PARSONS BRINCKERHOFF

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MOULTON A43 BAT TECHNICAL APPENDIX

Northamptonshire County Council

287512A-HHE

Final

Moulton A43 Bat Technical Appendix

287512A-HHE

Prepared for
Northamptonshire County Council
County Hall
Northampton
NN1 1ED

Prepared by
Parsons Brinckerhoff
The Forum
Barnfield Road
Exeter
EX1 1QR
www.pbworld.com

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INTRODUCTION

Overview

1.0.1 Parsons Brinckerhoff was commissioned by Northamptonshire County Council to undertake bat surveys along the route of the proposed Moulton bypass, between approximate OS Grid references SP 78901 64972 and SP 79826 67189.

1.0.2 The surveys were required to inform an Environmental Statement to accompany the planning application.

Survey Area Context

1.1.1 The proposed scheme is shown on Figure 1. At its northern end the survey area comprised arable farmland with farmland to the north, a small strip of woodland (Cowpasture Spinney Local Wildlife Site) was present to the east, with arable farmland and parkland beyond. The existing A43 bounded the survey area to the west with houses and gardens and additional arable farmland beyond. The southern end of the survey area comprised horse paddocks, a traditional orchard and amenity grassland with semi-natural woodland strips. The Round Spinney Industrial Estate bounded the southern part of the survey area to the south with Coleman Leys Potential Wildlife Site to the east and the suburbs of Northampton to the south. Arable farmland and the village of Moulton were present to the west of the survey area.

Objectives

1.2.1 Table 1 below summarises each survey undertaken together with its objective.

Table 1 Surveys undertaken

Survey	Objective
Tree Inspections	Tree inspections at ground level were undertaken for all trees likely to require removal to facilitate the proposed scheme, Category 1 and 1*[1] trees were subject to a further exhaustive inspection using an endoscope and aerial inspection techniques where required.
Bat Activity Surveys	Bat activity surveys were undertaken to assess the species assemblage within the area and the relative importance of the various habitat types and features for commuting and foraging bats up to approximately 500 m away from, the existing carriageway.
Static Automated Detector Surveys	Static automated surveys were undertaken to ensure additional, late emerging species were not missed by the transect surveys.
Dawn re-entry surveys	Dawn surveys were undertaken on trees / small groups of trees that were deemed to have potential to support roosting bats to identify whether the potential roost features were in use at the time of survey.

[1] As designated in Hundt L. (2012) *Bat Surveys: Good Practice Guidelines, 2nd Edition,* Bat Conservation Trust.

1.2.2 Together these surveys were considered sufficient to provide adequate baseline bat data to support an Environmental Impact Assessment and allow the recommendation of appropriate mitigation measures.

Legislation and Planning Context

1.3.1 Articles of wildlife and countryside legislation, planning policy guidance and references to both local and national biodiversity action plans and regional/local strategies and plans are referred to in this report.

1.3.2 The key legislation, planning policies and plans of relevance are:

Table 2 Legislation and Planning documents

The Conservation of Habitats and Species Regulations 2010 (and subsequent amendments)
Wildlife and Countryside Act 1981 (and subsequent amendments)
Countryside and Rights of Way Act 2000
Natural Environment and Rural Communities (NERC) Act 2006
The UK Biodiversity Action Plan (UKBAP)
The Cumbrian Biodiversity Action Plan (LBAP)
National Planning Policy Framework: Section 11:Conserving and Enhancing the Natural Environment (Formerly PPS9: Biodiversity and Geological Conservation)
Cumbria Wind Energy Supplementary Planning Document (SPD)

1.3.3 A summary of the legislation and guidance for bats within the UK is presented in Appendix 1.

METHODOLOGY

Overview

2.0.1 The Moulton survey area was deemed to be a site that presented a medium risk to bats based on the criteria in the BCT guidelines[2] which is summarised in the Habitat Quality Assessment included in Appendix 2. The potential for bats to use the survey area is given in Table 3 below.

Table 3 Potential Bat Risk Level

Roosting Potential	Foraging potential	Commuting Potential	Potential Risk Level of Development
Trees with moderate – high bat roost potential	Habitat could be used extensively by moderate numbers of foraging bats	Site is connected to the wider landscape by linear features, such as hedgerows, scrub and tree lines and a brook	Medium

2.0.2 The survey methodology was designed using the standard best practice guidance[3&4] for a medium risk site.

Previous Survey and Desk Study

2.1.1 Previous survey work and desk study at the A43 Moulton Bypass Survey Area was reviewed as part of this study. These are summarised in Table 4 below:

Table 4 Previous survey work

Survey	Date
Extended Phase 1 Habitat Survey	January and February 2009
Extended Phase 1 Habitat Survey Update	May and June 2009
Extended Phase 1 Habitat Survey Update	July and August 2011
Extended Phase 1 Habitat Survey Update	April 2013
Extended Phase 1 Habitat Survey Update	May 2014
Desk Study	2013
Building Inspections (internal and external)	2009 - 2013
Tree Inspections (ground based)	2009 - 2013
Transect Surveys	2009 and 2011

[2] Hundt L. (2012) *Bat Surveys Good Practice Guidelines – 2nd Edition*. Bat Conservation Trust.
[3] BCT (2011) *Bat Surveys – Good Practice Guidelines: Surveying for onshore wind farms. Bat Conservation Trust*. London.Edition, Bat Conservation Trust.
[4] Anon (1999) *Design Manual for Roads and Bridges, Volume 10: Environmental Design and Management, Section 4: Nature Conservation, Part 3 HA 80/99 Nature Conservation Advice in Relation to Bats.* Highways Agency.

Desk Study

2.2.1 A desk study was undertaken to collate and analyse existing records of notable and protected species historically found within the survey area and its immediate surroundings.

2.2.2 The desk study included a search for bat records within 4 km of the survey area. Data was also collected to identify any Statutory Sites designated for their bat interest within 10 km of the survey area. This was extended to 30 km for SACs. Non-statutory sites within 2 km of the survey area were also identified. The sources consulted to obtain the data are given in Table 5 below.

Table 5 Desk study resources

Multi Agency Geographic Information for the Countryside (MAGIC)
The Northants Mammal Recorder
Google Earth

Field Survey Overview

2.3.1 A range of field surveys were undertaken. These surveys and their objectives are given in Table 6 below.

Table 6 Surveys undertaken

Survey	Objective
Desk Study	The desk study was undertaken to identify the historic use of the area by bat species.
Tree Inspections	Tree inspections at ground level were undertaken for all trees likely to require removal to facilitate the proposed scheme, Category 1 and 1*[5] trees were subject to a further exhaustive inspection using an endoscope using aerial inspection techniques where required.
Dawn re-entry surveys	Dawn surveys were undertaken on trees / small groups of trees that were deemed to have some potential to support roosting bats to identify whether the potential roost features were in use at the time of survey.
Bat Activity Surveys	Bat activity surveys were undertaken to assess the species assemblage within the area and the relative importance of the various habitat types and features for commuting and foraging bats up to approximately 500 m away from, the existing carriageway.
Static Automated Detector Surveys	Static automated surveys were undertaken to ensure additional, late emerging species were not missed by the transect surveys.

[5] As designated in Hundt L. (2012) *Bat Surveys: Good Practice Guidelines, 2nd Edition,* Bat Conservation Trust.

Tree inspections

2.4.1 Ground-based tree inspections were undertaken by an experienced Ecologist on 20th August 2014. The inspections targeted each tree or group of trees within approximately 50 m of either side of the centre of the proposed scheme. The trees were assessed from the ground using a high powered torch and close-focusing binoculars. Features with the potential to be used by bats such as rot holes, woodpecker holes, cracks, cavities and thick, dense ivy were recorded and each tree was classified as:

- A confirmed roost if bats or signs of bats were present;
- Category 1* if the tree had multiple highly suitable features capable of supporting larger roosts;
- Category 1 if the tree contained one or two features or features capable of supporting small roosts;
- Category 2 if the tree had features with some limited potential to support a bat roost or if the tree had no obvious potential to support roosting bats but was of a size and age which meant that such features were likely to be present but potentially out of view;
- Category 3 if the tree had no obvious potential to support roosting bats and roost features were not expected to be present.

2.4.2 Following the ground-based inspections all Category 1* and 1 trees were subject to climb and inspect surveys by four Ecologists each holding a Natural England Survey Licence. The climb and inspect surveys examined all the features identified as having potential to support roosting bats during the ground-based inspections. The features were examined up-close for any signs of bats or bats themselves and the potential of the feature to support a roost was assessed.

2.4.3 The aerial surveys were undertaken on 11 and 12 September 2014. Surveyors undertaking climb and inspect surveys were assisted by the use of tree climbing equipment, ladders, high powered torches and video-endoscopes.

Dawn re-entry surveys

2.5.1 Dawn re-entry surveys were undertaken on all Category 1 or 1* trees and were also undertaken on targeted groups of Category 2 trees. Dawn surveys involved the monitoring of a tree or group of trees for an hour and a half, finishing at sunrise. All dawn surveys were undertaken by experienced Ecologists using broad band bat detectors[6] with either an integral recording feature or H2 Zoom external recording device. Each dawn survey was recorded in its entirety for subsequent analysis[7].

Bat Activity Transect Surveys

2.6.1 Bat Activity Transect Surveys were undertaken to identify the relative distribution of bat activity within the survey area. Using the data collected during previous site visits,

[6] Bat detectors used comprised Echo Meter 3 real-time-expansion detector (Wildlife Acoustics ltd., Massachusetts, USA); Duet frequency division and heterodyne detector (Batbox ltd., West Sussex, UK); or Batlogger real-time recorder and heterodyne detector (Elekon ltd., Littau, Germany).
[7] Analysis was undertaken using Analook v3.9.6 and/or Batsound v3.31

by previous studies and data from aerial photos of the survey area, a circular transect route was designed to cover all habitat types within the survey area. The total transect length was approximately 8.3 km long and incorporated 18 no. five-minute point counts (PCs). The transect route and point count locations are shown on Figure 2.

2.6.2 The bat activity transect survey dates are given in Table 7 below. The start location and direction walked (clockwise/anticlockwise) was varied throughout the year to reduce any sampling bias associated with the time of emergence and change in activity patterns throughout the night for each species.

Table 7 Bat Transect Survey Details

Date	Start Point	End Point	Additional Notes
28-May-14	11	12	Evening transect
05-Jun-14	11	10	Dusk through to dawn transect. Second circuit ended at PC3
28-Jul-14	10	11	Evening transect
19-Aug-14	15	14	Evening transect
11-Sep-14	5	4	Evening transect
22-Oct-14	1	2	Evening transect

2.6.3 The evening transects commenced 15 minutes before sunset and lasted for between approximately 3 and 4 hours. The Dusk through to dawn transect started 15 minutes before sunset and lasted for approximately 7.5 hours.

2.6.4 Experienced bat surveyors used bat detectors[8] to identify and record the bats present. On completion of the transect surveys sonograms of the recordings were checked to ensure that the field identification was accurate[9].

2.6.5 Weather conditions were recorded at the beginning of each transect survey along with any significant changes as the survey progressed. All surveys were undertaken in appropriate weather conditions.

Static Automated Surveys

2.7.1 Static detectors comprising Song Meter 2[10] real time expansion bat detectors were deployed in five locations along the length of the proposed route. The detectors were located in what was judged to be the "best" location within each area in order to sample as much of the bat activity as possible.

2.7.2 The detectors were set to record from half an hour before sunset until half an hour after sunrise for five nights each month between May and October 2014 (inclusive).

2.7.3 The dates that each static detector was active are given in Table 8 below.

[8] Echo Meter 3 real-time-expansion detectors (Wildlife Acoustics ltd., Massachusetts, USA) were used.
[9] Sonogram analysis was undertaken using BatSound v3.30 in 2009 and 2011 and v3.31 in 2014 together with Analook W v3.7 in 2009 and 2011 and v3.9.6 in 2014.
[10] Wildlife Accoustics, Concord, Massachusetts, USA

Table 8 Static Detector Survey dates

	Dates Active					
Detector	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**
1	28 - 1	6 – 10	22 – 26	19 - 23	11 – 15	22 – 26
2	29 - 2[11]	6 – 10	22 – 26	19 - 23	11 – 15	22 – 26
3	28 - 1	6 – 10	22 – 26	19 - 23	11 – 15	22 – 26
4	28 - 1	6 – 10	22 – 26	19 - 23	11 – 15	22 – 26
5	28 - 1	6 – 10	22 – 26	19 - 23	11 – 15	22 – 26

2.7.4 The static detectors were placed in the following habitat types present within the survey area:

- 1 – Detector placed on the arable field side of a hedge adjacent to the northern end of the existing A43;
- 2 – Detector located on the arable field side of a tree line along Overstone Lane;
- 3 – Detector located on the arable field side of a tree line along The Avenue;
- 4 – Detector located within the traditional orchard to the north of Round Spinney Industrial Estate; and
- 5 – Detector located within dense vegetation at the southern end of the proposed scheme.

2.7.5 Each static detector location is shown on Figure 2.

Analysis

2.8.1 WAC recordings from SM2 static detectors and EM3 detectors were converted into ZCA and WAV format using Kaleidoscope 2.0.7[12]. During the conversion a filter was applied to filter out noise files. The settings used during the filter process are given in Table 9 below:

Table 9 Filter settings

Signal of Interest	
Kilohertz	9 - 120
Milliseconds	1 - 500
Minimum number of calls	2

2.8.2 All noise files filtered out during the conversion process were saved but not analysed or included in subsequent data counts.

[11] In May Detector 2 did not switch on on the first night but battery life meant that the survey period could not be moved back by one night for all other detectors.
[12] Wildlife Accoustics, Concord, Massachusetts, USA

2.8.3 The converted files were analysed using AnalookW v3.3q (Corben, 2006) Anabat data analysis software. Where calls were still unclear the corresponding WAV file was analysed using BatSound v. 3.3.1.1[13].

2.8.4 WAV files from Duet and Batlogger detectors were analysed using BatSound v. 3.3.1.1[14].

2.8.5 Any amendments to species identification were marked onto the survey sheet using a different coloured pen. The date of the check was also marked.

Survey limitations

Desk Study

2.9.1.1 It should be noted that an absence of desk study records for particular species does not necessarily convey an absence of such species in that area, but is often a facet of under-recording. Because the desk study is designed to give an overview of the species already recorded in the local area, and used as indicative data prior to more detailed surveys such as bat activity and commuting route surveys, it is not considered to be a significant constraint.

Field data

2.9.2 Bat surveys undertaken using bat detectors are inherently biased. Bats with louder calls (such as the *Nyctalus* species) will be recorded at a greater distance (and therefore each bat will be recorded more frequently) than species which use quiet calls such as *Plecotus* sp. This affects the results of all surveys undertaken and the frequency that each species present will be recorded. The analysis of the results of the transect and static detector surveys takes this discrepancy in detectability into account.

2.9.3 Species identification by sonogram is limited (to a certain extent) by similarities in call structure. In addition all bats can modulate their calls according to the habitats they are navigating, their behaviour and the information they require at the time. This imposes limitations on reliable analysis particularly between species of the same genus in the genera's *Plecotus*, *Myotis* and *Nyctalus*. Due to the geographical location and habitat structure within the survey area every *Plecotus* bat recorded was assumed to be a brown long-eared bat, *Plecotus auritus* and unidentified *Myotis* species were assumed to be either Daubenton's bat *Myotis daubentonii*, whiskered bat *Myotis mystacinus*, Brandt's bat *Myotis brandtii* or Natterer's bat *Myotis Nattereri*. Nyctalus species were separated where possible but grouped where call parameter overlap prevented reliable identification.

2.9.4 Due to similarities in ecology and flight behaviour (within the species likely to be present within the site) the mitigation to reduce any impact is likely to be similar for all species present within *Myotis* or *Nyctalus* genera's. Therefore as long as any potential impacts recognise that the numbers of each individual species within the genera may be much lower than the total *Myotis* recordings identification to species level is not considered a significant limitation.

[13] Pettersson Elektronik AB, Uppsala, Sweden, 2002
[14] Pettersson Elektronik AB, Uppsala, Sweden, 2002

2.9.5 The static detector placed in the orchard (Detector 4) in May and June did not pick up any bat calls, similarly the detector placed at the southern end of the survey area (Detector 5) didn't pick up any bat calls in July.

2.9.6 Five very faint bat call files were recorded on Detector 4 in May and one in June. Although these calls have not been counted in the results (as including them would vary the methodology rendering it incomparable with the other data), their presence indicates that the survey during these months was valid. The "noise" files for Detector 5 in July did not reveal any faint bat files and the Ecologist collecting the equipment reported that it appeared to have been tampered with. As such the July results for Detector 5 will be treated as a failed survey and will not be considered reflective of the level of bat activity in this area in July. The July results for Detector 5 will also not be counted in the average level of activity figures for that detector.

2.9.7 The faint bat calls were visible on the WAV files which had been automatically filtered into the "noise" folder. The fact that some bat calls were picked up suggests that the detector was functioning correctly and the fact that the microphones used, continued to be used throughout the later surveys without issue, suggests that they were also functioning correctly.

RESULTS

Summary

3.0.1 In summary, nine bat species/groups were recorded within the survey area following analysis of the desk study and survey results. As mentioned in Section 2.10.4 it was assumed that *Myotis* species recorded within the site were limited to Daubenton's bat, Natterer's bat, whiskered bat or Brandt's bat; and also that all *Plecotus* records were limited to brown long-eared bat.

3.0.2 Because of the differences in flight behaviour and ability or willingness to cross gaps, the level of risk posed by a new road will differ significantly on a species by species basis. However many bat species have similar hunting behaviour and flight characteristics due to the fact that they occupy similar ecological niches; these similarities mean that the risks and mitigation required for species with similar ecological niches are broadly the same. For the purposes of this report the bats recorded have been classified as cluttered habitat; edge habitat or open habitat species with the flight characteristic assumptions as shown in Table 10 below.

Table 10 Species groups and general characteristics

Ecological niche	Species	Flight speed	Willingness to cross gaps and open habitat	Flight height	Light tolerance
Cluttered habitat species	Myotis bat species	Slow	Least willing to cross gaps and open ground.	Generally fly close to linear features, when crossing open habitat will usually fly close to the ground	Least tolerant of light. Artificial lighting may present a barrier to these species.
	Brown long-eared bat				
Edge habitat species	Common pipistrelle	Medium	Will regularly cross small and medium sized gaps	Tend to fly within 10 m of the ground / linear features	Mixed - some species such as pipistrelles will hunt insects drawn to lights, others such as Barbastelle are likely to avoid lighting.
	Soprano pipistrelle				
	Nathusius pipistrelle				
	Serotine				
	Barbastelle				
Open habitat species	Noctule	Fast	Open habitat does not present a problem for these species	Usually fly high 10 m + above open habitat	Light tolerant, will often predate insects drawn to lights.
	Leisler's bat				

3.0.3 The level of activity within the survey area varied considerably with some areas regularly registering high levels of bat activity and other areas registering very low levels.

Desk study

Designated Sites

3.1.1 The desk study recorded the presence of three statutory designated sites, one Special Protection Area and nine Local Nature Reserves and 13 Sites of Special Scientific Interest. An additional four non-statutory designated sites comprising one Local Wildlife Site and three Potential Wildlife Sites were present within 2 km of the survey area. None of the sites were designated for the presence of bats.

Bat Records

3.1.2 The desk study identified a total of 33 bat records within between 2004 and 2014. A further 169 historic records were also returned. A summary of the records returned is given in Table 11, below.

Table 11 Data Search results

Species	All Records	Records (2004 - 2014)
Pipistrelle	126	14
Common pipistrelle	14	5
Soprano pipistrelle	8	2
Brown long-eared bat	38	9
Daubenton's bat	4	0
Natterer's bat	4	0
Whiskered bat	1	0
Leisler's bat	2	1
Noctule	5	2
TOTAL	**202**	**33**

3.1.3 Of the desk study records returned, 112 were records of bat roosts. Of the 112 roost records, 19 of the roost records were records dating from the previous 10 years. A summary of roost records is given in Table 12, below.

Table 12 Data search roost records

Species	All Records	Records (2004 - 2014)
Pipistrelle	81	11
Common pipistrelle	4	1
Soprano pipistrelle	1	0
Brown long-eared bat	24	7
Daubenton's bat	1	0
Natterer's bat	1	0
Whiskered bat	0	0
Leisler's bat	0	0

Noctule	0	0
TOTAL	**112**	**19**

Previous Survey Work

3.1.4 Previous survey work undertaken by Aspect Ecology included ground-based tree inspections, transect surveys and building inspections. The previous survey work is summarised in Table 13 below.

Table 13 Previous survey work undertaken

Survey type	Details	Result
Building Inspections	Aspect Ecology undertook internal and external inspections of the sheds and temporary structures in and around the traditional orchard.	The building inspections revealed no evidence of roosting bats and the structures were considered to offer minimal opportunities for roosting bats.
Tree inspections	The semi-mature and mature trees within the survey area were appraised from the ground for their likely potential to support roosting bats.	Three trees were identified as having high potential to support roosting bats. Two of the trees were located in the tree line in the south east of the survey area with an additional tree with high bat potential present within the tree line on The Avenue.
Transect surveys	Dusk and dawn transect surveys were undertaken within he survey area on 10 - 11 September and 2 - 3 and 16 - 17 August.	The hedgerows, woodland, orchard and watercourses were considered to provide suitable bat foraging and commuting resources with moderate levels of bat activity recorded in these areas. The activity surveys identified the presence of at least five species of bat within the survey area namely: common pipistrelle, soprano pipistrelle, noctule, an unidentified Nyctalus species which could have been either noctule or Leisler's bat, a Myotis bat species, and serotine. The common and soprano pipistrelle dominated the bat activity recorded with low numbers of Myotis, noctule and serotine also present.

3.1.5 The full survey methodology and results can be found in the Overstone Leys, Northampton Ecological Baseline Description report produced by Aspect Ecology. This report has been included as Annex 1.

Tree Inspections

3.2.1 The ground-based tree inspections identified the presence of 0 Category 1* trees, 39 trees with the potential to be Category 1 and one Category 2 tree. Category 3 trees were not recorded.

3.2.2 Aerial inspections were undertaken for all potential Category 1 trees within the survey area. Following the aerial surveys 38 of the 39 potential Category 1 trees were

downgraded to Category 2. The final Category 1 tree was retained as a Category 1 tree. No evidence of bat use was found within any of the potential roost features surveyed.

3.2.3 The location of the Category 1 and Category 2 trees is shown on Figure 3.

Dawn re-entry surveys

3.3.1 Two dawn re-entry surveys were undertaken on the Category 1 tree with a single re-entry survey undertaken on three groups of previously inspected Category 2 trees. The trees surveyed are shown in Table 14 below.

Table 14 Dawn re-entry surveys

Tree numbers	Category (following climb and inspect survey)	Dawn re-entry surveys undertaken
25	1	Climb and inspect, two dawn re-entry surveys
1 - 21 & 35	2	Climb and inspect and single dawn re-entry survey (undertaken on this tree as part of a group)
22 - 24, 26 - 34 and 36 - 39	2	Climb and inspect survey

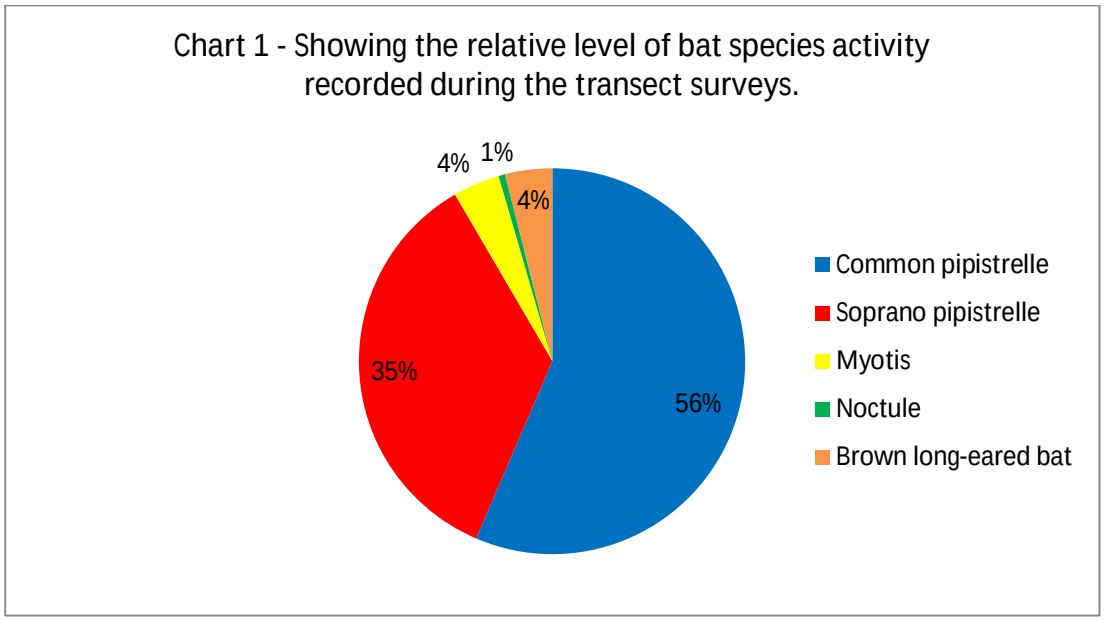
3.3.2 No bats were recorded returning to roost within the trees surveyed.

Transect Surveys

3.4.1 Five species were recorded at point counts within the survey area during the transect surveys. The species recorded comprised common pipistrelle, soprano pipistrelle, Myotis species, noctule, and brown long-eared bat. The only species recorded was a serotine, recorded between Point Count 13 and 14 during the June survey.

3.4.2 During the transect survey the most commonly encountered species was common pipistrelle which made up 56 % of all passes. The second most commonly recorded species was soprano pipistrelle. Common and soprano pipistrelle were recorded during each transect survey. Brown long-eared bats were recorded during the June transect, with Myotis species recorded during May and June. Noctule were only recorded on a single occasion, during the July transect.

3.4.3 Chart 1 shows the percentage breakdown of bat passes by species, recorded during all transect surveys.

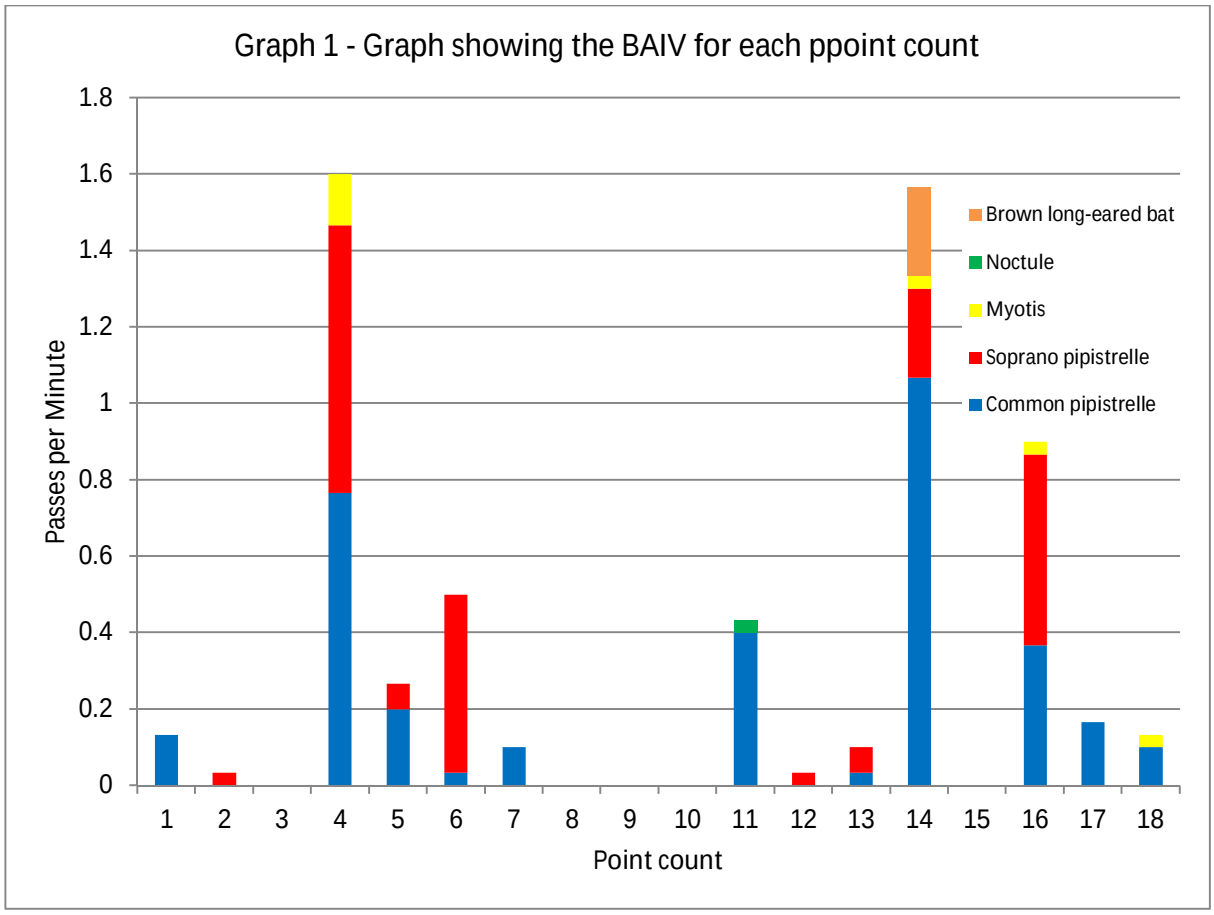


3.4.4 The transect survey recorded relatively low levels of bat activity across the survey area. No bat activity was recorded at Point Count 3, 8, 9, 10 or 15. Point Count 3 and 9 were located in the centre of grazed fields with Point Count 15 located next to a hedge which marked the boundary of the existing A43 and an arable field. Point Count 8 was located in a traditional orchard immediately to the north of the Round Spinney Industrial Estate and Point Count 10 was located in a small patch of woodland between the industrial estate and residential dwellings and gardens which line the existing A43.

3.4.5 The highest level of activity was recorded at Point Count 4, 14 and 16. These point counts were located next to Overstone Lane and The Avenue. These tree lined roads cross the survey area from east to west at the approximate centre of the route. Together with Point Count 18, these PCs were the only locations where cluttered habitat species (brown long-eared bat and *Myotis* species) were recorded.

3.4.6 Noctule was the only open habitat species recorded during the transect surveys. The only location that noctule were recorded was at Point Count 11 at the southernmost end of the scheme.

3.4.7 Graph 1 (below) shows the number of passes per minute recorded at each point count during the transect surveys.



3.4.8 Although no strong commuting routes were recorded during the transect surveys, the data shows that the tree lined roads which cross the survey area from east to west (The Avenue and Overstone Lane) are the most important commuting and foraging resource within the survey area for cluttered and edge habitat species. The transect surveys identified a very low level of use by open habitat species with the only pass recorded within the amenity grassland in the south of the survey area.

Static Automated Detector Surveys

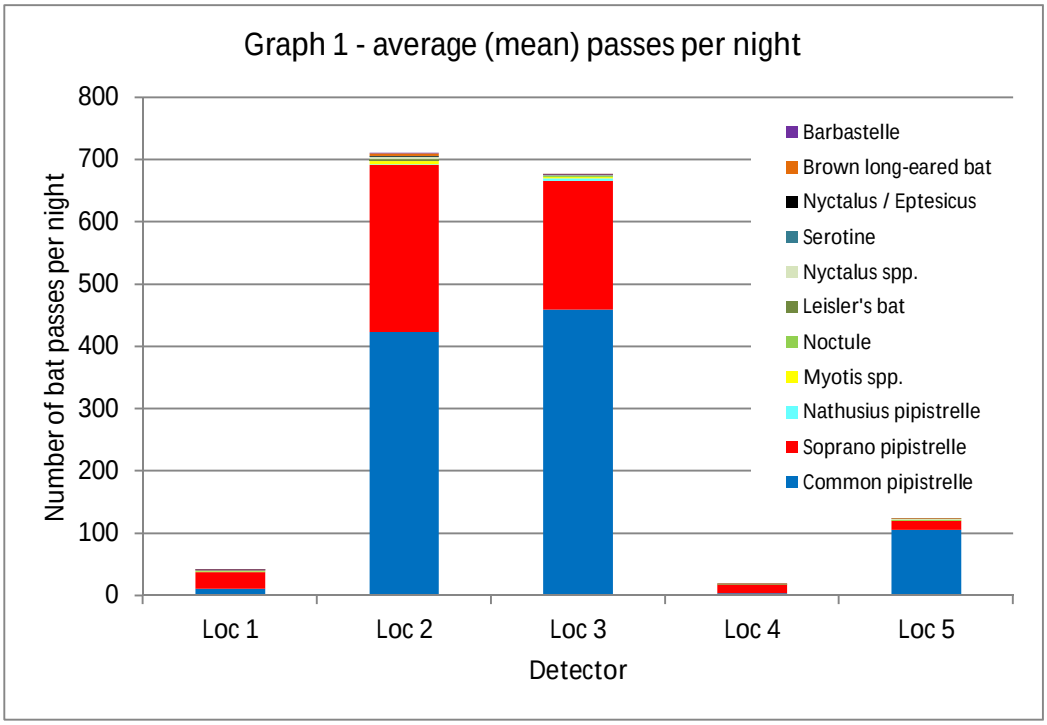
3.5.1 The static automated detectors were deployed along the route of the proposed road in the areas likely to record the highest level of bat activity. The location of each detector is shown on Figure 1.

3.5.2 The static detectors recorded at least two cluttered habitat species (Myotis and brown long-eared bat) and five edge habitat species (common pipistrelle, soprano pipistrelle, nathusius pipistrelle, Barbastelle, and serotine). Two open habitat species (noctule and Leisler's bat) were also recorded by the static detectors.

3.5.3 The mean number of nightly passes recorded by the static detectors was 320.9 which is regarded as a high level of activity. Of the 320.9 passes per night most passes were common pipistrelle (63.7%), with soprano pipistrelle passes making up the almost all of the remaining activity (33.9%).

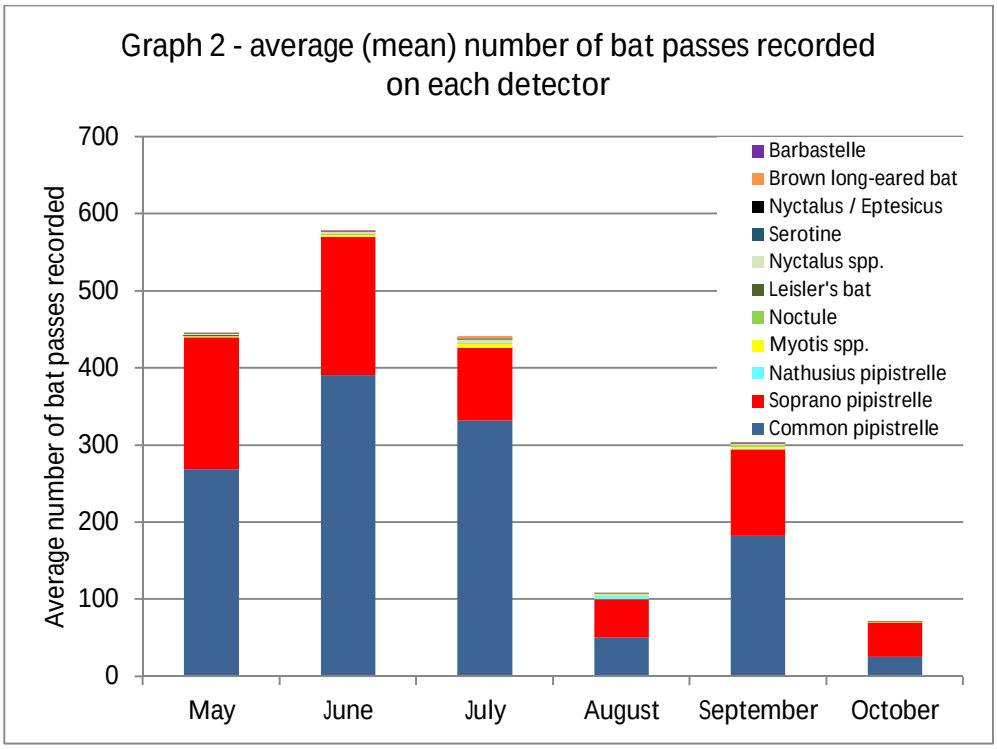
3.5.4 The bat activity recorded wasn't split evenly among the static detector locations. Detector 2 and 3 recorded the vast majority of activity with 45.9% and 43.6% of activity respectively.

3.5.5 The mean number of nightly passes recorded on each detector is shown on Graph 1 below. The graph shows that common and soprano pipistrelle activity on Detector 2 and 3 make up the majority of bat activity recorded.



3.5.6 The level of bat activity recorded on the static detectors was higher at the first three months of survey than was recorded in the final three months. This was despite the limitations identified in Section 2.10.6.

3.5.7 Graph 2 shows that the level of bat activity is reduced during the August surveys compared to July and September and also reduced during the October surveys. The reduced activity during the August surveys may have been due to farming activity in the adjacent fields or local area or perhaps localised adverse weather conditions although temperatures were suitable (>10^{o}C) and no substantial rain was forecast at the point that the detectors were deployed.

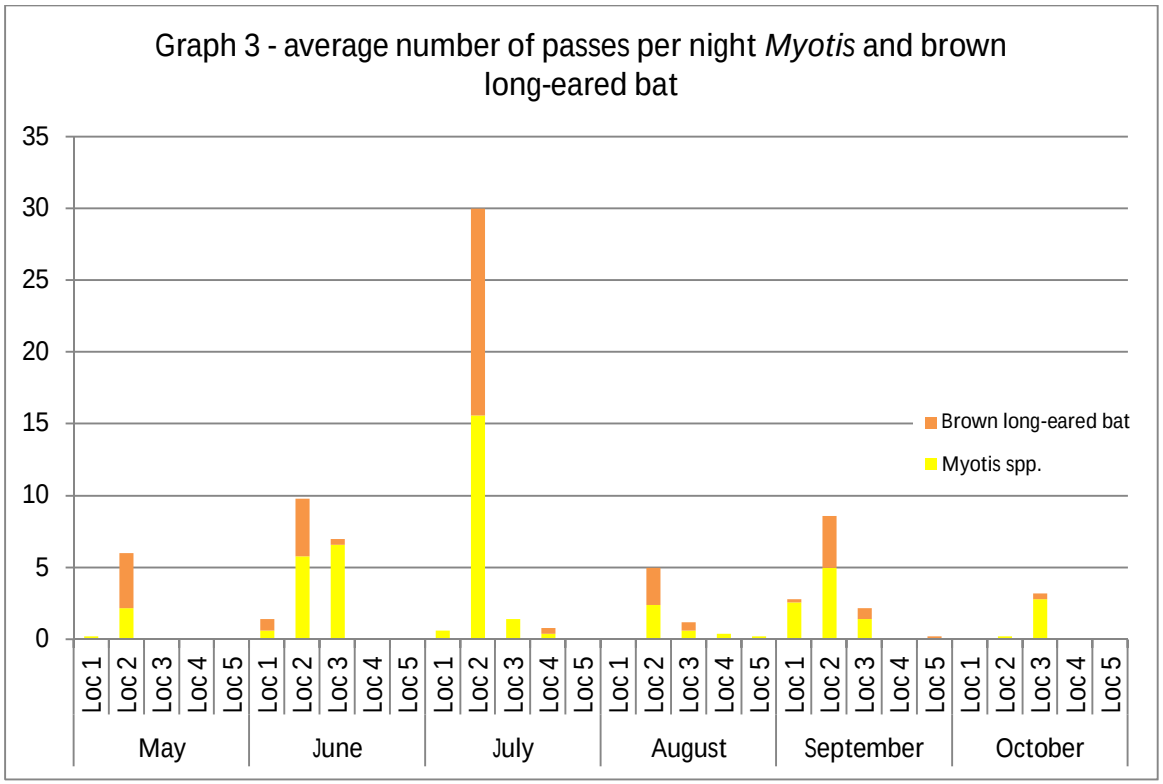


Cluttered Habitat Species

3.5.8 The level of cluttered habitat species (Myotis species and brown long-eared bat) activity was relatively sporadic throughout the static detector surveys. Static Detectors 2 and 3 regularly recorded more cluttered habitat species activity that the other detectors with the number of passes per night generally less than 10.

3.5.9 In July the level of cluttered habitat species activity in the vicinity of Detector 2 was considerably higher than that recorded during the other months. The fact that this activity comprised higher levels of both Myotis species activity and brown long-eared bat activity suggests that these cluttered habitat species may have been taking advantage of a localised increase in prey along specific to this tree line. It is considered unlikely that the increase in the level of activity was due to the presence of seasonally used brown long-eared and *Myotis* species roosts in the area or the presence of additional young bats foraging in the area because the increase in activity wasn't replicated on other detectors within the survey area.

3.5.10 Graph 3 shows the relatively low levels of cluttered bat species activity although, because these species have relatively quiet calls, it is considered that the level of activity recorded on Detector 2 and 3 represents a relatively moderate level of activity with the remaining detectors showing relatively low or very low activity levels.

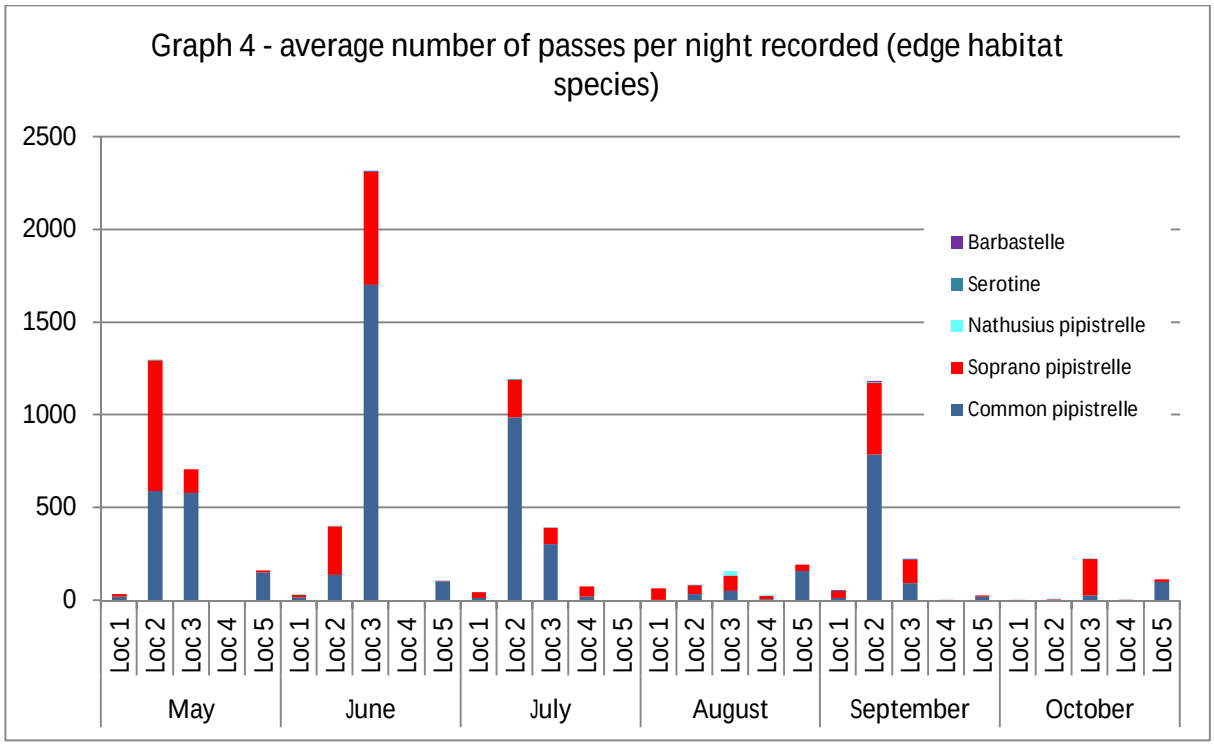


Edge habitat species

3.5.11 Common pipistrelle were the most commonly recorded edge habitat species present with most activity recorded on Static Detectors 2 and 3. The peak level of common pipistrelle activity was recorded in June when an average of 391 passes was recorded on each detector per night. The level of common pipistrelle activity was higher than every other species recorded in each month sampled with the exception of October when soprano pipistrelle activity averaged 43.3 ppn compared to 25.9 common pipistrelle ppn.

3.5.12 Like common pipistrelle activity, soprano pipistrelle activity was also concentrated around Detector 2 and 3. Soprano pipistrelle activity also peaked in June, with substantially lower levels recorded in August and October.

3.5.13 The level of common and soprano pipistrelle activity within the survey area as a whole was relatively high with very high levels of activity occasionally recorded on Detectors 2 and 3.

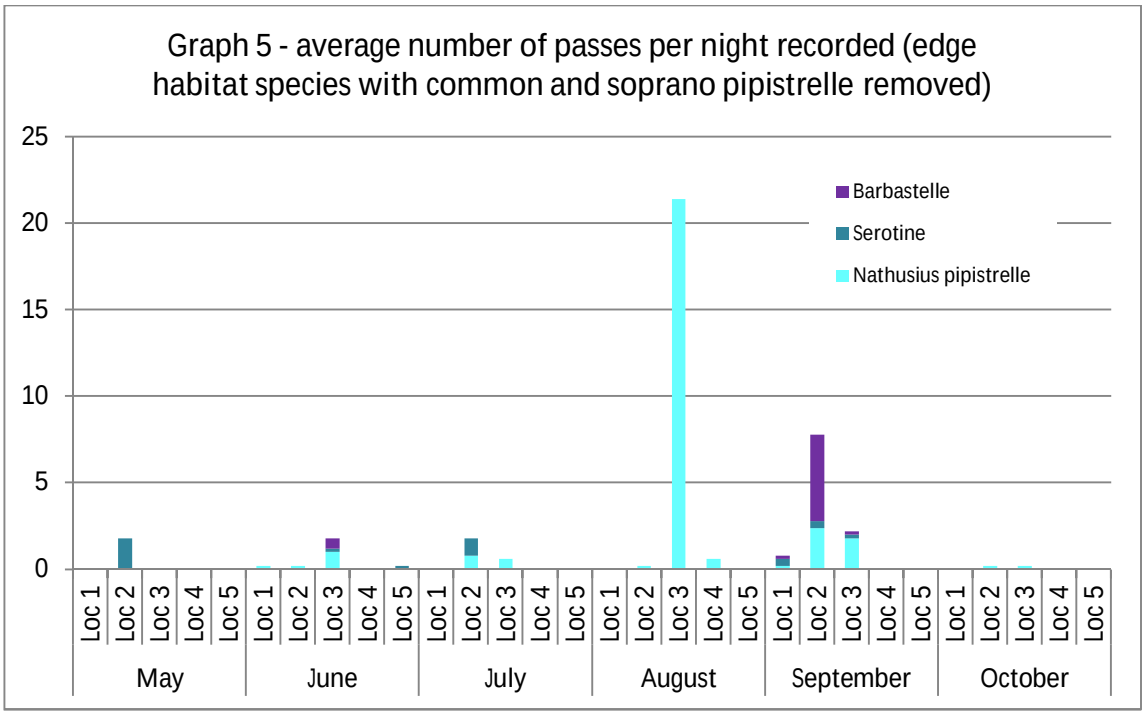


3.5.14 Unlike common and soprano pipistrelle species the level of nathusius pipistrelle activity within the survey area was generally very low with no activity recorded on any of the detectors before June. The level of nathusius pipistrelle activity peaked in August with 4.4 ppn recorded. Nathusius pipistrelle activity was concentrated around Detector 3 (4.1 ppn). Low levels of activity were also recorded on Detector 2 (0.6 ppn) with very low levels recorded on Detectors 1 and 4 and no activity recorded on Detector 5.

3.5.15 Graph 5 shows the level of edge species activity recorded with the common and soprano pipistrelle activity removed for clarity.

3.5.16 Barbastelle were recorded in June and September. This species is known to switch roosts on a regular basis and therefore the data is indicative of use of the survey area by low numbers (possibly a single bat) of barbastelle, on a sporadic basis. The site is possibly used only when the bat roosts nearby. Barbastelle were only recorded on Static Detectors 1, 2 and 3, with 1, 25 and 4 passes recorded respectively.

3.5.17 Serotine was the least recorded edge habitat species with a total of 21 passes confirmed. Due to the similarity in call structure to *Nyctalus* species it is possible that some of the Eptesicus / Nyctalus passes could also be attributed to serotine. Most serotine activity was recorded on Detector 2 with additional low levels of activity (one or two passes) also recorded on Detector 1, 3 and 5. Serotine were only recorded during May and July.



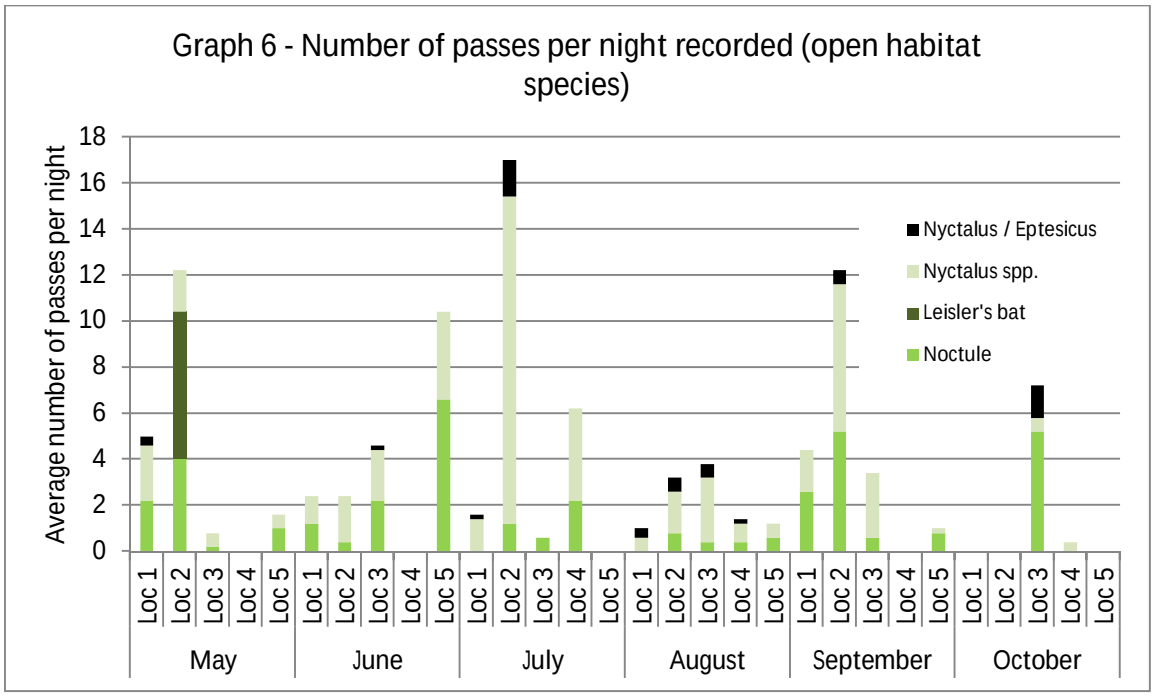
3.5.18 A diverse assemblage of edge habitat species were recorded within the survey area with high levels of common species activity, moderate of nathusius pipistrelle a rare but widespread and increasingly recorded species, and relatively low levels of other but widespread but rare barbastelle or restricted serotine.

Open habitat species

3.5.19 Two open habitat species, noctule and Leisler's bat were recorded within the survey area. The distribution of confirmed noctule activity was spread relatively evenly across survey area with the highest level of activity recorded on Detector 2 (1.9 ppn) and the lowest on Detector 4 (0.4 ppn). Leisler's bat were only recorded on Detector 2 in May although additional *Nyctalus* activity and activity that could not be distinguished between *Nyctalus* and *Eptesicus* species was also recorded.

3.5.20 The additional Nyctalus activity was predominantly recorded on Detector 2. The level of Nyctalus activity recorded in May was the second lowest level (after October) indicating that some of this unidentified Nyctalus activity could likely be attributed to Leisler's bat.

3.5.21 The level of open habitat species activity recorded was relatively average for a survey area comprising largely of farmland with tree lines and hedgerows in this geographic area. The open habitat species were present throughout the year and while activity was concentrated around Detector 2, open habitat species made use of the entire survey area.



Overview

3.6.1 The static detector surveys verified the higher level of use along Overstone Lane and The Avenue identified by the transect surveys. Both static detector and transect surveys data also identified the relatively low level of use within the traditional orchard and habitat bounding the existing A43. The static detector surveys also identified the presence of Leisler's bat, barbastelle, and nathusius pipistrelle. Overall the level of bat activity recorded is summarised in Table 15 below.

Table 15 Activity levels

Species	Species activity level	Species group	Species group activity level
Brown long-eared bat	Moderate	Cluttered habitat species	Moderate
Myotis species	Moderate		
Common pipistrelle	High	Edge habitat species	High
Soprano pipistrelle	High		
Nathusius pipistrelle	Moderate		
Barbastelle	Low		
Serotine	Low		
Noctule	Low	Open habitat species	Low
Leisler's bat	Low		

DISCUSSION

Status of Species Recorded

4.0.1 In total eight species and one genus (which could potentially represent up to four additional species) were recorded within the survey area. Each species recorded is known to be present within Northamptonshire. The status of each species is given in Table 16 below.

Table 16 Species status and activity levels

Species type	Genus	Species	National Status[15]	Known Local Status[16]	Species activity level	Species category activity level
Cluttered habitat species	Plecotus	Brown long-eared bat	Common	Common (38 records)	Moderate	Moderate
	Myotis	Daubenton's bat	Common	Fairly common (4 records)	Moderate	
		Natterer's bat	Fairly common	Fairly common (4 records)		
		Whiskered bat	Locally distributed	Single record		
		Brandt's bat	Common in the north and west, rare or absent in the south and east.	Suspected to be present		
Edge habitat species	Pipistrellus	Common pipistrelle	Common	Common (14 records with 126 additional "pipistrelle" records)	High	High
		Soprano pipistrelle	Common	Relatively common (8 records with 126 additional "pipistrelle" records)	High	
		Nathusius pipistrelle	Rare	Unknown – previously recorded within Northamptonshire	Moderate	
	Barbastella	Barbastelle	Widespread, rare	No records within 4 km but known to be present approximately 5.5	Low	

[15] Mitchell-Jones A. J. Carlin C. (2012) *Natural England Technical Infomration Note TIN051; Bats and onshore wind turbines interim guidance*. Natural England.

[16] No County level information is available for Northamptonshire, the local status has been taken from the Desk Study Information and conversations with Phil Richardson (Northamptonshire County Mammal Recorder) and Tina Cuss (Northamptonshire County Council, Senior Environmental Planner). All records referred to are desk study records, including historical records.

				km to the northeast of the scheme		
	Eptesicus	Serotine	Widespread, restricted to the South	Unknown – present within Northamptonshire but seldom recorded	Low	
Open habitat species	Nyctalus	Noctule	Uncommon	Fairly common (5 records)	Low	Low
		Leisler's bat	Scarce	Scarce (2 records)	Low	

Roosts

4.1.1 One Category 1 tree and 38 Category 2 trees were recorded within approximately 100 m of the footprint of the scheme. No bats or signs of roosting bats were recorded during elevated inspections and no bats were recorded returning to roosts during the dawn re-entry surveys.

4.1.2 At the time of survey, the scheme footprint and adjacent working area was deemed to be of **Negligible value** for roosting bats.

Foraging and Commuting

General

4.2.1 Impacts on bats are likely to include loss of suitable foraging habitat in areas adjacent to the proposed scheme. In addition, the traffic travelling along the new section of road is likely to lead to an increased number of bat-traffic collisions[17]. In addition, the road may lead to increased fragmentation. This could sever roosts from foraging areas or other seasonal roosts.

Cluttered Habitat Species

4.2.2 Moderate levels of activity from cluttered habitat species were recorded within the survey area. The species present were common or relatively common both locally and nationally. The species recorded represent both genres of cluttered habitat species with potential to be present within Northamptonshire (*Plecotus* and *Myotis* species).

4.2.3 Taking the level of activity and species composition recorded, the survey area is considered to be of **Local value** for foraging and commuting cluttered habitat species.

Edge Habitat Species

4.2.4 High levels of activity from edge habitat species were recorded within the survey area. All five edge habitat species known to be present within Northamptonshire were recorded within the survey area including occasional activity from the nationally rare barbastelle and nathusius pipistrelle and, seldom recorded (locally), serotine. Although the rarer species were not recorded in high numbers, the level of activity

[17] Lesinski G. Sikora A. And Olszewski A. (2011) *Bat Casualties on a Road Crossing a Mosaic Landscape.* European Journal of Wildlife Research. 57. 217-223.

recorded for each species combined with their expected abundance indicates that the survey area is of **County value** for foraging and commuting edge habitat species.

Open Habitat Species

4.2.5 Low levels of activity from open habitat species were recorded although both open habitat species recorded in Northamptonshire were recorded within the site, including the nationally and locally scarce Leisler's bat. The relative rarity of the Leisler's bat and the low level of activity recorded has been taken into account when determining that the survey area was of **Local value** for open habitat species.

Likely impact and Proposed Mitigation

4.3.1 The assessment of impact and any mitigation required will be detailed in the ecology chapter of the associated Ecological Impact Assessment.

APPENDICES

Appendix 1 Summery of UK bat legislation

5.0.1 Introduction

5.0.2 The following Appendix sets out details of legislation within the UK and how this legislation applies to particular species groups. The key pieces of international and national legislation are described after which specific legislation pertaining to species or species groups are described in turn.

5.0.3 International and national legislation

5.0.4 EC Habitats Directive

5.0.5 In 1992 the then European Community adopted Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, known as the Habitats Directive. The main aim of the EC Habitats Directive is to promote the maintenance of biodiversity by requiring member states to introduce protection for these habitats and species of European importance. The mechanism for protection is through designation of Special Areas of Conservation (SACs), both for habitats and for certain species listed within Annex II. There are a number of species listed within Annex II of the Habitats Directive that are present within the UK; these include four lower plant species, nine higher plant species, six species of molluscs, six species of arthropods, eight species of fish, two species of amphibian, and nine species of mammal.

5.0.6 The Bern Convention

5.0.7 The Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention) came into force in 1982. The principal aims of the Convention are to ensure conservation and protection of wild plant and animal species and their natural habitats (listed in Appendices I and II of the Convention), to increase cooperation between contracting parties, and to regulate the exploitation of those species (including migratory species) listed in Appendix 3. To this end the Convention imposes legal obligations on contracting parties, protecting over 500 wild plant species and more than 1000 wild animal species.

5.0.8 Bonn Convention

5.0.9 The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention or CMS) was adopted in Bonn, Germany in 1979 and came into force in 1985. Contracting Parties work together to conserve migratory species and their habitats by providing strict protection for endangered migratory species (listed in Appendix 1 of the Convention), concluding multilateral agreements for the conservation and management of migratory species which require or would benefit from international cooperation (listed in Appendix 2 of the Convention), and by undertaking co-operative research activities.

5.0.10 Convention on Biological Diversity

5.0.11 The Convention on Biological Diversity (Biodiversity Convention or CBD) was adopted at the Earth Summit in Rio de Janeiro, and entered into force in December 1993. It was the first treaty to provide a legal framework for biodiversity conservation. Contracting Parties are required to create and enforce national strategies and action plans to conserve, protect and enhance biological diversity.

5.0.12 Wildlife and Countryside Act 1981 (as amended)

5.0.13 The Wildlife and Countryside Act 1981 (as amended) is the principle mechanism for the legislative protection of wildlife in Great Britain. However it does not extend to Northern Ireland, the Channel Islands or the Isle of Man. This legislation is the means by which the Convention on the Conservation of European Wildlife and Natural Habitats (the 'Bern Convention') and the European Union Directives on the Conservation of Wild Birds (79/409/EEC) and Natural Habitats and Wild Fauna and Flora (92/43/FFC) are implemented in Great Britain.

5.0.14 Conservation of Habitats and Species Regulations 2010 (as amended)

5.0.15 In the UK the Council Directive 92/43/EEC has been transposed into national laws by means of the Conservation (Natural Habitats, & c.) Regulations 1994 (as amended), and the Regulations (Northern Ireland) 1995 (as amended). The Regulations came into force on 30 October 1994, and have been amended several times. Subsequently the Conservation of Habitats and Species Regulations 2010 was created which consolidated all the various amendments made to the 1994 Regulations in respect of England and Wales and is commonly known as the 'the Habitats Regulations', this document has also now been amended. In Scotland the Habitats Directive is transposed through a combination of the Habitats Regulations 2010 (in relation to reserved matters) and the 1994 Regulations. The Conservation (Natural Habitats, &c) Regulations (Northern Ireland) 1995 (as amended) transpose the Habitats Directive in relation to Northern Ireland.

5.0.16 The Regulations contain five Parts and four Schedules, and provide for the designation and protection of 'European sites', the protection of 'European protected species', and the adaptation of planning and other controls for the protection of European Sites.

5.0.17 Other legislation

5.0.18 Wild Mammals (Protection) Act 1996

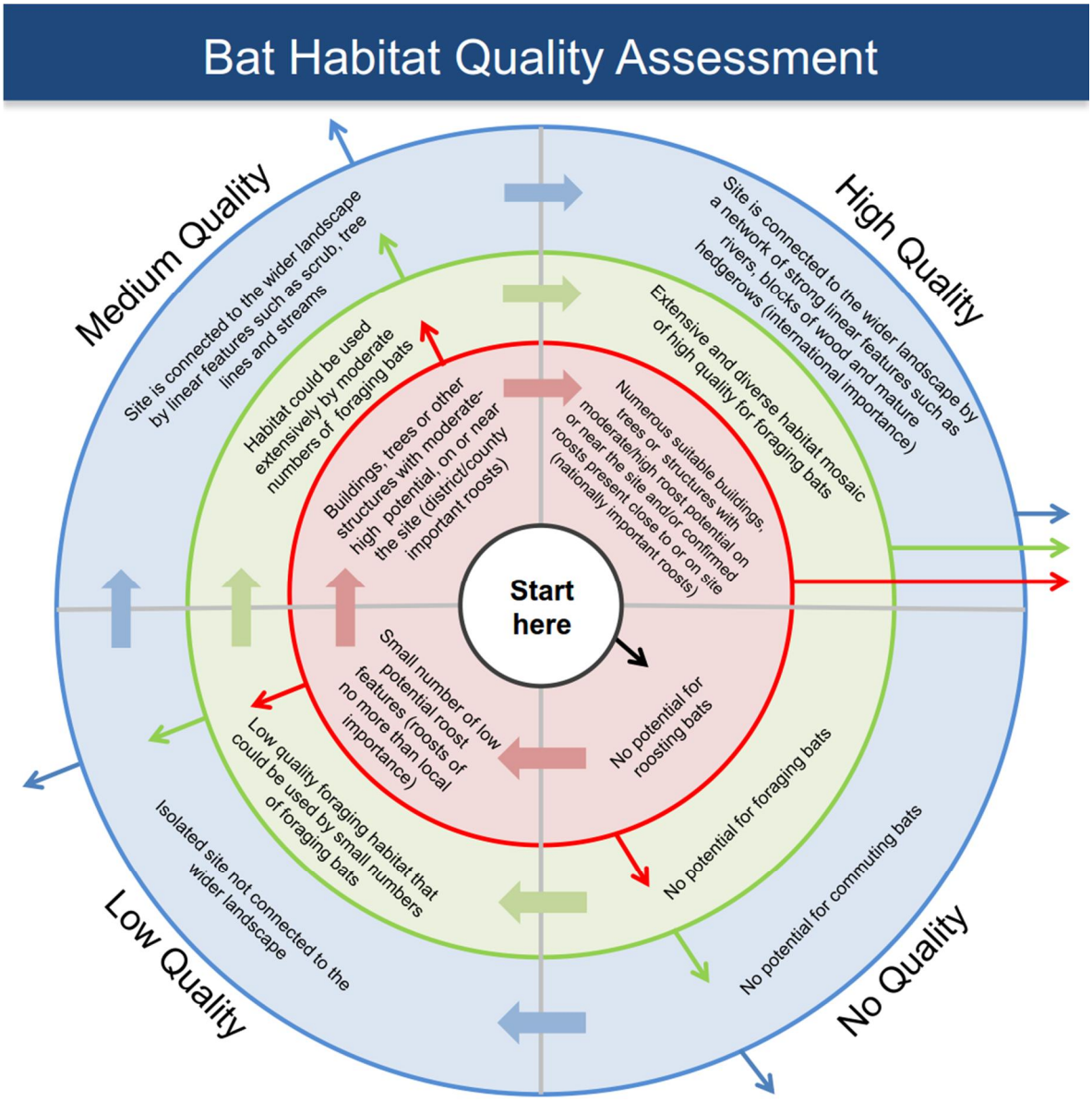
5.0.19 The Act protects wild mammals from malicious or intentional harm.

5.0.20 Bat specific legislation

5.0.21 All native UK bat species are fully protected by UK law under Schedule 5 (in respect of section 9(4)(b) and (c) and (5) only) and Schedule 6 of the Wildlife and Countryside Act (1981, as amended), and under Schedule 2 of the Conservation of Habitats and Species Regulations 2010. It is illegal to deliberately capture, injure or kill a bat or to intentionally or recklessly disturb bats. It is also illegal to damage, destroy or intentionally or recklessly obstruct access to a breeding or resting place used by a bat.

5.0.22 Any activity that would result in a contravention of the above legislation would likely require an EPS licence from the relevant statutory body (NE, CCW or SNH). Works or mitigation activities involving interference with bats or bat shelters must be carried out by a licensed bat worker.

Bat Habitat Quality Assessment Tool



Guidance notes:
This assessment wheel is to be used similarly to a flow diagram. Each band represents a different bat habitat feature across the survey area: roosting potential, foraging potential and commuting potential.

If the statement you read is correct, follow the thin arrow to the next feature. If the statement is incorrect, follow the thick arrows clockwise around the wheel, until you find a statement which matches that habitat you are assessing, then continue outwards to the next level.

Notice that you are unable to go anti-clockwise around the wheel. The wheel automatically categorises the habitat by its highest quality feature, irrelevant of the quality of other habitat features onsite.

All statements used in the wheel have been based on Hundt. L (2011) Bat Surveys – Good Practice Guidelines 2nd Edition, Surveying for onshore wind farms (Bat Conservation Trust).

PARSONS BRINCKERHOFF