Appendix 9.4

BAT ACTIVITY SURVEYS

FORT HALSTEAD, KENT

BAT ACTIVITY SURVEYS

A Report to: CBRE Ltd

Report No: RT-MME-127947-04 Rev A

Date Final Issued: October 2018
Date Rev A Issued: September 2019

MIDDLEMARCH ENVIRONMENTAL

Triumph House, Birmingham Road, Allesley, Coventry CV5 9AZ
Tel: 01676 525880 Fax: 01676 521400
E-mail: admin@middlemarch-environmental.com Web: www.middlemarch-environmental.com

REPORT VERIFICATION AND DECLARATION OF COMPLIANCE

This study has been undertaken in accordance with British Standard 42020:2013 “Biodiversity, Code of practice for planning and development”.

Report Version	Date	Completed by:	Checked by:	Approved by:
Rev A	12/09/2019	Hannah Train GradCIEEM (Senior Ecological Consultant)	Tom Docker MSc CEcol MCIEEM (Associate Director, EIA)	Dr Philip Fermor CEnv MCIEEM (Managing Director)
Final	31/10/2018	Jamie Fletcher BSc (Hons) (Ecological Consultant) and Stephanie Bradbury BSc (Hons) (Ecological Consultant)	Tom Docker MSc MCIEEM (Ecological Impact Assessment Manager)	Dr Philip Fermor CEnv MCIEEM (Managing Director)

The information which we have prepared is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management’s Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions.

DISCLAIMER

The contents of this report are the responsibility of Middlemarch Environmental Ltd. It should be noted that, whilst every effort is made to meet the client’s brief, no site investigation can ensure complete assessment or prediction of the natural environment.

Middlemarch Environmental Ltd accepts no responsibility or liability for any use that is made of this document other than by the client for the purposes for which it was originally commissioned and prepared.

VALIDITY OF DATA

The findings of this study are valid for a period of 18 months from the date of survey. If works have not commenced by this date, an updated site visit should carried out by a suitably qualified ecologist to assess any changes in the habitats present on site, and to inform a review of the conclusions and recommendations made.

NON-TECHNICAL SUMMARY

Middlemarch Environmental Ltd was commissioned by CBRE Ltd to undertake nocturnal emergence and dawn re-entry bat surveys at Fort Halstead in Kent. These surveys are required to inform a hybrid planning application associated with the proposed redevelopment of the site, which will involve the demolition of the majority of existing industrial buildings and the construction of a new employment-led mixed-use village.

A suite of baseline surveys have been completed by Waterman Group between 2006 and 2013, the results of which are provided in an Ecological Appraisal (Report EED12715-102.R.2.3.7.LM) and Protected Species and Habitat Survey (Report EED12715-102.R.3.3.6.LM), and summarised in the ecology chapter of an EIA associated with a previous application, for which outline planning consent was granted. Based on surveys undertaken between 2007 and 2013, evidence of roosting bats was found in ten buildings on site: A13, A14, A25, F6, H38, HR1, HR2, M10, N10 and R29. Buildings A25 and M10 have since been demolished, and R29 has been subject to repair works.

Due to the amount of time that has elapsed since the previous surveys were completed, updated ecological surveys were required for the current planning application.

During the Preliminary Bat Roost Assessment (Report RT-MME-127947-02), a total of 127 buildings were identified as having high potential to support roosting bats, and 108 buildings were identified as having low potential to support roosting bats. The nocturnal emergence and dawn re-entry surveys undertaken between July and September 2018 identified bat roosts in six of the surveyed buildings; A3, F11, N2, Q4, Q7 and R64. The bat roosts consisted of one brown long-eared bat maternity roost in R64 and five common pipistrelle day roosts in the other buildings. No bats emerged from or re-entered Buildings A13, A14, F6, H38, HR1, HR2 or N10 during the 2018 surveys. However, bats are known to regularly move between roosts and as such the buildings remain a roost whether occupied or not.

Seven bat species were recorded during the nocturnal emergence and dawn re-entry surveys; brown long-eared bat, common pipistrelle, Nathusius' pipistrelle, noctule, serotine, soprano pipistrelle and whiskered bat. Commuting and foraging activity was recorded during the survey period. This was predominantly along the woodland edges and over the areas of grassland and trees located between the buildings.

During the manual bat activity surveys undertaken between 19th June and 18th October 2018, low numbers of common pipistrelle were recorded foraging and commuting around the existing trees on site. Occasional detections of brown long-eared bat, Daubenton's bat, Leisler's bat, Nathusius' pipistrelle, noctule, serotine, soprano pipistrelle and whiskered bat were also recorded. Activity was concentrated around pockets of woodland located at the peripheries of the site.

Eight species of bat were recorded during the automated bat activity surveys undertaken between 12th July and 14th October 2018: common pipistrelle, Daubenton's bat, Nathusius' pipistrelle, Natterer's bat, noctule, serotine, soprano pipistrelle and whiskered bat. Sporadic and infrequent activity was recorded during all three survey periods. Common pipistrelle was by far the most frequently detected species with 95.7% of the total number of bat passes recorded.

The Illustrative Masterplan shows the majority of existing trees on site are to be retained as part of the new development, and new tree and shrub planting is to be incorporated into the soft landscaping. Therefore, the impact on foraging and commuting habitat is considered to be temporary. Whilst the new development is not expected to have a significant impact on commuting and foraging habitats, there is the potential for any new lighting, either temporary or permanent, at the site to impact commuting and foraging bats.

Following the results of the bat activity surveys, the following recommendations have been made, with further details provided in Chapter 6:

R1 Buildings
The recommendations made within the Preliminary Bat Roost Assessment (Report RT-MME-127947-02) and Nocturnal Emergence and Dawn Re-entry Bat Surveys Report (RT-MME-127947-03) must be adhered to.

R2 **Lighting**
The development should aim to limit the impact of light pollution on bats through the careful use of lighting in critical areas only and at a low level with minimum spillage. Any lighting, either temporary or permanent, along the site boundaries should be kept to a minimum and directed away from the boundary features to maintain dark areas and corridors. A lighting strategy should be designed and implemented on site to avoid impacting bat usage of the site and wider area. The strategy should be designed in accordance with the principles of 'Landscape and urban design for bats and biodiversity' and 'Bats and artificial lighting in the UK' as published by the Bat Conservation Trust (Gunnell *et al*, 2012 and Miles *et al*, 2018 respectively). Materials used under lights, such as floor surfaces, should be materials that have a minimum reflective quality to prevent light reflecting upwards into the sky. This will ensure that bats using the site and surrounding area to roost/forage/commute are not affected by illumination.

R3 **Habitat Retention**
The existing habitats on site, particularly the woodland, trees and hedgerows, should be retained where possible as these have been identified as a key foraging and commuting features for bats. Buffers should be created around suitable commuting and foraging habitats to maintain connectivity across the site and surrounding area.

R4 **Habitat Enhancement**
The development should aim to enhance the site for bats. This may include the provision of alternative roosting opportunities through the installation of bat boxes, and the enhancement of foraging areas by planting species which attract night flying insects.

R5 Should woodland clearance be undertaken on site then bat surveys using advanced techniques should be undertaken to allow for the status of bat species on site to be determined. The advanced survey will comprise a trapping exercise utilising specialist equipment including mist nests, harp traps and acoustic lures. The survey work must be undertaken by suitably qualified bat workers with the appropriate level of Natural England development licence to use these equipment types. Trapping will be undertaken through the night at different periods throughout the year, to allow bats to be detected at different stages of their annual cycle. No works can be completed June-mid July, when bats are likely to be giving birth or have dependant young.

R6 A Landscape Ecological Management Plan should be produced for the site, and habitat management proposals should be incorporated into this document.

R7 The use of chemical pesticides and herbicides as part of the landscape management on site should be avoided pre, during and post development, with organic controls used as an alternative. This will help maintain and enhance invertebrate populations, which form the entirety of all UK bat species' diets.

R8 An Ecological Mitigation Strategy should be compiled for the site, including proposals to maintain the sites high value to bats.

CONTENTS

1. INTRODUCTION

1.1 PROJECT BACKGROUND

Middlemarch Environmental Ltd was commissioned by CBRE Ltd to undertake Bat Activity Surveys at Fort Halstead in Kent. These surveys are required to inform a hybrid planning application associated with the proposed redevelopment of the site, which will involve the demolition of the majority of existing industrial buildings and the construction of a new employment-led mixed-use village. It is understood that the new village will comprise business areas (Use Classes B1a/b/c with energetic testing operations), development of up to 750 residential dwellings, a village centre (Use Classes A1/A3/A4/A5/B1a/D1/D2), a one form entry primary school, use of the Fort Area and bunkers as an Historic Interpretation Centre (Use Class D1), together with amenity space, landscape and ecological enhancements both on the site and on the adjacent land within the Applicants ownership.

A suite of baseline surveys have been completed by Waterman Group between 2006 and 2013, the results of which are provided in an Ecological Appraisal (Report EED12715-102.R.2.3.7.LM) and Protected Species and Habitat Survey (Report EED12715-102.R.3.3.6.LM), and summarised in the ecology chapter of an EIA associated with a previous application, for which outline planning consent was granted.

Due to the amount of time that has elapsed since the previous surveys were completed, updated ecological surveys were required for the current planning application.

In addition, Middlemarch Environmental Ltd has been commissioned to undertake the following assessments:

- Preliminary Ecological Appraisal (Report RT-MME-127947-01);
- Preliminary Bat Roost Assessment (Report RT-MME-127947-02);
- Nocturnal Emergence and Dawn Re-entry Bat Surveys (Report RT-MME-127947-03);
- Badger Survey (Report RT-MME-127947-05);
- Breeding Bird Survey (Report RT-MME-127947-06);
- Botanical Survey (Report RT-MME-127947-07);
- Terrestrial Invertebrate Survey (Report RT-MME-127947-08);
- Reptile Survey (Report RT-MME-127947-09);
- Dormouse Survey (Report RT-MME-127947-10);
- Winter Bird Survey (Report RT-MME-127947-11);
- Pre-development Arboricultural Survey (Report RT-MME-128206-01); and,
- Arboricultural Impact Assessment (Report RT-MME-128206-02).

This report details the results of bat activity surveys undertaken on site between the 19th June and the 18th October 2018.

All UK bat species are European protected species and they are capable of being material considerations in the planning process. A summary of the legislation protecting bats is included within Appendix 1. This section also provides some brief information on the ecology of British bat species.

1.2 SITE DESCRIPTION AND CONTEXT

The site is located off Star Hill Road in Halstead, Kent, centred at National Grid Reference TQ 4970 5922. It is an irregular shaped parcel of land that measures 131.89 ha in size.

At the time of the survey, the site comprised a defence research facility which contained a number of buildings with associated areas of hardstanding, surrounded by parcels of semi-natural and plantation woodland. Areas of neutral grassland, calcareous grassland and amenity grassland were also present, as well as patches of scrub and tall ruderal vegetation.

The site was bordered by the A224 Polhill to the north-east and Star Hill Road to the south-west. A mixture of arable and pastoral fields, pockets of woodland and farm buildings surround the site. The wider landscape was dominated by a rural setting, consisting of agricultural land interspersed with pockets of woodland and small settlements.

1.3 DOCUMENTATION PROVIDED

The conclusions and recommendations made in this report are based on information provided by the client regarding the scope of the project. Documentation made available by the client is listed in Table 1.1.

Document Name / Drawing Number	Author
Fort Halstead – Design and Access Statement: 00556I	John Thompson and Partners
Site Location Plan: 00556I_S01 Rev D5	John Thompson and Partners
Land Use and Green Infrastructure Plan: 00556I_PP01 Rev D10	John Thompson and Partners
Building Heights Plan: 00556I_PP02 Rev D10	John Thompson and Partners
Access and Movement: 00556I_PP03 Rev D9	John Thompson and Partners
Demolition Plan: 00556I_PP04 Rev D8	John Thompson and Partners
Ecological Appraisal: EED12715-102.R.2.3.7.LM	Waterman Group
Protected Species and Habitats Survey: EED12715-102.R.3.3.6.LM	Waterman Group
Environmental Statement - Ecology and Nature Conservation	Waterman Group
Decision Notice (planning application number SE/15/00628/OUT)	Sevenoaks District Council

Table 1.1: Documentation Provided by Client

2. METHODOLOGY

2.1 DESK STUDY

As part of the Preliminary Ecological Appraisal (Report RT-MME-127947-01) an ecological desk study (which included a search for records of bats) was undertaken within a 2 km radius of the site. The consultee for the desk study was Kent and Medway Biological Records Centre.

Middlemarch Environmental Ltd then assimilated and reviewed the desk study data provided by this organisation. Relevant bat data are discussed in Chapter 3. In compliance with the terms and conditions relating to its commercial use, the full desk study data are not provided within this report.

The desk study included a search for statutory nature conservation sites designated for bats within a 10 km radius of the site.

2.2 INITIAL HABITAT ASSESSMENT

A habitat assessment of the landscape was undertaken using maps, aerial photographs and ecological reports and associated drawings produced after the completion of ecological surveys by Waterman Group in 2015. In addition, a walkover survey was completed to determine the habitat features which are suitable to bats for commuting, foraging and roosting. This information was used in order to design transects appropriate for assessing how bats utilise the site, particularly for foraging and commuting purposes.

2.3 BAT ACTIVITY SURVEYS

2.3.1 Manual Transects

The site was subject to walked activity transect surveys in order to allow a profile of site usage by bats to be compiled. In accordance with the best practice guidance published by the Bat Conservation Trust (Collins, 2016) for sites with 'moderate' quality habitat, monthly transect surveys were completed between June and October 2018, in appropriate weather conditions for bats, consisting of eleven nocturnal surveys and one dusk/re-dawn survey completed within 24 hours.

Two transect routes were identified which allowed all features of potential value to bats on site to be assessed, with one route covering the main site located within the security fence and one route covering the wider ownership boundary outside of the security fence. The transects were designed with a total of 12 'Stop Points' each. This was to ensure that the transects were undertaken in accordance with guidelines of the Bat Conservation Trust (Collins, 2016) being a minimum of two hours long. At each 'Stop Point', the ecologist paused for a period of 3 minutes before continuing along the transect route.

The transect surveys were conducted using electronic bat detectors (Echo Meter Touch) to facilitate the detection of bats and to aid in the determination of species of bats using the site. Subsequent computer analysis of recordings allowed all species of bats using the site to be identified.

2.3.2 Automated Static Detector Surveys

Automated surveys using static detectors were used to supplement the data collected from the walked transect surveys, as recommended by the Bat Conservation Trust (Collins, 2016). A total of four static bat detectors (Song Meter SM3+ time expansion with inbuilt recording device) were installed in strategic locations to cover habitats across the site. The detectors were left in place for a total of five consecutive nights for three survey periods (Early July, Late July and Early October).

The recordings made by the static detectors were subsequently subject to computer analysis in order to identify the bat species utilising habitats on site and the levels of activity throughout the night.

3. DESK STUDY

3.1 STATUTORY NATURE CONSERVATION SITES

The site is located within 10 km of Westerham Mines SSSI, which is located 6.55 km to the south-west of the survey area. The principal interest of this site is the use of its abandoned ragstone mines by a variety of hibernating bats. With the increasing scarcity of bats in south-east England and the continued loss of the few suitable hibernacula remaining available to them, these mines represent an important winter refuge for bats in the county. Five species have been recorded hibernating here: Brandt's bat *Myotis brandti*, brown long-eared bat *Plecotus auratus*, Daubenton' bat *Myotis daubentoni*, Natterer's bat *Myotis nattereri* and whiskered bat *Myotis mystacinus*. The number of bats using the mines declined from the 1950s onwards, largely because of disturbance, but the fitting of grilles (allowing access for bats but not humans) and devices to maintain the air flow through the mines is thought to have led to an increase in numbers in recent years. However, it is very difficult to locate all the bats using the tunnels, and different species use them at different times during the winter. Thus, it is extremely hard to estimate the true numbers using the mines. There is also evidence that some use is made of the mines by bats in summer.

3.2 SPECIES RECORDS

The data search was carried out in July 2018 by Kent and Medway Biological Records Centre. Records of bat species within a 2 km radius of the survey area provided by the consultee are summarised in Table 3.1. It should be noted that the absence of records should not be taken as confirmation that a species is absent from the search area.

Species	No. of Records	Most Recent Record	Proximity of Nearest Record to Study Area	Species of Principal Importance?	Legislation / Conservation Status
Natterer's bat *Myotis nattereri*	4	2016	On site	-	ECH 4, WCA 5, WCA 6
Unidentified myotis *Myotis* sp.	3	2016	On site	#	ECH 2 #, ECH 4, WCA 5, WCA 6
Common pipistrelle *Pipistrellus pipistrellus*	17	2014	On site	-	ECH 4, WCA 5, WCA 6
Brown long-eared bat *Plecotus auratus*	5	2012	On site	✓	ECH 4, WCA 5, WCA 6
Leisler's bat *Nyctalus leisleri*	1	2007	On site	-	ECH 4, WCA 5, WCA 6
Serotine bat *Eptesicus serotinus*	20	2015	840 m south-east	-	ECH 4, WCA 5, WCA 6
Unidentified bat *Chiroptera* sp.	5	1999	960 m south-west	#	ECH 2 #, ECH 4, WCA 5, WCA 6
Pipistrelle species *Pipistrellus* sp.	5	2005	1,150 m north	#	ECH 4, WCA 5, WCA 6
Noctule *Nyctalus noctule*	4	2011	1,410 m west	✓	ECH 4, WCA 5, WCA 6
Soprano pipistrelle *Pipistrellus pygmaeus*	2	2013	1,580 m east	✓	ECH 4, WCA 5, WCA 6
Long-eared bat *Plecotus* sp.	1	2002	1,960 m north-west	#	ECH 4, WCA 5, WCA 6

Key:
#: Dependent on species.

ECH 2: Annex II of the European Communities Council Directive on the Conservation of Natural Habitats and Wild Fauna and Flora. Animal and plant species of community interest whose conservation requires the designation of Special Areas of Conservation.
ECH 4: Annex IV of the European Communities Council Directive on the Conservation of Natural Habitats and Wild Fauna and Flora. Animal and plant species of community interest in need of strict protection.
WCA 5: Schedule 5 of Wildlife and Countryside Act 1981 (as amended). Protected animals (other than birds).
WCA 6: Schedule 6 of Wildlife and Countryside Act 1981 (as amended). Animals which may not be killed or taken by certain methods.

Species of Principal Importance: Species of Principal Importance for Nature Conservation in England.

Table 3.1: Bat Records Identified During the Desk Study Within 2 km of the Survey Area

3.3 PREVIOUS BAT SURVEYS

A suite of baseline surveys have been completed by Waterman Group between 2006 and 2013, the results of which are provided in an Ecological Appraisal (Report EED12715-102.R.2.3.7.LM) and Protected Species and Habitat Survey (Report EED12715-102.R.3.3.6.LM), and summarised in the ecology chapter of an Environmental Impact Assessment.

Based on surveys undertaken between 2007 and 2013, evidence of roosting bats was found in ten buildings on site: A13, A14, A25, F6, H38, HR1, HR2, M10, N10 and R29. All roosts recorded were of low numbers (between one and four individuals) of common pipistrelle; however, two brown long-eared bats were recorded hibernating in the disused air-raid shelters inside the security fence (HR1 and HR2) with one individual in each shelter. One presumed summer roost was identified during the internal inspections in one of the bunkers within the Fort (Building F6), where bat droppings were recorded on the ground. It was not possible to determine the species of bat from the droppings, but it is considered likely to be a Myotis species roost.

The abundance of bats on site and in the wider survey area was below the expected number, given the location of the site and the perceived quality of the habitat for bats. All of the bat roosts were recorded as being of low conservation significance because of the low number of common bat species identified.

Buildings A25 and M10 have since been demolished, and R29 has been subject to repair works.

4. SURVEY RESULTS

4.1 INITIAL HABITAT ASSESSMENT

4.1.1 Bat Roosting Features

As part of the suite of ecological survey work undertaken on site, a walkover survey was conducted prior to the commencement of the Bat Activity Surveys. This walkover survey identified areas considered suitable to support roosting bats, with further supplementary information provided during the completion of the Preliminary Ecological Appraisal (Report RT-MME-127947-01) and the Preliminary Bat Roost Assessment (Report RT-MME-127947-02). Associated documents produced by Waterman Group in 2015 were also reviewed in order to further inform the initial habitat assessment.

Due to the large extent of the site and the many different habitat types and features present, a wide range of potential bat roosting features were identified. These included many mature trees throughout the site, assorted buildings in varying states of repair and use including concrete magazines and bunkers. Further details regarding bat roosting features on site are provided in the Preliminary Bat Roost Assessment (Report RT-MME-127947-02) and the results of the subsequent surveys undertaken are detailed in the Nocturnal Emergence and Dawn Re-entry Bat Surveys Report (RT-MME-127947-03).

4.1.2 Bat Foraging and Commuting Features

The site offers an abundance of highly suitable foraging and commuting features in the form of areas of extensive woodland, linear and scattered scrub, large parcels of grassland, grazing pasture, scattered trees, hedgerows, ornamental landscape planting and buildings in varying states of repair and subject to differing use. Much of the high-quality foraging and commuting habitat on site is well connected to further suitable habitat within the wider landscape including woodland, hedgerows, mature gardens, grassland, grazing pasture and arable land, with a number of large waterbodies, namely Chipstead Lakes and Sevenoaks Gravel Pits, also located within the wider landscape.

4.2 MANUAL TRANSECT SURVEYS

4.2.1 Personnel

The manual bat activity surveys were undertaken between 19th June and 18th October 2018 by the following personnel:

- Jamie Fletcher (Ecological Consultant);
- Victoria Aelen (Ecological Consultant);
- Harry Stone (Ecological Project Officer); and,
- Richard Sainsbury (Ecological Project Officer).

4.2.2 Weather Conditions

Weather conditions at the time of the surveys were recorded and are presented in Table 4.1.

Date	Time of Survey and Route	Parameter							
		Temperature (°C)		Cloud Cover (%)		Precipitation		Wind Speed (Beaufort)	
		Start	Finish	Start	Finish	Start	Finish	Start	Finish
19/06/2018	Dusk, Route 1	20	17	25	25	Nil	Nil	F1	F1
20/06/2018	Dusk, Route 2	21	17	50	75	Nil	Nil	F1	F1
18/07/2018	Dusk, Route 1	20	17	10	20	Nil	Nil	F0	F0
18/07/2018	Dusk, Route 2	20	17	10	20	Nil	Nil	F0	F0
20/08/2018	Dusk, Route 1	21	19	50	50	Nil	Nil	F0	F0
20/08/2018	Dusk, Route 2	21	19	50	50	Nil	Nil	F0	F0
30/08/2018	Dusk, Route 1	18	16	75	50	Nil	Nil	F1	F1
30/08/2018	Dusk, Route 2	18	16	75	50	Nil	Nil	F1	F1
19/09/2018	Dusk, Route 2	18	16	50	50	Nil	Nil	F1	F1
20/09/2018	Dusk, Route 1	17	15	100	100	Nil	Nil	F2	F3

Table 4.1: Weather Conditions During Transect Surveys (cont)

Date	Time of Survey and Route	Parameter							
		Temperature (°C)		Cloud Cover (%)		Precipitation		Wind Speed (Beaufort)	
		Start	Finish	Start	Finish	Start	Finish	Start	Finish
09/10/2018	Dusk, Route 1	17	14	0	0	Nil	Nil	F1	F1
17/10/2018	Dusk, Route 2	15	12	100	100	Nil	Nil	F0	F1
18/10/2018	Dawn, Route 2	8	9	100	100	Nil	Nil	F0	F0

Table 4.1 (cont'd): Weather Conditions During Transect Surveys

4.2.3 Transect Routes

Due to the large size of the site, two separate transect routes were surveyed, with one transect route focusing on the main site located within the security fence and one transect route focusing on the wider ownership boundary. The transect routes were designed to sample the linear habitats within the main site due to the undertaking of nocturnal emergence and dawn re-entry surveys in all central and built areas, whilst the transect route in the wider ownership boundary was designed to sample all of the different habitats present in this area.

Transect Route 1 – Main Site

The transect commenced in the north-eastern part of the site in the area of broadleaved semi-natural woodland lining the sites eastern boundary to the south of N10 (Stop Point 1), moving in a southerly direction within the broadleaved semi-natural woodland located along the eastern boundary (Stop Points 2 and 3), before continuing along the sites south-eastern boundary and entering the unimproved calcareous grassland and scattered scrub forming part of the Downs Range (Stop Points 4 and 5), continuing through broadleaved semi-natural woodland in a westerly direction along the sites southern boundary fence (Stop Point 6), then along broadleaved plantation woodland edge in the areas of poor semi-improved grassland close the sites western boundary (Stop Points 7 and 8), the route then continued in an easterly direction into the broadleaved semi-natural woodland lining the sites north-western boundary (Stop Points 9, 10, 11 and 12) where it concluded at the end of the woodland located to the north of N2 .

Transect Route 2 – Wider Ownership Boundary

The transect commenced in the north-western part of the site in the area of mixed plantation woodland to the west of Armstrong Close and Fort Road (Stop Points 1 and 2), the route then headed in an easterly direction along Fort Road and then north down Crow Drive towards the area of broadleaved semi-natural and mixed plantation woodland lining the sites eastern boundary (Stop Point 3), the route then continued in a southerly direction through the broadleaved semi-natural woodland (Stop Points 4, 5, 6 and 7), before reaching the area of unimproved calcareous sheep grazed grassland and scattered scrub located to the immediate south-east of the main site security fence abutting the Downs Range to the north (Stop Point 8), it then continued in a westerly direction through the area of unimproved calcareous grassland and scattered scrub (Stop Point 9), before heading through a stock proof gate into an area of broadleaved semi-natural woodland to the west (Stop Point 10) and then into an area of semi-improved neutral grassland and scattered scrub (Stop Point 11) before concluding in an area of mixed plantation woodland to the east of Star Hill Road (Stop Point 12).

4.2.4 June Bat Activity Survey – Transect Route 1

The manual bat activity survey was undertaken on 19th June 2018. The survey commenced 20 minutes prior to sunset and continued until 120 minutes after sunset. Sunset was at 21:19 hrs (BBC Weather Centre Data for Halstead). It should be noted that bat passes refer to the number of times that bats were detected by the Echo Meter Touch device. They do not necessarily represent separate bats and may be repeat recordings of the same bat if, for example, it was foraging in a loop. The results of the survey are shown on Drawing C127947-04-01 in Chapter 7.

Three species of bat were recorded during the transect survey: common pipistrelle *Pipistrellus pipistrellus*, serotine *Eptesicus serotinus* and soprano pipistrelle *Pipistrellus pygmaeus*. Data obtained during the survey is summarised in Table 4.2.

Time Band	Species Recorded		
	Common pipistrelle	Serotine	Soprano pipistrelle
21:00 – 21:15	11	-	-
21:15 – 21:30	-	-	-
21:30 – 21:45	-	-	-
21:45 – 22:00	-	-	-
22:00 – 22:15	-	2	1
22:15 – 22:30	2	-	-
22:30 – 22:45	3	-	-
22:45 – 23:00	5	-	-
23.00 – 23.15	7	-	-
23:15 – 23:30	-	-	-
Total	**28**	**2**	**1**

Table 4.2: Summary of Bat Passes Recorded during Manual Activity Survey, June 2018 (Route 1)

Passes by common pipistrelle were recorded throughout the transect survey, with foraging activity recorded within areas of broadleaved semi-natural woodland. Two serotine passes and one soprano pipistrelle pass were recorded in the area of unimproved calcareous grassland and scattered scrub forming part of the Downs Range, with both species likely to be foraging over the area or over the adjoining area of unimproved calcareous grassland and scattered scrub to the south of the security fence.

4.2.5 June Bat Activity Survey – Transect Route 2

The manual bat activity survey was undertaken on 20th June 2018. The survey commenced 20 minutes prior to sunset and continued until 120 minutes after sunset. Sunset was at 21:21 hrs (BBC Weather Centre Data for Halstead). It should be noted that bat passes refer to the number of times that bats were detected by the Echo Meter Touch device. They do not necessarily represent separate bats and may be repeat recordings of the same bat if, for example, it was foraging in a loop. The results of the survey are shown on Drawing C127947-04-02 in Chapter 7.

Three species of bat were recorded during the transect survey: common pipistrelle, soprano pipistrelle and whiskered bat *Myotis mystacinus*. Data obtained during the survey is summarised in Table 4.3.

Time Band	Species Recorded		
	Common pipistrelle	Soprano pipistrelle	Whiskered bat
21:00 – 21:15	-	-	-
21:15 – 21:30	6	-	-
21:30 – 21:45	4	2	-
21:45 – 22:00	9	-	-
22:00 – 22:15	2	-	-
22:15 – 22:30	-	-	-
22:30 – 22:45	2	-	-
22:45 – 23:00	1	-	4
23:00 – 23:15	2	-	-
23:15 – 23:30	2	-	-
Total	**26**	**2**	**4**

Table 4.3: Summary of Bat Passes Recorded during Manual Activity Survey, June 2018 (Route 2)

Passes by common pipistrelle were recorded throughout the transect survey with foraging activity recorded within areas of linear woodland and broadleaved semi-natural and mixed plantation woodland as well as areas of unimproved calcareous and semi-improved neutral grassland and scattered scrub. Two soprano pipistrelle passes were recorded along woodland edge in the northern part of the site, whilst four whiskered bat passes were recorded along the southern edge of broadleaved semi-natural woodland bordering the sites eastern boundary where it abutted unimproved calcareous grassland in the sites south-eastern corner.

4.2.6 July Bat Activity Survey – Transect Route 1

The manual bat activity survey was undertaken on 18th July 2018. The survey commenced 20 minutes prior to sunset and continued until 120 minutes after sunset. Sunset was at 21:06 hrs (BBC Weather Centre Data for Halstead). It should be noted that bat passes refer to the number of times that bats were detected by the Echo Meter Touch device. They do not necessarily represent separate bats and may be repeat recordings of the same bat if, for example, it was foraging in a loop. The results of the survey are shown on Drawing C127947-04-03 in Chapter 7.

Three species of bat were recorded during the transect survey: common pipistrelle, noctule *Nyctalus noctula* and soprano pipistrelle. Data obtained during the survey is summarised in Table 4.4.

Time Band	Species Recorded		
	Common pipistrelle	Noctule	Soprano pipistrelle
20:45 – 21:00	2	-	-
21:00 – 21:15	2	-	-
21:15 – 21:30	-	-	-
21:30 – 21:45	-	-	-
21:45 – 22:00	2	1	-
22:00 – 22:15	1	-	-
22:15 – 22:30	1	-	3
22:30 – 22:45	2	-	1
22:45 – 23:00	-	-	-
23:00 – 23:15	-	-	-
Total	**10**	**1**	**4**

Table 4.4: Summary of Bat Passes Recorded during Manual Activity Survey, July 2018 (Route 1)

Foraging passes by common pipistrelle were recorded throughout the survey period. Foraging activity was recorded within areas of linear woodland and broadleaved semi-natural woodland and unimproved calcareous and poor semi-improved grassland in the south and west of the site respectively. A single noctule pass was recorded high over the site, with the bat likely commuting over the site to or from another area within the wider landscape to forage elsewhere. Four soprano pipistrelle foraging passes were recorded in broadleaved semi-natural woodland in the northern part of the site.

4.2.7 July Bat Activity Survey – Transect Route 2

The manual bat activity survey was undertaken on 18th July 2018. The survey commenced 20 minutes prior to sunset and continued until 120 minutes after sunset. Sunset was at 21:06 hrs (BBC Weather Centre Data for Halstead). It should be noted that bat passes refer to the number of times that bats were detected by the Echo Meter Touch device. They do not necessarily represent separate bats and may be repeat recordings of the same bat if, for example, it was foraging in a loop. The results of the survey are shown on Drawing C127947-04-04 in Chapter 7.

Three species of bat were recorded during the transect survey: common pipistrelle, serotine and whiskered bat. Data obtained during the survey is summarised in Table 4.5.

Time Band	Species Recorded		
	Common pipistrelle	Serotine	Whiskered bat
20:45 – 21:00	2	-	-
21:00 – 21:15	-	-	-
21:15 – 21:30	7	-	-
21:30 – 21:45	4	-	2
21:45 – 22:00	-	-	-
22:00 – 22:15	1	-	-
22:15 – 22:30	-	3	-
22:30 – 22:45	4	-	-
22:45 – 23:00	-	-	-
23:00 – 23:15	-	-	-
Total	**18**	**3**	**2**

Table 4.5: Summary of Bat Passes Recorded during Manual Activity Survey, July 2018 (Route 2)

Passes by common pipistrelle were recorded throughout the transect survey with foraging activity recorded in areas of linear woodland and broadleaved semi-natural and mixed plantation woodland as well as areas of unimproved calcareous and semi-improved neutral grassland and scattered scrub. Two whiskered bat foraging passes were recorded within broadleaved semi-natural woodland lining the sites eastern boundary and three serotine foraging passes were recorded where broadleaved semi-natural woodland abuts semi-improved neutral grassland in the south-western part of the site.

4.2.8 August Bat Activity Survey – Transect Route 1 (First)

The manual bat activity survey was undertaken on 20th August 2018. The survey commenced 20 minutes prior to sunset and continued until 120 minutes after sunset. Sunset was at 20:11 hrs (BBC Weather Centre Data for Halstead). It should be noted that bat passes refer to the number of times that bats were detected by the Echo Meter Touch device. They do not necessarily represent separate bats and may be repeat recordings of the same bat if, for example, it was foraging in a loop. The results of the survey are shown on Drawing C127947-04-05 in Chapter 7.

Four species of bat were recorded during the transect survey: brown long-eared bat *Plecotus auritus*, common pipistrelle, noctule and soprano pipistrelle. Data obtained during the survey is summarised in Table 4.6.

Time Band	Species Recorded			
	Brown long-eared bat	Common pipistrelle	Noctule	Soprano pipistrelle
19:45 – 20:00	-	-	-	-
20:00 – 20:15	-	2	-	-
20:15 – 20:30	-	1	-	-
20:30 – 20:45	-	-	-	-
20:45 – 21:00	-	-	-	-
21:00 – 21:15	-	4	-	-
21:15 – 21:30	-	-	1	-
21:30 – 21:45	-	2	-	1
21:45 – 22:00	2	4	-	-
22:00 – 22:15	-	2	-	-
Total	**2**	**15**	**1**	**1**

Table 4.6: Summary of Bat Passes Recorded during First Manual Activity, August 2018 (Route 1)

Common pipistrelle foraging passes were recorded throughout the survey transect, with foraging activity recorded in areas of linear and broadleaved semi-natural woodland and unimproved calcareous and poor semi-improved grassland. One soprano pipistrelle foraging pass was recorded within broadleaved semi-natural woodland in the north of the site, with two brown long-eared bat passes also recorded in the same area. A single noctule pass was recorded over an area of poor semi-natural grassland in the west of the site, with the bat likely commuting over the site to or from another area within the wider landscape to forage elsewhere.

4.2.9 August Bat Activity Survey – Transect Route 2 (First)

The manual bat activity survey was undertaken on 20th August 2018. The survey commenced 20 minutes prior to sunset and continued until 120 minutes after sunset. Sunset was at 20:11 hrs (BBC Weather Centre Data for Halstead). It should be noted that bat passes refer to the number of times that bats were detected by the Echo Meter Touch device. They do not necessarily represent separate bats and may be repeat recordings of the same bat if, for example, it was foraging in a loop. The results of the survey are shown on Drawing C127947-04-06 in Chapter 7.

Two species of bat were recorded during the transect survey: common pipistrelle and whiskered bat. Data obtained during the survey is summarised in Table 4.7.

Time Band	Species Recorded	
	Common pipistrelle	Whiskered bat
19:45 – 20:00	-	-
20:00 – 20:15	10	-
20:15 – 20:30	-	-
20:30 – 20:45	4	-
20:45 – 21:00	-	-
21:00 – 21:15	-	-
21:15 – 21:30	-	4
21:30 – 21:45	-	-
21:45 – 22:00	-	-
22:00 – 22:15	-	-
Total	**14**	**4**

Table 4.7: Summary of Bat Passes Recorded during First Manual Activity Survey, August 2018 (Route 2)

Limited bat activity was recorded during the transect survey, with a total of ten common pipistrelle foraging passes recorded in the area of mixed plantation woodland in the north-western part of the site and the broadleaved semi-natural woodland in the north-eastern part of the site. Four whiskered bat passes were recorded along the southern edge of broadleaved semi-natural woodland bordering the sites eastern boundary where it abutted unimproved calcareous grassland in the site's south-eastern corner.

4.2.10 August Bat Activity Survey – Transect Route 1 (Second)

The manual bat activity survey was undertaken on 30th August 2018. The survey commenced 20 minutes prior to sunset and continued until 120 minutes after sunset. Sunset was at 19:50. It should be noted that bat passes refer to the number of times that bats were detected by the Echo Meter Touch device. They do not necessarily represent separate bat and may be repeat recordings of the same bat if, for example, it was foraging in a loop. Sunset was at 19:50 hrs (BBC Weather Centre Data for Halstead). The results of the survey are shown on Drawing C128079-04-07 in Chapter 7.

Two species of bat were recorded during the transect survey: common pipistrelle, noctule and soprano pipistrelle. Data obtained during the survey is summarised in Table 4.8.

Time Band	Species Recorded	
	Common pipistrelle	Noctule
19:30 – 19:45	3	-
19:45 – 20:00	-	-
20:00 – 20:15	-	-
20:15 – 20:30	1	-
20:30 – 20:45	2	1
20:45 – 21:00	2	-
21:00 – 21:15	-	-
21:15 – 21:30	2	-
21:30 – 21:45	2	-
21:45 – 22:00	-	-
Total	**12**	**1**

Table 4.8: Summary of Bat Passes Recorded during Second Manual Activity Survey, August 2018 (Route 1)

Common pipistrelle foraging passes were recorded throughout the survey period, with passes recorded along or within linear and broadleaved semi-natural woodland and over unimproved calcareous grassland. A single noctule pass was recorded high over the site, with the bat likely commuting over the site to or from another area within the wider landscape to forage elsewhere.

4.2.11 August Bat Activity Survey – Transect Route 2 (Second)

The manual bat activity survey was undertaken on 30th August 2018. The survey commenced 20 minutes prior to sunset and continued until 120 minutes after sunset. Sunset was at 19:50 hrs (BBC Weather Centre Data for Halstead). It should be noted that bat passes refer to the number of times that bats were detected by the Echo Meter Touch device. They do not necessarily represent separate bats and may be repeat recordings of the same bat if, for example, it was foraging in a loop. The results of the survey are shown on Drawing C127947-04-08 in Chapter 7.

Two species of bat were recorded during the transect survey: common pipistrelle and whiskered bat. Data obtained during the survey is summarised in Table 4.9.

Time Band	Species Recorded	
	Common pipistrelle	Whiskered bat
19:30 – 19:45	12	-
19:45 – 20:00	3	-
20:00 – 20:15	2	-
20:15 – 20:30	2	2
20:30 – 20:45	2	-
20:45 – 21:00	-	-
21:00 – 21:15	4	-
21:15 – 21:30	-	-
21:30 – 21:45	-	-
Total	**25**	**2**

Table 4.9: Summary of Bat Passes Recorded during Second Manual Activity Survey, August 2018 (Route 2)

Common pipistrelle foraging passes were recorded throughout the survey period, with passes recorded in mixed plantation woodland in the north-western part of the site, areas of linear woodland and broadleaved semi-natural woodland throughout the site and the area of semi-improved neutral grassland and scattered scrub in the south-western part of the site. Two whiskered bat passes were recorded in the area of broadleaved semi-natural woodland lining the sites eastern boundary.

4.2.12 September Bat Activity Survey – Transect Route 2

The manual bat activity survey was undertaken on 19th September 2018. The survey commenced 20 minutes prior to sunset and continued until 120 minutes after sunset. Sunset was at 19:04 hrs (BBC Weather Centre Data for Halstead). It should be noted that bat passes refer to the number of times that bats were detected by the Echo Meter Touch device. They do not necessarily represent separate bats and may be repeat recordings of the same bat if, for example, it was foraging in a loop. The results of the survey are shown on Drawing C127947-04-09 in Chapter 7.

Two species of bat were recorded during the transect survey: brown long-eared bat and common pipistrelle. Data obtained during the survey is summarised in Table 4.10.

Time Band	Species Recorded	
	Brown long-eared bat	Common pipistrelle
18:45 – 19:00	-	2
19:00 – 19:15	-	1
19:15 – 19:30	-	1
19:30 – 19:45	-	4
19:45 – 20:00	1	-
20:00 – 20:15	-	-
20:15 – 20:30	-	-
20:30 – 20:45	-	-
20:45 – 21:00	-	-
21:00 – 21:15	-	-
Total	**1**	**8**

Table 4.10: Summary of Bat Passes Recorded during Manual Activity Survey, September 2018 (Route 2)

Limited bat activity was recorded during the transect survey, with eight common pipistrelle foraging passes recorded within mixed plantation and broadleaved semi-natural woodland in the north-western and eastern parts of the site, and one brown long-eared bat pass recorded within broadleaved semi-natural woodland in the eastern part of the site.

4.2.13 September Bat Activity Survey – Transect Route 1

The manual bat activity survey was undertaken on 20th September 2018. The survey commenced 20 minutes prior to sunset and continued until 120 minutes after sunset. Sunset was at 19:02 hrs (BBC Weather Centre Data for Halstead). It should be noted that bat passes refer to the number of times that bats were detected by the Echo Meter Touch device. They do not necessarily represent separate bats and may be repeat recordings of the same bat if, for example, it was foraging in a loop. The results of the survey are shown on Drawing C127947-04-10 in Chapter 7.

Three species of bat were recorded during the transect survey: common pipistrelle, noctule and soprano pipistrelle. Data obtained during the survey is summarised in Table 4.11.

Time Band	Species Recorded		
	Common Pipistrelle	Noctule	Soprano pipistrelle
18:45 – 19:00	-	-	-
19:00 – 19:15	-	-	-
19:15 – 19:30	-	1	-
19:30 – 19:45	1	-	1
19:45 – 20:00	4	-	-
20:00 – 20:15	2	-	-
20:15 – 20:30	-	-	-
20:30 – 20:45	-	-	-
20:45 – 21:00	-	-	-
21:00 – 21:15	-	-	-
Total	**7**	**1**	**1**

Table 4.11: Summary of Bat Passes Recorded during Manual Activity Survey, September 2018 (Route 1)

Limited bat activity was record during the transect survey, with seven common pipistrelle foraging passes recorded within broadleaved semi-natural woodland in the eastern part of the site. One pass was recorded for both noctule and soprano pipistrelle, with both occurring in the south-western part of the site.

4.2.14 October Bat Activity Survey – Transect Route 1

The manual bat activity survey was undertaken on 9th October 2018. The survey commenced 20 minutes prior to sunset and continued until 120 minutes after sunset. Sunset was at 18:20 hrs (BBC Weather Centre Data for Halstead). It should be noted that bat passes refer to the number of times that bats were detected by the Echo Meter Touch device. They do not necessarily represent separate bats and may be repeat recordings of the same bat if, for example, it was foraging in a loop.

Three species of bat were recorded during the transect survey: common pipistrelle, Nathusius' pipistrelle *Pipistrellus nathusii* and whiskered bat. Data obtained during the survey is summarised in Table 4.12.

Time Band	Species Recorded		
	Common pipistrelle	Nathusius' pipistrelle	Whiskered bat
18:00 – 18:15	-	-	-
18:15 – 18:30	-	-	-
18:30 – 18:45	4	-	-
18:45 – 19:00	-	-	-
19:00 – 19:15	-	1	-
19:15 – 19:30	-	-	-
19:30 – 19:45	7	-	2
19:45 – 20:00	4	-	-
20:00 – 20:15	1	-	-
20:15 – 20:30	-	-	-
Total	**16**	**1**	**2**

Table 4.12: Summary of Bat Passes Recorded during Manual Activity Survey, October 2018 (Route 1)

Common pipistrelle foraging passes were recorded throughout the survey period, with passes recorded in areas of broadleaved semi-natural woodland throughout the site. One Nathusius' pipistrelle pass was recorded over the area of poor semi-improved grassland in the western part of the site, with the bat recorded commuting over the area from east to west. Two whiskered bat passes were recorded within broadleaved semi-natural woodland in the northern part of the site.

4.2.15 October Bat Activity Survey – Transect Route 2 (Dusk)

The manual bat activity survey was undertaken on 17th October 2018. The survey commenced 20 minutes prior to sunset and continued until 120 minutes after sunset. Sunset was at 18:02 hrs (BBC Weather Centre Data for Halstead). It should be noted that bat passes refer to the number of times that bats were detected by the Echo Meter Touch device. They do not necessarily represent separate bats and may be repeat recordings of the same bat if, for example, it was foraging in a loop. The results of the survey are shown on Drawing C127947-04-11 in Chapter 7.

Two species of bat were recorded during the transect survey: common pipistrelle and Leisler's bat *Nyctalus leisleri*. Data obtained during the survey is summarised in Table 4.13.

Time Band	Species Recorded	
	Common pipistrelle	Leisler's bat
17:45 – 18:00	-	-
18:00 – 18:15	-	-
18:15 – 18:30	7	-
18:30 – 18:45	2	1
18:45 – 19:00	-	-
19:00 – 19:15	-	2
19:15 – 19:30	1	-
19:30 – 19:45	-	-
19:45 – 20:00	2	-
20:00 – 20:15	-	-
Total	**12**	**3**

Table 4.13: Summary of Bat Passes Recorded during Manual Activity Survey, October 2018 (Route 2, Dusk)

Common pipistrelle foraging passes were recorded throughout the transect survey, with passes recorded along linear areas of broadleaved semi-natural woodland or within areas of mixed plantation and broadleaved semi-natural woodland throughout the site. Three Leisler's bat passes were recorded over the area of unimproved calcareous grassland in the southern part of the site.

4.2.16 October Bat Activity Survey – Transect Route 2 (Dawn)

The manual bat activity survey was undertaken on 18th October 2018. The survey commenced 120 minutes before sunrise and continued until 20 minutes after sunrise. Sunrise was at 07:28 hrs (BBC Weather Centre Data for Halstead). It should be noted that bat passes refer to the number of times that bats were detected by the Echo Meter Touch device. They do not necessarily represent separate bats and may be repeat recordings of the same bat if, for example, it was foraging in a loop. The results of the survey are shown on Drawing C127947-04-12 in Chapter 7.

Three species of bat were recorded during the transect survey: common pipistrelle, Daubenton's bat *Myotis daubentonii* and noctule. Data obtained during the survey is summarised in Table 4.14.

Time Band	Species Recorded		
	Common pipistrelle	Daubenton's bat	Noctule
05:15 – 05:30	-	-	-
05:30 – 05:45	-	-	-
05:45 – 06:00	-	-	-
06:00 – 06:15	1	-	1
06:15 – 06:30	-	-	-
06:30 – 06:45	-	2	-
06:45 – 07:00	-	-	-
07:00 - 07:15	-	-	-
07:15 – 07:30	-	-	-
07:30 – 07:45	-	-	-
Total	**1**	**2**	**1**

Table 4.13: Summary of Bat Passes Recorded during Manual Activity Survey, October 2018 (Route 2, Dawn)

Limited bat activity was recorded during the transect survey, with one common pipistrelle foraging pass recorded in the area of mixed plantation woodland in the north-western part of the site, two Daubenton's bat passes recorded within the area of broadleaved semi-natural woodland lining the sites eastern boundary and one commuting noctule pass over linear woodland either side of Crow Drive in the northern part of the site.

4.3 AUTOMATED SURVEYS

4.3.1 Introduction

Four static bat detectors were installed in strategic locations and left in place for five consecutive nights on three occasions between 12th July and 14th October 2018. The detectors were set to record from 20 minutes before sunset to 20 minutes after sunrise. The weather conditions and sunrise/sunset times for the local area (BBC Weather Centre for Halstead) at the time of the surveys are presented in Table 4.14.

Date	Sunset / Sunrise	Parameter			
		Temperature (°C) Max / Min	Average Cloud Cover (%)	Precipitation	Average Wind Speed (Beaufort)
Early July					
12/07/2018	21:17 / 05:00	19.5 / 15.5	81	Nil	F2
13/07/2018	21:16 / 05:01	19.0 / 14.5	85	Nil	F1
14/07/2018	21:15 / 05:02	22.0 / 14.0	75	Nil	F2
15/07/2018	21:14 / 05:02	24.0 / 13.0	65	Nil	F1
16/07/2018	21:12 / 05:04	24.0 / 14.5	67	Nil	F3
Late July					
26/07/2018	20:58 / 05:17	28.0 / 21.0	62	Nil	F2
27/07/2018	20:57 / 05:19	19.0 / 18.0	87	Nil	F2
28/07/2018	20:55 / 05:20	17.5 / 16.0	70	Nil	F3
29/07/2018	20:55 / 05:21	18.5 / 18.0	93	Nil	F3
30/07/2018	20:55 / 05:22	19.0 / 16.5	81	Nil	F2

Table 4.14: Weather Conditions During Automated Surveys (cont)

Date	Sunset / Sunrise	Parameter			
		Temperature (°C) Max / Min	Average Cloud Cover (%)	Precipitation	Average Wind Speed (Beaufort)
Early October					
09/10/2018	18:22 / 07:15	14.6 / 10.3	90	Nil	F2
10/10/2018	18:20 / 07:17	14.5 / 7.3	83	Occasional light showers	F3
11/10/2018	18:18 / 07:19	13.5 / 8.6	81	Nil	F2
12/10/2018	18:15 / 07:20	14.0 / 8.2	92	Occasional light showers	F3
13/10/2018	18:13 / 07:22	12.8 / 7.6	87	Occasional light showers	F3

Table 4.14 (cont'd): Weather Conditions During Automated Surveys

4.3.2 Automated Survey Results

Eight species of bat were recorded during the automated bat activity surveys: common pipistrelle, Daubenton's bat, Nathusius' pipistrelle, Natterer's bat, noctule, serotine, soprano pipistrelle and whiskered bat.

A summary of the number of bat passes recorded is provided in Table 4.15 and all raw data can be found in Appendix 1. Static detector 3 failed to work, and therefore no data was recorded by this detector.

Month	Night	Static Detector 1								Static Detector 2								Static Detector 4							
		Common pipistrelle	Daubenton's bat	Nathusius' pipistrelle	Natterer's bat	noctule	serotine	Soprano pipistrelle	Whiskered bat	Common pipistrelle	Daubenton's bat	Nathusius' pipistrelle	Natterer's bat	noctule	serotine	Soprano pipistrelle	Whiskered bat	Common pipistrelle	Daubenton's bat	Nathusius' pipistrelle	Natterer's bat	noctule	serotine	Soprano pipistrelle	Whiskered bat
Early July 12-17/07/18	**1**	20	0	0	0	1	0	0	0	39	0	0	0	1	0	0	0	Only two static detectors were installed during the July surveys							
	2	15	0	0	0	0	0	0	1	76	0	0	0	0	0	0	0								
	3	9	0	0	0	0	0	0	0	51	0	0	0	2	0	0	0								
	4	9	0	0	0	0	0	0	0	36	1	0	0	0	0	0	1								
	5	17	0	0	0	0	0	0	1	82	1	0	0	1	0	0	0								
	Total	**70**	**0**	**0**	**0**	**1**	**0**	**0**	**2**	**284**	**2**	**0**	**0**	**4**	**0**	**0**	**1**								
Late July 26-31/07/18	**1**	1	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0								
	2	14	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0								
	3	9	0	0	0	0	0	0	0	6	0	0	2	0	0	0	0								
	4	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0								
	5	6	0	0	0	1	0	0	0	5	0	0	1	0	0	0	0								
	Total	**33**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**17**	**0**	**0**	**3**	**0**	**0**	**0**	**0**								
Early October 09-14/10/18	**1**	2,662	179	0	5	0	0	82	69	8	1	1	0	1	0	0	0	0	0	0	0	3	0	0	0
	2	1,725	62	0	2	0	0	33	7	3	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0
	3	1,863	8	0	0	4	0	37	21	0	1	0	0	0	0	0	0	5	0	0	0	6	0	0	0
	4	1,171	35	0	4	7	1	34	28	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5	1,582	35	0	4	0	0	83	35	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	**9,003**	**319**	**0**	**15**	**11**	**1**	**269**	**160**	**19**	**4**	**1**	**0**	**1**	**0**	**0**	**0**	**7**	**0**	**0**	**0**	**9**	**0**	**0**	**0**

Table 4.15: Summary of Bat Passes Recorded by Static Detectors 1 to 4 during Automated Surveys, July and October 2018

Early July 2018
Four species of bat were recorded during the early July survey period: common pipistrelle, Daubenton's bat, noctule and whiskered bat. Common pipistrelle was frequently recorded during every night of the survey period, with a small number of passes by Daubenton's bat, noctule and whiskered bat recorded occasionally.

Late July 2018
Three species of bat were recorded during the late July survey period: common pipistrelle, Natterer's bat and noctule. Common pipistrelle was occasionally recorded during every night of the survey period, with a small number of passes by Natterer's bat and noctule also recorded occasionally.

Early October 2018
Eight species of bat were recorded during the early October survey period: common pipistrelle, Daubenton's bat, Nathusius' pipistrelle, Natterer's bat, noctule, serotine, soprano pipistrelle and whiskered bat. Common pipistrelle was the most frequently recorded species, with frequent passes detected every night of the survey period. Daubenton's bat, soprano pipistrelle and whiskered bat were also frequently recorded, with passes by Natterer's bat and noctule recorded occasionally and a small number of passes by Nathusius' pipistrelle and serotine also detected.

5. DISCUSSION AND CONCLUSIONS

5.1 SUMMARY OF SITE PROPOSALS

The proposals for the site are as follows:

Hybrid planning permission comprising:

In detail:

- *Demolition of existing buildings;*
- *Change of use and works to buildings Q13 and Q14 (including landscaping and public realm);*
- *Primary and secondary accesses.*

In outline:

- *Development of business space (use classes B1a/b/c) of up to 27,659 sq m GEA;*
- *Works within the 'X' enclave relating to energetic testing operations, including fencing, access, car parking;*
- *Development of up to 750 residential dwellings;*
- *Development of a mixed-use village centre (use classes A1/A3/A4/A5/B1a/D1/D2);*
- *Development of a one form entry primary school;*
- *Change of use of Fort Area and bunkers to Historic Interpretation Centre (use class D1) with workshop space;*
- *Roads, pedestrian and cycle routes, public transport infrastructure, car parking, utilities infrastructure, drainage;*
- *Landscaping, landforming and ecological mitigation works.*

5.2 SUMMARY OF BAT ACTIVITY

Brown long-eared bat
Brown long-eared bats have declined in Britain due to changing land use, including modern intensive agricultural practices, and the conversion of barns which have resulted in the loss of suitable feeding and roosting habitats (Bat Conservation Trust, 2010). They do, however, remain a common and widespread species, although are often under recorded due to their quiet echolocation call (Bat Conservation Trust, 2010). A small number of brown long-eared bat passes were recorded during the manual activity surveys; two detections in the first August manual survey following transect route 1 and one detection in the September manual survey following transect route 2. Due to the brief calls detected, it was considered likely that individual bats commuted across the site, using the boundary trees / woodland edges as commute corridors. However, a maternity roost for this species is present within Building R64, as identified during the 2018 nocturnal emergence and dawn re-entry surveys, and further suitable roosting locations are present in the wider landscape. If any new lighting is proposed to illuminate the boundary trees / woodland edges as part of the new development, then there is potential for the new development to impact local populations of brown long-eared bat by severing commute routes and potential foraging areas.

Common pipistrelle
Common pipistrelle is one of the most common species of bat in England and Wales (Bat Conservation Trust, 2010). It was the most frequently recorded bat species using the site during both the manual and automated activity surveys, with 95.7% of the total number of bat passes recorded (9,625 out of 10,053 bat passes recorded during the surveys). There are roosts for this species present within twelve of the buildings on site (A3, F11, N2, Q4, Q7, A13, A14, F6, H38, HR1, HR2 and N10), as identified during the 2018 nocturnal emergence and dawn re-entry surveys and previous Waterman surveys, and further suitable roosting locations are present in the wider landscape. The survey evidence collected to date indicates that the site contains habitats that are highly suitable for common pipistrelles, with the boundary trees and woodland edges used frequently for foraging and as commute corridors. However, other suitable habitat resources with connectivity to the site are widespread in the area.

Daubenton's bat
Daubenton's bat is widely distributed across the UK, with the exception of the very northern parts of Scotland, Ireland and the Isle of Man (Bat Conservation Trust, 2010). This species was frequently recorded during both the manual and automated activity surveys, with 3% of the total number of bat passes recorded

(327 out of 10,053 bat passes recorded during the surveys). These detections resulted from individual bats commuting and foraging along boundary trees and woodland edges. The survey evidence collected to date indicates that the site contains habitats that are suitable for Daubenton's bat, but other suitable habitat resources with connectivity to the site are widespread in the area. If any new lighting is proposed to illuminate the boundary trees or woodland edges as part of the new development, then there is potential for the new development to adversely impact local populations of Daubenton's bat by severing commute routes and foraging areas.

Leisler's bat
Leisler's bat is found throughout the British Isles, with the exception of northern Scotland (Bat Conservation Trust, 2010). A small number of Leisler's bat passes, three in total, were recorded during the first October manual survey following transect route 2 (dusk survey). Due to the brief calls detected, it was considered likely that individual bats commuted across the site, using the boundary trees / woodland edges as commute corridors. The survey evidence collected to date indicates that the site contains habitats that are suitable for Leisler's bat, but other suitable habitat resources with connectivity to the site are widespread in the area.

Nathusius' pipistrelle
Nathusius' pipistrelles have been widely recorded throughout the British Isles but records are sparse (Bat Conservation Trust, 2010). Two detections of this species were recorded during the activity surveys; one detection in the October manual survey following transect route 1 and one detection in the October automated survey. Due to the limited activity recorded on site by this species, it is not considered that the survey area is likely to provide a key habitat resource.

Natterer's bat
Natterer's bat is a scarce yet widely distributed species in Britain (Bat Conservation Trust, 2010). This species was occasionally recorded commuting along the boundary trees / woodland edges during the automated activity surveys; three detections in the late July automated survey and fifteen detections in the October automated survey. Due to the low number of bat passes by this species and the presence of other suitable habitat within the wider landscape, it is considered that the site is unlikely to provide a key habitat resource for Natterer's bat. However, if any new lighting is proposed to illuminate the boundary trees or woodland edges as part of the new development, then there is potential for the new development to impact local populations of Natterer's bat by severing commute routes and foraging areas.

Noctule
Noctule is still a relatively widespread species in much of England, Wales and to south-west Scotland, but has become scarce in some areas of intensive agriculture (Bat Conservation Trust, 2010). This species was occasionally recorded commuting along the boundary trees / woodland edges and foraging over the open grassland areas during both the manual and automated activity surveys. Noctule is one of the largest native bat species, and often emerges from roost locations prior to sunset. No roosts for this species have been identified on site; however, suitable roosting locations are present in the wider landscape. This species will readily fly over large open areas, and it is not considered that the survey area is likely to provide a key habitat resource.

Serotine
Serotine is a less common species, occurring mainly in southern England (Bat Conservation Trust, 2010). A small number of serotine passes, six in total, were recorded during the activity surveys; two detections in the June manual survey following transect route 1, three detections in the July manual survey following transect route 2, and one detection in the October automated survey. Due to the brief calls detected, it was considered likely that individual bats commuted across the site, using the boundary trees / woodland edges as commute corridors. The survey evidence collected to date indicates that the site contains habitats that are suitable for serotine, but other suitable habitat resources with connectivity to the site are widespread in the area.

Soprano pipistrelle
The soprano pipistrelle is widely distributed across the UK, with the exception of the very northern parts of Scotland (Bat Conservation Trust, 2010). Along with the common pipistrelle it is one of Britain's commonest bat species. The soprano pipistrelle was frequently recorded using the site during both the manual and automated activity surveys, with 2.7% of the total number of bat passes recorded (278 out of 10,053 bat passes recorded during the surveys). No roosts for this species have been identified on site; however, suitable roosting locations are present in the wider landscape. The survey evidence collected to date

indicates that the site contains habitats that are highly suitable for soprano pipistrelles, with the boundary trees and woodland edges used frequently for foraging and as commute corridors. However, other suitable habitat resources with connectivity to the site are widespread in the area.

Whiskered bat
Whiskered bat is an uncommon but widespread species in England and Wales (Bat Conservation Trust, 2010). This species was frequently recorded during both the manual and automated activity surveys, with 1.7% of the total number of bat passes recorded (177 out of 10,053 bat passes recorded during the surveys). The survey evidence collected to date indicates that the site contains habitats that are suitable for whiskered bat, but other suitable habitat resources with connectivity to the site are widespread in the area. If any new lighting is proposed to illuminate the boundary trees or woodland edges as part of the new development, then there is potential for the new development to impact local populations of whiskered bat by severing commute routes and foraging areas.

5.3 CONCLUSIONS AND SUMMARY OF POTENTIAL IMPACTS

The activity surveys identified that the site is utilised by ten different species of bat; brown long-eared bat, common pipistrelle, Daubenton's bat, Leisler's bat, Nathusius' pipistrelle, Natterer's bat, noctule, serotine, soprano pipistrelle and whiskered bat. Overall the site is considered to be of high value to foraging and commuting bats, most notably common pipistrelle which was the most frequently recorded bat species.

Potential impacts on bat species as a result of the development may include:

- Loss of roost sites;
- Loss or fragmentation of foraging and commuting habitats; and,
- Fragmentation of habitats due to lighting.

Each of these factors is considered further below. This discussion is informed by the levels of bat activity recorded on site, and by Middlemarch Environmental Ltd's current understanding of the proposed development.

5.3.1 Loss of Roost Sites
The data obtained during the Bat Activity Surveys indicates that roosts for several common bat species may be present in proximity to the site. Middlemarch Environmental Ltd has completed a Preliminary Bat Roost Assessment (Report RT-MME-127947-02), which identified a high number of buildings on site with potential to support roosting bats, and Nocturnal Emergence and Dawn Re-entry Bat Surveys (Report RT-MME-127947-03), which confirmed that common pipistrelle and brown long-eared bat were roosting within several of the buildings to be impacted by the proposed development; A3, F11, N2, Q4, Q7 and R64. Bat roosts were also identified in a further seven buildings during previous bat surveys at the site; A13, A14, F6, H38, HR1, HR2 and N10. The recommendations made in the Preliminary Bat Roost Assessment and Nocturnal Emergence and Dawn Re-entry Reports must be followed.

5.3.2 Loss or Fragmentation of Foraging and Commuting Habitat
The Bat Activity Surveys detailed in this report highlighted that habitats within the site are utilised by ten different species of bat, particularly common pipistrelle, for foraging and commuting, with the boundary trees and woodland edges across the site appearing to provide a valuable resource. As such, it is anticipated that loss or fragmentation of these habitats as a result of the works could have a significant detrimental impact on the ability of bat species to forage and commute in the local area.

However, as the woodland, hedgerows and trees in these areas will be mostly retained and the integrity of site boundaries maintained to minimise fragmentation, it is considered that the well-established bat foraging and commuting features will not be significantly impacted as a result of the development. In addition, if all retained and created habitat is managed in accordance with a Landscape and Ecological Management Plan (LEMP), this will continue to provide suitable foraging and commuting routes for the bat species found using the site and will ensure that the favourable conservation status of bats in the area is maintained. Recommendations regarding habitat retention and enhancement are made in Chapter 6.

5.3.3 Fragmentation of Habitat Due to Lighting
Lighting is a key factor in determining the usage of a site by bat species. At present, the site is predominantly unlit and the proposed development will inevitably result in increased illumination at the site. Construction and operational phase lighting within the proposed development has the potential to generate light spill

which could illuminate habitats used by bats. Insensitive lighting could disturb potential bat roosts, which could lead to delayed emergence or roost abandonment. Illumination of bat foraging and commuting routes could result in reduced activity or habitat fragmentation and barrier effects. Furthermore, an increase in lighting which attracts insects to one area has the potential to cause a reduction of insects elsewhere, for example in vegetated areas that bats may use for foraging (Gunnell et al, 2012).

At the time of writing, the lighting proposals for the site are unknown. Although an increase in lighting across the site would be unavoidable to accommodate the development, a lighting strategy should be designed to minimise the potential impact on bats utilising the site. A recommendation is made in Chapter 6.

6. RECOMMENDATIONS

All recommendations provided in this section are based on Middlemarch Environmental Ltd's current understanding of the site proposals, correct at the time the report was compiled. Should the proposals alter, the conclusions and recommendations made in the report should be reviewed to ensure that they remain appropriate.

R1 Buildings

The recommendations made within the Preliminary Bat Roost Assessment (Report RT-MME-127947-02) and Nocturnal Emergence and Dawn Re-entry Bat Surveys Report (RT-MME-127947-03) must be adhered to.

R2 Lighting

In line with paragraph 180 of the National Planning Policy Framework, the development should aim to limit the impact of light pollution on bats through the careful use of lighting in critical areas only and at a low level with minimum spillage. Any lighting, either temporary or permanent, along the site boundaries should be kept to a minimum and directed away from the boundary features to maintain dark areas and corridors. A lighting strategy should be designed and implemented on site to avoid impacting bat usage of the site and wider area. The strategy should be designed in accordance with the principles of 'Landscape and urban design for bats and biodiversity' and 'Bats and artificial lighting in the UK' as published by the Bat Conservation Trust (Gunnell *et al*, 2012 and Miles *et al*, 2018 respectively). Materials used under lights, such as floor surfaces, should be materials that have a minimum reflective quality to prevent light reflecting upwards into the sky. This will ensure that bats using the site and surrounding area to roost/forage/commute are not affected by illumination.

R3 Habitat Retention

The existing habitats on site, particularly the woodland, trees and hedgerows, should be retained where possible as these have been identified as a key foraging and commuting features for bats. Buffers should be created around suitable commuting and foraging habitats to maintain connectivity across the site and surrounding area.

R4 Habitat Enhancement

In line with the National Planning Policy Framework, the development should aim to enhance the site for bats. Bat boxes should be installed to provide roosting habitat for species such as pipistrelle. In general, bats seek warm places and for this reason boxes should be located where they will receive full/partial sun, although installing boxes in a variety of orientations will provide a range of climatic conditions. Position boxes at least 3 m above ground to prevent disturbance from people and/or predators. Permanent roost features should also be incorporated into buildings wherever possible on site. The planting of species which attract night flying insects is encouraged as this will be of value to foraging bats, for example: evening primrose *Oenothera biennis*, goldenrod *Solidago virgaurea*, honeysuckle *Lonicera periclymenum* and fleabane *Pulicaria dysenterica*.

Native species rich hedgerows should be planted on site wherever possible including species such as hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, holly *Ilex aquifolium*, yew *Taxus baccata*, guelder rose *Viburnum opulus*, field maple *Acer campestre*, spindle *Euonymus europaeus*, wild privet *Ligustrum vulgare* and buckthorn *Rhamnus cathartica*. Native species rich hedgerows will be used by foraging and commuting bats and a wide range of other species.

Native plants should be incorporated into landscaping designs, including gardens, amenity and recreational space, street trees and shrub borders. Native tree species could include English oak *Quercus robur*, beech *Fagus sylvatica*, wild cherry *Prunus avium*, silver birch *Betula pendula*, wild service *Sorbus torminalis*, rowan *Sorbus acuparia* and whitebeam *Sorbus aria*. Native border/shrub species could include dogwood *Cornus sanguinea*, hazel *Corylus avellana*, wayfaring tree *Viburnum lantana*, dog rose *Rosa canina*, spindle *Euonymus europeaus*, gorse *Ulex europeaus*, wild privet *Ligustrum vulgare* and guelder rose *Viburnum opulus*. Native plants species will be used by bats to forage, roost and commute and will also be used by a wide range of other species.

R5 Should woodland clearance be undertaken on site then bat surveys using advanced techniques should be undertaken to allow for the status of bat species on site to be determined. The advanced survey will comprise a trapping exercise utilising specialist equipment including mist nests, harp

traps and acoustic lures. The survey work must be undertaken by suitably qualified bat workers with the appropriate level of Natural England development licence to use these equipment types. Trapping will be undertaken through the night at different periods throughout the year, to allow bats to be detected at different stages of their annual cycle. No works can be completed June-mid July, when bats are likely to be giving birth or have dependant young.

R6 A Landscape Ecological Management Plan should be produced for the site, and habitat management proposals should be incorporated into this document.

R7 The use of chemical pesticides and herbicides as part of the landscape management on site should be avoided pre, during and post development, with organic controls used as an alternative. This will help maintain and enhance invertebrate populations, which form the entirety of all UK bat species' diets.

R8 An Ecological Mitigation Strategy should be compiled for the site, including proposals to maintain the sites high value to bats.

7. DRAWINGS

Drawing C127947-04-01 – Bat Activity Survey – Route 1 (19/06/2018)

Drawing C127947-04-02 – Bat Activity Survey – Route 2 (20/06/2018)

Drawing C127947-04-03 – Bat Activity Survey – Route 1 (18/07/2018)

Drawing C127947-04-04 – Bat Activity Survey – Route 2 (18/07/2018)

Drawing C127947-04-05 – Bat Activity Survey – Route 1 (20/08/2018)

Drawing C127947-04-06 – Bat Activity Survey – Route 2 (20/08/2018)

Drawing C127947-04-07 – Bat Activity Survey – Route 1 (30/08/2018)

Drawing C127947-04-08 – Bat Activity Survey – Route 2 (30/08/2018)

Drawing C127947-04-09 – Bat Activity Survey – Route 2 (19/09/2018)

Drawing C127947-04-10 – Bat Activity Survey – Route 1 (20/09/2018)

Drawing C127947-04-11 – Bat Activity Survey – Route 2 (17/10/2018)

Drawing C127947-04-12 – Bat Activity Survey – Route 2 (18/10/2018)

C127947-04-01

Legend

- Common pipistrelle
- Serotine bat pass
- Soprano pipistrelle
- 00 Route 1, Stop point 1 - 12
- Bat transect route 1

Phase 1 habitats:

- Scattered scrub
- Scattered trees
- Site boundary
- Fence
- Native species-rich hedge and trees
- Species-poor defunct hedgerow
- Species-poor intact hedgerow
- Not surveyed
- A Amenity grassland
- SI Semi-improved neutral grassland
- SI Semi-improved calcareous grassland
- Unimproved calcareous grassland
- Bracken
- Tall ruderal
- Broad-leaved semi-natural woodland
- Broad-leaved plantation woodland
- Coniferous plantation woodland
- Mixed plantation woodland
- SI Poor semi-improved grassland
- Other habitat: Built-up area with scattered trees present in abundance throughout site

N

Project: Fort Halstead

Drawing: Bat Activity Survey - Route 1 (19/06/2018)

Client: CBRE Ltd

Drawing Number	Revision
C127947-04-01	00
Scale @ A3	Date
1:8000	December 2018
Approved By	Drawn By
JF	CD

MIDDLEMARCH ENVIRONMENTAL
Triumph House, Birmingham Road, Allesley, Coventry CV5 9AZ
T:01676 525880 F:01676 521400
E:admin@middlemarch-environmental.com

C127947-04-02

Legend

- Common pipistrelle
- Soprano pipistrelle
- Whiskered bat
- Route 2, Stop point 1 - 12
- Bat transect route 2

Phase 1 habitats:

- Scattered scrub
- Scattered trees
- Site boundary
- Fence
- Native species-rich hedge and trees
- Species-poor defunct hedgerow
- Species-poor intact hedgerow
- Not surveyed
- Amenity grassland
- Semi-improved neutral grassland
- Semi-improved calcareous grassland
- Unimproved calcareous grassland
- Bracken
- Tall ruderal
- Broad-leaved semi-natural woodland
- Broad-leaved plantation woodland
- Coniferous plantation woodland
- Mixed plantation woodland
- Poor semi-improved grassland
- Other habitat: Built-up area with scattered trees present in abundance throughout site

N

Project: Fort Halstead

Drawing: Bat Activity Survey - Route 2 (20/06/2018)

Client: CBRE Ltd

Drawing Number	Revision
C127947-04-02	00
Scale @ A3	Date
1:8000	December 2018
Approved By	Drawn By
JF	CD

MIDDLEMARCH ENVIRONMENTAL
Triumph House, Birmingham Road, Allesley, Coventry CV5 9AZ
T:01676 525880 F:01676 521400
E:admin@middlemarch-environmental.com

C127947-04-03

Legend

- Common pipistrelle
- Noctule bat
- Soprano pipistrelle
- Route 1, Stop point 1 - 12
- Bat transect route 1

Phase 1 habitats:

- Scattered scrub
- Scattered trees
- Site boundary
- Fence
- Native species-rich hedge and trees
- Species-poor defunct hedgerow
- Species-poor intact hedgerow
- Not surveyed
- A — Amenity grassland
- SI — Semi-improved neutral grassland
- SI — Semi-improved calcareous grassland
- Unimproved calcareous grassland
- Bracken
- Tall ruderal
- Broad-leaved semi-natural woodland
- Broad-leaved plantation woodland
- Coniferous plantation woodland
- Mixed plantation woodland
- SI — Poor semi-improved grassland
- Other habitat: Built-up area with scattered trees present in abundance throughout site

N

Project	Fort Halstead
Drawing	Bat Activity Survey - Route 1 (18/07/2018)
Client	CBRE Ltd
Drawing Number: C127947-04-03	Revision: 00
Scale @ A3: 1:8000	Date: December 2018
Approved By: JF	Drawn By: CD

MIDDLEMARCH ENVIRONMENTAL
Triumph House, Birmingham Road, Allesley, Coventry CV5 9AZ
T:01676 525880 F:01676 521400
E:admin@middlemarch-environmental.com

C127947-04-04

Legend

- Common pipistrelle
- Serotine bat
- Whiskered bat
- Route 2, Stop point 1 - 12
- Bat transect route 2

Phase 1 habitats:

- Scattered scrub
- Scattered trees
- Site boundary
- Fence
- Native species-rich hedge and trees
- Species-poor defunct hedgerow
- Species-poor intact hedgerow
- Not surveyed
- Amenity grassland
- Semi-improved neutral grassland
- Semi-improved calcareous grassland
- Unimproved calcareous grassland
- Bracken
- Tall ruderal
- Broad-leaved semi-natural woodland
- Broad-leaved plantation woodland
- Coniferous plantation woodland
- Mixed plantation woodland
- Poor semi-improved grassland
- Other habitat: Built-up area with scattered trees present in abundance throughout site

N

Project: Fort Halstead

Drawing: Bat Activity Survey - Route 2 (18/07/2018)

Client: CBRE Ltd

Drawing Number	Revision
C127947-04-04	00
Scale @ A3	Date
1:8000	December 2018
Approved By	Drawn By
JF	CD

MIDDLEMARCH ENVIRONMENTAL
Triumph House, Birmingham Road, Allesley, Coventry CV5 9AZ
T:01676 525880 F:01676 521400
E:admin@middlemarch-environmental.com

C127947-04-05

Legend

- Brown long-eared bat
- Common pipistrelle
- Noctule bat
- Soprano pipistrelle
- 00 Route 1, Stop point 1 - 12
- Bat transect route 1

Phase 1 habitats:

- Scattered scrub
- Scattered trees
- Site boundary
- Fence
- Native species-rich hedge and trees
- Species-poor defunct hedgerow
- Species-poor intact hedgerow
- Not surveyed
- A Amenity grassland
- SI Semi-improved neutral grassland
- SI Semi-improved calcareous grassland
- Unimproved calcareous grassland
- Bracken
- Tall ruderal
- Broad-leaved semi-natural woodland
- Broad-leaved plantation woodland
- Coniferous plantation woodland
- Mixed plantation woodland
- SI Poor semi-improved grassland
- Other habitat: Built-up area with scattered trees present in abundance throughout site

N

Project: Fort Halstead

Drawing: Bat Activity Survey - Route 1 (20/08/2018)

Client: CBRE Ltd

Drawing Number	Revision
C127947-04-05	00
Scale @ A3	Date
1:8000	December 2018
Approved By	Drawn By
JF	CD

MIDDLEMARCH ENVIRONMENTAL
Triumph House, Birmingham Road, Allesley, Coventry CV5 9AZ
T:01676 525880 F:01676 521400
E:admin@middlemarch-environmental.com

C127947-04-06

Legend

- Whiskered bat
- Common pipistrelle
- Route 2, Stop point 1 - 12
- Bat transect route 2

Phase 1 habitats:

- Scattered scrub
- Scattered trees
- Site boundary
- Fence
- Native species-rich hedge and trees
- Species-poor defunct hedgerow
- Species-poor intact hedgerow
- Not surveyed
- Amenity grassland
- Semi-improved neutral grassland
- Semi-improved calcareous grassland
- Unimproved calcareous grassland
- Bracken
- Tall ruderal
- Broad-leaved semi-natural woodland
- Broad-leaved plantation woodland
- Coniferous plantation woodland
- Mixed plantation woodland
- Poor semi-improved grassland
- Other habitat: Built-up area with scattered trees present in abundance throughout site

Project	Fort Halstead
Drawing	Bat Activity Survey - Route 2 (20/08/2018)
Client	CBRE Ltd
Drawing Number: C127947-04-06	Revision: 00
Scale @ A3: 1:8000	Date: December 2018
Approved By: JF	Drawn By: CD

MIDDLEMARCH ENVIRONMENTAL
Triumph House, Birmingham Road, Allesley, Coventry CV5 9AZ
T:01676 525880 F:01676 521400
E:admin@middlemarch-environmental.com

C127947-04-07

Legend

- Common pipistrelle
- Noctule bat
- Route 1, Stop point 1 - 12
- Bat transect route 1

Phase 1 habitats:

- Scattered scrub
- Scattered trees
- Site boundary
- Fence
- Native species-rich hedge and trees
- Species-poor defunct hedgerow
- Species-poor intact hedgerow
- Not surveyed
- A — Amenity grassland
- SI — Semi-improved neutral grassland
- SI — Semi-improved calcareous grassland
- Unimproved calcareous grassland
- Bracken
- Tall ruderal
- Broad-leaved semi-natural woodland
- Broad-leaved plantation woodland
- Coniferous plantation woodland
- Mixed plantation woodland
- SI — Poor semi-improved grassland
- Other habitat: Built-up area with scattered trees present in abundance throughout site

Project	Fort Halstead
Drawing	Bat Activity Survey - Route 1 (30/08/2018)
Client	CBRE Ltd
Drawing Number: C127947-04-07	Revision: 00
Scale @ A3: 1:8000	Date: December 2018
Approved By: JF	Drawn By: CD

MIDDLEMARCH ENVIRONMENTAL
Triumph House, Birmingham Road, Allesley, Coventry CV5 9AZ
T:01676 525880 F:01676 521400
E:admin@middlemarch-environmental.com

C127947-04-08

Legend

- Common pipistrelle
- Whiskered bat
- Route 2, Stop point 1 - 12
- Bat transect route 2

Phase 1 habitats:

- Scattered scrub
- Scattered trees
- Site boundary
- Fence
- Native species-rich hedge and trees
- Species-poor defunct hedgerow
- Species-poor intact hedgerow
- Not surveyed
- Amenity grassland
- Semi-improved neutral grassland
- Semi-improved calcareous grassland
- Unimproved calcareous grassland
- Bracken
- Tall ruderal
- Broad-leaved semi-natural woodland
- Broad-leaved plantation woodland
- Coniferous plantation woodland
- Mixed plantation woodland
- Poor semi-improved grassland
- Other habitat: Built-up area with scattered trees present in abundance throughout site

N

Project	Fort Halstead
Drawing	Bat Activity Survey - Route 2 (30/08/2018)
Client	CBRE Ltd
Drawing Number: C127947-04-08	Revision: 00
Scale @ A3: 1:8000	Date: December 2018
Approved By: JF	Drawn By: CD

MIDDLEMARCH ENVIRONMENTAL
Triumph House, Birmingham Road, Allesley, Coventry CV5 9AZ
T:01676 525880 F:01676 521400
E:admin@middlemarch-environmental.com

C127947-04-09

Legend

- Brown long-eared bat
- Common pipistrelle
- Route 2, Stop point 1 - 12
- Bat transect route 2

Phase 1 habitats:

- Scattered scrub
- Scattered trees
- Site boundary
- Fence
- Native species-rich hedge and trees
- Species-poor defunct hedgerow
- Species-poor intact hedgerow
- Not surveyed
- Amenity grassland
- Semi-improved neutral grassland
- Semi-improved calcareous grassland
- Unimproved calcareous grassland
- Bracken
- Tall ruderal
- Broad-leaved semi-natural woodland
- Broad-leaved plantation woodland
- Coniferous plantation woodland
- Mixed plantation woodland
- Poor semi-improved grassland
- Other habitat: Built-up area with scattered trees present in abundance throughout site

N

Project	Fort Halstead
Drawing	Bat Activity Survey - Route 2 (19/09/2018)
Client	CBRE Ltd
Drawing Number: C127947-04-09	Revision: 00
Scale @ A3: 1:8000	Date: December 2018
Approved By: JF	Drawn By: CD

MIDDLEMARCH ENVIRONMENTAL
Triumph House, Birmingham Road, Allesley, Coventry CV5 9AZ
T:01676 525880 F:01676 521400
E:admin@middlemarch-environmental.com

C127947-04-10

Legend

- Common pipistrelle
- Noctule bat
- Soprano pipistrelle
- Route 1, Stop point 1 - 12
- Bat transect route 1

Phase 1 habitats:

- Scattered scrub
- Scattered trees
- Site boundary
- Fence
- Native species-rich hedge and trees
- Species-poor defunct hedgerow
- Species-poor intact hedgerow
- Not surveyed
- A — Amenity grassland
- SI — Semi-improved neutral grassland
- SI — Semi-improved calcareous grassland
- Unimproved calcareous grassland
- Bracken
- Tall ruderal
- Broad-leaved semi-natural woodland
- Broad-leaved plantation woodland
- Coniferous plantation woodland
- Mixed plantation woodland
- SI — Poor semi-improved grassland
- Other habitat: Built-up area with scattered trees present in abundance throughout site

N

Project	Fort Halstead
Drawing	Bat Activity Survey - Route 1 (20/09/2018)
Client	CBRE Ltd
Drawing Number: C127947-04-10	Revision: 00
Scale @ A3: 1:8000	Date: December 2018
Approved By: JF	Drawn By: CD

MIDDLEMARCH ENVIRONMENTAL
Triumph House, Birmingham Road, Allesley, Coventry CV5 9AZ
T:01676 525880 F:01676 521400
E:admin@middlemarch-environmental.com

C127947-04-11

Legend

- Common pipistrelle
- Leislers bat
- Route 2, Stop point 1 - 12
- Bat transect route 2

Phase 1 habitats:

- Scattered scrub
- Scattered trees
- Site boundary
- Fence
- Native species-rich hedge and trees
- Species-poor defunct hedgerow
- Species-poor intact hedgerow
- Not surveyed
- A — Amenity grassland
- SI — Semi-improved neutral grassland
- SI — Semi-improved calcareous grassland
- Unimproved calcareous grassland
- Bracken
- Tall ruderal
- Broad-leaved semi-natural woodland
- Broad-leaved plantation woodland
- Coniferous plantation woodland
- Mixed plantation woodland
- SI — Poor semi-improved grassland
- Other habitat: Built-up area with scattered trees present in abundance throughout site

N

Project
Fort Halstead

Drawing
Bat Activity Survey - Route 2 (17/10/2018)

Client
CBRE Ltd

Drawing Number	Revision
C127947-04-11	00
Scale @ A3	Date
1:8000	December 2018
Approved By	Drawn By
JF	CD

MIDDLEMARCH ENVIRONMENTAL
Triumph House, Birmingham Road, Allesley, Coventry CV5 9AZ
T:01676 525880 F:01676 521400
E:admin@middlemarch-environmental.com

C127947-04-12

Legend

- Common pipistrelle
- Daubentons bat
- Noctule bat
- Route 2, Stop point 1 - 12
- Bat transect route 2

Phase 1 habitats:

- Scattered scrub
- Scattered trees
- Site boundary
- Fence
- Native species-rich hedge and trees
- Species-poor defunct hedgerow
- Species-poor intact hedgerow
- Not surveyed
- A — Amenity grassland
- SI — Semi-improved neutral grassland
- SI — Semi-improved calcareous grassland
- Unimproved calcareous grassland
- Bracken
- Tall ruderal
- Broad-leaved semi-natural woodland
- Broad-leaved plantation woodland
- Coniferous plantation woodland
- Mixed plantation woodland
- SI — Poor semi-improved grassland
- Other habitat: Built-up area with scattered trees present in abundance throughout site

N

Project	Fort Halstead
Drawing	Bat Activity Survey - Route 2 (18/10/2018)
Client	CBRE Ltd
Drawing Number: C127947-04-12	Revision: 00
Scale @ A3: 1:8000	Date: December 2018
Approved By: JF	Drawn By: CD

MIDDLEMARCH ENVIRONMENTAL
Triumph House, Birmingham Road, Allesley, Coventry CV5 9AZ
T:01676 525880 F:01676 521400
E:admin@middlemarch-environmental.com

REFERENCES AND BIBLIOGRAPHY

Altringham, J (2003). *British Bats.* New Naturalist. HarperCollins.

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

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

Joint Nature Conservation Committee (2012). *UK Post-2010 Biodiversity Framework*. Available: http://jncc.defra.gov.uk/pdf/UK_Post2010_Bio-Fwork.pdf

Jones, K and Walsh, A (2006). *A Guide to British Bats.* The Mammal Society, London.

Miles, J., Ferguson, J., Smith, N. and Fox, H. (2018) *Bats and artificial lighting in the UK. Bats and the Built Environment Series*. Bat Conservation Trust and Institution of Lighting Professionals.

Ministry of Housing, Communities and Local Government (2018) *National Planning Policy Framework*. Available: https://www.gov.uk/government/collections/revised-national-planning-policy-framework

Mitchell-Jones, A.J. & McLeish, A.P. (2004). *The Bat Workers' Manual (3nd Ed.).* JNCC, Peterborough.

The Conservation of Habitats and Species Regulations 2017.

Waterman Group (2015) *Ecological Appraisal: Fort Halstead, Kent*. Report Number EED12715-102.R.2.3.7.LM.

Waterman Group (2015) *Protected Species and Habitats Survey: Fort Halstead, Kent*. Report Number EED12715-102.R.3.3.6.LM

Waterman Group (2015) *Environmental Statement - Ecology and Nature Conservation: Fort Halstead, Kent*.

APPENDICES

APPENDIX 1: Number of Bat Passes Recorded During Automated Surveys (Tables A1.1-A1.4)

APPENDIX 2: Overview of Relevant Legislation and Policy

APPENDIX 1

NUMBER OF BAT PASSES RECORDED DURING AUTOMATED SURVEYS

Early July 2018 Automated Activity Survey Results

Date	Time Band	AM / PM	Temp (°C)	Static 1				Static 2			
				Common pipistrelle	Daubenton's bat	Noctule	Whiskered bat	Common pipistrelle	Daubenton's bat	Noctule	Whiskered bat
12-13/07/18 Sunset: 21:17 Sunrise: 05:00	20.00 – 21.00	PM	21.0	0	0	0	0	0	0	0	0
	21.00 – 22.00		19.5	0	0	0	0	5	0	0	0
	22.00 – 23.00		18.0	0	0	0	0	2	0	0	0
	23.00 – 00.00		17.5	1	0	0	0	0	0	1	0
	00.00 – 01.00	AM	17.0	5	0	1	0	0	0	0	0
	01.00 – 02.00		17.0	6	0	0	0	2	0	0	0
	02.00 – 03.00		17.0	7	0	0	0	0	0	0	0
	03.00 – 04.00		16.5	1	0	0	0	4	0	0	0
	04.00 – 05.00		16.0	0	0	0	0	26	0	0	0
	05.00 – 06.00		15.5	0	0	0	0	0	0	0	0
	Total			**20**	**0**	**1**	**0**	**39**	**0**	**1**	**0**
13-14/07/18 Sunset: 21:16 Sunrise: 05:01	20.00 – 21.00	PM	20.0	0	0	0	0	0	0	0	0
	21.00 – 22.00		19.0	0	0	0	0	10	0	0	0
	22.00 – 23.00		18.0	0	0	0	0	1	0	0	0
	23.00 – 00.00		17.0	0	0	0	0	2	0	0	0
	00.00 – 01.00	AM	16.0	4	0	0	0	1	0	0	0
	01.00 – 02.00		15.5	6	0	0	1	2	0	0	0
	02.00 – 03.00		15.0	4	0	0	0	0	0	0	0
	03.00 – 04.00		15.0	1	0	0	0	0	0	0	0
	04.00 – 05.00		15.0	0	0	0	0	60	0	0	0
	05.00 – 06.00		14.5	0	0	0	0	0	0	0	0
	Total			**15**	**0**	**0**	**1**	**76**	**0**	**0**	**0**
14-15/07/18 Sunset: 21:15 Sunrise: 05:02	20.00 – 21.00	PM	24.0	0	0	0	0	0	0	0	0
	21.00 – 22.00		22.0	0	0	0	0	9	0	0	0
	22.00 – 23.00		20.0	0	0	0	0	1	0	0	0
	23.00 – 00.00		19.5	0	0	0	0	1	0	1	0
	00.00 – 01.00	AM	19.0	1	0	0	0	0	0	1	0
	01.00 – 02.00		17.0	0	0	0	0	0	0	0	0
	02.00 – 03.00		15.0	0	0	0	0	1	0	0	0
	03.00 – 04.00		15.0	6	0	0	0	4	0	0	0
	04.00 – 05.00		15.0	2	0	0	0	35	0	0	0
	05.00 – 06.00		14.0	0	0	0	0	0	0	0	0
	Total			**9**	**0**	**0**	**0**	**51**	**0**	**2**	**0**
15-16/07/18 Sunset: 21:14 Sunrise: 05:02	20.00 – 21.00	PM	25.0	0	0	0	0	0	0	0	0
	21.00 – 22.00		23.5	0	0	0	0	9	0	0	0
	22.00 – 23.00		22.0	0	0	0	0	2	0	0	1
	23.00 – 00.00		20.0	1	0	0	0	0	0	0	0
	00.00 – 01.00	AM	17.5	0	0	0	0	3	0	0	0
	01.00 – 02.00		16.0	5	0	0	0	0	1	0	0
	02.00 – 03.00		15.5	1	0	0	0	0	0	0	0
	03.00 – 04.00		15.0	2	0	0	0	2	0	0	0
	04.00 – 05.00		14.5	0	0	0	0	20	0	0	0
	05.00 – 06.00		14.0	0	0	0	0	0	0	0	0
	Total			**9**	**0**	**0**	**0**	**36**	**1**	**0**	**1**

Table A1.1: Summary of Bat Passes Recorded by Static Detectors 1 and 2, Early July 2018 (cont)

Date	Time Band	AM / PM	Temp (°C)	Static 1				Static 2			
				Common pipistrelle	Daubenton's bat	Noctule	Whiskered bat	Common pipistrelle	Daubenton's bat	Noctule	Whiskered bat
16-17/07/18 Sunset: 21:12 Sunrise: 05:04	20.00 – 21.00	PM	25.0	0	0	0	0	0	0	0	0
	21.00 – 22.00		23.0	0	0	0	0	2	0	0	0
	22.00 – 23.00		21.0	0	0	0	0	0	0	0	0
	23.00 – 00.00		19.5	2	0	0	0	0	1	1	0
	00.00 – 01.00	AM	18.0	4	0	0	0	8	0	0	0
	01.00 – 02.00		17.0	2	0	0	1	0	0	0	0
	02.00 – 03.00		16.0	1	0	0	0	0	0	0	0
	03.00 – 04.00		15.5	5	0	0	0	14	0	0	0
	04.00 – 05.00		15.0	3	0	0	0	58	0	0	0
	05.00 – 06.00		14.5	0	0	0	0	0	0	0	0
	Total			**17**	**0**	**0**	**1**	**82**	**1**	**1**	**0**

Table A1.1 (cont'd): Summary of Bat Passes Recorded by Static Detectors 1 and 2, Early July 2018

Late July 2018 Automated Activity Survey Results

Date	Time Band	AM / PM	Temp (°C)	Static 1			Static 2		
				Common pipistrelle	Natterer's bat	Noctule	Common pipistrelle	Natterer's bat	Noctule
26-27/07/18 Sunset: 20:58 Sunrise: 05:17	20.00 – 21.00	PM	30.0	0	0	0	0	0	0
	21.00 – 22.00		28.0	0	0	0	3	0	0
	22.00 – 23.00		25.0	0	0	0	0	0	0
	23.00 – 00.00		24.5	1	0	0	0	0	0
	00.00 – 01.00	AM	24.0	0	0	0	0	0	0
	01.00 – 02.00		23.0	0	0	0	0	0	0
	02.00 – 03.00		22.0	0	0	0	0	0	0
	03.00 – 04.00		22.0	0	0	0	0	0	0
	04.00 – 05.00		22.0	0	0	0	0	0	0
	05.00 – 06.00		21.5	0	0	0	0	0	0
	Total			**1**	**0**	**0**	**3**	**0**	**0**
27-28/07/18 Sunset: 20:57 Sunrise: 05:19	20.00 – 21.00	PM	20.0	0	0	0	0	0	0
	21.00 – 22.00		19.0	0	0	0	1	0	0
	22.00 – 23.00		18.0	1	0	0	0	0	0
	23.00 – 00.00		18.0	3	0	0	1	0	0
	00.00 – 01.00	AM	18.0	4	0	0	0	0	0
	01.00 – 02.00		18.0	3	0	2	0	0	0
	02.00 – 03.00		18.0	2	0	0	0	0	0
	03.00 – 04.00		18.0	1	0	0	0	0	0
	04.00 – 05.00		18.0	0	0	0	0	0	0
	05.00 – 06.00		18.0	0	0	0	0	0	0
	Total			**14**	**0**	**2**	**2**	**0**	**0**

Table A1.2: Summary of Bat Passes Recorded by Static Detectors 1 and 2, Late July 2018 (cont)

Date	Time Band	AM / PM	Temp (°C)	Static 1			Static 2		
				Common pipistrelle	Natterer's bat	Noctule	Common pipistrelle	Natterer's bat	Noctule
28-29/07/18 Sunset: 20:55 Sunrise: 05:20	20.00 – 21.00	PM	18.0	0	0	0	0	0	0
	21.00 – 22.00		17.5	0	0	0	5	0	0
	22.00 – 23.00		17.0	1	0	0	0	0	0
	23.00 – 00.00		17.0	1	0	0	0	1	0
	00.00 – 01.00	AM	17.0	1	0	0	0	0	0
	01.00 – 02.00		17.0	0	0	0	0	0	0
	02.00 – 03.00		17.0	2	0	0	1	1	0
	03.00 – 04.00		16.5	3	0	0	0	0	0
	04.00 – 05.00		16.0	1	0	0	0	0	0
	05.00 – 06.00		16.0	0	0	0	0	0	0
	Total			**9**	**0**	**0**	**6**	**2**	**0**
29-30/07/18 Sunset: 20:55 Sunrise: 05:21	20.00 – 21.00	PM	19.0	0	0	0	0	0	0
	21.00 – 22.00		18.5	1	0	0	0	0	0
	22.00 – 23.00		18.0	1	0	0	0	0	0
	23.00 – 00.00		18.0	1	0	0	1	0	0
	00.00 – 01.00	AM	18.0	0	0	0	0	0	0
	01.00 – 02.00		18.0	0	0	0	0	0	0
	02.00 – 03.00		18.0	0	0	0	0	0	0
	03.00 – 04.00		18.0	0	0	0	0	0	0
	04.00 – 05.00		18.0	0	0	0	0	0	0
	05.00 – 06.00		18.0	0	0	0	0	0	0
	Total			**3**	**0**	**0**	**1**	**0**	**0**
30-31/07/18 Sunset: 20:55 Sunrise: 05:22	20.00 – 21.00	PM	20.0	0	0	0	0	0	0
	21.00 – 22.00		19.0	0	0	0	4	0	0
	22.00 – 23.00		18.0	0	0	0	0	0	0
	23.00 – 00.00		17.5	3	0	0	0	0	0
	00.00 – 01.00	AM	17.0	3	0	1	1	0	0
	01.00 – 02.00		17.0	0	0	0	0	1	0
	02.00 – 03.00		17.0	0	0	0	0	0	0
	03.00 – 04.00		17.0	0	0	0	0	0	0
	04.00 – 05.00		17.0	0	0	0	0	0	0
	05.00 – 06.00		16.5	0	0	0	0	0	0
	Total			**6**	**0**	**1**	**5**	**1**	**0**

Table A1.2 (cont'd): Summary of Bat Passes Recorded by Static Detectors 1 and 2, Late July 2018

Early October 2018 Automated Activity Survey Results

Date	Time Band	AM / PM	Temp (°C)	Static 1								Static 2							
				Common pipistrelle	Daubenton's bat	Nathusius' pipistrelle	Natterer's bat	Noctule	Serotine	Soprano pipistrelle	Whiskered bat	Common pipistrelle	Daubenton's bat	Nathusius' pipistrelle	Natterer's bat	Noctule	Serotine	Soprano pipistrelle	Whiskered bat
09-10/10/18 Sunset: 18:22 Sunrise: 07:15	18:00 – 19:00	PM	14.6	1	0	0	0	0	0	1	0	3	1	0	0	0	0	0	0
	19:00 – 20:00		14.2	67	3	0	0	0	0	2	0	0	0	0	0	0	0	0	0
	20.00 – 21.00		14.1	200	31	0	4	0	0	4	4	0	0	1	0	0	0	0	0
	21.00 – 22.00		14.0	262	28	0	0	0	0	4	17	0	0	0	0	0	0	0	0
	22.00 – 23.00		13.7	247	28	0	0	0	0	18	11	1	0	0	0	0	0	0	0
	23.00 – 00.00		13.5	225	9	0	0	0	0	12	3	1	0	0	0	0	0	0	0
	00.00 – 01.00	AM	12.4	198	17	0	0	0	0	8	3	0	0	0	0	0	0	0	0
	01.00 – 02.00		12.2	155	5	0	0	0	0	8	1	0	0	0	0	0	0	0	0
	02.00 – 03.00		11.8	278	24	0	0	0	0	0	14	0	0	0	0	1	0	0	0
	03.00 – 04.00		11.3	219	21	0	1	0	0	3	16	0	0	0	0	0	0	0	0
	04.00 – 05.00		10.8	239	8	0	0	0	0	5	0	0	0	0	0	0	0	0	0
	05.00 – 06.00		11.2	214	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	06:00 – 07:00		10.7	166	0	0	0	0	0	15	0	3	0	0	0	0	0	0	0
	07:00 – 08:00		10.3	191	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
	Total			**2,662**	**179**	**0**	**5**	**0**	**0**	**82**	**69**	**8**	**1**	**1**	**0**	**1**	**0**	**0**	**0**
10-11/10/18 Sunset: 18:20 Sunrise: 07:17	18:00 – 19:00	PM	14.5	3	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0
	19:00 – 20:00		14.2	72	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
	20.00 – 21.00		13.5	295	1	0	0	0	0	7	1	0	0	0	0	0	0	0	0
	21.00 – 22.00		13.3	284	29	0	0	0	0	5	4	0	0	0	0	0	0	0	0
	22.00 – 23.00		12.8	187	22	0	0	0	0	1	2	0	0	0	0	0	0	0	0
	23.00 – 00.00		12.1	151	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0
	00.00 – 01.00	AM	11.3	207	5	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	01.00 – 02.00		10.9	281	1	0	2	0	0	3	0	0	0	0	0	0	0	0	0
	02.00 – 03.00		10.6	245	4	0	0	0	0	8	0	0	0	0	0	0	0	0	0
	03.00 – 04.00		9.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	04.00 – 05.00		9.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	05.00 – 06.00		8.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	06:00 – 07:00		7.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	07:00 – 08:00		7.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total			**1,725**	**62**	**0**	**2**	**0**	**0**	**33**	**7**	**3**	**1**	**0**	**0**	**0**	**0**	**0**	**0**

Table A1.3: Summary of Bat Passes Recorded by Static Detectors 1 and 2, Early October 2018 (cont)

Date	Time Band	AM / PM	Temp (°C)	Static 1								Static 2							
				Common pipistrelle	Daubenton's bat	Nathusius' pipistrelle	Natterer's bat	Noctule	Serotine	Soprano pipistrelle	Whiskered bat	Common pipistrelle	Daubenton's bat	Nathusius' pipistrelle	Natterer's bat	Noctule	Serotine	Soprano pipistrelle	Whiskered bat
11-12/10/18 Sunset: 18:18 Sunrise: 07:19	17:00 – 18:00	PM	13.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	18:00 – 19:00		13.2	64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	19:00 – 20:00		12.8	155	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	20.00 – 21.00		12.5	256	1	0	0	0	0	4	0	0	1	0	0	0	0	0	0
	21.00 – 22.00		12.2	132	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	22.00 – 23.00		12.1	160	0	0	0	1	0	0	3	0	0	0	0	0	0	0	0
	23.00 – 00.00		11.5	245	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	00.00 – 01.00	AM	10.8	118	0	0	0	0	0	5	1	0	0	0	0	0	0	0	0
	01.00 – 02.00		10.4	113	1	0	0	0	0	12	2	0	0	0	0	0	0	0	0
	02.00 – 03.00		9.8	44	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	03.00 – 04.00		9.6	167	0	0	0	0	0	11	1	0	0	0	0	0	0	0	0
	04.00 – 05.00		9.5	199	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
	05.00 – 06.00		9.3	198	2	0	0	3	0	3	11	0	0	0	0	0	0	0	0
	06:00 – 07:00		8.9	12	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	07:00 – 08:00		8.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total			**1,863**	**8**	**0**	**0**	**4**	**0**	**37**	**21**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**
12-13/10/18 Sunset: 18:15 Sunrise: 07:20	17:00 – 18:00	PM	13.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	18:00 – 19:00		13.4	62	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0
	19:00 – 20:00		13.2	117	3	0	0	1	0	5	0	0	0	0	0	0	0	0	0
	20.00 – 21.00		13.3	161	1	0	4	0	0	4	4	0	0	0	0	0	0	0	0
	21.00 – 22.00		12.7	133	8	0	0	0	0	4	9	0	0	0	0	0	0	0	0
	22.00 – 23.00		12.6	138	4	0	0	0	1	11	5	0	0	0	0	0	0	0	0
	23.00 – 00.00		12.1	217	8	0	0	0	0	6	4	0	0	0	0	0	0	0	0
	00.00 – 01.00	AM	11.6	154	2	0	0	0	0	2	1	0	0	0	0	0	0	0	0
	01.00 – 02.00		10.4	88	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	02.00 – 03.00		10.1	101	5	0	0	2	0	1	5	0	1	0	0	0	0	0	0
	03.00 – 04.00		9.7	0	3	0	0	3	0	1	0	0	0	0	0	0	0	0	0
	04.00 – 05.00		9.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	05.00 – 06.00		9.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	06:00 – 07:00		8.5	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	07:00 – 08:00		8.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total			**1,171**	**35**	**0**	**4**	**7**	**1**	**34**	**28**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**

Table A1.3 (cont'd): Summary of Bat Passes Recorded by Static Detectors 1 and 2, Early October 2018 (cont)

Date	Time Band	AM / PM	Temp (°C)	Static 1								Static 2							
				Common pipistrelle	Daubenton's bat	Nathusius' pipistrelle	Natterer's bat	Noctule	Serotine	Soprano pipistrelle	Whiskered bat	Common pipistrelle	Daubenton's bat	Nathusius' pipistrelle	Natterer's bat	Noctule	Serotine	Soprano pipistrelle	Whiskered bat
13-14/10/18 **Sunset: 18:13** **Sunrise: 07:22**	17:00 – 18:00	PM	13.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	18:00 – 19:00		12.5	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
	19:00 – 20:00		11.7	46	4	0	0	0	0	2	0	2	0	0	0	0	0	0	0
	20.00 – 21.00		11.3	114	10	0	4	0	0	4	4	0	0	0	0	0	0	0	0
	21.00 – 22.00		11.2	95	21	0	0	0	0	4	17	0	0	0	0	0	0	0	0
	22.00 – 23.00		10.8	254	4	0	0	0	0	18	11	0	0	0	0	0	0	0	0
	23.00 – 00.00		10.6	122	12	0	0	0	0	12	3	0	0	0	0	0	0	0	0
	00.00 – 01.00	AM	9.4	113	2	0	0	0	0	5	0	0	0	0	0	0	0	0	0
	01.00 – 02.00		9.2	75	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	02.00 – 03.00		9.1	123	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	03.00 – 04.00		8.7	163	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	04.00 – 05.00		8.1	217	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0
	05.00 – 06.00		7.6	151	0	0	0	0	0	27	0	1	0	0	0	0	0	0	0
	06:00 – 07:00		12.8	109	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0
	07:00 – 08:00		12.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total			**1,582**	**35**	**0**	**4**	**0**	**0**	**83**	**35**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Table A1.3 (cont'd): Summary of Bat Passes Recorded by Static Detectors 1 and 2, Early October 2018

Date	Time Band	AM / PM	Temp (°C)	Static 3								Static 4							
				Common pipistrelle	Daubenton's bat	Nathusius' pipistrelle	Natterer's bat	Noctule	Serotine	Soprano pipistrelle	Whiskered bat	Common pipistrelle	Daubenton's bat	Nathusius' pipistrelle	Natterer's bat	Noctule	Serotine	Soprano pipistrelle	Whiskered bat
09-10/10/18 **Sunset: 18:22** **Sunrise: 07:15**	18:00 – 19:00	PM	14.6	Static detector failed to work								0	0	0	0	1	0	0	0
	19:00 – 20:00		14.2									0	0	0	0	1	0	0	0
	20.00 – 21.00		14.1									0	0	0	0	0	0	0	0
	21.00 – 22.00		14.0									0	0	0	0	0	0	0	0
	22.00 – 23.00		13.7									0	0	0	0	0	0	0	0
	23.00 – 00.00		13.5									0	0	0	0	1	0	0	0
	00.00 – 01.00	AM	12.4									0	0	0	0	0	0	0	0
	01.00 – 02.00		12.2									0	0	0	0	0	0	0	0
	02.00 – 03.00		11.8									0	0	0	0	0	0	0	0
	03.00 – 04.00		11.3									0	0	0	0	0	0	0	0
	04.00 – 05.00		10.8									0	0	0	0	0	0	0	0
	05.00 – 06.00		11.2									0	0	0	0	0	0	0	0
	06:00 – 07:00		10.7									0	0	0	0	0	0	0	0
	07:00 – 08:00		10.3									0	0	0	0	0	0	0	0
	Total			-	-	-	-	-	-	-	-	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**
10-11/10/18 **Sunset: 18:20** **Sunrise: 07:17**	18:00 – 19:00	PM	14.5	Static detector failed to work								0	0	0	0	0	0	0	0
	19:00 – 20:00		14.2									0	0	0	0	0	0	0	0
	20.00 – 21.00		13.5									1	0	0	0	0	0	0	0
	21.00 – 22.00		13.3									0	0	0	0	0	0	0	0
	22.00 – 23.00		12.8									0	0	0	0	0	0	0	0
	23.00 – 00.00		12.1									0	0	0	0	0	0	0	0
	00.00 – 01.00	AM	11.3									0	0	0	0	0	0	0	0
	01.00 – 02.00		10.9									0	0	0	0	0	0	0	0
	02.00 – 03.00		10.6									0	0	0	0	0	0	0	0
	03.00 – 04.00		9.7									0	0	0	0	0	0	0	0
	04.00 – 05.00		9.1									1	0	0	0	0	0	0	0
	05.00 – 06.00		8.2									0	0	0	0	0	0	0	0
	06:00 – 07:00		7.5									0	0	0	0	0	0	0	0
	07:00 – 08:00		7.3									0	0	0	0	0	0	0	0
	Total			-	-	-	-	-	-	-	-	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Table A1.4: Summary of Bat Passes Recorded by Static Detectors 3 and 4, Early October 2018 (cont)

Date	Time Band	AM / PM	Temp (°C)	Static 3								Static 4							
				Common pipistrelle	Daubenton's bat	Nathusius' pipistrelle	Natterer's bat	Noctule	Serotine	Soprano pipistrelle	Whiskered bat	Common pipistrelle	Daubenton's bat	Nathusius' pipistrelle	Natterer's bat	Noctule	Serotine	Soprano pipistrelle	Whiskered bat
11-12/10/18 **Sunset: 18:18** **Sunrise: 07:19**	17:00 – 18:00	PM	13.5	Static detector failed to work								0	0	0	0	0	0	0	0
	18:00 – 19:00		13.2									3	0	0	0	3	0	0	0
	19:00 – 20:00		12.8									0	0	0	0	0	0	0	0
	20.00 – 21.00		12.5									0	0	0	0	0	0	0	0
	21.00 – 22.00		12.2									0	0	0	0	1	0	0	0
	22.00 – 23.00		12.1									0	0	0	0	2	0	0	0
	23.00 – 00.00		11.5									1	0	0	0	0	0	0	0
	00.00 – 01.00	AM	10.8									0	0	0	0	0	0	0	0
	01.00 – 02.00		10.4									0	0	0	0	0	0	0	0
	02.00 – 03.00		9.8									0	0	0	0	0	0	0	0
	03.00 – 04.00		9.6									0	0	0	0	0	0	0	0
	04.00 – 05.00		9.5									0	0	0	0	0	0	0	0
	05.00 – 06.00		9.3									0	0	0	0	0	0	0	0
	06:00 – 07:00		8.9									1	0	0	0	0	0	0	0
	07:00 – 08:00		8.6									0	0	0	0	0	0	0	0
	Total			-	-	-	-	-	-	-	-	**5**	**0**	**0**	**0**	**6**	**0**	**0**	**0**
12-13/10/18 **Sunset: 18:15** **Sunrise: 07:20**	17:00 – 18:00	PM	13.8	Static detector failed to work								0	0	0	0	0	0	0	0
	18:00 – 19:00		13.4									0	0	0	0	0	0	0	0
	19:00 – 20:00		13.2									0	0	0	0	0	0	0	0
	20.00 – 21.00		13.3									0	0	0	0	0	0	0	0
	21.00 – 22.00		12.7									0	0	0	0	0	0	0	0
	22.00 – 23.00		12.6									0	0	0	0	0	0	0	0
	23.00 – 00.00		12.1									0	0	0	0	0	0	0	0
	00.00 – 01.00	AM	11.6									0	0	0	0	0	0	0	0
	01.00 – 02.00		10.4									0	0	0	0	0	0	0	0
	02.00 – 03.00		10.1									0	0	0	0	0	0	0	0
	03.00 – 04.00		9.7									0	0	0	0	0	0	0	0
	04.00 – 05.00		9.5									0	0	0	0	0	0	0	0
	05.00 – 06.00		9.4									0	0	0	0	0	0	0	0
	06:00 – 07:00		8.5									0	0	0	0	0	0	0	0
	07:00 – 08:00		8.2									0	0	0	0	0	0	0	0
	Total			-	-	-	-	-	-	-	-	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Table A1.4 (cont'd): Summary of Bat Passes Recorded by Static Detectors 3 and 4, Early October 2018 (cont)

Date	Time Band	AM / PM	Temp (°C)	Static 3								Static 4							
				Common pipistrelle	Daubenton's bat	Nathusius' pipistrelle	Natterer's bat	Noctule	Serotine	Soprano pipistrelle	Whiskered bat	Common pipistrelle	Daubenton's bat	Nathusius' pipistrelle	Natterer's bat	Noctule	Serotine	Soprano pipistrelle	Whiskered bat
13-14/10/18 **Sunset: 18:13** **Sunrise: 07:22**	17:00 – 18:00	PM	13.0	Static detector failed to work								0	0	0	0	0	0	0	0
	18:00 – 19:00		12.5									0	0	0	0	0	0	0	0
	19:00 – 20:00		11.7									0	0	0	0	0	0	0	0
	20.00 – 21.00		11.3									0	0	0	0	0	0	0	0
	21.00 – 22.00		11.2									0	0	0	0	0	0	0	0
	22.00 – 23.00		10.8									0	0	0	0	0	0	0	0
	23.00 – 00.00		10.6									0	0	0	0	0	0	0	0
	00.00 – 01.00	AM	9.4									0	0	0	0	0	0	0	0
	01.00 – 02.00		9.2									0	0	0	0	0	0	0	0
	02.00 – 03.00		9.1									0	0	0	0	0	0	0	0
	03.00 – 04.00		8.7									0	0	0	0	0	0	0	0
	04.00 – 05.00		8.1									0	0	0	0	0	0	0	0
	05.00 – 06.00		7.6									0	0	0	0	0	0	0	0
	06:00 – 07:00		12.8									0	0	0	0	0	0	0	0
	07:00 – 08:00		12.8									0	0	0	0	0	0	0	0
Total				**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Table A1.4 (cont'd): Summary of Bat Passes Recorded by Static Detectors 3 and 4, Early October 2018

APPENDIX 2

LEGISLATION

Bats and the places they use for shelter or protection (i.e. roosts) receive European protection under The Conservation of Habitats and Species Regulations 2017 (Habitats Regulations 2017). They receive further legal protection under the Wildlife and Countryside Act (WCA) 1981, as amended. This protection means that bats, and the places they use for shelter or protection, are capable of being a material consideration in the planning process.

Regulation 41 of the Habitats Regulations 2017, states that a person commits an offence if they:

- deliberately capture, injure or kill a bat;
- deliberately disturb bats; or
- damage or destroy a bat roost (breeding site or resting place).

Disturbance of animals includes in particular any disturbance which is likely to impair their ability to survive, to breed or reproduce, or to rear or nurture their young, or in the case of animals of a hibernating or migratory species, to hibernate or migrate; or to affect significantly the local distribution or abundance of the species to which they belong.

It is an offence under the Habitats Regulations 2017 for any person to have in his possession or control, to transport, to sell or exchange or to offer for sale, any live or dead bats, part of a bat or anything derived from bats, which has been unlawfully taken from the wild.

Whilst broadly similar to the above legislation, the WCA 1981 (as amended) differs in the following ways:

- Section 9(1) of the WCA makes it an offence to *intentionally* kill, injure or take any protected species.
- Section 9(4)(a) of the WCA makes it an offence to *intentionally or recklessly** damage or destroy, *or obstruct access to*, any structure or place which a protected species uses for shelter or protection.
- Section 9(4)(b) of the WCA makes it an offence to *intentionally or recklessly** disturb any protected species *while it is occupying a structure or place which it uses for shelter or protection*.

*Reckless offences were added by the Countryside and Rights of Way (CRoW) Act 2000.

As bats re-use the same roosts (breeding site or resting place) after periods of vacancy, legal opinion is that roosts are protected whether or not bats are present.

The following bat species are Species of Principal Importance for Nature Conservation in England: barbastelle bat *Barbastella barbastellus*, Bechstein's bat *Myotis bechsteinii*, noctule *Nyctalus noctula*, soprano pipistrelle *Pipistrellus pygmaeus*, brown long-eared bat *Plecotus auritus*, greater horseshoe bat *Rhinolophus ferrumequinum* and lesser horseshoe bat *Rhinolophus hipposideros*.

The reader should refer to the original legislation for the definitive interpretation.

ECOLOGY

At present, 18 species of bats are known to live within the United Kingdom, of which 17 species are confirmed as breeding. All UK bat species are classed as insectivorous, feeding on a variety of invertebrates including midges, mosquitoes, lacewings, moths, beetles and small spiders.

Bats will roost within a variety of different roosting locations, included houses, farm buildings, churches, bridges, walls, trees, culverts, caves and tunnels. At different times of the year the bats roosting requirements alter and they can have different roosting locations for maternity roosts, mating roosts and hibernation roosts. Certain bat species will also change roosts throughout the bat activity season with the bat colony using the site to roost for a few days, abandoning the roost and then returning a few days or weeks later. This change can be for a variety of reasons including climatic conditions and prey availability. Bats are known live for several years and if the climatic conditions are unfavourable at a particular roost, they may abandon it for a number of years, before returning when conditions change. Due to the matriarchal nature of bat colonies, the locations of these roosts can be passed down through the generations.

Bats usually start to come out of hibernation in March and early April (weather dependent), when they start to forage and replenish the body weight lost during the hibernation period. The female bats then start to congregate together in maternity roosts prior to giving birth and a single baby is born in June or July. The female then works hard to feed her young so that they can become independent and of a sufficient weight to survive the winter before the weather gets too cold and invertebrate activity reduces. Males generally live solitary lives, or in small groups with other males, although in some species the males can be found living with the females all year. The mating season begins in the autumn. During the winter bats hibernate in safe locations which provide relatively constant conditions, although they may venture outside to forage on warmer winter nights.