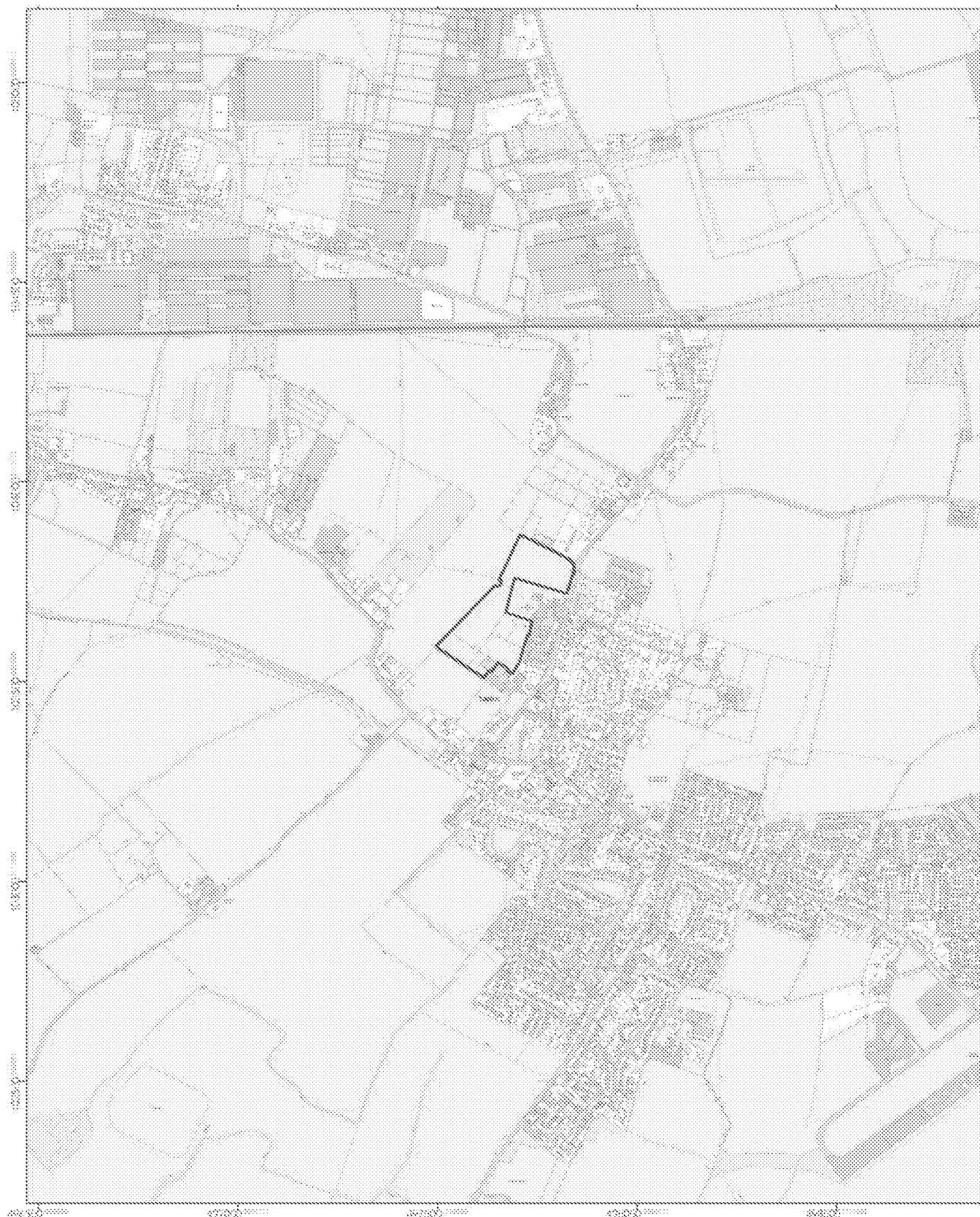
- 1.3.1 The survey area is located to the west of North End Road and lies to the north west of Yapton Village Centre in the Arun district of West Sussex. The site comprises c.4.6ha of undeveloped land, currently dominated by improved grassland, with hedgerows, trees, tall ruderal vegetation, scrub, two agricultural buildings and hard-standing.

¹ Urban Edge Environmental Consulting (UEEC; 2020): *Land at North End Road, Yapton, West Sussex: Preliminary Ecological Appraisal Report*.

- 1.3.2 The site is bounded to the east by Yapton Church of England Primary School, residential property, farm buildings and North End Road, and to the north, west and south by agricultural land.
- 1.3.3 The wider landscape is dominated by open pasture and farmland with connecting hedgerows, and woodland to the north east and north west. The settlement of Yapton is located to the west and south west.
- 1.3.4 The extent of the survey area is outlined in red on Figure 1.1, while the Phase 1 habitats map is included for reference at Appendix I.

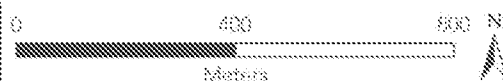
1.4 Proposed Construction Activities

- 1.4.1 Outline planning consent has been obtained for a residential development (application references Y/44/17/OUT and Y/88/18/OUT). The proposals include demolition of existing buildings, and construction of c.108 dwellings, together with parking, access, landscaping, and associated facilities. A detailed application was submitted earlier in 2020 for site access. Reserved matters applications are now being submitted for the remainder of the site and proposed layout plans are shown at Figure 1.2 and Figure 1.3.



Land at North End Road, Yapton, West Sussex

 Survey area



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Ordnance Survey 0100031673

Scale: 1:10,000 Created by: AD

Date: Apr 2019 Reviewed by: NP

Drawing number:
UEGV/ECO-Site_190402



URBAN EDGE
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Figure 1.1: Survey area



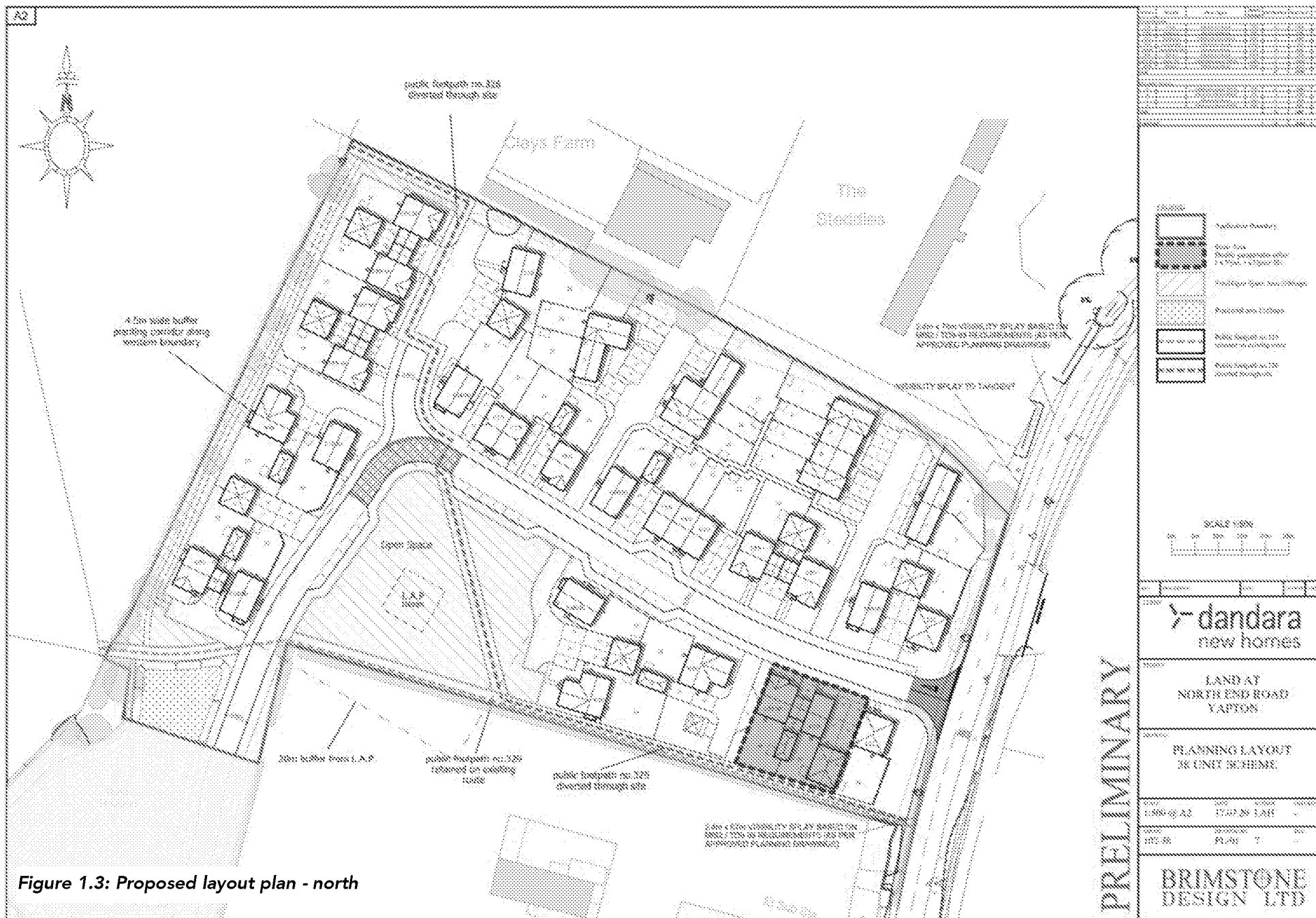


Figure 1.3: Proposed layout plan - north

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2 Survey Methodology

2.1 Desk Study

- 2.1.1 Sussex Biological Records Centre (SxBRC) was consulted for records of bat species within a 2km search radius. The desk-study data search was carried out as part of the Preliminary Ecological Appraisal¹. Additionally, the Multi-Agency Geographic Information for the Countryside (MAGIC) website was consulted for citations of Sites of Special Scientific Interest (SSSI) or Special Areas of Conservation (SAC) which are notified for important populations of bats within 10km of the survey area.

2.2 Preliminary Ecological Appraisal

- 2.2.1 The Preliminary Ecological Appraisal was based on an Extended Phase 1 Habitat Survey of the site undertaken on 19 March 2019 by an experienced ecologist. Within the survey area every parcel of land was classified, recorded and mapped using standard colour codes, in accordance with a list of ninety habitat types specified within the methodology for Phase 1 habitat survey (Joint Nature Conservation Council, 2010).
- 2.2.2 This basic methodology was extended to provide more detail in relation to habitats with potential to support rare or protected fauna, as described by the Chartered Institute of Ecology and Environmental Management's *Guidelines for Preliminary Ecological Appraisal* (CIEEM, 2017b). For further details on methods, limitations and personnel refer to the PEA report¹. The PEA recommended additional surveys for foraging and commuting bats.

2.3 Bat Activity Survey

- 2.3.1 Bat activity surveys were based on standard industry guidelines (Collins (ed.), 2016) and Natural England's standing advice² for bats, comprising:
- ✦ Transect surveys: walking through a representative sample of the survey area's habitats to a predetermined route, to listen for, observe and record bats in flight away from their roosts using handheld bat detectors, noting bat activity and behaviour; and
 - ✦ Remote monitoring: installation of automated detectors for a five night period per deployment to remotely monitor bat activity in fixed locations within the survey area, with locations changing over the course of the season.
- 2.3.2 Current guidelines (Collins (ed.), 2016) recommend reasonable levels of bat activity survey effort, based on overall habitat suitability; see Box 1. The PEA concluded that the improved grassland habitat which dominates the survey area is unlikely to host an abundant invertebrate

² Natural England (2015): *Bats: surveys and mitigation for development projects*. Accessed online at: <https://www.gov.uk/guidance/bats-surveys-and-mitigation-for-development-projects>

fauna and is considered to be of low suitability as foraging habitat for bats. However, the site is grazed by livestock which may encourage invertebrates to the site. The boundary hedgerows to the north and east may serve as navigation routes or foraging features for bats but are also of low suitability due to their mainly tightly managed form and condition.

Box 1: Recommended survey effort for bat activity surveys (Collins, 2016)		
Low suitability habitat	Moderate suitability habitat	High suitability habitat
One survey visit per season (spring/summer/autumn), and One static detector location per transect, monitored for five consecutive nights per season (30mins before sunset (SS) to 30mins after sunrise (SR) each night)	One survey visit per month (April to October), including at least one dusk & pre-dawn survey, and Two static detector locations per transect, each monitored for five consecutive nights per month (SS-30mins to SR+30mins)	Up to two survey visits per month (April to October), including at least one dusk and pre-dawn survey, and Three static detector locations per transect, each monitored for five consecutive nights per month (SS-30mins to SR+30mins)

2.3.3 Considering the suitability of the site's habitats and scale of proposed development, the survey method followed the standard approach for low suitability habitats, as follows:

- ✧ One survey visit per season (spring/summer/autumn), with one static detector location per transect.
- ✧ One transect each to be walked by one surveyor on each occasion.

Transect surveys

2.3.4 Transect surveys of the site coincided with deployment and retrieval of the automated detectors. A transect route representative of the survey area's habitats and transitional zones was plotted and walked once during each survey. Start points were randomised and the direction of travel alternated to avoid crepuscular bias. One surveyor undertook each transect survey, and walked at a slow, consistent speed along the transect route, stopping for approximately 5 to 7 minutes at each transect point to listen for bats and record activity and behaviour (spot counts). Bat activity between transect points was also recorded where possible. The locations of transect points are shown in Appendix II, and these are referred to within the results.

2.3.5 Dusk activity surveys commenced at sunset and continued for approximately two hours. Two hours was considered to be a sufficient length of time in which to adequately cover the survey area and to account for the species likely to be present in these habitats in Sussex. Dawn activity surveys (where applicable) started approximately two hours before dawn and continued at least until sunrise.

2.3.6 Wildlife Acoustics Echometer Touch and Touch2 Pro full spectrum detectors were used during the transect surveys. Bat recordings were analysed using Kaleidoscope Pro (v5.1.9) software which enables evaluation of a range of echolocation call parameters to identify bats to genus or species level. Weather conditions were noted during each survey (minimum/maximum air temperatures, wind speed/direction, precipitation and cloud cover) and are reported in Table

2.1 and alongside the results in Appendix III. Sample call sonograms recorded during the surveys are given at Appendix IV.

Table 2.1: Bat survey dates and weather conditions

Date (2019)	Dusk/Dawn	Weather conditions
20 August	Dusk	16.1°C – 14.5°C, 20% cloud cover, light wind (Beaufort scale 1), no precipitation
1 October	Dusk	15.1°C – 14.4°C, 60% cloud cover, light wind (Beaufort scale 1), light rain at start then dry

Remote monitoring

- 2.3.7 One Wildlife Acoustics Anabat Express zero-crossing bat detector was used for the automated remote monitoring. This was sited at a height of around 3–5m above ground level and left in-situ for at least 5 nights during each month of survey. Deployment locations were chosen systematically to achieve an even distribution across the survey area representative of its habitats where possible, and are shown in Appendix II; these locations are referred to within the results.
- 2.3.8 The bat detector was set to record passes from 30 minutes before sunset to 30 minutes after sunrise to capture early emerging and late returning bats and this was standard for all surveys. Data from the recorder were analysed using AnalookW (v4.4a) and Kaleidoscope Pro (v5.1.9) software which enable evaluation of a range of echolocation call parameters to identify bats to genus or species level. Sample call sonograms recorded during the surveys are given at Appendix IV.
- 2.3.9 Weather data for the survey period was obtained from the closest weather station using the Met Office Weather Observations Website (<http://www.metoffice.gov.uk/home>). Weather data is presented in Appendix V.

Evaluation criteria

- 2.3.10 Within this report, the potential suitability of foraging/commuting habitats is classified as negligible, low, moderate or high with reference to Table 4.1 in the *Good Practice Guidelines* (Collins (ed.), 2016). Levels of bat activity are also noted as low, moderate or high, however, these should be taken as relative terms applicable within the survey area only. In other words, they are intended to indicate which parts of the survey area are used more frequently by bats, and which may therefore be of importance to the conservation status of local bat populations. Interpretation of these terms and the accompanying data on species assemblage and abundance is, where appropriate, used to indicate areas of high and moderate value to bats. These again are relative terms applicable within the survey area only.
- 2.3.11 It should be noted that bat passes recorded during automated static monitoring were split to a maximum duration of 60 seconds and do not equate to numbers of individual bats. Bats will often repeatedly pass a detector when hunting along a linear feature such as a hedgerow or tree line, and there is no way to determine numbers of individuals from this data. The number

of bat passes should instead be taken as an index of relative bat activity at a particular location within the site.

- 2.3.12 Evaluation of the potential impacts on bats was undertaken with reference to Chapter 6 of English Nature (2004) and Natural England Standing Advice³, with predicted impacts to each feature noted as of low, medium or high significance.

Limitations

- 2.3.13 The activity surveys reported herein were instructed in August 2019 and carried out during August and October 2019. The surveys were hence undertaken in accordance with the BCT's recommended timings for activity surveys (Collins (ed.), 2016), with at least 14 days between each survey.
- 2.3.14 Due to the timing of the instruction, a spring survey could not be completed in 2019. This survey was scheduled for spring 2020. However, by April 2020 when the survey was due to take place a "lockdown" had been declared to prevent the spread of the coronavirus outbreak. Additional survey work was not considered by the client to be compliant with the lockdown. The result is that early season bat activity data has not been obtained for the site. However, taking account of the geographic location of the site in relation to range of UK bat species, the low suitability of site habitats, and the species recorded in 2019, the authors consider it unlikely that a significantly different species assemblage, abundance or distribution within the site would have been recorded in spring 2020. The proposed mitigation strategy is therefore considered likely to be adequate.
- 2.3.15 There were no difficulties in gaining access to the site to carry out the surveys, however, the October survey started 25mins late due to traffic. Weather conditions were generally good during the surveys and within acceptable parameters. There were no equipment malfunctions or other limitations of relevance to the methods applied.

2.4 Personnel

- 2.4.1 The personnel deployed on the surveys are listed in Table 2.2.

Table 2.2: Survey personnel and qualifications

Feature / Task	Personnel
Preliminary Ecological Appraisal	Becci Bond BSc(Hons) MCIEEM
Bat activity surveys	Survey 1 : Anna Douglas; Survey 2 : Nick Pincombe

³ Natural England (2015): *Bats: surveys and mitigation for development projects*. Accessed online [23/9/19] at: <https://www.gov.uk/guidance/bats-surveys-and-mitigation-for-development-projects>

Personnel	Qualifications
Nick Pincombe BA(Hons) MSc CEnv MIEMA MCIEEM	Director with fourteen years' experience leading survey and impact assessment teams for a wide range of ecology and environmental planning projects. Natural England Class Licences to survey for bats (WML-CL18) and great crested newt (WML-CL08).
Becci Bond BSc(Hons) MCIEEM	Senior Ecologist with nine years' professional consultancy experience. Licences to survey for bats (WML-CL17), great crested newt (WML-CL09) and hazel dormouse (WML-CL10a).
Anna Douglas BSc(Hons) MSc GradCIEEM	Ecologist with four years' professional consultancy experience. Licences to survey for bats (WML-CL17) and great crested newt (WML-CL09).

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3 Results

3.1 Desk Study

- 3.1.1 SxBRC returned 39 records of eleven species of bat from within 2km of the survey area, during a date range of 1984 to 2018, as summarised in Table 3.1. The majority of these records were of foraging and in-flight bats, but included six bat roosts of unspecified type. There are eleven SSSI and one SAC within 10km of the survey area. Bat populations do not feature among the notified features of any of these sites.

Table 3.1: Summary of bat records data within 2km of the site

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

3.2 Habitat Suitability

- 3.2.1 The improved grassland habitat which dominates the survey area is unlikely to host an abundant invertebrate fauna and is considered to be of low suitability as foraging habitat for bats. However, the site is grazed by livestock which may encourage invertebrates to the site. The boundary hedgerows to the north and east may serve as navigation routes or foraging features for bats but are also of low suitability due to their mainly tightly managed form and condition. However, the majority of the grassland resource within the survey area would be lost under the proposal and it is likely that the boundary hedgerows will experience an increase in artificial lighting following development, which may render them less suitable for foraging/commuting in future. As a result bat activity surveys were recommended.

3.3 Bat Activity Survey: August 2019

- 3.3.1 Bat activity transect 1 took place at dusk on 20 August 2019 and followed a route starting at transect point TP1 (Appendix II) then running sequentially through to TP14. Full results are included at Appendix III; example sonograms recorded at the site are included at Appendix IV.
- 3.3.2 Sunset on 20 August was at 20:14. The survey started at 20:14 and ended at 21:57. Low levels of foraging and commuting activity were recorded (a total of 17 bat passes). Activity was spread roughly equally throughout the site, with the majority of bats commuting over the site. One serotine was recorded foraging in the southern section of the site. The majority (47%) of passes were common pipistrelles, with remainder soprano pipistrelle (18%), serotine (18%), noctule (12%), and *Myotis* spp. bats (6%). Bat activity was recorded sporadically throughout the survey, the first bat recorded was a soprano pipistrelle at 20:41 (27 minutes after sunset) and the last bat recorded was a Daubenton's bat at 21:49. One Western barbastelle was recorded (heard not seen) at 21:45 in the south-east of the site.
- 3.3.3 A Titley Scientific Anabat Express detector was installed on 20 August 2019 at a height of c.5m on the south-western boundary of the site (see label "Aug" on the plan at Appendix II). A summary of the passive monitoring data from 20 to 24 August 2019 is presented in Table 3.2.

Table 3.2: Summary of bat passes, 20-24/08/2019, south-west

Date Sunset / Sunrise	First record (time / sp.)	Last record (time / sp.)	Species recorded / total passes
20.08.19 20:12 / 06:00	21:15 Noctule	20:42 Soprano pipistrelle	- Serotine: 1 <i>Myotis</i> spp: 2 - Noctule: 20 - Common pipistrelle: 20 - Soprano pipistrelle: 23
21.08.19 20:10 / 06:01	19:15 Noctule	21:56 Noctule	
22.08.19 20:08 / 06:03	19:37 Noctule	04:20 Noctule	
23.08.19 20:06 / 06:04	18:53 Noctule	04:04 Soprano pipistrelle	
24.08.19 20:04 / 06:06	18:48 Noctule	03:45 common pipistrelle	

- 3.3.4 Low to moderate levels (relative to the survey area) of bat activity were recorded in the south western section of the survey area in August 2019. The most common species were noctule, soprano and common pipistrelle bats, with each species comprising roughly a third of the activity recorded. The remaining calls were made up of serotine (1 pass) and *Myotis* spp. bats (2 passes). Bat passes ranged from seven to 19 passes a night, with activity increasing each night, with the peak on the final night of the monitoring period (Figure 3.1). Over the course of the monitoring period bat activity was generally highest in the two hours after sunset, with activity recorded throughout the remainder of the night, but at a reduced rate (Figure 3.2).

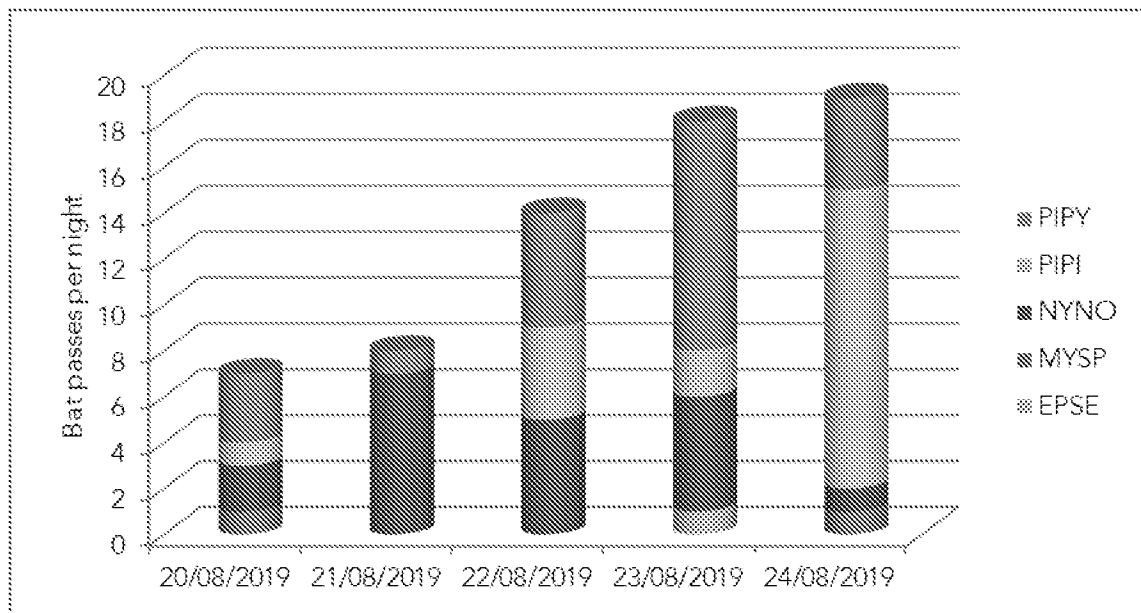


Figure 3.1: Bat passes per night, 20-24/08/2019, south-west

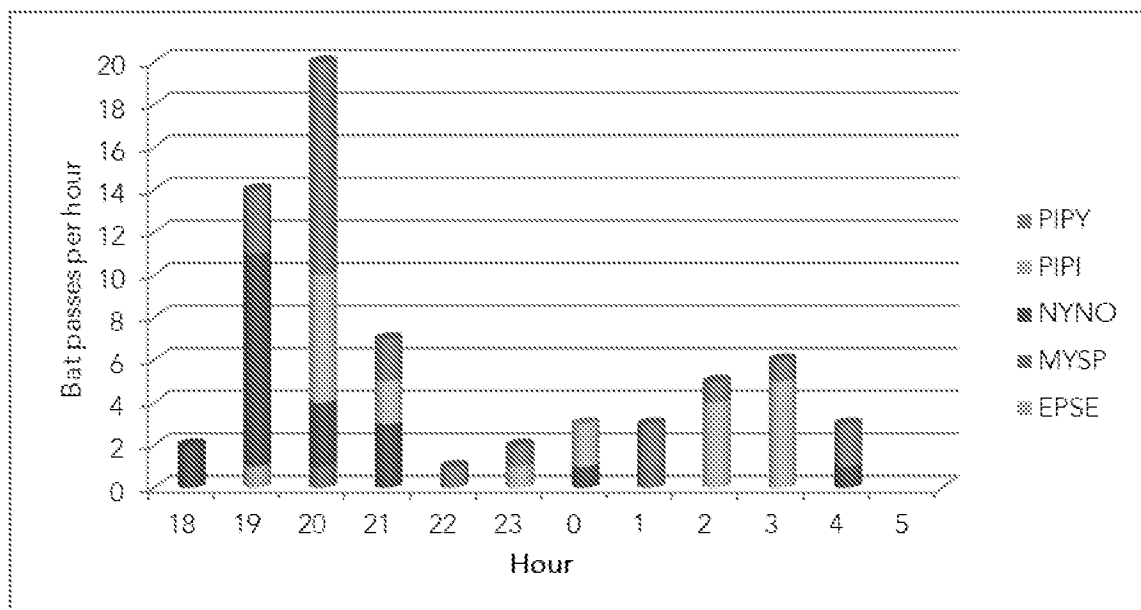


Figure 3.2: Bat passes per hour, 20-24/08/2019, south-west

3.4 Bat Activity Survey: October 2019

3.4.1 Bat activity transect 2 took place at dusk on 01 October 2019, starting at transect point TP10 and following the route in reverse sequence to TP1. Full results are included at Appendix III; example sonograms recorded at the site are included at Appendix IV.

3.4.2 Sunset on 01 October 2019 was at 18.41. The survey started at 19.05 and ended at 20.45. Low levels of foraging and commuting activity were recorded (a total of 24 bat passes); with most activity recorded to the central-eastern edge of the site. The first bat recorded was a soprano

pipistrelle at 19:13 (32 minutes after sunset) and the last bat recorded was a common pipistrelle at 20:05.

- 3.4.3 A Titley scientific Anabat Express recorder was installed on 02 October 2019 at a height of c.5m on the north eastern boundary of the site (see label "Oct" on the plan at Appendix II). A summary of the passive monitoring data from 02-06/October/2019 is presented in Table 3.3.

Table 3.3: Summary of bat passes, 2-6/10/2019, north-eastern boundary

Date Sunset / Sunrise	First record (time / sp.)	Last record (time / sp.)	Species recorded / total passes
02.10.19 18:38 / 07:06	No bats recorded	No bats recorded	▪ Common pipistrelle: 4
03.10.19 18:36 / 07:08	No bats recorded	No bats recorded	
04.10.19 18:33 / 07:09	03:44 common pipistrelle	03:44 common pipistrelle	
05.10.19 18:31 / 07:11	19:56: common pipistrelle	21:12: common pipistrelle	
06.10.19 18:29 / 07:12	No bats recorded	No bats recorded	

- 3.4.4 Very Low levels of bat activity (4 calls in total) were recorded to the north-eastern boundary of the survey area in October 2019. All activity recorded was from common pipistrelle bats. The majority of the calls (75%) were recorded on the fourth night of survey, with the remaining call recorded on the third night of the survey. No bat passes were recorded on the first, second or final night of the survey period, as shown on Figure 3.3. The temperatures at dusk were very low on the 1 October and there was rain on 6 October; this may account for the reduced bat numbers.

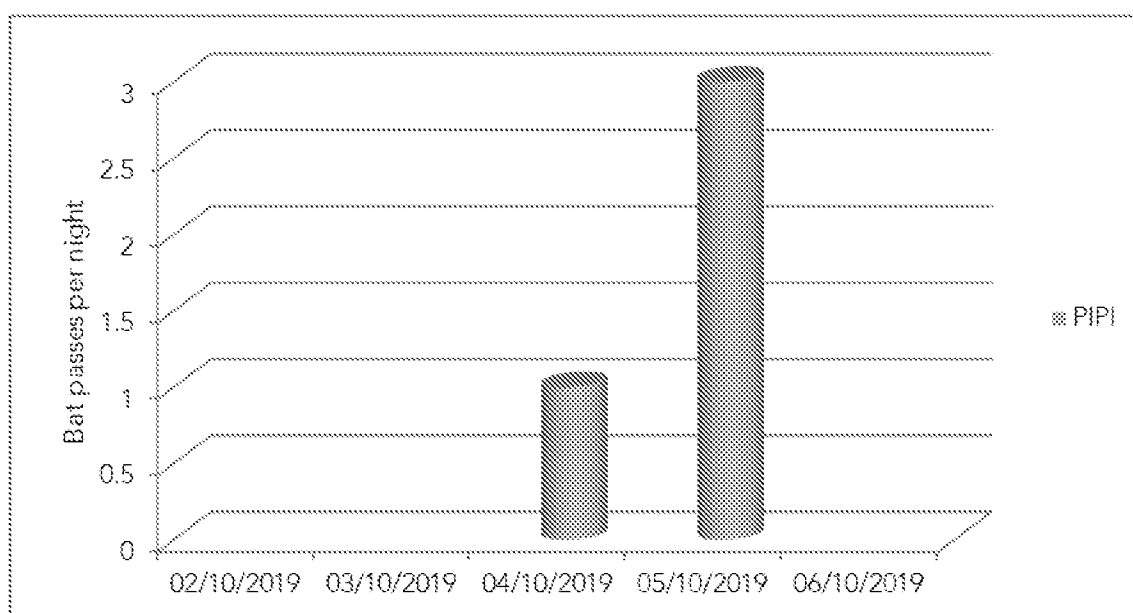
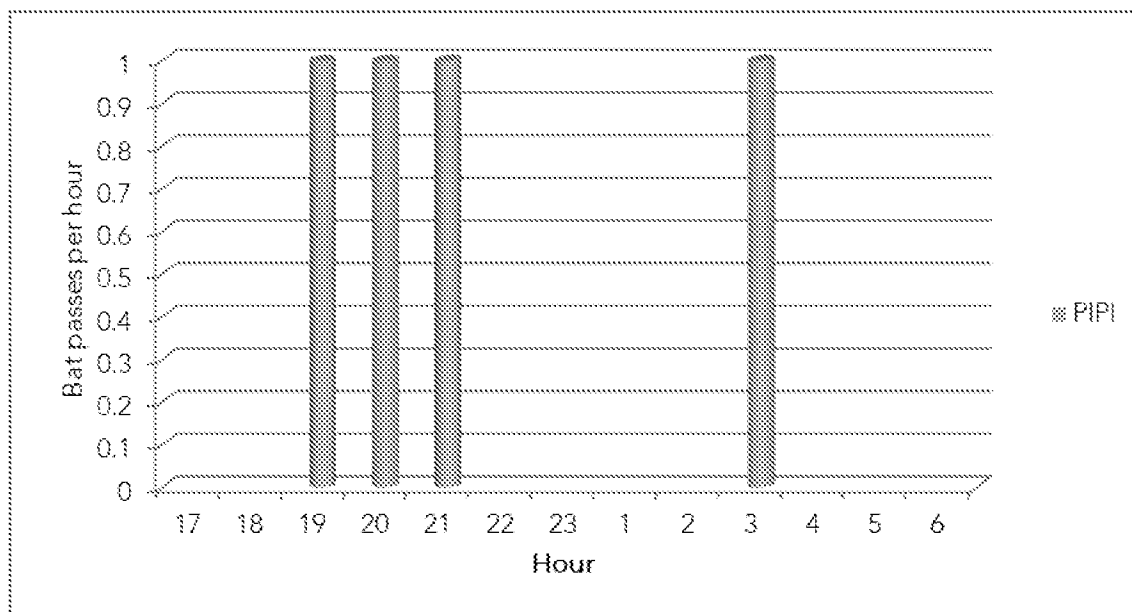


Figure 3.3: Bat passes per night, 2-6/10/2019, north-eastern boundary**Figure 3.4: Bat passes per hour, 2-6/10/2019, north-eastern boundary**

4 Evaluation

4.1 Introduction

- 4.1.1 This chapter presents an evaluation of survey results and an assessment of likely impacts to foraging and commuting bats as a result of the development proposals, before making recommendations for avoidance, mitigation and enhancement measures.

4.2 Species Assemblage

- 4.2.1 Species diversity recorded during the bat activity surveys included up to six species. Their local and national conservation status is listed in Table 4.1 (BCT, 2010; Mathews *et al.*, 2018; Russ, 2012; Sussex Bat Group⁴). All of these species have previously been recorded within 2km of the site as confirmed during the desk study stage.
- 4.2.2 *Myotis* bat call parameters overlap significantly and it is not normally possible to conclusively identify them to species level unless they are in the hand. The low number of *Myotis* bat calls recorded within the survey area was most closely matched to the call parameters of Daubenton's *M. daubentonii* bats.

Table 4.1: Conservation status of recorded bat species (abundance and distribution)

Species	Sussex abundance/distribution	UK abundance/distribution	UK status
Western barbastelle	Very rare, widespread	Very rare, widespread south and central regions of England and Wales	Vulnerable
Serotine	Uncommon, widespread	Uncommon, widespread, southern England	Vulnerable
Daubenton's	Fairly abundant, widespread	Widespread, fairly abundant	Least concern
Noctule	Uncommon, widespread	Uncommon, widespread, absent in Scotland	Least concern
Common pipistrelle	Abundant, widespread	Widespread, abundant	Least concern
Soprano pipistrelle	Fairly common, widespread	Fairly common, widespread	Least concern

⁴ Sussex Bat Group website: Bats in Sussex. Accessed online [14/11/19] at: <http://www.sussexbatgroup.org.uk/batsinsussex>

4.3 Impact Assessment

Habitat losses and land use changes

- 4.3.1 Low to moderate levels (relative to the survey area) of bat activity were recorded in the south-western section of the survey area in August 2019 (1.1 BPPH), and very low levels of bat activity (4 calls in total/0.06 BPPH) were recorded to the north-eastern boundary of the survey area in October 2019. The October 2019 transect survey, although recording a low level of foraging and commuting activity, recorded the most activity along the central-eastern edge of the site.
- 4.3.2 The proposals include the construction of c.108 dwellings, across the majority of the site together with parking, access, landscaping, and retention of the some of existing grassland as a wildflower meadow. The majority of boundary hedgerows would be retained and protected during construction activities, but c.46.5m of hedgerow H4 would be removed to facilitate site access. This would be offset by native species-rich hedgerow creation and enhancement as part of the landscaping strategy for the development as a whole. The majority (>67%) of bats recorded on site were pipistrelles which are frequently found foraging in residential areas. No significant impacts to foraging or commuting bats are predicted to result from the proposed land use change.

Increases in artificial light

- 4.3.3 Overall, although proposed habitat losses and changes in land use within the survey area are not predicted to result in significant impacts to foraging and commuting bats, the development may result in a risk of increased artificial light levels. Stone (2013) presents a detailed summary of the potential impacts of artificial light on bat behaviour. Impacts differ between species, and complex interactions exist between potential beneficial effects (such as exploiting concentrations of invertebrate prey abundance) and adverse effects such increased exposure to predation, increased risk of mortality through collision with vehicles (when feeding around street lights), reduced invertebrate abundance in unlit areas reducing the availability of prey to light-intolerant bats, and fragmentation of habitats as a result of intolerant species avoiding light sources.
- 4.3.4 Details of the lighting proposals are not yet available; however, Stone (2013) presents a summary of the anticipated impact of artificial light on each UK species by behaviour. The impact of light on foraging and commuting bats is classified as low for *Eptesicus serotinus* and individuals of the genus *Nyctalus* and *Pipistrellus* – which includes 95.7% of all bats recorded during passive monitoring at the site. These species are unlikely to be significantly affected by proposals for the site. Light intolerant species recorded at the site, including individuals of the genus *Myotis*, together comprised 4.3% (3 bat passes) of activity recorded during passive monitoring. Use of the site by these species may be reduced by the development proposals, however, it is likely that the overall development quanta proposed can be accommodated without significant impacts on the abundance and distribution of bats within the survey area, or adverse effects on the conservation status of local bats populations within their natural range.

4.4 Recommendations for Avoidance and Mitigation of Impacts

- 4.4.1 It is concluded that there is no requirement for avoidance and mitigation measures additional to those already provided in the Preliminary Ecological Appraisal. The mitigation proposals are considered likely to be adequate despite the lack of a third survey. Recommendations relating to bats and their habitats are listed in Table 4.2 below but for the avoidance of doubt all recommendations in the PEA continue to apply.

Table 4.2: Recommended ecological protection measures

#	Recommended ecological protection measures
R5	The hedgerow priority habitats are of comparatively greater ecological value. These features are focused on some of the site boundaries and provide habitats suitable for a range of protected species, are of value in their own right and should where possible be retained and protected during construction, and could also provide a focus for ecological enhancement measures (see below).
R6	British Standard BS 5837:2012 and/or National Joint Utilities Group Guidelines (NJUG, 1995) should be followed at all times during construction when working in close proximity to trees or shrubs which are to be retained. According to NJUG Guidelines the root protection zone or precautionary area is 4x the circumference of the trunk (circumference is measured around the trunk at a height of 1.5m above ground level). The distance is measured from the centre of the trunk to the nearest part of any excavation or other work. If a separate tree survey is carried out for the proposed development, works should be undertaken in accordance with the recommendations therein.
R7	Avoid the use of external lighting, or keep its use to the minimum required for its intended purpose, during both construction and operation. This will be of benefit to nocturnal species e.g. bats. Where external lighting is to be provided, it should be low-level, directional lighting with minimal spill and glare, and consideration should be given to reduced hours of operation and/or a movement responsive system of control. Use narrow-spectrum bulbs and light sources that emit minimal UV light, avoiding white and blue wavelengths of the spectrum. Use glass lantern covers instead of plastic to filter UV light. Lighting should not be directed towards the boundary hedgerows.

R7: Artificial light – additional detail

- 4.4.2 Negative impacts on foraging and commuting bats and other nocturnal species should be prevented, during both construction and operation of the proposed development, by avoiding light spill falling onto retained tree lines and hedgerows which are present at the north, east and west site boundaries. The lighting design strategy should refer to guidance from the Institute of Lighting Professionals on bats and artificial lighting, and take account of the following recommended specifications (ILP/BCT, 2018):
- ✧ All luminaires should lack UV elements when manufactured. Metal halide, fluorescent sources should not be used.
 - ✧ LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.

- ✧ A warm white spectrum (ideally <2700Kelvin) should be adopted to reduce blue light component.
- ✧ Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats (Stone, 2012).
- ✧ Internal luminaires can be recessed where installed in proximity to windows to reduce glare and light spill.
- ✧ The use of specialist bollard or low-level downward directional luminaires to retain darkness above should be considered. However, this often comes at a cost of unacceptable glare, poor illumination efficiency, a high upward light component and poor facial recognition, and their use should only be as directed by the lighting professional.
- ✧ Column heights should be carefully considered to minimise light spill.
- ✧ Only luminaires with an upward light ratio of 0% and with good optical control should be used (refer to ILP guidance for the reduction of obtrusive light).
- ✧ Luminaires should always be mounted on the horizontal, i.e. no upward tilt.
- ✧ Any external security lighting should be set on motion-sensors and short (1min) timers.
- ✧ As a last resort, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed.

4.5 Ecological Net Gain

- 4.5.1 The measures recommended in the PEA to achieve an overall net gain for biodiversity continue to apply and should be carried out as part of the proposed scheme. Those relating to bats and their habitats are listed in Table 4.3.

Table 4.3: Preliminary recommendations for ecological net gain

#	Preliminary recommendations for ecological net gain
R11	It is recommended that new green spaces are sown with a locally-sourced native wildflower and grass seed mix (i.e. wildflower meadow). This should be particularly targeted towards retained habitat features such as hedgerow boundaries, but should also be extended to public realm areas such as road verges, and if possible be included towards the margins of new areas of grassland within the site. A wildflower meadow treatment would provide a greater botanical diversity than currently present, and will benefit local populations of invertebrates such as butterflies and bees and their predators. Even if planted only at the margins of areas of amenity grassland, particularly if adjacent to other features such as hedgerows and ditches, this would provide a habitat enhancement for reptiles, small mammals and invertebrates.
R12	Hedgerow creation and/or restoration as part of the landscaping plan for the site could use a wide range of native shrub species of local provenance. Fruit, seed, nut and nectar-bearing species should be used preferentially when selecting a palette of species for landscape planting, so that food sources are available throughout most of the year (e.g. hazel <i>Corylus avellana</i>, hawthorn <i>Crataegus monogyna</i>, blackthorn <i>Prunus spinosa</i>, rowan <i>Sorbus aucuparia</i>

#	Preliminary recommendations for ecological net gain
	and honeysuckle <i>Lonicera periclymenum</i>). If an evergreen hedge is required for landscape screening, suitable native species include holly <i>Ilex aquifolium</i> , holm oak <i>Quercus ilex</i> although both can be rather slow growing, ivy <i>Hedera helix</i> and privet <i>Ligustrum vulgare</i> . Beech <i>Fagus sylvatica</i> and hornbeam <i>Carpinus betulus</i> are also widely used as hedging plants and, although not evergreen, these will keep their brown leaves through winter if trimmed in late summer.
R15	The value of the site for bats could be enhanced by installing a range of artificial roost boxes. It is recommended that these are placed on retained trees within the development, or incorporated within buildings facades. Boxes suitable for a wide range of species should be used, for instance: ▪ New buildings: integral bat tubes could be installed within buildings which face vegetated areas, particularly towards the north and west of the development. Bat tubes can be incorporated into the design of the building so that only the access holes are visible from the exterior of the building. The Schwegler 1FR or 2FR Bat Tube is designed to meet the characteristic requirements of the types of bats that inhabit buildings such as pipistrelles <i>Pipistrellus spp.</i> or serotines <i>Eptesicus serotinus</i>. It is designed to be installed on the external walls of buildings, either flush or beneath a rendered surface. ▪ Pipistrelles <i>Pipistrellus sp.</i>: bat boxes suitable to install on mature trees either within or at the edges of the development include the Schwegler 1FF Flat Bat Box, or other manufacturer's equivalent. ▪ Noctules <i>Nyctalus spp.</i> and brown long eared bats <i>Plecotus auritus</i>: bat boxes suitable to install on mature trees either within or at the edges of the development include the Schwegler 2F General Purpose Bat Box or the 2FN Woodland Bat Box, or other manufacturer's equivalent. ▪ Bat boxes should ideally be located south-facing (between south-east and south-west) and above 4m from ground level. If possible they should be installed facing vegetation features such as mature hedgerows or trees, but with a clear line of flight for bats entering or leaving the roost, and away from sources of artificial light. The exact numbers and locations of boxes within and around the site should be specified by an ecologist once further bat surveys have been carried out.

5 Conclusions

5.1 Summary

- 5.1.1 Bat activity surveys were undertaken for the site of a proposed residential development on Land at North End Road in Yapton, West Sussex. The study was undertaken to establish the baseline assemblage and relative abundance of bat species using the site, and the types and locations of bat activity, to identify and evaluate potential impacts of development on foraging and commuting bats, and make recommendations accordingly.

5.2 Results

- 5.2.1 The desk study data search returned 39 records of eleven species of bat from within 2km of the survey area. There are no designated sites notified for important populations of bats within 10km of the survey area.
- 5.2.2 Two bat activity surveys were carried out, one each in August and October 2019. Species diversity recorded during the bat activity surveys included up to six species. The majority (>67%) of bat calls recorded during automated monitoring were from pipistrelle bats, with common pipistrelles registering 34.2% of calls, and soprano pipistrelles registering 32.8%. Of the remaining bat passes, those of noctule were the next most frequently recorded (28.6%), followed by *Myotis spp.* (2.8%) and finally serotine bats (1.4%). One Western barbastelle was recorded during the August transect survey. This means that 95.7% of all bats recorded during automated monitoring were of the genus *Eptesicus*, *Nyctalus* or *Pipistrellus*. The highest levels of bat activity, albeit still low to moderate, were recorded within the south-west of the site in August 2019.
- 5.2.3 A third survey was scheduled for spring 2020. However, by April 2020 a “lockdown” had been declared to prevent the spread of the coronavirus outbreak. The result is that early season bat activity data has not been obtained for the site. However, taking account of the geographic location of the site in relation to range of UK bat species, the low suitability of site habitats, and the species recorded in 2019, the authors consider it unlikely that a significantly different species assemblage, abundance or distribution within the site would have been recorded in spring 2020.

5.3 Evaluation

- 5.3.1 Low to moderate levels (relative to the survey area) of bat activity were recorded in the south-western section of the survey area in August 2019 (1.1 BPPH), and very low levels of bat activity (4 calls in total/0.06 BPPH) were recorded to the north-eastern boundary of the survey area in October 2019. The October 2019 transect survey, although recording a low level of foraging and commuting activity, recorded the most activity along the central-eastern edge of the site.

The proposals include the construction of c.108 dwellings, across the majority of the site together with parking, access, landscaping, and retention of the some of existing grassland as a wildflower meadow. The majority of boundary hedgerows would be retained and protected during construction activities, but c.46.5m of hedgerow H4 would be removed to facilitate site access. This would be offset by native species-rich hedgerow creation and enhancement as part of the landscaping strategy for the development as a whole. The majority (>67%) of bats recorded on site were pipistrelles which are frequently found foraging in residential areas. No significant impacts to foraging or commuting bats are predicted to result from the proposed land use change.

- 5.3.2 The impact of light on foraging and commuting bats is classified as low for *Eptesicus serotinus* and individuals of the genus *Nyctalus* and *Pipistrellus* – which includes 95.7% of all bats recorded during passive monitoring at the site. These species are unlikely to be significantly affected by proposals for the site. Light intolerant species recorded at the site, including individuals of the genus *Myotis*, together comprised 4.3% (3 bat passes) of activity recorded during passive monitoring. Use of the site by these species may be reduced by the development proposals, however, it is likely that the overall development quanta proposed can be accommodated without significant impacts on the abundance and distribution of bats within the survey area, or adverse effects on the conservation status of local bats populations within their natural range.

5.4 Recommendations

- 5.4.1 It is concluded that there is no requirement for avoidance and mitigation measures additional to those already provided in the Preliminary Ecological Appraisal. The mitigation proposals are considered likely to be adequate despite the lack of a third survey. The recommendations contained in the PEA (UEEC, 2020) continue to apply, including those for achieving an overall net gain for biodiversity in line with the requirements of local and national policy and guidance. Those relating to bats and their habitats are summarised in Table 5.1.

Table 5.1: Summary of recommendations

#	Summary of recommendations
Ecological protection measures	
R5	The hedgerow priority habitats within the survey should where possible be retained and protected during construction, and could also provide a focus for ecological enhancement measures.
R6	Standard site procedures to prevent impacts on trees should be adhered to during construction.
R7	The use of external lighting should be avoided or minimised to prevent impacts to nocturnal species such as bats. Lighting should not be directed towards the boundary hedgerows.
Ecological net gain	
R11	Green spaces should be sown with a locally-sourced native wildflower and grass seed mix.
R12	Hedgerow creation and enhancement should use a range of native fruit, seed, nut and nectar-bearing species shrub species of local provenance.
R15	The value of the site for bats could be enhanced by installing a range of artificial roost boxes

#	Summary of recommendations
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	onto new buildings and retained trees.
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5.5 Conclusions

- 5.5.1 The proposed development is unlikely to result in significant impacts to foraging and commuting bats. Mitigation measures are recommended to reduce and offset residual impacts on a proportionate basis.

References and Bibliography

Barataud M. (2015): *Acoustic Ecology of European Bats: Species Identification, Study of their Habitats and Foraging Behaviour*. Museum national d'Histoire naturelle.

Bat Conservation Trust websites: www.bats.org.uk and <http://roost.bats.org.uk/>

British Standards Institution (BSI; 2013): *BS42020:2013 Biodiversity – Code of practice for planning and development*. BSI Standards Limited, London.

Chartered Institute of Ecology and Environmental Management (CIEEM, 2017a): *Guidelines for Ecological Report Writing*. 2nd Edition, CIEEM, Winchester.

CIEEM (2017b): *Guidelines for Preliminary Ecological Appraisal*. 2nd Edition, CIEEM, Winchester.

Collins, J. (ed.) (2016): *Bat Surveys for Professional Ecologists: Good Practice Guidelines*. 3rd Edition, Bat Conservation Trust, London.

Dietz, D. & Kiefer, A. (2016): *Bats of Britain and Europe*. Bloomsbury Publishing, London.

English Nature (2004): *Bat Mitigation Guidelines*. Peterborough.

Greenaway, F. (2004): *Advice for the management of flightlines and foraging habitats of the barbastelle bat *Barbastella barbastellus**. English Nature Research Report, Number 657.

Greenaway, F. (2008): *Barbastelle bats in the Sussex West Weald 1997 – 2008*.

Gunnel K., Grant, G. and Williams, C. (2012): *Landscape and Urban Design for Bats and Biodiversity*. Bat Conservation Trust.

Gunnel K, Murphy B, Williams C (2013): *Designing for biodiversity: A technical guide for new and existing buildings*. RIBA Publishing and Bat Conservation Trust.

Institute of Lighting of Professionals (2018): *Guidance Note 08/18: Bats and artificial lighting in the UK*. Co-authored by the Bat Conservation Trust, September 2018.

Joint Nature Conservation Committee (2004): *Bat Workers Manual*. 3rd edition, Peterborough.

Multi-agency Geographic Information for the Countryside (MAGIC) (www.magic.gov.uk)

Russ, J. (2012): *British Bat Calls: A Guide to Species Identification*. Pelagic Publishing, UK.

Stone, E. L. (2013): *Bats and lighting: overview of current evidence and mitigation*. University of Bristol.

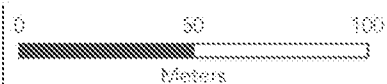
Appendix I: Phase 1 Habitats Map

Please see following page.



Land at North End Road, Yapton, West Sussex

	Survey area		Desire scrub
	Target note		Improved grassland
	Hedgerow, species-poor		Tall ruderal
	Hard-standing		Building



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Ordnance Survey 5100051673

Scale: 1:1,600 Created by: AD
Date: Jan 2020 Reviewed by: NP

Drawing number:

UE0306ECO-Phase1_200128



URBAN EDGE
ENVIRONMENTAL
CONSULTING

Tel: 01273 686 766
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Web: www.ueec.co.uk

Appendix II: Bat Activity Survey Plan

Please see insert.



Land at North End Road, Yapton, West Sussex

-  Survey area
-  Transect point
-  Static detector position

0 50 100
Meters

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Ordnance Survey 0100031673

Scale: 1:1,600 Created by: AD
Date: Dec 2019 Reviewed by: NP
Drawing number:
UE0306ECD-Bats_191219

URBAN EDGE Tel: 01273 686 766
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Appendix III: Bat Activity Survey Results

Abbreviations:

BABA	Barbastelle	EPSE	Serotine	MYBE	Bechstein's
MYBR	Brandt's	MYDA	Daubenton's	MYMY	Whiskered
MYNA	Natterer's	MYsp	Myotis sp.	NYLE	Leisler's
NYNO	Noctule	PINA	Nathusius' pipistrelle	PIPI	Common pipistrelle
PIPY	Soprano pipistrelle	Plsp	Pipistrelle sp.	PLAU	Brown long-eared
RHFE	Greater horseshoe	RHHI	Lesser horseshoe		

Survey 1: Dusk, 20/08/2019

Sunset/sunrise:	Start time:	End time:	Precipitation:
20:14	20:14	21:57	None
Air temp start:	Air temp end:	Wind:	Cloud cover:
16.1°C	14.5°C	B1	20%
Equipment:			
Wildlife Acoustics EchoMeter Touch2 Pro full spectrum detector			
Transect Point (TP)	From	Time	Length (mins)
TP1	20:14	20:21	7
TP1 to TP2	20:21	20:24	3
TP2	20:24	20:31	7
TP2 to TP3	20:31	20:33	2
TP3	20:33	20:40	7
TP3 to TP4	20:40	20:44	4
TP4	20:44	20:51	7
TP4 to TP5	20:51	20:56	5
TP5	20:56	21:03	7
TP5 to TP6	21:03	21:07	4
TP6	21:07	21:14	7
TP6 to TP7	21:14	21:17	3
TP7	21:17	21:24	7
TP7 to TP8	21:24	21:27	3
TP8	21:27	21:34	7
TP8 to TP9	21:34	21:37	3
TP9	21:37	21:44	7
TP9 to TP10	21:44	21:50	6
TP10	21:50	21:57	7

TP: Transect point

Time: of recording and/or time at transect point

No.(I): Number of bats

No.(P): Number of passes

E/R: emergence/re-entry

F/C: Foraging/commuting

Soc.: Social calls

S/NS/SNH: Seen / not seen / seen not heard Comment: e.g. location of roost, direction of flight, behaviour, frequency, call shape

Surveyor (AD):

TP	Time	Spp.	No.(I)	No.(P)	E/R	F/C	Soc.	S/NS	Comment
3-4	20:41	PIPY	1	2		C		S	Between TPs
3-4	20:41	NYNO	1	1		C		S	Commuting north to south along treeline
3-4	20:43	NYNO	1	1		C		NS	
5	21:01	PIPY	1	1		C		NS	
5	21:04	EPSE	1	1		F		S	Foraging at south corner
6	21:10	EPSE	1	1		C		NS	
7	21:17	PIPI	1	1		C		NS	Brief pass
7	21:19	PIPI	1	3		C		NS	
7	21:21	PIPI	1	2		C		NS	
7-8	21:26	Mysp	1	1		C		NS	Between TP's
8	21:29	PIPI	1	1		C		NS	
8	21:33	PIPI	1	1		C		NS	
8-9	21:36	EPSE	1	1		C		NS	Between TPs
9	21:45	BABA	1	1		C		NS	
9-10	21:49	MYDA	1	1		C		NS	

Survey 2: Dusk, 01/10/2019**Sunset/sunrise:**

18.41

Start time:

19.05

End time:

20:45

Precipitation:

Light rain at start

Air temp start:

15.1°C

Air temp end:

14.4°C

Wind:

B1

Cloud cover:

60%

Equipment:

Wildlife Acoustics EchoMeter Touch2 Pro full spectrum detector

Transect Point (TP)**From****Time****Length (mins)**

TP10

19:05

19:12

6

TP10 to TP9

19:12

19:14

3

TP9

19:14

19:21

7

TP9 to TP8

19:21

19:23

4



TP8	19:23	19:30	7
TP8 to TP7	19:30	19:34	3
TP7	19:34	19:41	7
TP7 to TP6	19:41	19:44	3
TP6	19:44	19:51	7
TP6 to TP5	19:51	19:54	1
TP5	19:54	20:01	7
TP5 to TP4	20:01	20:08	3
TP4	20:08	20:15	5
TP4 to TP3	20:15	20:17	2
TP3	20:17	20:24	7
TP3 to TP2	20:24	20:26	2
TP2	20:26	20:33	7
TP2 to TP1	20:33	20:35	2
TP1	20:35	20:41	7

TP: Transect point

Time: of recording and/or time at transect point

No.(I): Number of bats

No.(P): Number of passes

E/R: emergence/re-entry

F/C: Foraging/commuting

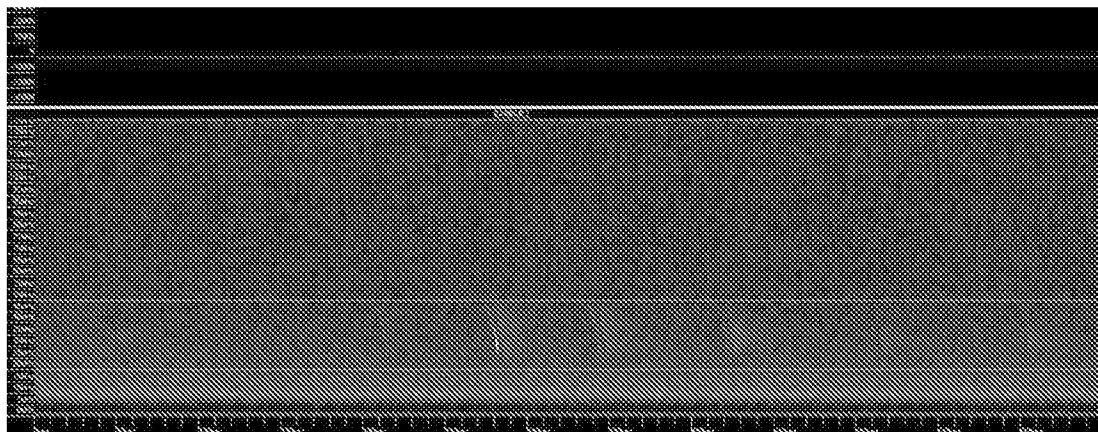
Soc.: Social calls

S/NS/SNH: Seen / not seen / seen not heard Comment: e.g. location of roost, direction of flight, behaviour, frequency, call shape

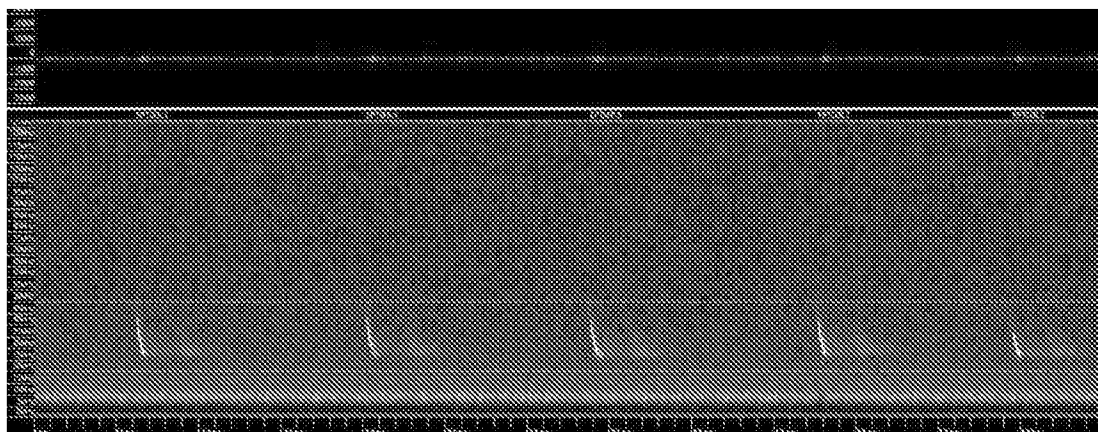
Surveyor (NP):

TP	Time	Spp.	No.(I)	No.(P)	E/R	F/C	Soc.	S/NS	Comment
10-9	19:13	PIPY	1	2		F		S	Along hedge near TP9
9	19:17	PIPY	1	2		C		NS	
9	19:21	PIPI	2	4		F		S	Along hedge
8	19:23	PIPY	1	1		C		NS	
8	19:24	PIPY	1	1		C		NS	
8	19:25	PIPI	1	2		F		S	Hedge end
8	19:27	PIPY	1	1		F		S	Didn't echolocate
8	19:28-19:30	PIPI	1	1		F		S	At hedge end
8-7	19:31	PIPI	1	1		F		S	
8-7	19:32	PIPI	1	1		F		S	
7	19:34-19:36	PIPI	2	6		F	Y	NS	
6	19:45	EPSE	1	1		C		NS	
5-4	20:05	PIPI	1	1		C		NS	

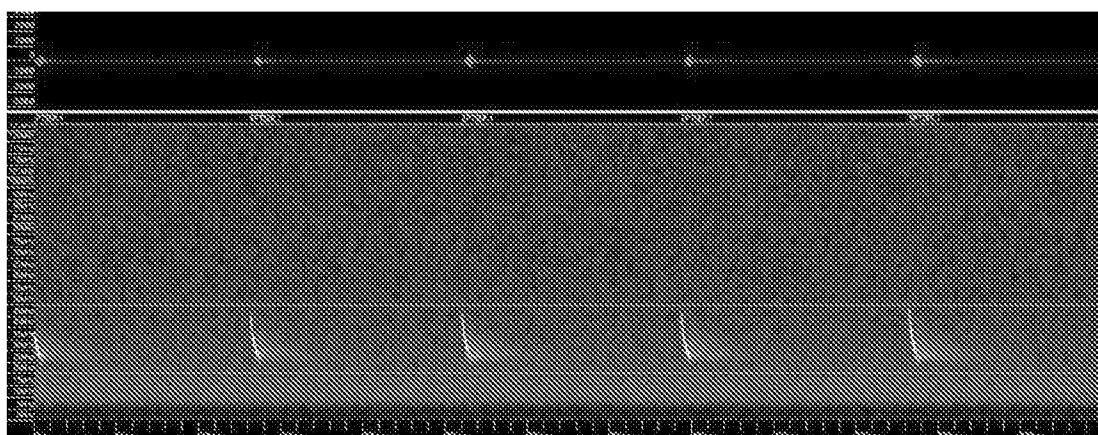
Appendix IV: Bat Sonograms



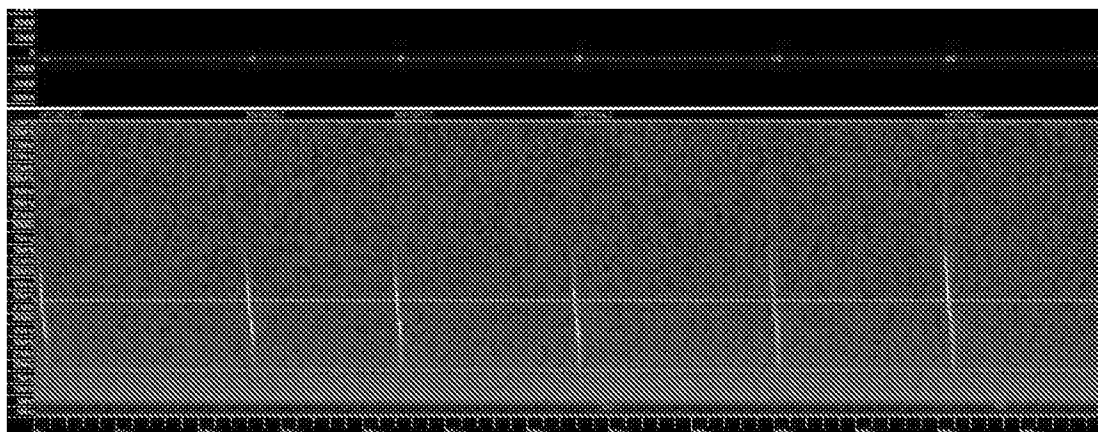
Barbastelle bat recorded on 20 August during the bat activity survey at 21:44



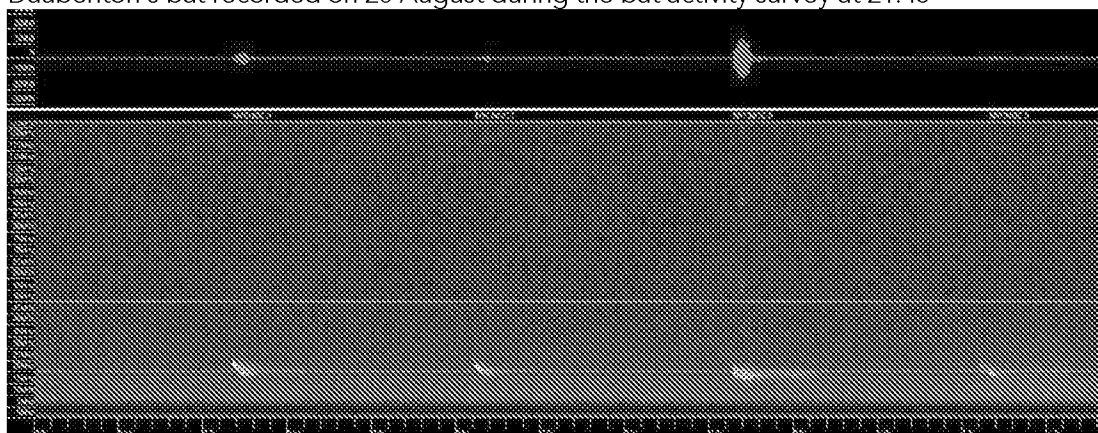
Serotine bat recorded on 20 August during the bat activity survey at 21:03



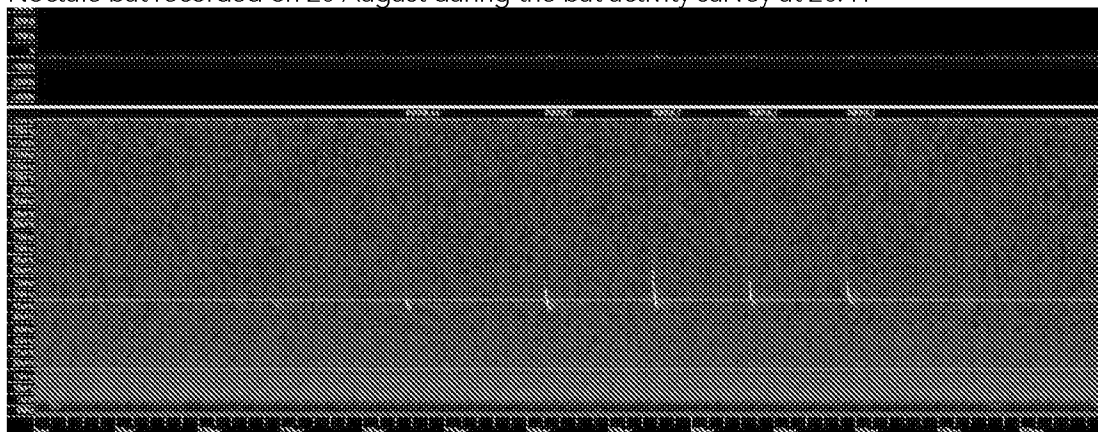
Serotine bat recorded on 1 October during the bat activity survey at 19:45



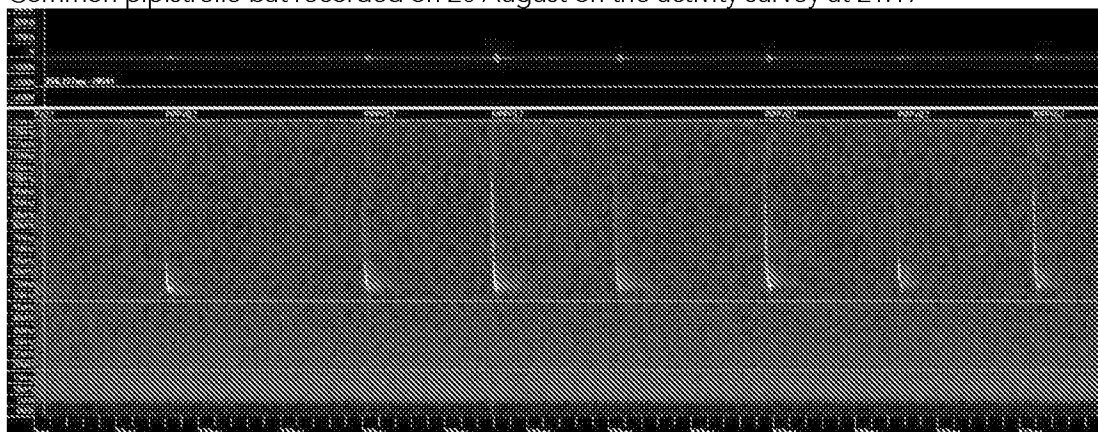
Daubenton's bat recorded on 20 August during the bat activity survey at 21:48



Noctule bat recorded on 20 August during the bat activity survey at 20:41



Common pipistrelle bat recorded on 20 August on the activity survey at 21:19



Soprano pipistrelle bat recorded on 1 October on the activity survey at 19:16

Appendix V: Weather Data

Date	Temperature	Precipitation	Wind Direction and Speed
20.08.19	20.5 °C	0.0	North westerly, less than 5 knots
21.08.19	15.7 °C	0.0	North westerly, less than 5 knots
22.08.19	15.9 °C	0.0	No wind recorded
23.08.19	15.6 °C	0.0	No wind recorded
24.08.19	18.2 °C	0.0	No wind recorded
02.10.19	5.8 °C	0	North easterly, less than 5 knots
03.10.19	14.2 °C	0	North westerly, less than 5 knots
04.10.19	12.4 °C	0	No wind recorded
05.10.19	13.5 °C	0.0	South easterly, less than 5 knots
06.10.19	13.6 °C	16.5	Westerly, less than 5 knots

Temperature at 21:00, rainfall accumulation and wind data were obtained from Six Villages WOW Weather observation Station (approx. 5 km north west of site) as reported on Met Office Weather Observation Website: <http://wow.metoffice.gov.uk/home> [accessed 19/12/2019]

Appendix VI: Legislation and Planning Context

Legislation

General

The main legislative instruments for ecological protection in England and Wales are the Wildlife and Countryside Act 1981 (WCA; as amended), Countryside and Rights of Way Act 2000 (CRoW; as amended), Natural Environment and Rural Communities Act 2006 (NERC) and the Conservation of Habitats and Species Regulations 2017 (the Habitats Regulations).

WCA 1981 consolidated and amended pre-existing national wildlife legislation in order to implement the Bern Convention and the Birds Directive. It complements the Habitats Regulations, offering protection to a wider range of species than the latter. The Act also provided for the designation and protection of nationally important conservation sites of value for their floral, faunal or geological features, termed Sites of Special Scientific Interest (SSSI). Schedules of the act list protected species of flora and fauna, as well as invasive species, and detail the possible offences that apply to these species.

The CROW Act 2000 amended and strengthened existing wildlife legislation detailed in the WCA. It placed a duty on government departments and the National Assembly for Wales to have regard for biodiversity, provided increased powers for the protection and maintenance of SSSI, and created a right of access to parts of the countryside. The Act contained lists of habitats and species (Section 74) for which conservation measures should be promoted, in accordance with the recommendations of the Convention on Biological Diversity (Rio Earth Summit) 1992.

The NERC Act 2006 consolidated and replaced aspects of earlier legislation. Section 40 of the Act places a duty upon all local authorities and public bodies in England and Wales to promote and enhance biodiversity in all of their functions. Sections 41 (England) and 42 (Wales) list habitats and species of principal importance to the conservation of biodiversity (otherwise known as priority habitats/species as listed in the now superseded UK Biodiversity Action Plan). These lists supersede Section 74 of the CRoW Act 2000. These species and habitats are a material consideration in the planning process.

The Habitats Regulations 2017 consolidate and update the Conservation of Habitats and Species Regulations 2010 and all its various amendments. The Regulations are the principal means by which Council Directive 92/43/EEC (The Habitats Directive) is transposed into English and Welsh law, and place a duty upon the relevant authority of government to identify sites which are of importance to the habitats and species listed in Annexes I and II of the Habitats Directive. Those sites which meet the criteria are, in conjunction with the European Commission, designated as Sites of Community Importance, which are subsequently identified as Special Areas of Conservation (SAC) by the European Union member states.

The Habitats Regulations also place a duty upon the government to maintain a register of European protected sites designated as a result of Council Directive 2009/147/EC on the Conservation of Wild Birds (The Birds Directive). These sites are termed Special Protection Areas (SPA) and, in conjunction with SACs, form a network of sites known as Natura 2000. The Habitats Directive introduces for the first time for protected areas, the precautionary principle; that is that projects can only be permitted having ascertained no adverse effect on the integrity of the site. Projects may still be permitted if there are no alternatives, and there are imperative reasons of overriding public interest.

The Habitats Regulations also provide for the protection of individual species of fauna and flora of European conservation concern listed in Schedules 2 and 5 respectively (European Protected Species (EPS)). Schedule 2



includes species such as otter and great crested newt for which the UK population represents a significant proportion of the total European population. It is an offence to deliberately kill, injure, disturb or trade in these species. Schedule 5 plant species are protected from unlawful destruction, uprooting or trade under the regulations. Under the Habitats Regulations disturbance includes any activity which is likely to: impair the ability of a EPS to survive, breed, reproduce, or rear/nurture its young; impair the ability of a EPS to migrate or hibernate; or significantly affect the local distribution or abundance of the species.

Badgers (*Meles meles*)

Badgers are listed under Schedule 6 of the Wildlife and Countryside Act which grants them partial protection. This protection is extended by the Protection of Badgers Act 1992 (Badger Act) which makes it an offence to take, injure or kill a badger, interfere with a sett, sell or possess a live badger, or mark or ring a badger without a licence. Under the Act disturbance is illegal without a licence. Natural England has published guidelines to be adopted when determining whether an activity is 'disturbing' i.e. a licence is required when, for example, using heavy machinery (generally tracked vehicles) within 30m of any entrance to an active sett. Licences are not normally issued during the badger breeding season (December – June inclusive).

Bats (*Chiroptera*)

Bats and their roosts are fully protected by protected by the WCA and the Habitats Regulations. The legislation makes it an offence, *inter alia*, to:

- ✧ Intentionally kill, injure or take a bat.
- ✧ Possess or control a live or dead bat, any part of a bat, or anything derived from a bat.
- ✧ Intentionally or recklessly damage, destroy or obstruct access to any structure or place that a bat uses for shelter or protection. This is taken to mean all bat roosts whether bats are present or not.
- ✧ Intentionally or recklessly disturb a bat while it is occupying a structure or place that it uses for shelter or protection.
- ✧ Make a false statement in order to obtain a licence for bat work.

Birds

Birds are protected by the Wildlife and Countryside Act, 1981 (as amended). This legislation makes it an offence to intentionally kill, injure or take away any wild bird. It is also an offence to take, damage or destroy the nest of any wild bird while it is in use or being built or to take or destroy the egg of any wild bird. In addition, certain species are listed on Schedule 1 of the WCA (such as kingfisher *Alcedo atthis*). This makes it an additional offence to intentionally or recklessly disturb the adults while they are in and around their nest or intentionally or recklessly disturb their dependent young. Such species are considered to be in greater need of legal protection or of high nature conservation priority.

Birds of Conservation Concern ("BoCC4) are included on Red and Amber lists (Eaton *et al.*, 2015). Birds on the Red list are those of highest conservation priority due significant and sustained population decreases and/or range contractions (e.g. house sparrow *Passer domesticus* and starling *Sturnus vulgaris*). Birds on the Amber list are the next most critical group and include species whose population/range have shown moderate declines, or which have recovered to some extent from historical decline, such as dunnoek *Prunella modularis*.

Dormouse (*Muscardinus avellanarius*)

Dormouse is fully protected by the WCA and the Habitats Regulations. The legislation makes it an offence, *inter alia*:

- ✧ Intentionally kill, injure or take a dormouse.
- ✧ Possess or control a live or dead dormouse, any part of, or anything derived from a dormouse.

- ❖ Intentionally or recklessly damage, destroy or obstruct access to any structure or place that a dormouse uses for shelter or protection.
- ❖ Intentionally or recklessly disturb a dormouse while it is occupying a structure or place that it uses for shelter or protection.

Great crested newt (*Triturus cristatus*; GCN) (and natterjack toad *Bufo calamita*)

GCN is fully protected by the WCA and the Habitats Regulations. The legislation makes it an offence, *inter alia*, to:

- ❖ Intentionally kill, injure or take a GCN (including its eggs).
- ❖ Possess or control a live or dead GCN, any part of, or anything derived from a GCN.
- ❖ Intentionally or recklessly damage, destroy or obstruct access to any structure or place that a GCN uses for shelter or protection.
- ❖ Intentionally or recklessly disturb a GCN while it is occupying a structure or place that it uses for shelter or protection.

Reptiles

The four common species (slow-worm *Anguis fragilis*, common lizard *Zootoca vivipara*, adder *Vipera berus* and grass snake *Natrix natrix*) are partially protected under the WCA. They are protected, *inter alia*, against intentional killing and injuring. The handling and translocation of these reptiles does not require a licence.

Smooth snake *Coronella austriaca* and sand lizard *Lacerta agilis* are fully protected by the WCA and the Habitats Regulations. The legislation makes it an offence, *inter alia*, to:

- ❖ Intentionally kill, injure or take a smooth snake or sand lizard.
- ❖ Possess or control a live or dead smooth snake or sand lizard, any part of, or anything derived from a smooth snake or sand lizard.
- ❖ Intentionally or recklessly damage, destroy or obstruct access to any structure or place that a smooth snake or sand lizard uses for shelter or protection.
- ❖ Intentionally or recklessly disturb a smooth snake or sand lizard while it is occupying a structure or place that it uses for shelter or protection.

Weeds Act 1959 / Ragwort Control Act 2003

This legislation provides for orders to be made for control where notifiable weed species such as ragwort are said to be a problem. The act does not make it illegal to have ragwort (or other weed species) on your land, make it illegal to allow ragwort to spread, or force landowners automatically to control it. However, if DEFRA is satisfied that there are injurious weeds to which this Act applies growing upon any land it may serve upon the occupier of the land a notice in writing requiring them, within the time specified in the notice, to take such action as may be necessary to prevent the weeds from spreading.

Planning context

National Planning Policy Framework (Section 15: Conserving and enhancing the natural environment)

The National Planning Policy Framework (NPPF), published in February 2019, outlines the Government's commitment to the conservation of wildlife and natural features. It is concerned with:

- ❖ *Protecting and enhancing valued landscapes, sites of biodiversity or geological conservation value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);*
 - ❖ *Recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;*
-



- ❖ *Maintaining the character of the undeveloped coast, while improving public access to it where appropriate;*
- ❖ *Minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current & future pressures;*
- ❖ *Preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and*
- ❖ *Remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.*

The NPPF requires that local plans should distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries.

To protect and enhance biodiversity and geodiversity, the NPPF states that planning policies 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.*

When determining planning applications, local planning authorities should aim to protect and enhance biodiversity by applying 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;*
- ❖ *development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;*
- ❖ *development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and*
- ❖ *development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.*

The following wildlife sites should be given the same protection as habitats sites:

- ❖ *potential Special Protection Areas and possible Special Areas of Conservation;*
 - ❖ *listed or proposed Ramsar sites; and*
-

- » *sites identified, or required, as compensatory measures for adverse effects on habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.*

The presumption in favour of sustainable development does not apply where development requiring appropriate assessment because of its potential impact on a habitats site is being planned or determined. The policies within the NPPF (and additional guidance contained within Circular 06/2005) are a material planning consideration.

UK/Local Biodiversity Action Plan Designations and Birds of Conservation Concern and Red Data Book Listings

Note that BAP designations and status as RSPB Birds of Conservation Concern or Red Data Book species does not offer any further legal protection, but planning authorities are required to prevent these species from being adversely affected by development in accordance with National Planning Policy and the CROW and NERC Acts.

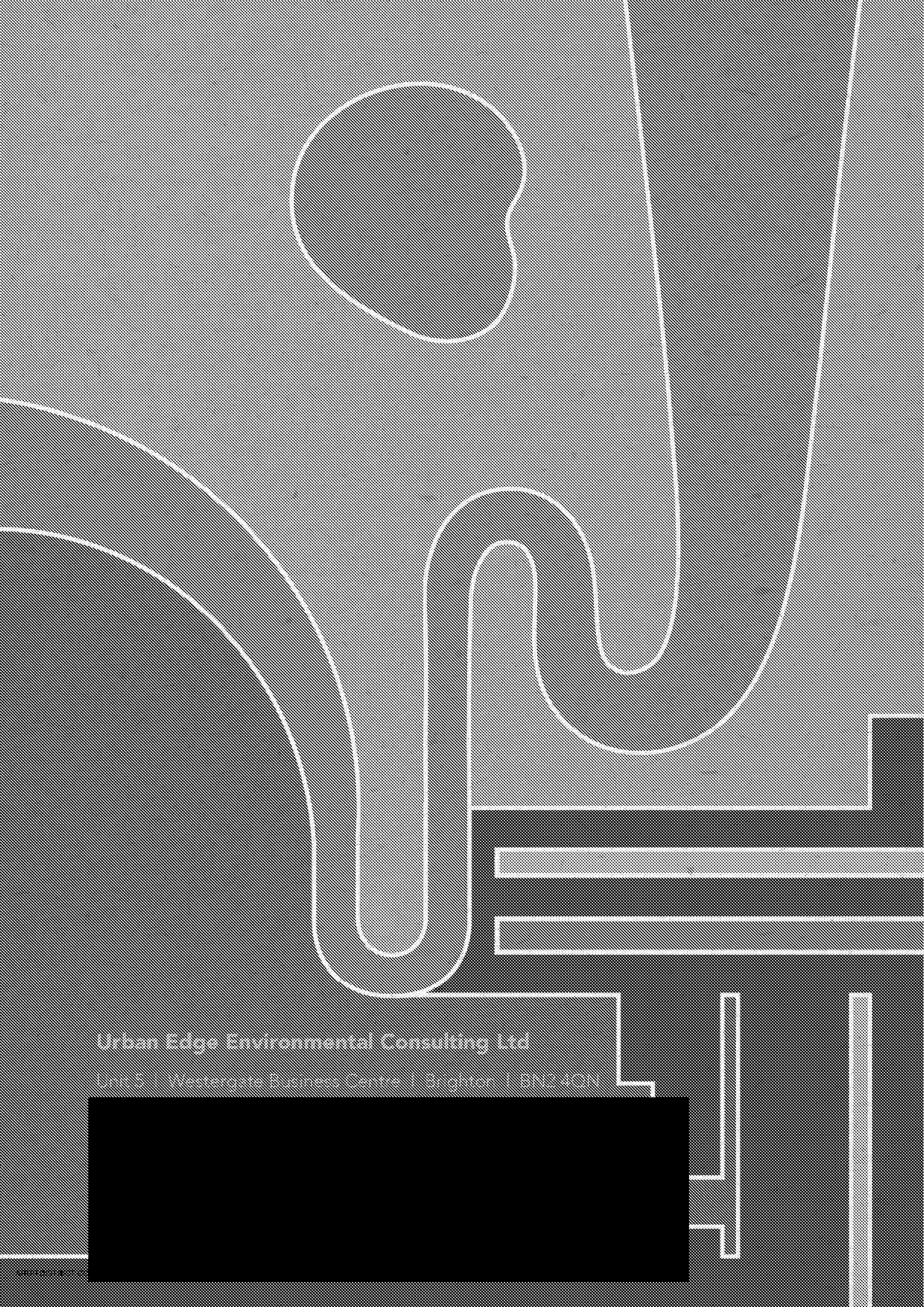
The United Kingdom Biodiversity Action Plan (UKBAP), first published in 1994 and updated in 2007, was a government initiative designed to implement the requirements of the Convention of Biological Diversity to conserve and enhance species and habitats. The UKBAP contained a list of priority habitats and species of conservation concern in the UK, and outlined biodiversity initiatives designed to enhance their conservation status.

However, as a result of devolution, and new country-level and international drivers and requirements, much of the work previously carried out by the UK BAP is now focussed at a country-level rather than a UK-level, and the UK BAP was succeeded by the 'UK Post-2010 Biodiversity Framework' in July 2012. The UK lists of priority habitats and species nonetheless remain an important reference source and were used to draw up statutory lists of priority habitats and species in England, Northern Ireland, Scotland and Wales. The priority habitats and species correlate with those listed on Section 41 and 42 of the NERC Act.

The UKBAP required that conservation of biodiversity be addressed at a County level through the production of Local BAPs. These are targeted towards species of conservation concern characteristic of each area. In addition, a number of local authorities and large organisations have produced their own BAPs. Where they exist, Local BAP targets with regard to species and habitats are a material consideration in the planning process.

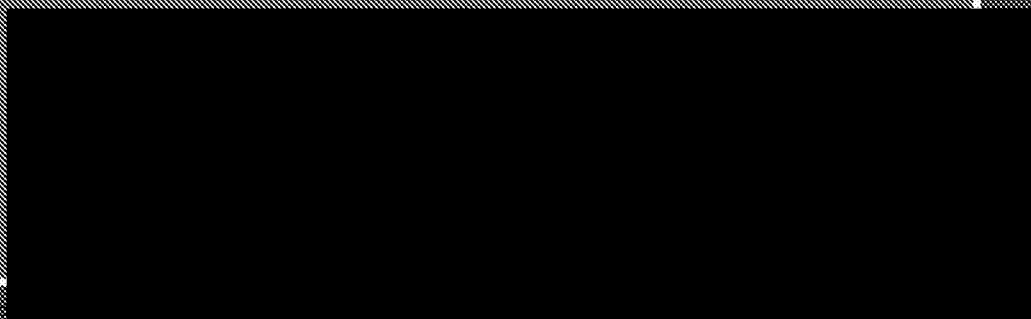
Appendix VII: Legal and Technical Limitations

- This report has been prepared by Urban Edge Environmental Consulting Ltd (UEEC Ltd) with all reasonable skill, care and diligence within the terms of the contract made with the Client to undertake this work, and taking into account the information made available by the Client. No other warranty, expressed or implied, is made as to the professional advice included in this report or any other services provided by us.
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- The advice provided in this report does not constitute legal advice. As such, the services of lawyers may also be considered to be warranted.
- Unless otherwise stated in this report, the assessments made assume that the sites and facilities that have been considered in this report will continue to be used for their current planned purpose without significant change.
- All work carried out in preparing this report has utilised and is based upon UEEC Ltd's current professional knowledge and understanding of current relevant UK standards and codes, technology and legislation. Changes in this legislation and guidance may occur at any time in the future and may cause any conclusions to become inappropriate or incorrect. UEEC Ltd does not accept responsibility for advising the Client or other interested parties of the facts or implications of any such changes;
- Where this report presents or relies upon the findings of ecological field surveys (including habitat, botanical or protected/notable species surveys), its conclusions should not be relied upon for longer than a maximum period of two years from the date of the original field surveys. Ecological change (e.g. colonisation of a site by a protected species) can occur rapidly and this limitation is not intended to imply that a likely absence of, for instance, a protected species will persist for any period of time;
- This report has been prepared using factual information contained in maps and documents prepared by others. No responsibility can be accepted by UEEC Ltd for the accuracy of such information;
- Every effort has been made to accurately represent the location of mapped features, however, the precise locations of features should not be relied upon;
- Populations of animals and plants are often transient in nature and a single survey visit can only provide a general indication of species present on site. Time of year when the survey was carried out, weather conditions and other variables will influence the results of an ecological survey (e.g. it is possible that some flowering plant species which flower at other times of the year were not observed). Every effort has been made to accurately note indicators of presence of protected, rare and notable species within and adjacent to the site but the possibility nonetheless exists for other species to be present which were not recorded or otherwise indicated by the survey;
- Any works undertaken as a consequence of the recommendations provided within this report should be subjected to the necessary health & safety checks and full risk assessments.



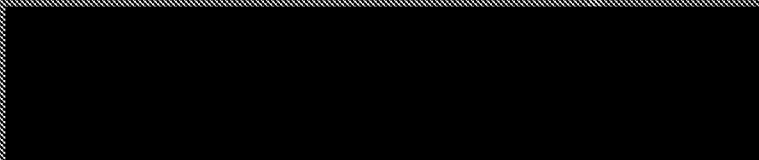
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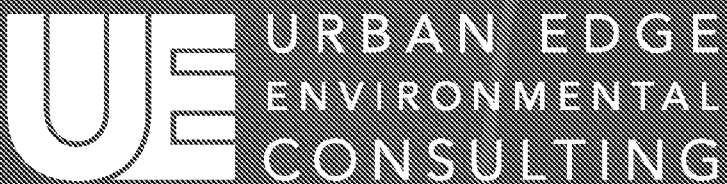


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