CALDECOTE FARM

NEWPORT PAGNELL · MILTON KEYNES

APPENDIX 6

ENVIRONMENTAL STATEMENT

ECOLOGY AND NATURE CONSERVATION

APPENDIX 6.2 BAT REPORT

newlands developments

Newlands Developments

Land at Caldecote Farm, Newport Pagnell

Appendix 6.2 Bat Survey Report

July 2021

FPCR Environment and Design Ltd
Registered Office: Lockington Hall, Lockington, Derby DE74 2RH
Company No. 07128076. [T] 01509 672772 [F] 01509 674565 [E] mail@fpcr.co.uk [W] www.fpcr.co.uk

Rev	Issue Status	Prepared / Date	Reviewed / Date	Approved/Date
-	Draft	JAW / 13.06.18	SAR / 20.06.18	JD / 26.06.18
	Final	JAW / 18.03.21		

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1.0 INTRODUCTION

1.1 The following report has been prepared by FPCR Environment & Design Ltd on behalf of Newlands Developments and provides details of reptile surveys undertaken at a site known as 'Land at Caldecote Farm, Newport Pagnell'.

1.2 This report should be read in conjunction with the Environmental Statement[1] and associated protected species reports produced for the site.

Site Location and Context

1.3 The site is located between Milton Keynes and Newport Pagnell in Buckinghamshire, central grid reference SP 8757 4228 (see Figure 1). The M1 motorway corridor forms the boundary to the west of the site, whilst Monks Way (A422) bounds the north / north-west boundary and Willen Road is located immediately to the east. Surrounding land use in the wider area consists of existing residential areas of Newport Pagnell to the north and Tongwell Industrial Estate and adjacent residential areas, comprising Willen and Blakelands to the west of the M1. To the east is an active sand and gravel extraction site and further afield consists of extensive open farmland and habitats associated with the River Ouzel.

1.4 The site comprises a field compartment which has been partially restored to agriculture following cessation of historic extraction activities. The site currently consists of species-poor grassland interspersed with tall ruderal species and scattered scrub. Remnant sand and gravel deposits, shallow ephemeral pools and bunds in varying stages of succession, between bare ground and poor semi-improved grassland, are located at the eastern periphery of the grassland. The site is bound by native hedgerows to the east, west and part of the north boundary, which widen to highway planting where associated with the A422 at the north-west and Willen Road to the south. The eastern-most extent of the site is formed by a short section of highway (Willen Road) and a section of adjoining arable field compartment.

1.4.1. The site was originally subject to an extended Phase 1 Habitat survey in April 2016, which was subsequently updated on the 29th May 2018 and 21st January 2021, to confirm that there had been no significant alterations in the nature or extent of habitats or of their suitability for faunal species.

1.4.2. Comments received from the Countryside Officer at Milton Keynes Council (Offer's Committee Report, dated 10th June 2020, planning reference 19/02402/FUL)[6], in regard to bat surveys undertaken on-site as part of a previous planning application, are detailed below.

"Bat Report

The habitat assessment was carried out in April 2016 and as such is out-of-date. The assessment was repeated in May 2018, which is still potentially beyond too old. The ground assessments of the trees were not carried out in accordance with Collins, 2016, instead relying on BS 8596:2015 Surveying for Bats in Trees & Woodlands. The habitats on site are largely unsuitable for roosting bats, and opportunities for foraging and commuting bats are also limited.

1 FPCR, 2021 Land at Caldecote Farm, Newport Pagnell Environmental Statement

6 Milton Keynes Council 10.06.2020 – CF – Officers Committee Report.pdf Available at: https://publicaccess2.milton-keynes.gov.uk/online-applications/applicationDetails.do?keyVal=PY2TIKKW0K600&activeTab=summary

There are no trees on site with the potential roost features (although no detailed information on the trees has been included in the report) and activity across the site, as recorded during activity transects and static detector surveys, is relatively low.

A sensitive lighting scheme should be secured by condition to protect foraging and commuting bats and other wildlife that may be using the habitats surrounding the site. The applicant should submit a lighting plan, including the types of lighting that will be used, their location and a lux contour map, showing light spill".

1.5 The assessment undertaken within this report is based upon the results of the bats surveys undertaken in 2016, and where required further discussion with the Milton Keynes Conservation Officer will be sought to clarify the extent, if any, of required updates to the current survey information.

Development Proposals

1.6 The development proposals entail the erection of two storage and distribution units (Class B8) with associated access, car parking, servicing, landscaping, earthworks and drainage.

Legislation

1.7 Bats are afforded full protection under the Wildlife & Countryside Act 1981 (as amended)[7] and the Conservation of Habitats and Species Regulations 2017 (as amended)[8].

1.8 Under the Conservation of Habitats and Species Regulations 2017 (as amended) it is illegal to:

- Deliberately capture, injure or kill any wild animal of a European Protected Species (EPS),
- Deliberately disturb wild animals of an EPS (affecting ability to survive, breed or rear young) – 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,
- Deliberately disturb wild animals of an EPS (impairing ability to migrate or hibernate) – disturbance of animals includes in particular any disturbance which is likely to impair their ability in the case of hibernating or migratory species to hibernate or migrate,
- Deliberately disturb wild animals of an EPS (affecting local distribution and abundance) – disturbance of animals includes in particular any disturbance which is likely to affect significantly the local distribution or abundance of the species to which they belong,
- Deliberately disturb wild animals of an EPS (whilst occupying a structure of place used for shelter or protection) – intentionally or recklessly disturb any wild animal while it is occupying a structure or place which it uses for shelter or protection,
- Damage or destroy a breeding site or resting place of a wild animal an EPS.

1.9 Under the Wildlife and Countryside Act 1981 (as amended) it is illegal to:

- Recklessly or intentionally kill, injure or take any wild animals included in Schedule 5,

[7] The Wildlife and Countryside Act 1981 (as amended). [Online]. London:HMSO Available at http://www.legislation.gov.uk/ukpga/1981/69 [Accessed 02/12/2014]
[8] The Conservation of Habitats and Species Regulations 2017 – Statutory Instrument 2017 No.1012. [Online]. London: HMSO. Available at: http:// http://www.legislation.gov.uk/uksi/2017/1012/pdfs/uksiem_20171012_en.pdf [Accessed 23/01/2018].

- Recklessly or intentionally damage or destroy, or obstruct access to any structure or place which any wild animal included in Schedule 5 uses for shelter or protection,
- Recklessly or intentionally disturb any such animal while it is occupying a structure or place which it uses for shelter or protection.

1.10 If impacts to bats or their roosts cannot be avoided a European Protected Species Licence from Natural England is required in order to allow proposals to derogate from the Legislation (Licenses cannot be obtained to provide protection against offences under the Wildlife & Countryside Act 1981 (as amended)). As part of the application process a number of 'Tests' have to be met by the application.

1.11 Natural England Guidance Note: European Protected Species and the Planning Process – Natural England's Application of the 'Three Tests' to Licence Applications (March 2011) states:

"In determining whether or not to grant a licence Natural England must apply the requirements of Regulation 53[5] of the Regulations and, in particular, the three tests set out in sub-paragraphs (2)(e), (9)(a) and (9)(b)[6].

(1) ***Regulation 53(2)(e****) states: a licence can be granted for the purposes of "preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment".*

(2) ***Regulation 53(9)(a)*** *states: the appropriate authority shall not grant a licence unless they are satisfied "that there is no satisfactory alternative".*

(3) ***Regulation 53(9)(b)*** *states: the appropriate authority shall not grant a licence unless they are satisfied "that the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range."*

1.12 Conservation status is defined as *"the sum of the influences acting on the species concerned that may affect the long term distribution and abundance of its population within its territory"*. It is assessed as favourable when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long term basis as a viable component of its natural habitats, and
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- There is, or will probably continue to be, a sufficiently large habitat to maintain its populations on a long term basis.

1.13 These tests must not only reach agreement with Natural England when assessing a Licence application they must also be assessed by the planning authority when determining a planning application.

1.14 All UK bat species are included as Priority species on the Buckinghamshire and Milton Keynes Biodiversity Action Plan[9].

[9] National Environment Programme Forward to 2020: Buckinghamshire and Milton Keynes Biodiversity Plan [Accessed 12.06.2016] Available at: file:///C:/Users/jat/Downloads/Forward-to-2020-Bucks-and-Milton-Keynes-Biodiversity-Action-Plan-Feb-2018.pdf

2.0 METHODOLOGY

Desktop Study

2.1 As part of the desk study the Buckinghamshire & Milton Keynes Environmental Records Centre (BMERC) was consulted for information during June 2016, and updated in January 2021, on existing ecological data regarding all bat species within a 1km radius of the site.

Field Surveys

Pre-Survey Habitat Assessment

2.2 A pre-survey habitat assessment was carried out on 13th April 2016 prior to the bat surveys being undertaken and aerial photography was used to assess the potential usage of the site by bats, including what species may be present, what habitat was suitable for bats, any potential roosting locations and potential foraging and commuting areas.

2.3 This assessment aims to provide a guide to the amount of survey effort expended which should ultimately be proportional to:

- The type and scale of the proposed development and its predicted impacts on bats,
- The size, nature and complexity of the development site,
- The likelihood of bats being present or affected,
- The species and numbers of individuals concerned, and
- The type of roost and/or habitat affected.

2.4 The site was also categorised for its habitat suitability for bats, which would also provide guidance on survey effort. Habitats were assessed using guidance from the bat surveys, good practice guidelines (Bat Conservation Trust, 3rd Edition 2016)[10].

2.5 This assessment was updated on 29th May 2018, and on 21st January 2021, when an update walkover survey was completed.

Tree Assessments

Ground Assessments

2.6 Assessment of the single on-site tree was undertaken from ground level, with the aid of a torch and binoculars by an experienced bat worker from FPCR on 21st January 2021 and previously on 13th April 2016 and 29th May 2018. During the survey Potential Roosting Features (PRF) for bats such as the following were sought (Based on P16, British Standard, *Surveying for bats in trees and woodland* – Guide, October 2015[11]):

- Natural holes (e.g. knot holes) arising from naturally shed branches or branches previously pruned back to a branch collar,

[10] Bat conservation Trust (2016) Professional Ecologists: Good Practice Guidelines, Bat Conservation Trust, London

[11] Description based on P16, British Standard 8596:2015 Surveying for bats in trees and woodland, October 2015

- Man-made holes (e.g. cavities) that have developed from flush cuts or cavities created by branches tearing out from parent stems,
- Woodpecker holes,
- Cracks/splits in stems or branches (horizontal and vertical);
- Partially detached, loose or platy bark,
- Cankers (caused by localised bark death) in which cavities have developed,
- Other hollows or cavities, including butt rots,
- Compression of forks with included bark, forming potential cavities,
- Crossing stems or branches with suitable roosting space between,
- Ivy stems with diameters in excess of 50mm with suitable roosting space behind (or where roosting space can be seen where a mat of thinner stems has left a gap between the mat and the trunk),
- Bat or bird boxes; and
- Other suitable places of rest or shelter.

2.7 Certain factors such as orientation of the feature, its height from the ground, the direct surroundings and its location in respect to other features, may enhance or reduce the potential value.

2.8 Based on the above, trees were classified into general bat roost potential groups based on the presence of these features. Table 1 (below) broadly classifies the potential categories as accurately as possible as well as discussing the relevance of the features. This table is based upon Table 4.1 and Chapter 6 in *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (J., Collins (Bat Conservation Trust), 2016).

2.9 Although the British Standard Document (British Standard, *Surveying for bats in trees and woodland – Guide*, October 2015) groups trees with moderate and high potential, these have been separated below (as per Table 4.1 in The Bat Conversation Trust Guidelines) to allow more specific survey criteria to be applied.

Table 1: Classification and Survey Requirements for Bats in Trees

Classification of Tree	**Description of** Category and Associated Features **(based on** Potential Roosting Features **listed above)**	**Likely Further Survey work**
Confirmed Roost	Evidence of roosting bats in the form of live bats, droppings, urine staining, mammalian fur oil staining, etc.	A Natural England derogation licence application will be undertaken. This will require a combination of aerial assessment by roped access bat workers **and** nocturnal survey during appropriate period (May to August). Replacement roost sites commensurate with status of roost to be provided. Works to be undertaken under supervision using a good practice method statement.

Classification of Tree	**Description of** Category and Associated Features **(based on** Potential Roosting Features **listed above)**	Likely Further Survey work
High Potential	A tree with one or more Potential Roosting Features that are obviously suitable for larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter protection, conditions (height above ground level, light levels, etc) and surrounding habitat but unlikely to support a roost of high conservation status (i.e. larger roost, irrespective of wider conservation status). Examples include (but are not limited to); woodpecker holes, larger cavities, hollow trunks, hazard beams, etc.	A combination of aerial assessment by roped access bat workers **and** nocturnal survey during appropriate period (May to August). Following additional assessments, tree may be upgraded or downgraded based on findings. After completion of survey work, some good practice removal operations **likely** to be required.
Moderate Potential	A tree with Potential Roosting Features which could support one or more potential roost sites due to their size, shelter protection, conditions (height above ground level, light levels, etc) and surrounding habitat but unlikely to support a roost of high conservation status (i.e. larger roost, irrespective of wider conservation status). Examples include (but are not limited to); woodpecker holes, rot cavities, branch socket cavities, etc.	A combination of aerial assessment by roped access bat workers **and /or** nocturnal survey during appropriate period (May to August). Following additional assessments, tree may be upgraded or downgraded based on findings. After completion of survey work, some good practice removal operations likely to be required.
Low Potential	A tree of sufficient size and age to contain Potential Roosting Features but with none seen from ground or features seen only very limited potential. Examples include (but are not limited to); loose/lifted bark, shallow splits exposed to elements or upward facing holes.	No further survey required but some good practice removal operations may be required
Negligible/No potential	Negligible/no habitat features likely to be used by roosting bats	None.

* The Conservation of Habitats & Species Regulations 2017 (as amended) affords protection to breeding sites or resting places at all times. For an area to be classified as a breeding site or resting place, the Regulations require there to be a reasonably high probability that the species will return to the sites and / or place.

Activity Surveys

2.10 The potential for the site and immediate surrounds to support feeding and commuting bats was also assessed, particular regard being given to the presence of continuous treelines, water courses and hedges providing good connectivity in the landscape, and the presence of varied habitat such as scrub, woodland, grassland and open water in the vicinity.

Activity Transect Surveys

2.11 The primary objectives of transects completed was to identify foraging areas, commuting routes, species composition and species utilisation of the development area.

2.12 This methodology takes into account the statutory guidance from English Nature (now Natural England)[12] and further guidelines introduced by the Bat Conservation Trust[13] and JNCC[14]. The survey effort was determined from recommendations provided in BCT[2] guidance, the relevant survey guidance over the survey period.

2.1 The transect routes were determined prior to survey in order to cover most areas of the site and included point count stops to identify activity levels around the features of potential value to bats that are to be most affected by proposals (i.e. hedgerows, tree lines, dense scrub etc). Each point count was five minutes long, during which time all bat activity was recorded.

2.2 Dusk transects were commenced either prior to or at sunset and were a minimum of 2 hours in duration. Each transect was walked at a steady pace and when a bat passed by, the species, time and behaviour was recorded on a site plan to help to form a general view of the bat activity present on site and highlight any habitats types associated with bat activity.

2.3 Surveyors used Wildlife Acoustics Inc. Echo Meter Touch® bat detectors were utilised in conjunction with Echo Meter Touch® app and Apple Inc. iPad® during the transect surveys to detect bats and aid species identification.

2.4 Post-survey, bat calls were analysed using bat calls were analysed using AnalookW© (Chris Corben) software package and/or BatSound® Pro (Pettersson Elektronik) software package, by taking measurements of the peak frequency, inter-pulse interval, call duration and end frequency. From this, the level of bat activity across the site in relation to the abundance of individual species foraging and commuting along habitats was assessed.

2.5 Three activity transects were completed over the active survey period in 2016 during May (dusk), June (dusk) and September (dusk).

2.6 All transects were undertaken when conditions were suitable (i.e. when the ambient air temperature exceeded 10ºC and there was little wind and no rain) see Table 2.

Table 2: Activity Transect Timings & Conditions

Date	Sunset/ Sunrise	Temperature at Start of Survey °C	Rain (0-5)	Wind (0-5)	Cloud %
17.05.16	20.55	12	0	2	100
22.06.16	21:26	18	0	0	100
05.09.16	19:38	22	0	0	30

[12] English Nature (2004) *Bat Mitigation Guidelines.*
[13] Bat Conservation Trust, 2016. *Bat Surveys for Professional Ecologists Good Practice Guidelines* 3rd edition.
[14] JNCC (1999) *Bat Workers Manual*

Automated Static Bat Detector Surveys

2.7 Static passive recording broadband detectors were deployed on site to supplement the manual transects surveys. In addition, passive recording is stipulated in the guidance document Bat Conservation Trust (2016) Good Practice Guidelines 3rd edition[15].

2.8 Passive monitoring was undertaken using an automated logging system Wildlife Acoustics Inc. Song Meter® SM2BAT+ bat detectors with its output saved to an internal storage device. SM2BAT+ detectors were placed along linear features considered to be of value to bats, such as hedgerows.

2.9 Devices were placed in each location for an extended period of time of suitable weather conditions (little no rain/wind and temperatures above 10°C). The conditions over each of the survey period were however representative for the timing of the survey. Detectors were programmed to activate 30 minutes before dusk and recorded continuously until 30 minutes following sunrise.

2.10 In accordance with the size of the site, the number of manual activity transect routes undertaken and the assessment of habitat suitability to support foraging and commuting bats, static units were deployed on site for a minimum of 5 consecutive nights.

2.11 For the purposes of analysis if the static detector was out for more than 5 nights the additional nights were only assessed for Annex II bat species. The recorded data was analysed using AnalookW© (Chris Corben) software package and/or BatSound® Pro (Pettersson Elektronik) software package to assess the amount of bat activity on site by recording the number of bat registrations.

Table 3: Activity Static Detector Timings & Conditions

Date	Position	Temperature at Start of Survey °C
20.05.2016	H4	Data (desktop sources) indicates that conditions were generally suitable over the recording period.
01.06.2016 – 11.06.2016	H4	Data (desktop sources) indicates that conditions were generally suitable over the recording period.
20.07.2016 – 25.07.2016	H5	Data (desktop sources) indicates that conditions were generally suitable over the recording period.
05.09.2016 – 10.09.2016	H1	Data (desktop sources) indicates that conditions were generally suitable over the recording period.

Limitations

2.12 Although species identification is undertaken to as accurate a level as possible, in some cases the quality of the call is such that full species identification cannot be made. Therefore, in some cases terminology may be general (for example *Pipistrellus* or *Myotis* species).

[15] Collins, J. (ed.)(2016) Bat Surveys for Professional Ecologists: Good Practicee Guidelines (3rd edn). The Bat Conservation Trust, London.

2.13 The SM2BAT+ records sound files of up to 12 seconds in length before a new file is created. The analysis of the SM2BAT+ files recorded can highlight the presence of more than one bat where recorded simultaneously on the same sound file. However, it is not possible to determine whether consecutive sound files have been recorded as the result of a single bat passing the detector as it commutes across the landscape or by one bat repeatedly triggering the detector as it forages in close proximately for an extended period. Therefore, each sound file is counted as a single bat registration. The number of sound files recorded does however reflect the relative importance of the location of the detector by calculating the bat registrations per hour.

2.14 One of the transect surveys (June 2016) was completed during a single lap of the field whilst the other two in May and September were completed in two laps. In all cases the surveys were carried out using current guidelines and methodologies.

2.15 Bat surveys were not undertaken on land within the highway which comprised mainly busy and well-lit roads. Static detectors (June 2016 and July 2016) were placed within hedgerows bordering the highway of Willen Road and therefore it is considered that the survey results collected during these periods accurately represent the species and abundance of bats utilising the habitats within the highway corridors. As such further surveys of these areas are not considered necessary.

2.16 The static used on site in May failed to record for 5 consecutive days and the static was therefore redeployed at the beginning of June for five nights.

2.17 Bat transect and static detector surveys were last completed during May, June and September 2016. Since this time update walkover surveys have confirmed that on-site habitats have remained unchanged and therefore it can be reasonably assumed that bat assemblages have also remained the same/similar given the limited nature of the habitats present.

3.0 RESULTS

Desktop Study

3.1 Records provided by consultees pertaining to bat species are listed in Table 4. The locations of these records are presented in Figure 6.1 of the accompanying ES Chapter.

Table 4: Records of Notable Species with 1km of the Site

Species	Conservation Status	Location	Distance from Site
Brown long-eared *Plecotus auritus*	CHSR, WCA, NERC	SP 87 43 Newport Pagnell	At least 450m north-west
		SP 8785 4120 St Mary's Church, Willen	700m south
Common pipistrelle *Pipistrellus pipistrellus*	CHSR, WCA, NERC	SP 873 430 The Mill House	450m north
		SP 875 431 Green Park	550m north

Species	Conservation Status	Location	Distance from Site
		SP 8785 4120 St Mary's Church, Willen	700m south
		SP 868 425 Tongwell Lake	350m west
Natterer's Bat *Myotis nattereri*	CHSR, WCA, NERC	SP 886 427 Caldecote Mill , River Ouzel	700m east
Noctule *Nyctalus noctula*	CHSR, WCA, NERC	SP 8785 4120 St Mary's Church, Willen	700m south
Pipistrelle species *Pipistrellus* sp.	CHSR, WCA, NERC	SP 8785 4120 St Mary's Church, Willen	700m south

Pre-Survey Habitat Assessment

3.2 The site generally provided little in terms of significant suitable bat habitat, mainly consisting of regularly managed semi-improved grassland of limited floristic value. Areas of bare earth, earth mounds dominated by tall ruderal vegetation and several ephemeral pools created a mosaic of habitats which could attract bats, and their insect prey, although the value of these habitats were limited by their small area. The site was bordered by hedgerows on all fronts, with areas of plantation woodland along the north-west and south-east boundaries. The hedgerows bordering the highways, although mature, were well-lit and therefore partially unsuitable. The arable habitat located east of Willen Road and forming the eastern most part of the site was considered to be completely unsuitable for foraging and commuting bats. The location of the site being completely bound by major roads also affords some isolation from surrounding suitable habitat. The locations of habitats within the application boundary are illustrated in Figure 6.3 of the accompanying ES Chapter.

3.3 During recent survey of the site in January 2021 it was noted that three sections of hedgerow H1, totalling approximately 85m, had recently been removed to facilitate the current M1 highway works. The remaining hedgerow sections were intact but unmanaged and dominated by bramble growing up and over the canopy.

Tree Assessments

Ground Assessments

3.4 A single mature ash *Fraxinus excelsior* was present within the site boundary. The tree was in a generally good condition with no features with the potential to support roosting bats.

Activity Surveys

3.5 The following sections are a summary of the results recorded during the nocturnal surveys. Full detailed breakdown of the data, including full detailed tables and locations are available in the associated plans (as indicated).

Activity Transects (Figures 1-3)

May 2016

3.6 During the transect in May a total of four bat contacts were recorded, two of these being common pipistrelle and two being common noctule. Of these, three were recorded in point counts and one recorded in the walked section between point counts. The first bat was in the north of site identified as a noctule foraging in grassland adjacent to the boundary hedgerow (H5) at 21:18. The second bat was a commuting common noctule at point count 3 foraging in the central grassland habitat. The third and fourth bats were common pipistrelles, the first recorded as foraging in grassland habitat adjacent to H1 whilst the fourth bat was identified commuting across grassland habitat located centrally within the site. All bats were recorded within a period of 1 hour after sunset.

June 2016

3.7 During the summer transect, a total of sixteen bat contacts were recorded, the majority comprising common pipistrelle with a lesser number of common noctule and a single soprano pipistrelle. Of the sixteen bats recorded, ten were identified as utilising grassland habitat in association with the boundary hedgerows whilst the remaining bat contacts were recorded associated with the quarry area and on a single occasion centrally within the field compartment. The first bat was a noctule recorded at 21:56 commuting above plantation woodland at the north-west of site.

August 2016

3.8 During the August transect, a total of nine bat contacts were recorded. These were identified as common pipistrelle, noctule and *Nyctalus* sp. The first bat recorded was a noctule recorded at 20:09 commuting along H4 at the east boundary. All other bat contacts were also recorded in association with boundary features with the exception of three *Nyctalus* sp. contacts which were commuting high over the site.

Static Bat Detector Survey

3.9 The overall static dataset indicated that the site is used to a limited extent by foraging and commuting bats. Activity levels were at their lowest at the beginning of June 2016 (Static 1) with a total of just 75 registrations recorded, whilst activity was greater during July 2016 with 1248 registrations followed by Static 2 in June which recorded 953 registrations. Overall the other activity levels were unremarkable with 205 registrations in September 2016.

3.10 A total of eight species/species groups were recorded during the survey period based on the 2481 registrations, see Table 5 for full details.

Table 5: Total Number and Percentage Breakdown of all Bat Registrations

Species	Percentage of Total bat registrations across all surveys	Total number of bat registrations
Noctule	44%	1099
Common pipistrelle	38%	944

Species	Percentage of Total bat registrations across all surveys	Total number of bat registrations
Nyctalus spp.	13%	343
Soprano pipistrelle	3%	62
Myotis sp.	0.8%	20
Pipistrellus spp.	0.4%	9
Brown long-eared	0.1%	3
Nathusius pipistrelle	0.0%	1

3.11 The bat species with the greatest number of registrations over the entire survey period was noctule bat (1099 or 43% of total) followed by common pipistrelle (944 or 38% of total) and *Nyctalus* sp. (343 or 13% of total), followed by much lower numbers of bat calls from other species.

3.12 Only one notable bat species, Nathusius' pipistrelle *Pipistrellus nathusii*, was recorded during June 2016 in association with H4. Given that a total of 2481 registrations were recorded over the entire survey period a single record is of low significance.

3.13 In terms of overall bat activity the results show a notable trend in noctule activity during July 2016. Total counts of 505 registrations were recorded between 9pm and 11pm followed by a peak count of 301 between 4am and 5am, whilst the average number of registrations between the hours of 11pm and 4am was 20 per hour demonstrating a marked drop in bat activity during this period. This trend and given the timings of the registrations suggests that a noctule roost may be located close by with H5 and the adjoining planation woodland, which runs parallel to the A422 providing a suitable wildlife corridor for commuting noctule bats.

3.14 No Annex II bat species were identified during any of the static detector surveys. The full results of the static surveys are provided in Table 6.

Table 6: Activity Static Detector Results

Unit Number	Total Average / hr	Total Registrations	Noctule			Common Pipistrelle			Nyctalus Species			Soprano Pipistrelle		
			Average / hr	Peak Count	Period Total	Average / hr	Peak Count	Period Total	Average / hr	Peak Count	Period Total	Average / hr	Peak Count	Period Total
Stat - 1 June	1.69	75	0.36	13	16	1.24	25	55	0	0	0	0.07	3	3
Stat - 3 July	26.22	1248 (Highest)	14.46	227	694	9.69	204	465	0.96	14	46	0.67	11	32
Stat - 4 September	3.19	205	0.71	14	46	0.84	24	54	1.04	32	67	0.31	8	20
Totals:	**12.37**	**2481**	**5.48**	**237**	**1099**	**4.7**	**204**	**944**	**1.71**	**105**	**343**	**0.31**	**11**	**62**

Unit Number	Total Average / hr	Total Registrations	Myotis Species			Pipistrelle Species			Brown Long-eared			Nathusius' pipistrelle		
			Average / hr	Peak Count	Period Total	Average / hr	Peak Count	Period Total	Average / hr	Peak Count	Period Total	Average / hr	Peak Count	Period Total
Stat - 1 June	1.69	75	0	0	0	0	0	0	0	0	0	0.02	1	1
Stat - 3 July	26.22	1248 (Highest)	0.04	2	2	0.13	3	6	0.06	2	3	0	0	0
Stat - 4 September	3.19	205	0.25	7	16	0.03	1	2	0	0	0	0	0	0
Totals:	**12.37**	**2481**	**0.1**	**7**	**20**	**0.04**	**3**	**9**	**0.01**	**2**	**3**	**0**	**1**	**1**

4.0 DISCUSSION & RECOMMENDATIONS

4.1 All UK species of bat are listed on the Conservation of Habitats and Species Regulations 2017 (as amended) making it illegal to deliberately disturb any such animal or damage / destroy a breeding site or roosting place of any such animal. Bats are also afforded full legal protection under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Under this legislation it is illegal to recklessly or intentionally kill, injure or take a species of bat or recklessly or intentionally damage or obstruct access to or destroy any place of shelter or protection or disturb any animal whilst they are occupying such a place of shelter or protection. Some bat species, are Species of Principal Importance under Section 41 of the Natural Environment and Rural Communities Act 2006 (NERC) and all are included as Priority species on the Buckinghamshire and Milton Keynes Biodiversity Action Plan.

Roost Sites

4.2 No buildings were present within the application site and no trees were identified as supporting suitable roosting habitat for bats. Therefore the possible presence of a bat roost does not pose a constraint to the proposals.

Habitat – Foraging / Commuting

4.3 Over the survey period a minimum of eight species or genus of bat were identified using the site. These species included common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, *Pipistrellus* species, brown long-eared, *Myotis* species, *Nyctalus* species and noctule. An additional species was identified during the desk study, Natterer's Bat. This assemblage of species, located on a site on the urban infrastructure fringe with a limited mosaic of habitats comprising of mainly poor semi-improved grassland with hedgerows, bare ground, ephemeral pools and other quarry associated habitats is considered to be typical for a site of this size and nature in Buckinghamshire.

4.4 Common pipistrelle and noctule are two of the UK's most common bat species and were the two most frequently encountered across the site during the static detector and transect surveys. *Nyctalus* sp. was the third most common genus recorded throughout the entire survey period. Low numbers (less than 100 registrations) of soprano pipistrelle, brown long-eared, *Pipistrellus* species and *Myotis* sp. were recorded throughout the entire survey period. A single Nathusius' pipistrelle was recorded during June.

Pipistrelle Species

4.5 Common pipistrelle, the second most frequently recorded species, saw the highest level of activity occurring in July (less than 100 contacts recorded in June and September). This is would be expected as June is it the maternity period for bats and so by July the female bats are busy feeding both themselves and the juveniles at the roost and therefore foraging activity is likely to increase during this month. As activity during June and September was low, these results indicate that site's habitats form only part of a small part of their foraging habitats within their natural range. The results demonstrate that the hedgerows do not form a significant commuting route to roost sites surrounding the site, as no significant activity at dusk or dawn was recorded along them.

4.6 Soprano pipistrelle was the fourth most commonly recorded species across the site, albeit recorded in significantly lower numbers than common pipistrelle and common noctule, with the highest level of activity recorded during July and September.

4.7 Nathusius' pipistrelle are widespread but rare across the UK, most commonly encountered during migration in late summer/autumn, although some do remain all year and breed in the UK. This species was identified during the static detector surveys in June (one registration) in the middle of hedgerow H4, a typical habitat in which this species would be found. No other registrations were identified. Within Buckinghamshire it is likely that this species is under recorded and thus records of these species are not considered significant as it is likely that this species was foraging or commuting within its natural range.

Myotis species

4.8 Unidentified *Myotis* species were identified during the transect surveys in July and September in association with hedgerows H5 and H1.

Nyctalus species

4.9 *Nyctalus* species and noctule were the most frequently encountered bat species / genus across the site during the static detector and transect surveys. The *Nyctalus* sp. calls were analysed as *Nyctalus* bat species as a precaution based on the overlapping call parameters between noctule and Leisler's bats *Nyctalus leisleri.* The cluttered environment in which the static detector was located means that it is more likely that individual bats will produce these higher frequency calls for these species.

4.10 The highest levels of bat activity by this species occurred in July along the north-west / north site boundary in conjunction with off-site plantation woodland and H5. Given the time of year that the activity was recorded it is considered likely that a maternity roost utilises the tree line at certain times of the year as it moves between roost sites and as such is considered to be a seasonally important commuting corridor.

Plecotus species

4.11 Brown long-eared bats were identified utilising the off-site plantation woodland at the north-west/north site boundary and in conjunction with H5. Activity by this species was only recorded during July.

Mitigation & Enhancements

Mitigation

4.12 As part of the site proposals, hedgerow H4 will be lost in its entirety along with part losses to H2, H3 and H5. To ensure that impacts on the local bat population are avoided the following measures are recommended and should be incorporated within the final scheme:

- All lost hedgerows should be compensated for on a like-for-like basis, with hedgerows trees incorporated to enhance hedgerow structure until they reach maturity in a more suitable location on site to maintain foraging and commuting lines.

- Incorporation of strategic dark corridors i.e. at the western-most boundary of the site to ensure habitats of value to bats for foraging, potential roosting and commuting remain suitable. It is recommended that all boundary habitats are considered and maintained as dark corridors for bats, this incorporates natural dark routes already present adjacent the site (i.e. highway planting) and retained hedgerows.

Lighting & Connectivity

4.13 Urbanisation often results in higher levels of light pollution[16] which is an increasing problem for bats. Increasing light levels can result in a reduction in a number of effects such as disturbance / loss of roost sites and commuting routes, alterations to the feeding behaviour of bats / available resources and increased chances of being preyed upon[17]. As such a sensitive lighting design should be incorporated into the development to minimise any impacts arising for lighting.

4.14 Lighting considerations which are recommended to be implemented during construction and incorporated into the development in order to ensure minimal light spill from the site include;

- During the construction period no lighting is present at night,
- Lighting is directed to where it is needed, to avoid light spillage, particularly along the hedgerow and woodland edges,
- Lighting that is incorporated into the development design should be low pressure sodium lights as the light is emitted at one wavelength and as such has a low attraction to insects,
- Any upward lighting should be avoided,
- Security lighting backing onto boundary hedgerows and woodland will be low wattage (<70W) motion censored lights[18]. These should be provided at construction stage to forestall a future installation of unsuitable lighting which could impact on bats.

Enhancements

4.15 On completion of the development the site offers significant opportunities to provide enhancements for the local bat population. The following provides an overview of the enhancements.

M1 Motorway Wildlife Corridor

4.16 The western most periphery of the site will be enhanced by the creation of a habitat mosaic consisting of native broadleaved woodland, attenuation ponds and species-rich grassland. Creation of these habitats will enhance the existing designated M1 Motorway Wildlife Corridor and in the short and long term will provide a strong green corridor for bats species in the local area. The implementation of this habitat creation will increase overall biodiversity found within the site, enabling a greater potential range of insects which will use the area, therefore enhancing the value of these features for bats in conjunction with existing areas of value including the semi-mature / mature woodland planting at the north and south boundaries of the site.

[16] Stone, E.L. (2013) *Bats and lighting: Overview of current evidence and mitigation*.

[17] Bat Conservation Trust & UK Institute of Lighting Professional (May 2009). *Bats and Lighting in the UK. Bats and Built Environment Series*. London & Rugby.

[18] Stone, E.L. (2013) *Bats and lighting: Overview of current evidence and mitigation*.

Hedgerows

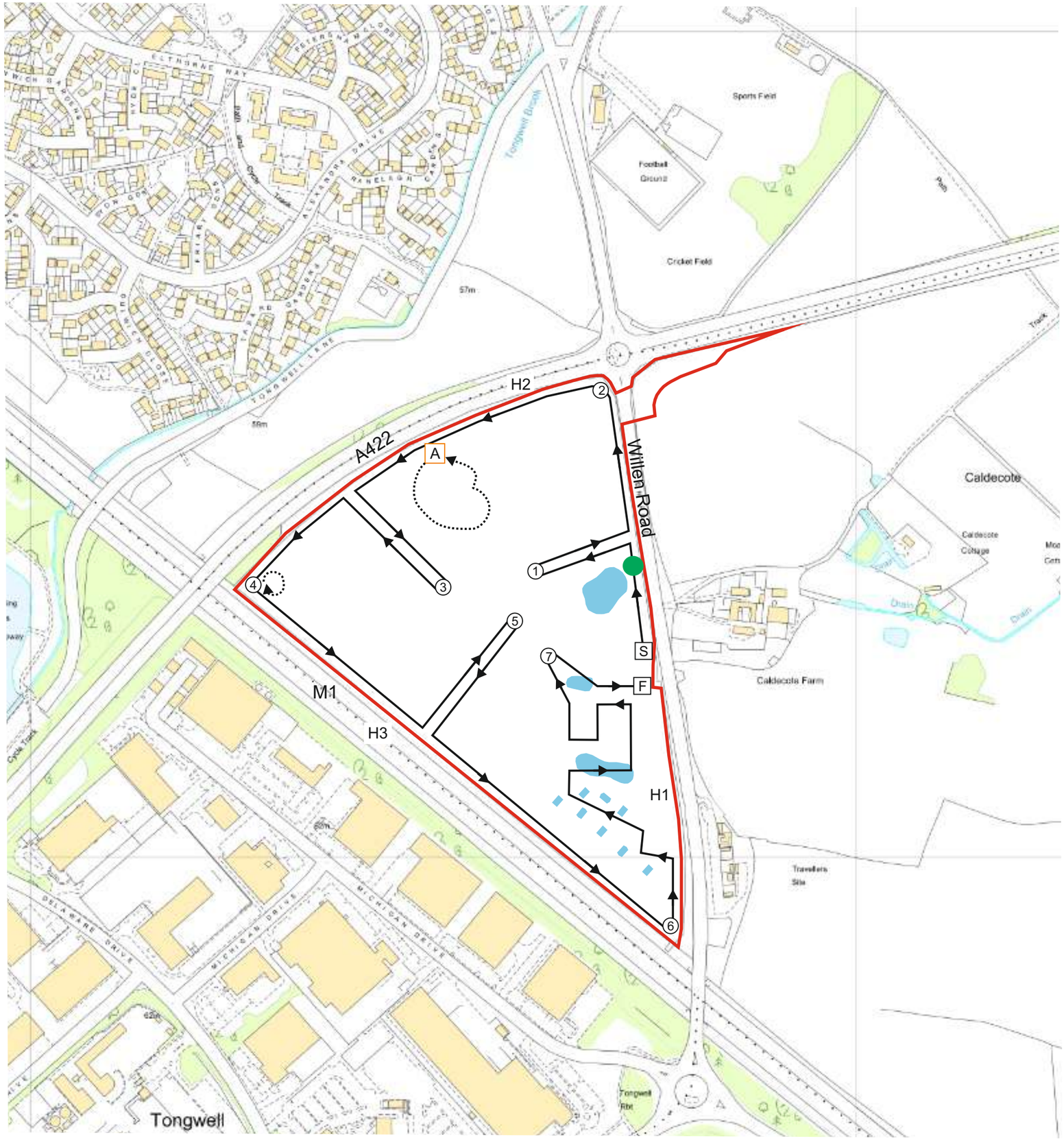
4.17 Where hedgerows are retained their diversity and overall structure should be enhanced via "gapping up" with native species; this will increase species diversity, strengthen the hedgerow and improve the corridor for foraging bats.

4.18 Preference will be given to planting species of local provenance within the hedgerows and woodland that will be nectar and fruit producing species to provide foraging for insects, birds and mammals. Species could include a mix of alder *Alnus glutinosa*, beech *Fagus sylvatica*, silver birch *Betula pendula,* wych elm *Ulmus glabra,* wild cherry *Prunus avium*, hornbeam *Carpinus betulus,* English oak *Quercus robur,* rowan *Sorbus aucuparia,* goat willow *Salix caprea,* hawthorn *Crataegus monogyna*, hazel *Corylus avellana*, field maple *Acer campestre*, blackthorn *Prunus spinosa*, dogwood, *Cornus sanguinea*, elder *Sambucus nigra,* guelder rose *Viburnum opilus*, field rose *Rosa arvensis* and dog rose *Rosa canina*.

4.19 Management of the hedgerows should be undertaken in an ecologically sensitive manner to enhance their nature conservation value. Such management may include;

- Allowing the hedgerow to reach at least a height of 3m. Once reached the hedgerow can be 'topped out' to maintain the height or to suit circumstances, with a width of at least 1-2m;
- A proportion of trees within the hedgerow such as English oak and field maple should be allowed to mature into standard trees to provide nesting and foraging opportunities for local wildlife and a varied habitat structure; and
- Grassland along the hedgerow base should be allowed to grow to provide a graduated sward height and habitat.

4.20 A range of bat boxes could be incorporated into the scheme, installed on retained trees and within the fabric of any appropriate newly built structures to provide potential roosting habitat within the site.



17.05.16 (Dusk)					
Ref	Time	Species	Behaviour	Habitat	No. of Passes
START	20:53	-	-		-
PC1	20:59 - 21:02	-	-		-
PC2	21:10 - 21:13	-	-		-
A	21:18	Noctule	Forage	H2/Grassland	4
PC3	21:21 - 21:14	Noctule	Commute	Grassland	1
PC4	21:32 - 21:35	C Pip	Forage	H3/Grassland	3
PC5	21:42 - 21:45	C Pip	Commute	Grassland	1
PC6	21:54 - 21:57	-	-		-
PC7	22:04 - 22:07	-	-		-
PC1 L2	22:18 - 21:21	-	-		-
PC2 L2	22:25 - 22:28	-	-		-
PC3 L2	22:33 - 22:36	-	-		-
PC4 L2	22:42 - 22:45	-	-		-
PC5 L2	22:50 - 22:53	-	-		-
PC6 L2	23:00 - 23:03	-	-		-
PC7 L2	23:08 - 23:11	-	-		-
FINISH	23:12	-	-		-

Newlands Developments

Land at Caldecote Farm, Newport Pagnell

Transects Results May 2016

NTS @ A3 RR / JAW 23.03.2021

Figure 1

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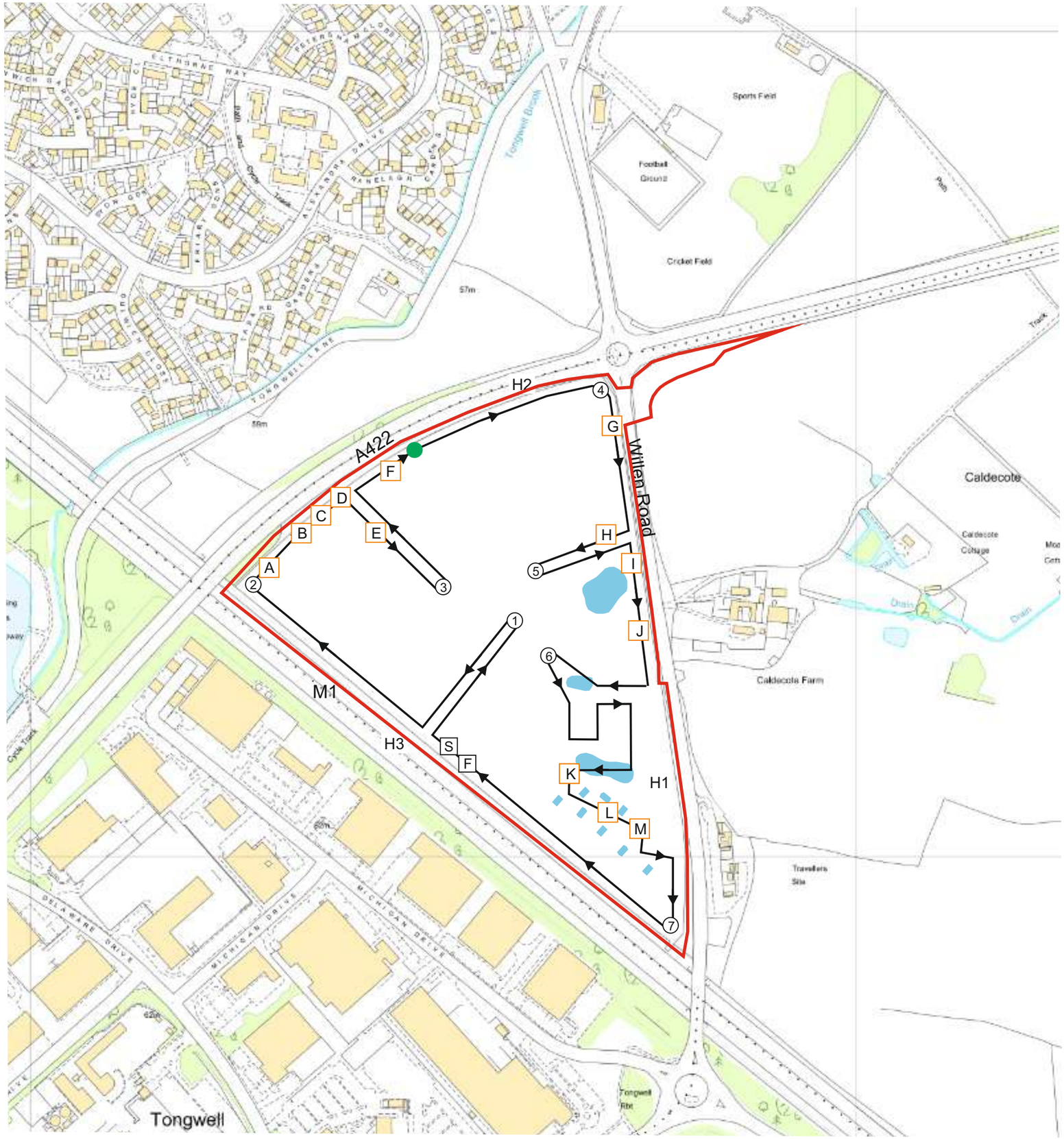
J:\7200\7252\ECO\Bats\Transect Results\Plans\7252 - Bat Transect Result Plan - First Survey - May 2016



	22.06.16				
Ref	**Time**	**Species**	**Behaviour**	**Habitat**	**No. of passes**
START	21:26	-	-	-	-
PC1	21:33 - 21:36	-	-	-	-
PC2	21:53 - 21:56	-	-	-	-
A	21:56	Noctule	Commute	Plantation woodland	1
B	21:59	C Pip	Commute	Plantation woodland	1
C	22:00	C pip	Forage	Plantation woodland	2
D	22:03	C Pip	Forage	Plantation woodland	1
E	22:06	Noctule	Forage	Grassland	3
PC3	22:10 - 21:13	Noctule	Forage	Grassland	1
F	22:21	C Pip	Forage	H2/Grassland	1
PC4	22:26 - 22:29	Noctule	Forage	H2/Grassland	1
G	22:32	C Pip	Forage	H1/Grassland	2
H	22:34	S Pip & C Pip	Forage	Grassland	1
PC5	22:39 - 22:42	-	-		-
I	22:46	C Pip	Forage	H1/Grassland	1
J	22:48	Noctule	Forage	H1/Grassland	1
K	22:53	C Pip	Forage	Plantation woodland	1
PC6	23:03 - 23:06	-	-		-
L	23:11	S Pip	Forage	Grassland	2
M	23:14	C Pip	Forage	Grassland	1
PC7	23:17 - 23:20	-	-	-	-
FINISH	23:26	-	-	-	-

Newlands Developments

Land at Caldecote Farm, Newport Pagnell

Transects Results June 2016

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Figure 2

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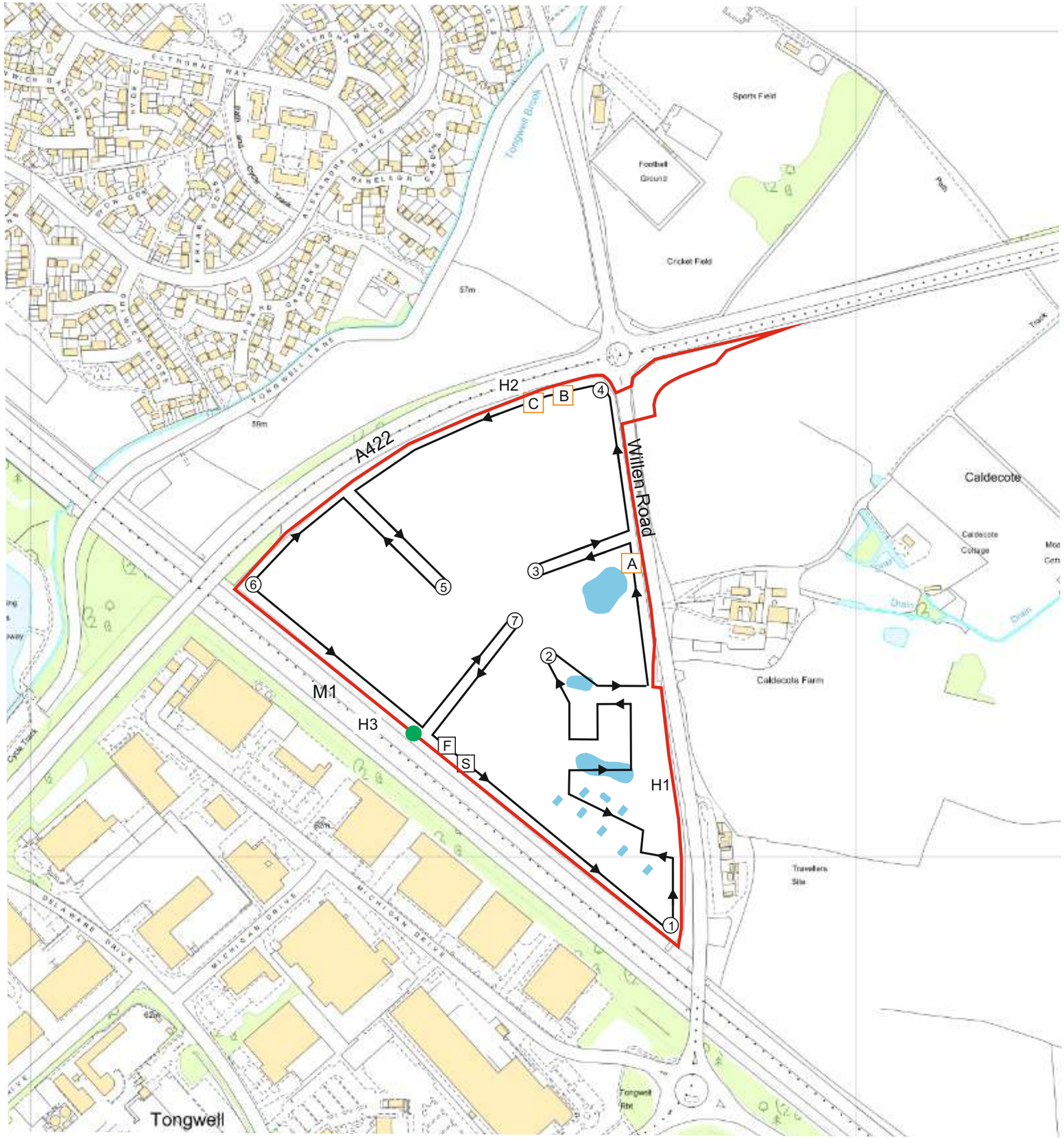

05.09.16				
Ref	**Time**	**Species**	**Behaviour**	**No. of passes**
START	19:38	-	-	-
PC1	19:50 - 19:55	-	-	-
PC2	20:00 - 20:05	-	-	-
A	20.09	Noctule	Commute	1
PC3	20:12 - 20:17	-	-	-
PC4	20:22 - 20:27			
B	20:28	C Pip	Forage	1
PC5	20:35 - 20:40	C Pip	Commute	1
PC6	20:42 - 20:47	-	-	-
PC7	20:51 - 20:56			
PC1 L2	21:00 - 21:05	Noctule	Commute	1
PC2 L2	21:10 - 21:15	Nyctalus sp.	Commute	1
PC3 L2	21:16 - 21:21	Nyctalus sp.	Commute	2
PC4 L2	21:23 - 21:28	Nyctalus sp. and C Pip	Commute	1
C	21.29	C Pip	Commute	1
PC5 L2	21:33 - 21:38	-	-	-
PC6 L2	21:39 - 21:44	-	-	-
PC7 L2	21:49 - 21:54	-	-	-
FINISH	21:55	-	-	-

Newlands Developments

Land at Caldecote Farm, Newport Pagnell

Transects Results September 2016

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Figure 3

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