Longfield Solar Farm

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1. Introduction

1.1 Background

1.1.1 In 2020, AECOM undertook a Preliminary Ecological Appraisal (PEA) (***Appendix 8B: PEA*** of the Environmental Statement (ES) **[EN010118/APP/6.2]**) of the Longfield Solar Farm Site on behalf of Longfield Solar Farm Ltd (hereafter referred to as 'the Applicant'). This PEA identified the need for follow-up ecological surveys and assessments to determine a baseline and potential impacts of the proposed Longfield Solar Energy Farm (hereafter referred to as 'the Scheme') on protected and, or notable species. As part of this work, AECOM undertook bat surveys within the Scheme boundary (hereafter referred to as the 'Order limits') (see red line boundary on **Figure A3, Annex A**).

1.2 Order limits Description

1.2.1 The Order limits is located in Essex within the administrative areas of Braintree District Council and Chelmsford City Council.

1.2.2 The Order limits is approximately centred on National Grid Reference (NGR) TL 74179 14620 and located approximately 1.1 kilometres (km) to the west of the village of Terling (**Figure A3, Annex A**).

1.2.3 The Order limits comprises a single parcel of land separated by several areas of woodland which is in total approximately 453 hectares (ha) in area.

1.2.4 The landscape features within the Order limits consist of agricultural fields mainly under arable production, with some small parcels of pasture, interspersed with individual trees, hedgerows, linear tree belts, small woodland blocks and farm access tracks. The hedgerows within the Order limits range between lengths of dense tall vegetation (shrub and tree species), the dominant hedgerow type in the landscape, and thin lines of vegetation with sporadic trees. The arable fields are of small to moderate size, some of which are of irregular shape.

1.2.5 The landscape features immediately surrounding the Order limits comprise a number of villages, including Fuller Street approximately 300 metre (m) to the north, Gamble's Green and Terling 500 metres (m) and 1.1km to the East, Boreham 500m to the south-west, Hatfield Peverel 1.5km to the south-east and the city of Chelmsford 5.7 kilometres (km) to the south-west. Boreham Road runs north to south along the western edge of the Order limits, with the A12 carriageway abutting and bounding the southern edge of the Order limits boundary.

1.2.6 The northern part of the Order limits and surrounding area consists of undulating and relatively elevated landform, as part of the River Ter valley. The landform rises steeply northwards from the river and Terling Spring, between 35m Above Ordnance Datum (AOD) to 50m AOD along parts of Braintree Road. It culminates at a ridgeline at 70m AOD at Rank's Green, in the northern part of the Order limits. To the south of the River Ter, the landform also rises steeply, across Sandy Wood, to a ridgeline at 55m AOD.

1.2.7 To the west of the Order limits, the landscape consists of a varied pattern of landform, reflecting past sand and gravel extraction and engineered flat terrain across Boreham airfield, which is situated at 55m AOD approximately 800m to the west of the Order limits. From the airfield, the landform falls very gradually eastwards to the River Ter, which flows southwards between Terling and the northern part of Hatfield Peverel, at approximately 20m AOD.

1.2.8 The River Chelmer is present 2.5km to the south of the Order limits. There are several large-scale reservoirs and lakes adjacent to the river. From the river, the landform rises consistently northwards, to form a ridgeline around 40m AOD at Boreham, and southwards, across Little Baddow, to an elevated ridgeline at 100m AOD, approximately 3km from the Order limits boundary.

1.2.9 Most of the southern and central part of the Order limits is located across flat and low-lying landform at approximately 45m AOD, between Waltham Road / Boreham Road and Terling Road. The northern part of the Order limits is located within part of the River Ter valley, where there is rising land to the north and south of Terling Spring and adjacent to Braintree Road.

1.3 Description of the Scheme

1.3.1 Longfield Solar Farm is a new solar farm scheme that would connect to the national electricity transmission network. Longfield will use ground mounted solar photovoltaic (PV) panel arrays to generate electricity energy from the sun and combine these with a Battery Energy Storage System (BESS). The Scheme will be connected to the national electricity transmission network by an underground cable. The Scheme will be located within the Order limits boundary as shown on **Figure A3, Annex A**.

1.3.2 The principal infrastructure will be located within the Order limits and will include:

a. Solar PV modules;

b. PV module mounting structures;

c. Inverters;

d. Transformers;

e. Switchgears (housed inside a building);

f. On-site cabling;

g. One or more BESS (expected to be formed of lithium ion batteries storing electrical energy);

h. An electrical compound comprising a substation and control building;

i. Fencing and security measures; and

j. Access tracks.

1.3.3 During the construction phase, one or more temporary construction compound(s) will be required as well as temporary roadways to facilitate access to all land within the Order limits.

1.3.4 Further information on the Scheme is provided in ***Chapter 2: The Scheme*** of the ES **[EN010118/APP/6.2]**.

1.4 Scope of this Report

1.4.1 The PEA Report (Ref 1-1) identified bat species that could be a potential constraint to the works or influence the design and implementation of the Scheme. Bats are protected under UK and European legislation and are species of principal importance (listed under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006) (see **Section 2**).

1.4.2 The objective of the desk study and bat surveys, reported in this document, are to determine the presence, assemblage and distribution of bat species, within the Order limits, assign a biodiversity importance to these and identify outline potential impacts of the Scheme on bats.

1.4.3 This report includes the following information:

a. Relevant legislation and policy;

b. Methods for desk and field-based assessments undertaken between May and September 2020 and April 2021;

c. Limitations to the surveys undertaken and any assumptions made as a result of any incomplete data;

d. Survey results including preliminary roost appraisals and bat activity surveys;

e. Assessment of biodiversity importance of the bat species and sites designated for bat species (where applicable); and

f. Conclusions.

1.4.4 This report is a technical appendix to accompany ***Chapter 8: Ecology*** of the ES **[EN010118/APP/6.2]**, reporting on and evaluating the baseline data collected.

2. Relevant Legislation and Policy

2.1 Legislation

2.1.1 The following wildlife legislation is potentially relevant to bats in relation to the Scheme:

a. Wildlife and Countryside Act 1981 (as amended) (the WCA);

b. Countryside and Rights of Way (CRoW) Act 2000;

c. Natural Environment and Rural Communities (NERC) Act 2006; and

d. Conservation of Habitats and Species Regulations 2017 (as amended).

2.1.2 The above legislation has been considered when planning and undertaking the commissioned survey work using the methods described in Section 3; when identifying potential constraints to the Scheme; and when making recommendations for further survey, design options and mitigation, as discussed in Section 6. Compliance with legislation may require the attainment of relevant protected species licences prior to the implementation of the proposed development.

2.1.3 All bat species and their roosts are legally protected in the UK under the Conservation of Habitats and Species Regulations 2017 (as amended), which implements the EC Directive 92/43/EEC (the Habitats Directive). In addition, Barbastelle (*Barbastella barbastellus*), Lesser and Greater Horseshoe Bats (*Rhinolophus hipposideros* and *Rhinolophus ferrumequinum*) and Bechstein's Bat (*Myotis bechsteinii*) are listed in Annex II of the Habitats Directive, which requires sites to be designated in member states for their protection. Bats and their roosts are also protected under the WCA.

2.1.4 Taken together, the Conservation of Habitats and Species Regulations 2017 (as amended) and the WCA make it illegal to:

a. Deliberately capture or intentionally take a bat;

b. Deliberately or intentionally kill or injure a bat;

c. Be in possession or control of any live or dead bat or any part of, or anything derived from a bat;

d. Damage or destroy a breeding site or resting place of a bat;

e. Intentionally or recklessly obstruct access to any place that a bat uses for shelter or protection;

f. Intentionally or recklessly disturb a bat while it is occupying a structure or place that it uses for shelter or protection; and

g. Deliberately disturb bats, in particular any disturbance which is likely to (i) impair their ability to survive, breed, reproduce or to rear or nurture their young; or in the case of hibernating or migratory species, to hibernate or migrate; or (ii) affect significantly the local distribution or abundance of the species to which they belong.

2.1.5 A bat roost is defined as any structure a bat uses for breeding, resting, shelter or protection. It is important to note that since bats tend to re-use the same

roost sites, current legal opinion is that a bat roost is protected regardless of whether or not the bats are present at a specific point in time.

2.1.6 Section 40 of the NERC Act 2006 places a legal obligation on public bodies in England to have regard to particular living organisms and types of habitat which are of the greatest conservation importance whilst carrying out their functions, whilst also having a general regard for protecting all biodiversity. The NERC Act 2006 Section 41 includes seven bats as species of 'principal importance': Barbastelle, Bechstein's bat, Noctule (*Nyctalus noctula*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), Brown Long-eared Bat (*Plecotus auritus*), Lesser and Greater Horseshoe Bats.

2.1.7 Local Planning Authorities must be satisfied that favourable conservation status of bats (and other European Protected Species) can be maintained before granting planning permission. Demonstrating the maintenance of 'favourable conservation status' is one of three Habitats Directive "derogation tests" relating to European protected species that the Local Planning Authority must be satisfied are met in order to be able to grant planning permission.

2.1.8 The three "derogation tests" as set out in paragraph 53 of Conservation of Habitats and Species Regulations 2017 (as amended) are that:

a. "*The development must be either for "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*";

b. "*That there is no satisfactory alternative*"; and

c. "*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*".

2.1.9 Favourable conservation status is defined in Article 1(i) of the Habitats Directive as when:

a. "*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*";

b. "*The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future*"; and

c. "*There is, and will probably continue to be, a sufficiently large habitat to maintain its population on a long-term basis*".

2.2 European Protected Species Mitigation Licences

2.2.1 Although the law provides strict protection for bats, it also allows this protection to be set aside (derogated) under Regulation 53 of the Conservation of Habitats and Species Regulations 2017 (as amended) through the issuing of European Protected Species Mitigation Licences (EPSMLs) for the purpose of preserving public health; public safety; other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment. However, in accordance with the requirements of the Conservation of Habitats and Species Regulations 2017 (as amended) a licence can only be issued where the following requirements are satisfied:

a. There is no satisfactory alternative; and

b. 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.

2.2.2 The process of obtaining an EPSML from Natural England will normally take two months (Natural England's standard determination period is 30 working days). In addition, Natural England would normally expect any bat EPSML application to be accompanied by the data collected from the detailed bat surveys, which are used to determine the status of the structure or tree with regard to bats; specifically, the location of roost sites, the bat species utilising the roost and the type of roost (such as maternity, or transitional).

2.2.3 The application for an EPSML would need to include the production of a detailed method statement for the proposed works. This document would include details of working practices and mitigation measures to ensure that the favourable conservation status of the bats using the structure or tree is not adversely affected.

2.3 Planning Policy

2.3.1 National and local planning policy relevant to nature conservation is provided in detail in the PEA Report for the Scheme (Ref 1-1) and included as ***Appendix 8B*** of the ES **[EN010118/APP/6.2]**.

2.4 Local Biodiversity Action Plan Species

2.4.1 The Essex Biodiversity Action Plan (BAP) (1-2) sets out species action plans within Essex and provides the local nature conservation strategy for identifying threats to species within this county and sets out the actions necessary to conserve them. The Essex BAP provides context to inform the identification of threatened and, or uncommon species within the district and, or county. The Essex BAP also identify priorities for conservation and enhancement but confers no particular legislative or policy protection to the species identified, however in some cases this is provided through related legislation and local planning policy.

2.4.2 The Essex BAP lists pipistrelle species (Common and Soprano Pipistrelle). Actions are relevant to other species of bats present in Essex. BAP targets for pipistrelle species include:

a. Maintain existing populations and range of pipistrelles;

b. Encourage water quality levels which will help support populations of aquatic insects on which Pipistrelles feed;

c. Ensure the needs of this species are considered in incentive schemes designed for the management of suitable pipistrelle habitats; and

d. Encourage favourable management of land adjacent to known roost sites to support foraging by juvenile pipistrelles.

3. Methods

3.1 Desk Study

3.1.1 A desk study to obtain records of bat species[1] was undertaken in July 2020 through Essex Wildlife Trust Records Centre within a 2km radius of the Order limits as part of the PEA (Ref 1-1), and in January 2021 through Essex Field Club within a 5km radius of the Order limits (see ***Appendix 8L: Essex Field Club Desk Study*** of the ES **[EN010118/APP/6.2]**). A search was made of relevant statutory site designations within 10km of the Order limits and other statutory or non-statutory nature conservation designations within 2km of the Order limits (including those of relevance to bats) as part of the PEA Report (Ref 1-1).

3.1.2 A search was also undertaken of freely available resources including the Essex Bat Group website on bat distribution (Ref 1-3); Magic.gov.uk (Ref 1-4) for bat designated Special Areas of Conservation (SACs) within 30km of the Scheme; and granted licences (EPSML) in relation to bats within 2km of the Order limits.

3.2 Field Survey

Introduction

3.2.1 All field surveys were led by competent ecologists, familiar with bat ecology and surveying, with the relevant Natural England bat survey class licences for the survey type, and full or associate members of the Chartered Institute of Ecology and Environmental Management (CIEEM).

3.2.2 Prior to the start of the surveys in each new location, a daytime site visit was undertaken for each location by the lead surveyor in order to plan the works, assess any health and safety issues on the Order limits, and record the context of the survey locations.

Preliminary Roost Assessment

3.2.3 A preliminary roost assessment (PRA) survey was carried out on all relevant features identified within the Order limits, and up to 50m from the Order limits (where indirect impacts were possible, and suitable habitat existed), on 12th, 13th, 20th, 21st May, 10th July 2020 and 20th April 2021. Where access was permitted, a licensed bat ecologist (with a minimum Natural England Level 1 Class Licence) and an assistant undertook an initial assessment of relevant buildings/structures, woodland blocks and trees at ground level for their suitability for roosting bats (see **Figure A4, Annex A**).

3.2.4 The aim of the survey was to undertake a rapid assessment to identify (a) the presence of bats or their roost(s), and/or (b) features that were suitable for roosting bats, but for which the presence/absence of bats or their roosts could not be determined.

3.2.5 Use of a GPS was made to accurately record the location of trees, woodlands and structures along with photos and notes recorded in line with guidance in the Bat Surveys: Good Practice Guidelines for Professional Ecologists 3rd

[1] Within the last ten years, only records up to ten years old were considered within the assessment, as any records older than ten years are unlikely to be still representative of bat species in the local area.

Edition (Ref 1-5) (see **Table 4 and Table 5, Annex A**). Any trees and structures were viewed from the ground. During the surveys, signs of bats such as staining and droppings were searched for and recorded.

3.2.6 Based on the overall suitability for use as a roost each tree, woodland or structure was classified as negligible, low, moderate or high roost suitability, or as a confirmed roost, in accordance with best practice guidelines (Ref 1-5). The results helped to inform the layout of the Scheme and any requirement for more detailed survey work to confirm the presence or likely absence of bat roosts, if roost features are likely to impacted. Note that it is currently assumed that none of these features will be impacted by the Scheme due to the embedded mitigation, on the basis of habitats being retained and a suitable buffer zone provided around potential roosting features to avoid roost loss or any significant disturbance. As such these assessments were carried out on a precautionary basis to inform any future amendments to the Scheme that may require further survey where roost disturbance or loss is requirement.

Bat Activity Surveys

3.2.7 The survey effort for the bat activity surveys was based on the proposed Scheme footprint and up to 50m from the Order limits, located in mainly low value suitability habitats for foraging and commuting bats, comprising large open intensively managed arable farmland, a few livestock fields and some smaller areas of grassland/set-aside, with the retention of woodland, individual trees, ponds and hedges that are normally more frequently used by foraging and commuting bats. In accordance with the bat survey guidelines (Ref 1-5), habitats assessed as being of low value for foraging and commuting bats require three activity transects surveys within a year capturing spring, summer and autumn.

3.2.8 Bat activity surveys were undertaken in 2020 in accessible and suitable foraging and commuting bat habitat at three transect locations covering representative habitats across the Order limits. Each transect route was surveyed in spring, summer and autumn (May, July and September) (see **Figure A5, Annex A**).

3.2.9 Each activity survey involved two surveyors walking a transect route which included a series of counts at pre-determined points along the transect (shown as 'stopping' points on **Figure A5, Annex A**). These stopping points were located at potentially higher value features with regards to foraging and, or commuting bats such as woodland edges, hedges as well as more open areas. At each point surveyors stopped and recorded bat activity for three minutes using bat echolocation detectors. All activity encountered whilst walking between points was also noted. The survey route was designed to include potential flight paths or foraging areas within the Scheme and potential roost sites. The walked direction of the transects were varied during each survey visit in order to ensure different areas of the transect were walked close to dusk.

3.2.10 Surveyors carried full spectrum bat echolocation detectors (Batlogger M or Anabat Swift) to determine which species were present. In accordance with survey guidelines (Ref 1-5), dusk surveys were carried out from sunset to at least 2 hours after sunset. The time, location, numbers, species (where possible) and direction of flight were recorded for each bat pass (a discrete

burst of echolocation heard, or bat activity observed) during the survey. Echolocation calls detected were analysed with specialist software comprising Bat Explorer, Kaleidoscope and Analook W to verify bat calls. Survey visits were conducted in this way where weather conditions allowed, with surveys scheduled to avoid nights with cold (>7°C), wet or windy conditions.

3.2.11 In addition to the transect surveys, six automated static bat detectors (two on each transect, comprising Anabat Swift or Express detectors with the same standard microphones and setting) were placed across the Scheme in representative habitats to record bat activity over a longer period of time (*i.e.* a minimum of 5 nights per season). This is double the recommended number of detectors required (normally one per transect for low value habitat) (Ref 1-5) and ensured better coverage of the Scheme due to the large geographic spread and the ability to consider small areas of higher value habitat within each transect location. The locations of the static detectors are shown on **Figure A5, Annex A**.

3.2.12 All microphones were located at least 1m above the ground on trees, and clear of vegetation between the adjacent habitats and the microphone. All detectors were set on default settings to record in zero-crossing format. The static detectors were set up to record bat calls from sunset to sunrise for the recommended minimum of five consecutive nights per season in spring, summer and autumn (see deployment dates and weather in Annex D).

3.2.13 Weather conditions were recorded, using the temperate log files on each static detector and rain/wind conditions recorded at the nearest weather station using online resources (Ref 1-6). Weather data were taken into consideration in the analysis. Where any prolonged period of strong wind >25mph or rain was experienced, the static detectors were left for longer within the Order limits to obtain sufficient data during optimum weather conditions for bat activity.

3.3 Bat Data Analyses

Activity Surveys

3.3.1 The transect data were described in relation to species, number of passes (and where possible number of bats), observed behaviour, temporal and spatial trends. The static bat detector data collected were analysed to determine the total number of bat passes for each species or species group (depending on the level of identification possible from the recordings made) and then used to derive a metric - the Bat Activity Index (BAI) for the bat activity at each survey location.

3.3.2 These analyses provide an indication of:

a. Seasonal variation in species activity and composition at each survey location;

b. Relative levels of bat activity across the Scheme; and

c. Potential roosting sites, important foraging areas and commuting routes.

Bat Activity Index (BAI)

3.3.3 BAI values were calculated by averaging the total number of bat passes per hour for each static bat detector unit at each location per month. The term 'pass' is defined as a single file made up of bat pulses of a single species *i.e.* this may be one bat in a file or many bats in a single file.

3.3.4 Limited guidance is available on what constitutes low to high bat activity on a site/scheme based on number of passes. As such a relative scale is used by AECOM that follows the protocol used by Ecobat (Ref 1-7) in this report where:

a. Low activity: 0-20th percentiles;

b. Low to moderate activity: 21st-40th percentiles;

c. Moderate activity: 41st-60th percentiles;

d. Moderate to high activity: 61st-80th percentiles; and

e. High activity: 81st-100th percentiles.

3.3.5 For transect data relative bat activity levels were described to aid the discussion. No guidance is available on what constitutes low, moderate or high bat activity based on number of passes during a transect (based on a transect survey time of 2 to 3 hours). As such a relative scale is used by AECOM in this report where:

a. Very low activity is up to 5 passes per survey;

b. Low activity is 6 to 25 passes per survey;

c. Moderate activity is 26 to 99 passes per survey; and

d. High activity is 100 passes per survey.

3.3.6 Reference to surveyor observations, including numbers of individual bats seen, flight routes and behaviour and detectability of individual species are also made to inform the overall evaluation.

Bat Roost Categorisation

3.3.7 Where bat roosts were found these were categorised as follows based on standard guidance (Ref 1.5):

a. Day roost - A place where individual bats, or small groups of males, rest or shelter in the day but are rarely found by night in the summer;

b. Night roost - A place where bats rest or shelter in the night but are rarely found in the day and may be used by a single individual occasionally or it could be used regularly by the whole colony;

c. Feeding roost - A place where individual bats or a few individuals rest or feed during the night but are rarely present by day;

d. Transitional/occasional roost - Used by a few individuals or occasionally small groups for generally short periods of time on waking from hibernation or in the period prior to hibernation;

e. Swarming site - Where large numbers of males and females gather during late summer to autumn. Appear to be important mating sites;

f. Mating site - Where mating takes place from late summer and can continue through winter;

g. Maternity roost - Where female bats give birth and raise their young to independence;

h. Hibernation roost - Where bats may be found individually or together during winter, which has a constant cool temperature and high humidity; and

i. Satellite roost - An alternative roost found in close proximity to the main nursery colony used by a few individual breeding females to small groups of breeding females throughout the breeding season.

Biodiversity Evaluation

3.3.8 A hierarchical geographical approach used to assign biodiversity importance (*i.e.* sensitivity) of any bat roosts, and bat foraging and commuting habitat associated with the Order limits is based upon Guidelines of Ecological Impact Assessment in the UK and Ireland (Ref 1-8), and Valuing Bats in Ecological Assessment (Ref 1-9) and professional judgement. It is acknowledged that in the Guidelines of Ecological Impact Assessment guidelines 'Importance' is used as opposed to Valuing Bats in Ecological Assessment which uses 'Value'. These geographical frames of reference and method of determination used in the assessment is similar and therefore the use of 'Importance' and/ or 'Value' for ecological features is interchangeable. Refer to Annex C for full details on the methodology used to determine biodiversity importance.

3.3.9 Reference has also been made where required to:

a. Natural England Joint Publication JP025: A Review of the Population and Conservation Status of British Mammals. (Ref 1-10);

b. NERC Act Section 41 list of species of principal importance;

c. Essex Bat Group local distribution maps (Ref 1-3);

d. Bat Roosts in Trees: A Guide to Identification and Assessment for Tree-Care and Ecology Professionals (Ref 1-11); and

e. The State of the UK's Bats 2017: National Bat Monitoring Programme Populations Trends (Ref 1-12).

3.3.10 The importance presented reflects the currently known distribution within the Scheme.

3.4 Assumptions and Limitations

Desk Study

3.4.1 The information collected from the desk study background record search represents only those records submitted to records centres and is therefore not a definitive list of all records of bat species identified within the Desk Study Area. If records have not been provided, this does not confirm absence from the Order limits.

Field Survey

3.4.2 Survey areas were chosen to provide a representative sample of the Order limits, based on the best quality in terms of potential bat roosting/foraging/commuting habitat which could be impacted as a result of the Scheme (*i.e.* mainly arable/livestock fields). Note that since the surveys,

the Scheme boundary has changed slightly, resulting in some areas where the survey results are outside the Scheme and other areas not completely covered. This is not a significant limitation as similar habitats are present close to the Scheme and the data are still useful for assessing landscape scale effects on bats. Any gaps in the PRA survey will be covered through additional surveys where impacts are predicted.

3.4.3 Not all habitats were surveyed in detailed. No woodland, wetlands or hedgerows were surveyed in detail, as they were either outside the footprint of the Scheme (*i.e.* retained and buffered from the Scheme) or access was not possible to land outside the Order limits. No access has been made to all areas within the grid connection land to the southwest of the Order limits, and therefore no surveys were carried out within these areas. There may be permanent or temporary habitat loss or disturbance within these areas and further surveys may be required (*i.e.* for roosting bats) in these areas prior to any potential works in these areas where impacts to potential roosting features or foraging/commuting habitat are likely.

Data interpretation limitations

3.4.4 It is accepted that *Myotis* bat species are difficult or impossible to identify from echolocation alone, therefore these species are often aggregated as '*Myotis* species'. This aggregation, where undertaken, is widely accepted and does not affect the evaluation of the results of activity surveys. This is not a significant limitation as other survey methods such as DNA testing of droppings or trapping may be employed to identifying Myotis species if required.

3.4.5 The preliminary roost assessment surveys undertaken were aimed at determining the presence/likely absence of roosts, therefore there would be a need for further surveys on potential roosts if they are likely to be impacted by the Scheme. Sufficient robust roost survey data are required to be collected for any future licence application (EPSML) for roost loss and, or modification and significant disturbance and to allow the Local Planning Authority to evaluate the planning submission and discharge its legal biodiversity duty in accordance with Natural England's standing advice.

3.4.6 Bats are highly mobile and may roost in different locations each year where suitable roost features are present. Where required, a precautionary approach for mitigation would be proposed for trees or structures assessed with roost suitability but where roosts were not found.

3.4.7 These limitations did not significantly limit this report and assessment. Ecological data in relation to these species are valid for 18 months to 2 years based on best practice guidance (CIEEM, 2019) (Ref 1-19). After this time update surveys are likely to required.

4. Results

4.1 Desk Study

4.1.1 There are no international statutory site biodiversity designations for bats within 30km of the Scheme. There are no national statutory site biodiversity designations for bats within 10km of the Scheme or relevant non-statutory sites within 2km of the Scheme.

4.1.2 The combined data search results from Essex Wildlife Trust (***Appendix 8B: PEA*** of the ES) and Essex Field Club (***Appendix 8L: Essex Field Club Desk Study*** of the ES) returned 130 bat records within 5km of the Order limits including Brown Long-eared Bat, Common Pipistrelle (*Pipistrellus pipistrellus*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), Serotine (*Eptesicus serotinus*), Leisler's Bat (*Nyctalus leisleri*), Barbastelle, Natterer's Bat (*Myotis nattereri*) other unidentified bats including unknown *Myotis*, Pipistrelle and Long-eared bat species.

4.1.3 Of these records, seven are stated to relate to confirmed roosts, the nearest being 500m from the Order limits. These comprise a Natterer's and Brown Long-eared Bat maternity roost 3.9km to the east of the Order limits at Cresswell; a Brown Long-eared maternity roost 500m south of the Order limits at Boreham, south of the A12; an unknown Common Pipistrelle roost and an Brown Long-eared Bat roost at White Notley 3km to the east of the Order limits; and one unknown Soprano Pipistrelle roost and one maternity Soprano Pipistrelle roost approximately 5km from the Order limits in Chelmsford and Silver End respectively.

4.1.4 There were two bat mitigation licences within 2km of the Order limits, comprising a Brown Long-eared Bat resting place in 2017 (ref. 2017-28969-EPS-MIT), located 1km to the north-east of the Order limits near Terling and a Brown Long-eared Bat and Common Pipistrelle resting place in 2011 (ref. EPSM2011-2945), located 650m to the south of the Order limits at Boreham.

4.2 Preliminary Roost Assessment

4.2.1 The results of the preliminary roost assessment are shown in **Figure A4, Annex A** and in **Annex D**.

4.2.2 In summary, this initial assessment has found; 109 features with high suitability bat roosting habitat, 44 features with moderate suitability, 53 with low suitability and 40 features with negligible suitability (see **Table 1**). Some of these features, and most large woodlands, particularly those with moderate to high suitability are likely to contain roosting bats, however none of the features identified are currently likely to be directly or indirectly impacted by the Scheme due to retention of these features, and buffers around them (see discussion in Section 5).

Table 1: Summary of Preliminary Roost Assessment Results

Feature Type	Negligible	Low	Moderate	High
Trees	29	35	36	65

Feature Type	Negligible	Low	Moderate	High
Treeline / hedge with trees	10	15	6	21
Woodland/ copse	1	2	2	23
Buildings	0	0	0	1

4.3 Bat Activity Surveys

4.3.1 The results of these surveys and the Bat Activity Index (BAI) (see method **Section 3.3**) are summarised below, with full results in Annex D. Transect mapping and static bat detector locations are shown in **Figure A5, Annex A**.

Transect Surveys

4.3.2 A total of nine transects were surveyed during 2020 to provide a representative coverage of the habitats within the Order limits. This comprised three transects (1 – south, 2 – middle, 3 – north), each surveyed in spring, summer and autumn. The transect included sampling representative habitats within the Order limits, comprising hedges/tree lines, woodland edge, roadside verges, the River Ter and arable field margins.

4.3.3 Species recorded during the bat transect surveys comprised at least seven species: Common Pipistrelle, Soprano Pipistrelle, Brown Long-eared Bat, Serotine, Noctule, Barbastelle, Daubenton's Bat (*Myotis daubentonii)*, *Myotis* species (Daubenton's and/or other unknown *Myotis* species), *Nyctalus* species (Noctule and/or Leisler's Bat).

Spring

4.3.4 Three transects were surveyed on 20th and 21st May 2020. Activity on transect 1- south and 2 - middle were moderate (56 and 72 passes respectively) and on transect 3 - north transect it was high (102 passes).

4.3.5 Species recorded on transect 1 – south comprised moderate activity of Common Pipistrelle and low activity of Soprano Pipistrelle. The highest areas of activity comprised the edge of Porter's and Toppinghoehall Woods and a hedgeline between the southern section of Toppinghoehall Woods and woodland to the west of the Order limits at stopping point 12 (see **Figure A5, Annex A**).

4.3.6 Species recorded on transect 2 – middle comprised moderate activity of Common Pipistrelle and low activity of Soprano Pipistrelle, with very low activity (two passes each) of Brown Long-eared Bat and Barbastelle. The highest areas of activity comprised habitat close to Scarletts Farm around stopping point 3, woodland copse close to the ST3 and along the minor road (within hedges and mature trees) close to stopping points 11 and 12 (see **Figure A5, Annex A**).

4.3.7 Species recorded on transect 3 – north comprised moderate activity of both Common and Soprano Pipistrelle with very low activity (a single pass) of a Myotis species (probable Daubenton's Bat). The highest areas of activity

comprised Ridley Hall Road, Sandy Wood, hedges to the south, close to Scarletts Farm and hedgerows to the south and north of The Moors. (see **Figure A5, Annex A**).

Summer

4.3.8 Three transects were surveyed on 10th and 20th July 2020. Activity on transect 1 - south was high (104 passes) and transects 2 - middle and 3 – north moderate (39 and 77 passes respectively).

4.3.9 Species recorded on transect 1 – south comprised moderate activity of Common Pipistrelle and Soprano Pipistrelle, with very low activity of Barbastelle (2 passes), Noctule (3 passes), Myotis species (1 pass) and an unknown Nyctalus species (Noctule or Leisler's bat) (1 pass). The highest areas of activity comprised. The highest areas of activity comprised a track and tree line north- east of Stock's Farm at stopping point 4, the edge of Porter's and Toppinghoehall Woods and a hedgeline between the southern section of Toppinghoehall Woods and woodland to the west of the Order limits at stopping point 12 (see **Figure A5, Annex A**).

4.3.10 Species recorded on transect 2 – middle comprised moderate activity of Common Pipistrelle and low activity of Soprano Pipistrelle. The highest areas of activity comprised a quiet road with hedgerow, trees and farmyard area at stopping point 7, around an unamed woodland at stopping point 8 and Ringer's Wood stopping point 9 (see **Figure A5, Annex A**).

4.3.11 Species recorded on transect 3 – north comprised moderate activity of Common Pipistrelle. Low activity of Soprano Pipistrelle, with very low activity of Noctule (5 passes), Serotine (1 pass), Myotis species (1 pass) and an unknown Nyctalus species (Noctule or Leisler's bat) (1 pass). The highest areas of activity comprised habitats along Ridley Hall Road, around the River Ter between stopping points 3 and 4, and around Sandy Wood (see **Figure A5, Annex A**).

Autumn

4.3.12 Three transects were surveyed on 9th and 11th September 2020. Activity on transects 1 - south 2 - middle and 3 – north was moderate (47, 59 and 52 passes respectively).

4.3.13 Species recorded on transect 1 – south comprised low activity of Common Pipistrelle and Soprano Pipistrelle (18 passes), with very low activity of Myotis species (3 passes) and Brown Long-eared Bat (1 pass). The highest areas of activity comprised Stock's Farm stopping point 14, a track and tree line north-east of Stock's Farm at stopping point 4, the edge of Porter's Woods at stopping point 5 (see **Figure A5, Annex A**).

4.3.14 Species recorded on transect 2 – middle comprised moderate activity of Common Pipistrelle, low activity of Soprano Pipistrelle and very low activity of Myotis species (probable Daubenton's Bat) (2 passes). The highest areas of activity comprised habitat close to Scarletts Farm around stopping point 3, woodland copse close to the ST3 and along the minor road (within hedges and mature trees) close to stopping points 11 and 12, along a minor road with near stopping point 7 and around an unamed woodland at stopping point 8 (see **Figure A5, Annex A**).

4.3.15 Species recorded on transect 3 – north comprised moderate activity of Soprano Pipistrelle. Low activity of Common Pipistrelle, with very low activity of Daubenton's Bat (2 passes) and Barbastelle (1 pass). The highest areas of activity comprised habitats around the River Ter between stopping points 3 and 4, and around Sandy Wood (see **Figure A5, Annex A**).

Static Bat Detector Surveys

4.3.16 Species recorded on the static bat detectors at the six locations across the three transect sites surveyed in 2020 comprised at least eight species; Common Pipistrelle, Soprano Pipistrelle, Leisler's Bat, Noctule, Myotis species (Daubenton's Bat and/or other species), Brown Long-eared Bat, Barbastelle and Serotine. Full results are provided in Annex D with static locations in **Figure A5, Annex A**. A summary is provided as **Table 2**and **Figure 1**.

4.3.17 The highest activity (a BAI of 28 passes per hour) was recorded in the summer at ST4, located on the hedgerow linking to Ringer's Wood and close to Terling Hall Road. Other areas with relatively high activity comprised ST4 during the spring and ST3 (a small woodland edge) in the spring and autumn.

4.3.18 In total 9,789 bat passes were recorded across the whole Order limits based on 144 nights of data, from the six static detectors. The most commonly recorded species by far were Common and Soprano Pipistrelles with 7,239 and 1,863 passes respectively, with 165 passes of either of these two species (as their calls overlap, particularly with social calls). The highest number of calls from a single species was 2,031 passes of Common Pipistrelle at ST4 during the summer across 10 nights of recording (see **Table 2** and **Figure 2**).

4.3.19 Leisler's and Noctule bats were the next most frequently recorded with 176 and 155 passes respectively, throughout the year. There were 89 passes of Brown Long-eared Bats recorded, with a notable peak of 39 passes at ST3 (a small woodland) in the autumn. There were 60 passes in total of Myotis species scattered across the Order limits in low numbers throughout the year. Based on direct field observations, during activity transects these are most likely attributable to Daubenton's Bat. There were 34 passes of passes of Barbastelle scattered across the Order limits in very low numbers throughout the year. There were 8 passes of Serotine in the spring and summer in south and middle transect locations.

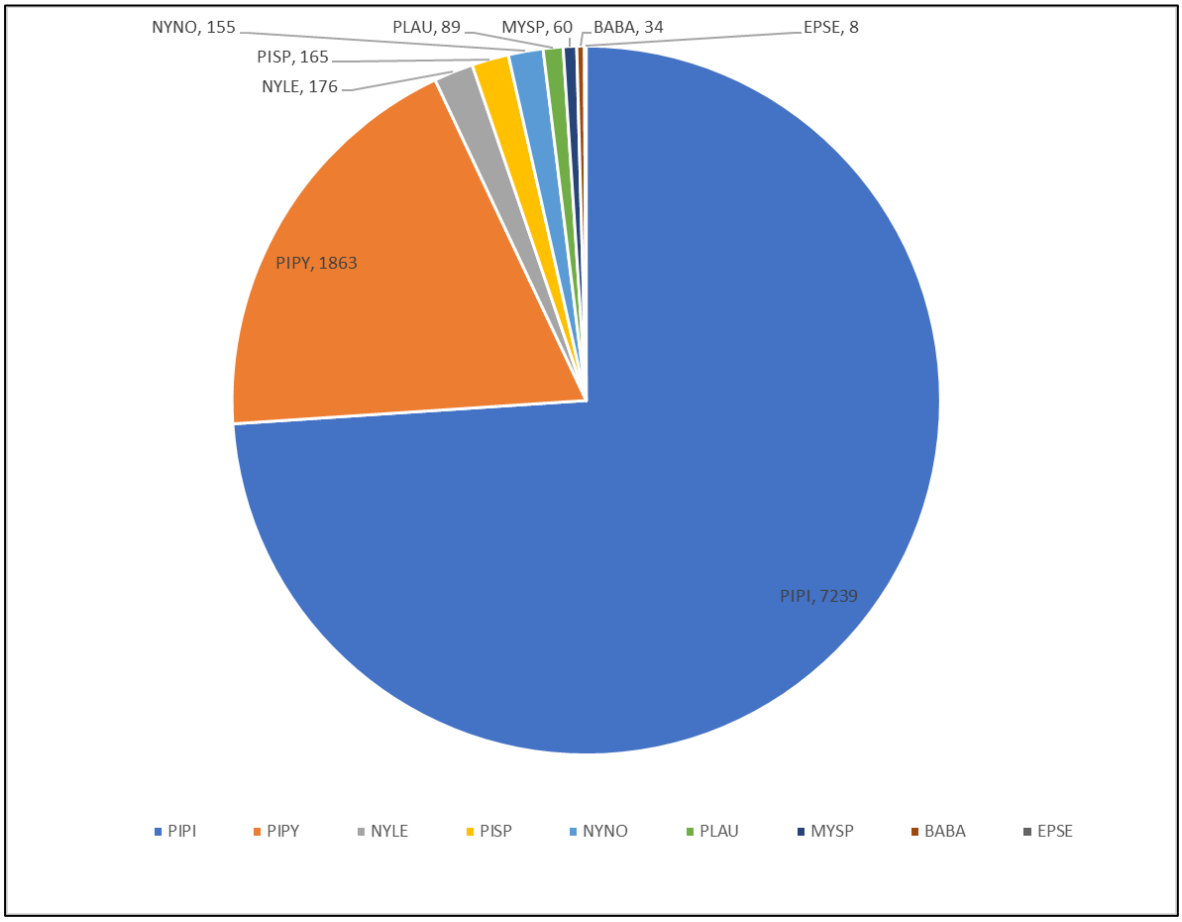
Table 2: Summary of Bat Activity Index (BAI) from static detector surveys

Date 2020 / Location	BAI* per hr	Activity Level	Date 2020 / Location	BAI* per hr	Activity Level	Date 2020 / Location	BAI* per hr	Activity Level
Spring			Summer			Autumn		
ST1	8.5	Moderate to high	ST1	3.1	Moderate	ST1	2.3	Low to moderate

Date 2020 / Location	BAI* per hr	Activity Level	Date 2020 / Location	BAI* per hr	Activity Level	Date 2020 / Location	BAI* per hr	Activity Level
ST2	7.2	Moderate to high	ST2	5.1	Moderate	ST2	2.7	Moderate
ST3	20.9	High	ST3	19.0	Moderate to high	ST3	20.8	High
ST4	21.3	High	ST4	28.0	High	ST4	5.4	Moderate
ST5	1.4	Low to moderate	ST5	2.0	Low to moderate	ST5	1.2	Low
ST6	0.9	Low	ST6	0.3	Low	ST6	0.6	Low

* BAI = Bat Activity Index (overall number of bat passes per hour)

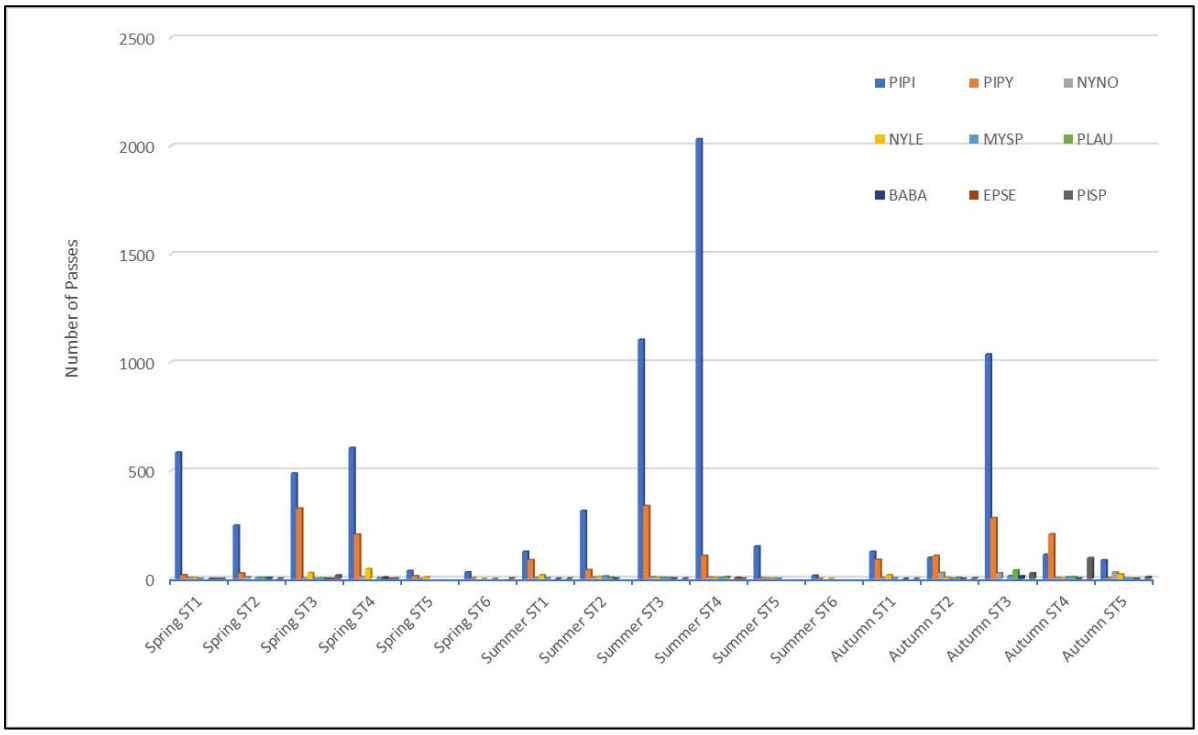
Figure 1: Total Number of Passes per Species



* Key to species: PIPI - Common Pipistrelle (blue), PIPY - Soprano Pipistrelle (orange), NYLE – Leisler's (grey), PISP – Common or Soprano Pipistrelle (yellow), NYNO - Noctule (light blue), PLAU - Brown Longeared Bat (green),

MYSP - Myotis species (dark blue), BABA – Barbastelle (brown) and EPSE - Serotine (purple).

Figure 2: Number of Bat Passes per Location and Season.



5. Discussion / Evaluation

5.1 Nature Conservation Evaluation

Introduction

5.1.1 An evaluation of the biodiversity importance of bat species in relation to Scheme in terms of potential roosts, foraging and commuting habitats is described below. Potential outline impacts and effects on bat species are discussed.

Designated Sites

5.1.2 No designated sites of relevance to bats were identified or are likely to be impacted by the Scheme.

Roosts

5.1.3 There are no relevant roosts within the Scheme identified in the desk study. The nearest roost is a Brown Long-eared Bat maternity roost located approximately 500m to the south of the Order limits. Bats from this roost (and other nearby roosts) may cross the A12 and use the Order limits for foraging as within this species Core Sustenance Zone (CSZ) of 3km (Ref 1-5). None of the other roosts identified in the desk study, all of which are over 3km from the Order limits, are of high conservation significance, *i.e.* maternity or non-breeding roosts of more common species, (Brown long-eared Bat, Common or Soprano Pipistrelle and Natterer's Bat). Although these roosts are located at a distance from the Order limits (all over 3km) that is either outside or towards the limits of their CSZs, bats from these roosts may use the Order limits occasionally for foraging and commuting.

5.1.4 Based on the field data collected from a preliminary roost assessment and bat activity surveys, there are likely to be roosts within or close to the Order limits of Common and Soprano Pipistrelle Bats, Noctule, Leisler's bat, Myotis bat species (*e.g*. Daubenton's Bat), Brown Long-eared Bat and Barbastelle. This includes the timing of observations in relation to expected emergence times (from static and transect data).

5.1.5 All roosts and potential roost features identified are outside the current footprint of the Scheme (due to avoidance of potential roosting features). As such no detailed roost presence/absence or characterisation has been undertaken to determine roost importance and therefore no specific biodiversity importance has been assigned. As a precautionary approach based on the data collected, bat roosts have been assigned of up to County Importance based on potential maternity roosts of common species and small numbers/individual roosts of rarer species such as Barbastelle.

Commuting and Foraging Habitats

5.1.6 Species recorded on the activity surveys (activity transects and static bat detectors) in 2020 comprised at least eight species: Common Pipistrelle, Soprano Pipistrelle, Brown Long-eared Bat, Serotine, Noctule, Barbastelle, Leisler's Bat, Daubenton's Bat and unknown *Myotis* species (Daubenton's Bat and/or other Myotis species).

5.1.7 Biodiversity importance of foraging and commuting bats is based on species rarity, numbers, presence of nearby roosts and type/complexity of community/foraging features (see Annex C). This also considers the lower detectability on bat detectors of species such as Barbastelle, Brown Long-eared Bat and Myotis bats compared to species such as Common and Soprano Pipistrelle and Noctule (Ref 1-13).

5.1.8 There was a range of activity (including foraging, commuting and social calling) with multiple bats often recorded.

5.1.9 Foraging and commuting habitat with the highest relative bat activity, were present in the following locations (see **Figure A5, Annex A**):

a. A small copse and pond at ST3

b. A hedgerow close to a minor road, mature trees and links to woodland at ST4

c. Ancient Woodlands including Porter's Wood, Ringer's Wood, Toppenhoehall Wood and Sandy Wood

d. The River Ter and associated habitats

e. Stock's Farm

f. Scarlett's Farm

5.1.10 Most of these areas with highest activity were located along linear features such as running water, hedges and woodland edges, with very limited foraging and commuting observed over open fields or crops.

5.1.11 Based on the data collected in 2020 the commuting and foraging habitat for bats is assessed as of up to County/District Importance (depending on the species, see **Table 3** and guidance in Annex C). This is based on the species, estimated numbers, roosts nearby and habitat characteristics comprises well grown and well-connected hedgerows, larger or connected woodland blocks, mixed agriculture, and small villages/hamlets.

5.1.12 The habitat is assessed as of County/District Importance for foraging/commuting Soprano and Common Pipistrelle (both common species) based on the presence of large numbers of bats, with numerous roosts/potential within and close to the Scheme, suitable habitats and their use of the habitats described above.

5.1.13 The habitat is assessed as of County/District Importance for Barbastelle (a Red List Near Threatened and classed as a 'rarest' species) based on the presence of individual bats throughout the Scheme, with possible small numbers of nearby roosts, and their use of the habitats described above.

5.1.14 The habitat is assessed as of Local Importance for all other species; Daubenton's Bat, unknown *Myotis* species[2], Noctule, Leisler's Bat, Serotine, and Brown Long-eared Bat based on the presence of individual bats or small numbers, with unknown/single roosts within or close to the Order limits and their use of the habitats as described above.

[2] Within Essex three Myotis bat species have been recorded comprising Daubenton's and Natterer's Bat with one record of a Whiskered Bat (*Myotis mystacinus*) (REF 1-3).

Table 3: Summary of Biodiversity Importance of Commuting and Foraging Habitat

Species	Rarity	Number of bats	Roosts/ potential roosts nearby	Type and complexity of linear features/Foraging characteristics	Commuting & Foraging Importance
Common Pipistrelle	Common (2)	Large numbers (20)	Moderate number (4)	Well grown and well-connected hedgerow, larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4)	County/District
Soprano Pipistrelle	Common (2)	Large numbers (20)	Moderate number (4)	Well grown and well-connected hedgerow, larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4)	County/District
Noctule	Rarer (5)	Small numbers (10)	Small number (3)	Well grown and well-connected hedgerow, larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4)	Local
Leisler's	Rarer (5)	Small numbers (10)	Small number (3)	Well grown and well-connected hedgerow, larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4)	Local
Serotine	Rarer (5)	Individual bats (5)	Small number (3)	Well grown and well-connected hedgerow, larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4)	Local
Brown Long-eared Bat	Common (2)	Individual bats (5)	Moderate number (4)	Well grown and well-connected hedgerow, larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4)	Local
Barbastelle	Rarest (20)	Individual bats (5)	Small number (3)	Well grown and well-connected hedgerow, larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4)	County/District
Daubenton's Bat / Myotis species*	Rarer (5)	Individual bats (5)	Small number (3)	Well grown and well-connected hedgerow, larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4)	Local

Individual bats 1 or 2, Small numbers 3 to 10, Large numbers>10 bats. * Daubenton's Bat / other species.

5.2 Potential Impacts and Significance of Effects

5.2.1 The primary purpose of this technical appendix is to provide an assessment of the biodiversity importance of the bat population identified within the Scheme to inform ***Chapter 8: Ecology*** of the ES (see **Section 1.1**). An assessment of potential impacts (considering embedded mitigation), any additional mitigation and residual effects will be undertaken in an Environmental Statement (ES) when the final Scheme design is provided and will form part of the DCO submission. As all UK bat species are protected by European legislation, they must be considered in the Environmental Impact Assessment (EIA) for the Scheme and any unavoidable adverse impacts must be mitigated. Where avoidance is not possible then appropriate mitigation and habitat compensation would be provided.

5.2.2 The impact assessment process will involve:

a. Identifying and characterising impacts and their effects;

b. Incorporating measures to avoid and mitigate negative impacts;

c. Assessing the significance of any residual effects after mitigation;

d. Identifying appropriate compensation measures to offset; and

e. Identifying opportunities for ecological enhancement.

5.2.3 The assessment of impacts will consider the baseline conditions for bats reported in this technical appendix (pending any updates) to allow:

a. A description of how the baseline conditions will change as a result of the project and associated activities; and

b. The identification of cumulative impacts arising from the proposal and other relevant developments.

5.2.4 There is currently no scientific literature available on the impacts to bats from solar farms (Ref 1-14). Small schemes have not been routinely monitored and the first large scale (Nationally Significant Infrastructure Project (NSIP)) solar scheme Cleve Hill in Kent only received planning consent in May 2020 (Ref 1-15) so it is too early to fully predict long-term effects on bat populations. However, construction impacts are likely to be similar to other large-scale developments with habitat changes and losses, potential noise, dust, and lighting disturbance during construction and decommissioning works. Operational impacts and resulting effects will be based on the changes to habitats over time and the likely response of individual bat species. This will also require monitoring to improve confidence in the assessment of residual adverse or beneficial effects, to feedback into the landscape management plan and to provide a dataset for future large scale solar schemes.

5.2.5 The potential impacts are summarised as follows:

a. Disturbance to habitats used by bats for roosting, foraging and commuting from noise, dust and lighting;

b. Loss of habitats (mainly agricultural land) to the Scheme infrastructure (*i.e.* solar panels, substation, battery storage, control/junction boxes, access roads);

c. Changes to bat foraging and commuting habitats, *e.g*. from agriculture (arable crops/cattle grazing) to grassland (potentially cut or grazed);

d. Potential attraction or avoidance of bats to the solar panels from potential increases in prey (*i.e.* flying insects), potential noise attraction/disturbance, barrier effects;

e. Potential for roosting in new infrastructure; and

f. Indirect beneficial impacts through a possible reduction of agriculture chemical inputs to watercourses/, reduction in pesticide use on crops within the local area resulting in an increase in prey availability.

5.2.6 Whilst all potential roosts are likely to be retained, as they are either located outside the boundary of the Scheme or retained and avoided as part of the embedded mitigation, there will be some temporary or permanent loss of habitats resulting in adverse effects to foraging/commuting bats associated with nearby roosts and in the wider area. Due to the embedded mitigation it is anticipated that mainly low value habitats for foraging or commuting bats will be impacted by the Scheme (*i.e.* arable fields) and that any losses will be compensated through habitat creation and enhancement elsewhere within the Scheme. Newly created habitats and a change from intensive agriculture to grassland may also be beneficial to bats.

5.2.7 If the footprint of the final Scheme results in any features that are likely to be directly impacted (*e.g*. from the cable routes/access) then further more detailed bat roost surveys will be required at specific features (*i.e.* structures with low to high roost suitability and trees with moderate to high roost suitability) to inform mitigation and potential licence application in accordance with best practice guidance (Ref 1-5). Where construction works are undertaken within these buffer zones, there may be indirect impacts to roosts/potential roosts. These impacts would be avoided through use of a precautionary working method statement.

5.2.8 Effects from lighting have the potential to affect roosting bats within and close to the Scheme and bats commuting to and from foraging areas during the construction, operation and decommissioning phases (Ref 1-16). Some bat species are more sensitive to lighting (*e.g*. Myotis species and Brown Long-eared Bats), and as the Order limits is currently largely undeveloped, there is minimal artificial lighting. The lighting for the construction compound is likely to be of a temporary nature and used mainly during the construction and decommissioning phases. Security lighting where used during the operational phase is likely to be manually operated or on PIR sensors and will not be on continuously. Given the rural nature of the Order limits, it is unlikely that any security lighting would be often triggered. Whilst security/compound lighting would be available for the lifetime of the Scheme, Order limits activity will predominantly take place during daylight hours and is therefore not expected to cause significant disturbance to foraging or commuting bats.

6. Conclusions

6.1.1 The objective of the desk study and bat surveys, reported in this document, is to determine the presence, assemblage and distribution of bat species, within the Order limits, assign a biodiversity importance to these and identify outline potential impacts of the Scheme on bats.

6.1.2 All roosts and potential roost features identified are outside the current footprint of the Scheme (due to avoidance of potential roosting features). As such no detailed roost presence/absence or characterisation has been undertaken to determine roost importance and therefore no specific biodiversity importance has been assigned. As a precautionary approach based on the data collected bat roosts have been assigned of up to County/District Importance based on potential maternity roosts of common species and small numbers/individual roosts of rarer species such as Barbastelle.

6.1.3 The commuting and foraging habitat for bats is assessed as of up to County/District Importance. This is based on the species, estimated numbers, roosts nearby and habitat characteristics comprises well grown and well-connected hedgerows, larger or connected woodland blocks, mixed agriculture, and small villages/hamlets.

6.1.4 Prior to construction, if any trees, woodlands, or buildings which are identified as being suitable for bat roosts are impacted as a result of the Scheme, then these should be surveyed in more detail to determine roost presence or likely absence and, where required, to characterise the roost/s. Based on the Scheme layout it is anticipated that impacts to potential roosts are likely to be avoided and that any further survey work, where required, is likely to be minor (*e.g*. possibly work to a few individual trees to facilitate access) and on a precautionary basis.

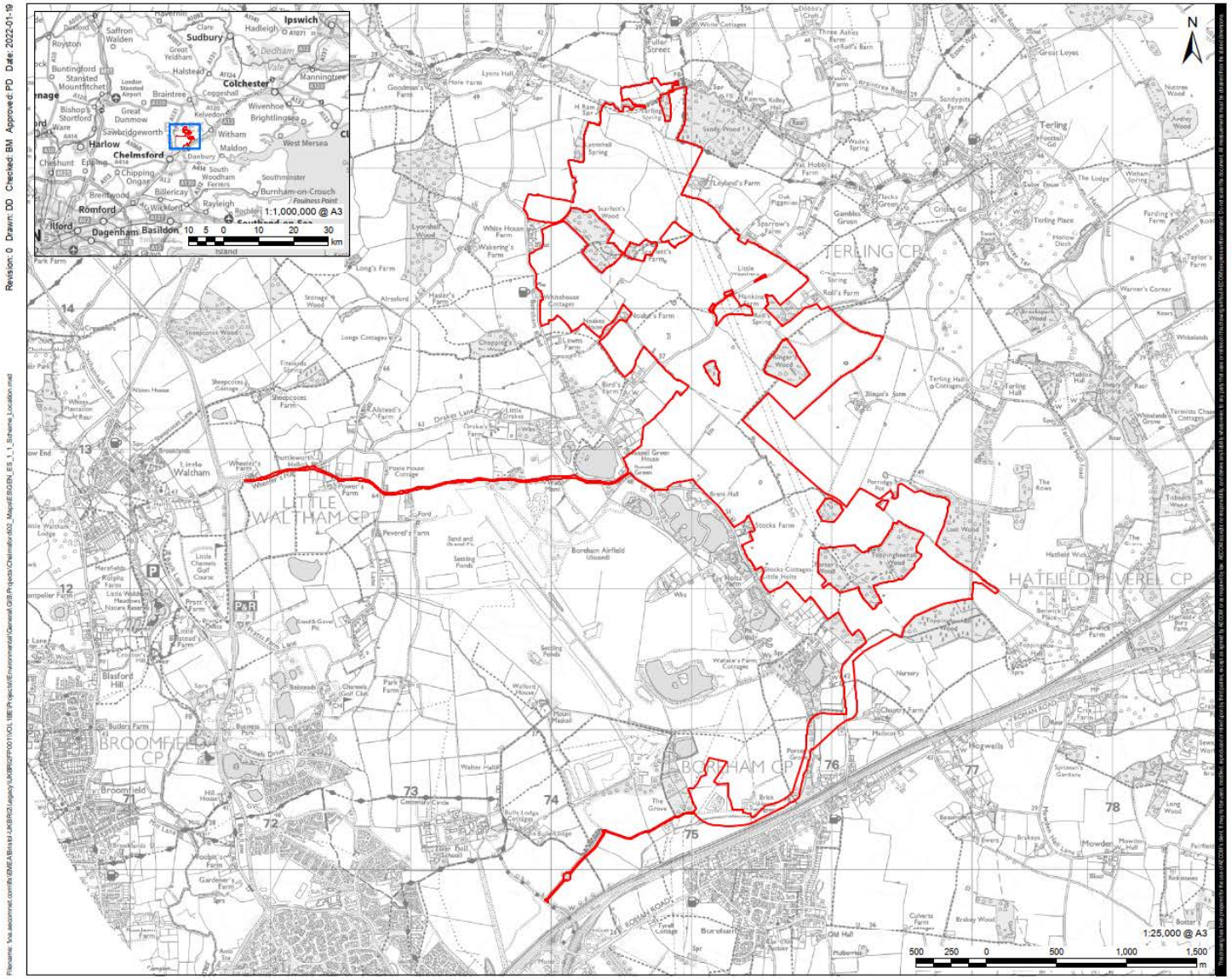
7. References

Ref 1 AECOM, 2021. Longfield Solar Farm Preliminary Ecological Appraisal October 2021.
Ref 2 Essex Biodiversity Action Plan
Ref 3 essexbatgroup about/bats-of-essex.
Ref 4 Multi-agency Geographic Information for the Countryside (MAGIC)
Ref 5 Collins, J (ed.) 2016. Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition). The Bat Conservation Trust, London.
Ref 6 Sunset/sunrise times
Ref 7 Ecobat [Accessed January 2021].
Ref 8 Chartered Institute of Ecology and Environmental Management (CIEEM) (2018), Guidelines for Ecological Impact Assessment in the United Kingdom: Terrestrial, Freshwater, Coastal and Marine.
Ref 9 Wray, S., Wells, D., Long, E. & Mitchell-Jones, T. 2010. Valuing Bats in Ecological Impact Assessment, IEEM In-Practice issue 70, p 23-25.
Ref 10 Mathews, F., Kubasiewicz, L. M., Gurnell, J., Harrower, C. A., McDonald, R. A. and Shore, R. F. 2018. Natural England Joint Publication JP025: A Review of the Population and Conservation Status of British Mammals. A report by the Mammal Society under contract to Natural England, Natural Resources Wales and Scottish Natural Heritage.
Ref 11 Andrews, H. 2018. Bat Roosts in Trees: A Guide to Identification and Assessment for Tree-Care and Ecology Professionals.
Ref 12 Bat Conservation Trust. 2017. The State of the UK's Bats: National Bat Monitoring Programme Populations Trends.
Ref 13 Barataud, M. 2015. Acoustic ecology of European bats. Species Identification and Studies of Their Habitats and Foraging Behaviour. Biotope Editions, Mèze; National Museum of Natural History, Paris (collection Inventaires et biodiversité), 340 p
Ref 14 Harrison, C., Lloyd, H., and Field, C. 2016. Evidence review of the impact of solar farms on birds, bats and general ecology. Manchester Metropolitan University August 2016.
Ref 15 Cleve Hill Solar Farm
Ref 16 Bat Conservation Trust & Institution of Lighting Professionals. 2018. Guidance Note 08/18 Bats and artificial lighting in the UK Bats and the Built Environment series.
Ref 17 BRE 2014 Biodiversity Guidance for Solar Developments. Eds G E Parker and L Greene.
Ref 18 Natural England TIN101 2011 Solar parks: maximising environmental benefits
Ref 19 CIEEM: Advice Note on the lifespan of ecological surveys and reports

8. Annexes

8.1 Annex A - Figures

Figure A3: Site Location (*Note: Figure is based on a previous iteration of the site boundary (Order limits) which was valid at the time of writing*)



AECOM

PROJECT
60640215 - LONGFIELD SOLAR FARM

CLIENT
Longfield Solar Farm

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LEGEND
Order Limits

NOTES
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ISSUE PURPOSE
Ecology Appendix

PINS REFERENCE NUMBER
EN010118

FIGURE TITLE
Scheme Location

FIGURE NUMBER
Figure A3

Figure A4: PRA results (*Note: Figure is based on a previous iteration of the site boundary (Order limits) which was valid at the time of writing*)

Revision: 0 Drawn: BF Checked: MP Approved: PD Date: 2022-01-21

Filename : W:\Active Projects\Longfield Solar Farm Chelmsford\GIS\02_Maps\ECO_ES_8I_2_Bat_PRA.mxd

N

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PROJECT

LONGFIELD
SOLAR FARM

CLIENT

Longfield Solar Farm

CONSULTANT

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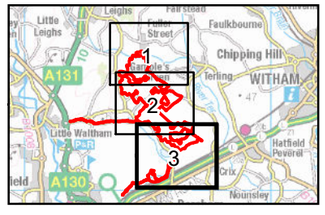
LEGEND

- Order Limits

Preliminary Roost Tree
- High suitability
- Moderate suitability
- Low suitability
- Negligible suitability

Woodland
- High suitability
- Negligible suitability

Tree line / hedgerow with trees
- High suitability
- Moderate suitability
- Low suitability
- Negligible suitability



NOTES

1. Not all feature are mapped where Negligible
2. Mapping not to be used for determining precise tree/hedge locations.

ISSUE PURPOSE

Environmental Statement

PINS REFERENCE NUMBER

EN010118

FIGURE TITLE

Preliminary Bat Roost Assessment

FIGURE NUMBER

Figure
A4.1

1:9,000 @ A3

100 0 100 200 300 m

Revision: 0 Drawn: BF Checked: MP Approved: PD Date: 2022-01-21

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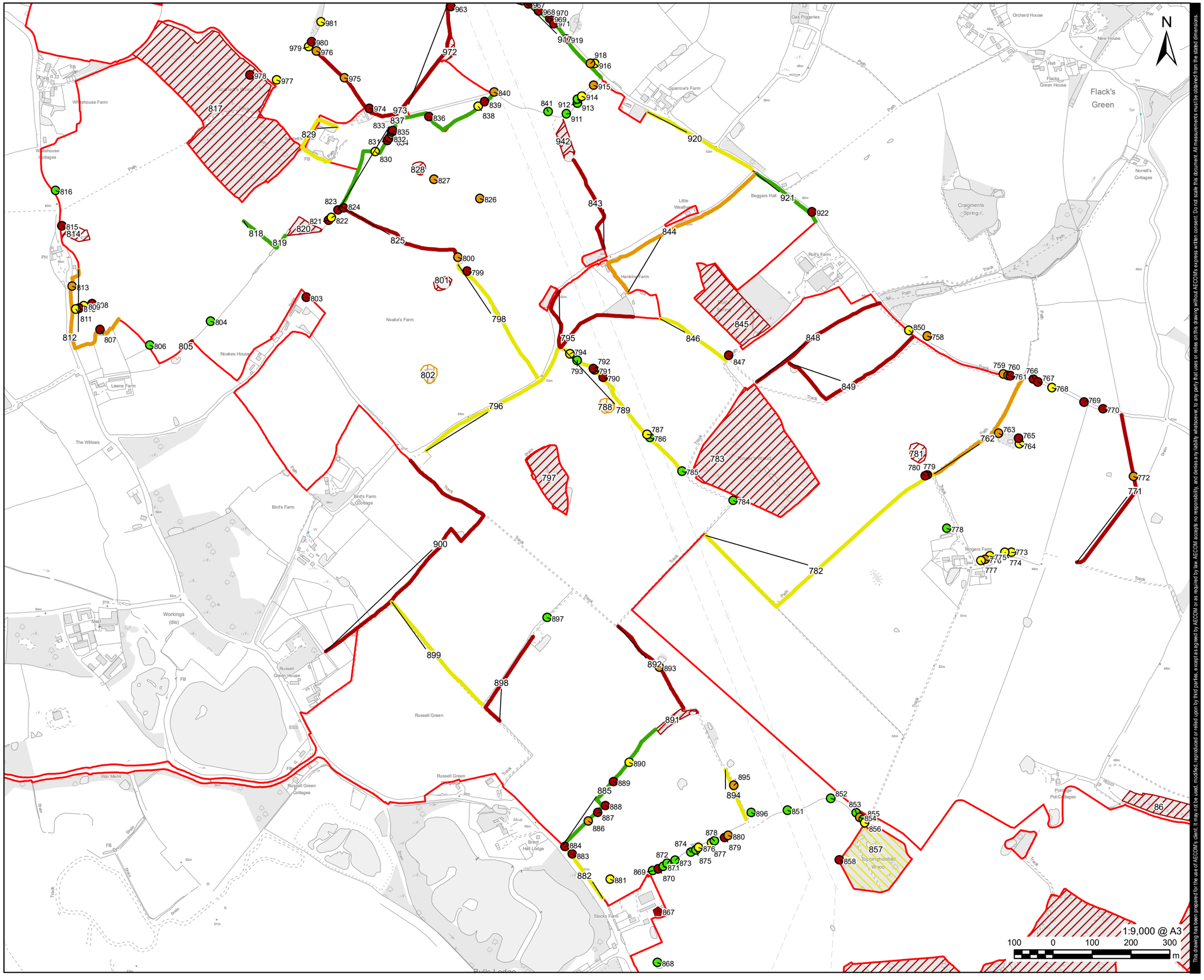

AECOM

PROJECT

LONGFIELD SOLAR FARM

CLIENT

Longfield Solar Farm

CONSULTANT

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www.aecom.com

LEGEND

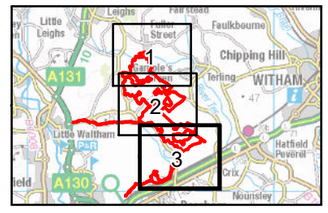
- Order Limits

Preliminary Roost Assesment Structure
- High suitability

Tree
- High suitability
- Moderate suitability
- Low suitability
- Negligible suitability

Woodland
- High suitability
- Moderate suitability
- Low suitability

Tree line / hedgerow with trees
- High suitability
- Moderate suitability
- Low suitability
- Negligible suitability



NOTES

1. Not all feature are mapped where Negligible
2. Mapping not to be used for determining precise tree/hedge locations.

Coordinate System: British National Grid

ISSUE PURPOSE

Environmental Statement

PINS REFERENCE NUMBER

EN010118

FIGURE TITLE

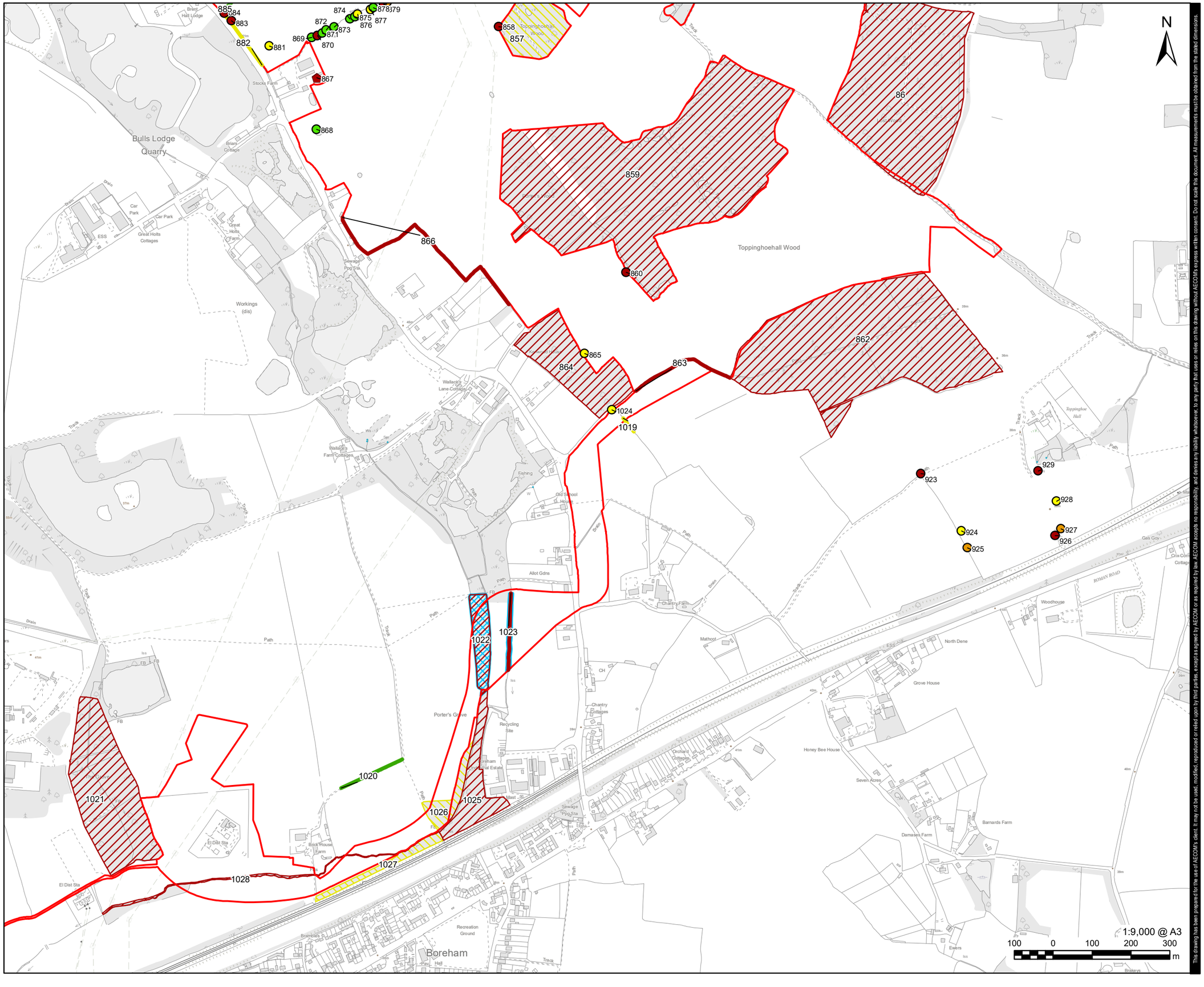
Preliminary Bat Roost Assessment

FIGURE NUMBER

Figure A4.2

Revision: 0 Drawn: BF Checked: MP Approved: PD Date: 2022-01-21

Filename: W:\Active Projects\Longfield Solar Farm Chelmsford\GIS\02_Maps\ECO_ES_8l_2_Bat_PRA.mxd



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LEGEND

- Order Limits

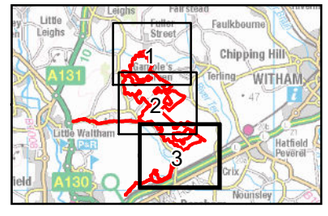
Preliminary Roost Assesment Structure
- High suitability

Tree
- High suitability
- Moderate suitability
- Low suitability
- Negligible suitability

Woodland
- High suitability
- Low suitability

Tree line / hedgerow with trees
- High suitability
- Low suitability
- Negligible suitability

Woodland
- No access



NOTES

1. Not all feature are mapped where Negligible
2. Mapping not to be used for determining precise tree/hedge locations.

ISSUE PURPOSE

Environmental Statement

PINS REFERENCE NUMBER

EN010118

FIGURE TITLE

Preliminary Bat Roost Assessment

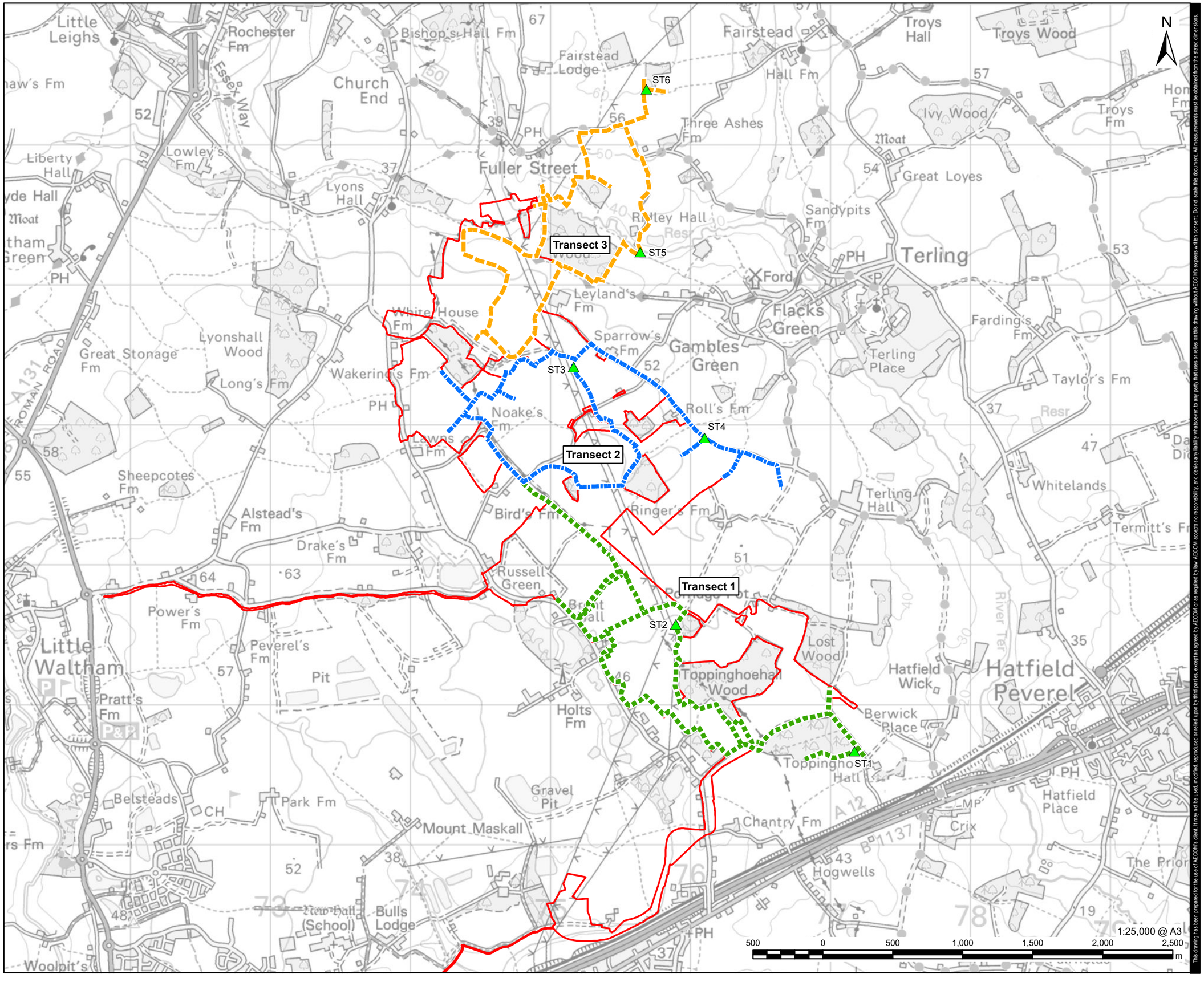
FIGURE NUMBER

Figure
A4.3

Figure A5: Bat survey transect results (*Note: Figure is based on a previous iteration of the site boundary (Order limits) which was valid at the time of writing*)

Revision: 0 Drawn: BF Checked: MP Approved: PD Date: 2022-01-21

Filename : W:\Active Projects\Longfield Solar Farm Chelmsford\GIS\02_Maps\ECO_ES_8_3_Bat_Transect.mxd



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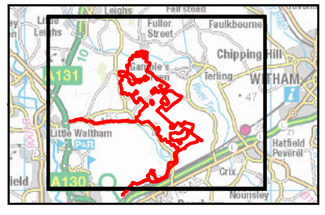
LEGEND

- Order Limits

Bat survey transect

- Transect 3 (Spring, Summer and Autumn)
- Transect 2 (Spring, Summer and Autumn)
- Transect 1 (Spring, Summer and Autumn)
- Static detector



NOTES

ISSUE PURPOSE

Environmental Statement

PINS REFERENCE NUMBER

EN010118

FIGURE TITLE

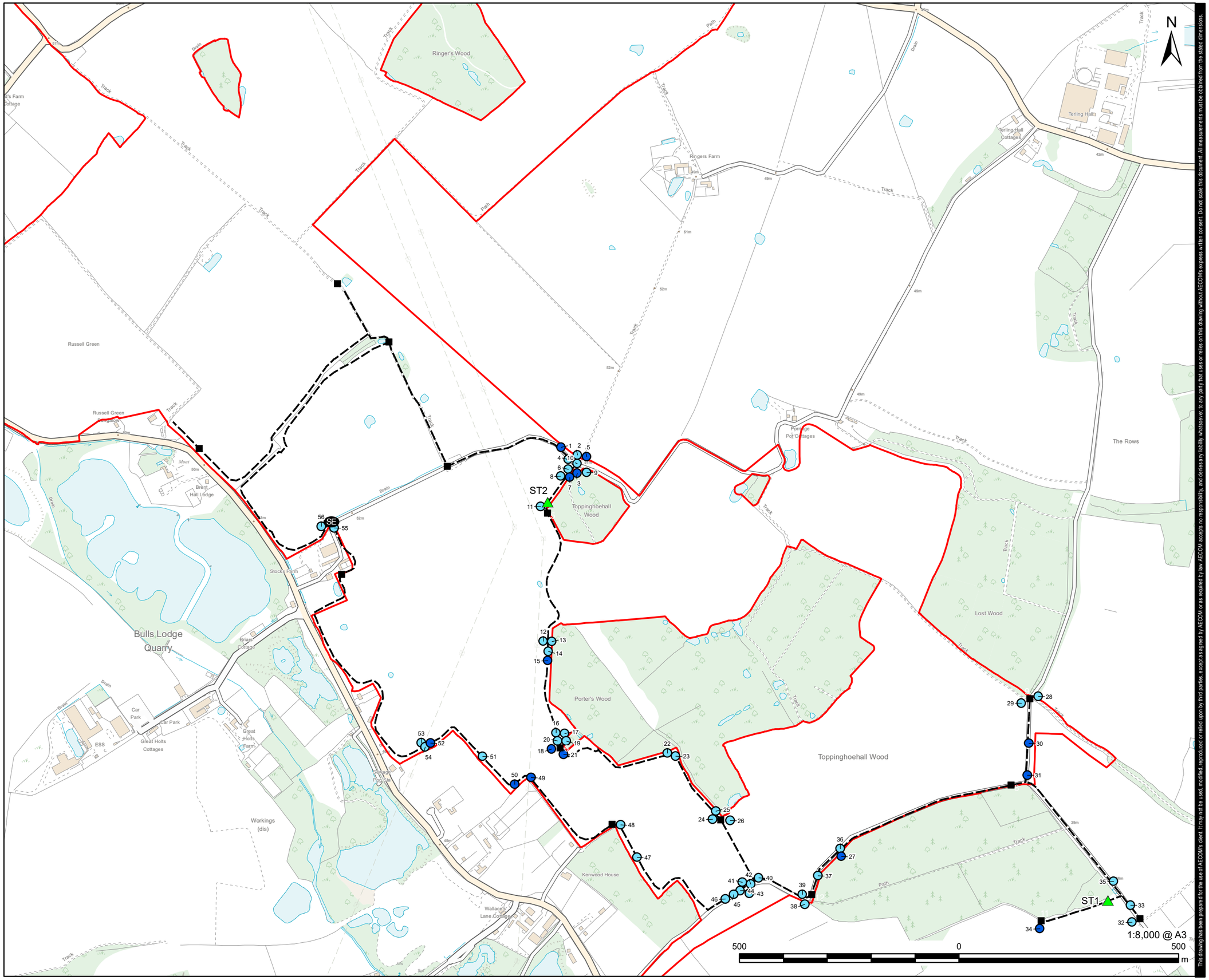
Bat Survey
Transect Overview

FIGURE NUMBER

Figure A5

Revision: 0 Drawn: BF Checked: MP Approved: PD Date: 2022-01-21

Filename: W:\Active Projects\Longfield Solar Farm Chelmsford\GIS\02_Maps\ECO_ES_8I_3_Bat_Transect.mxd



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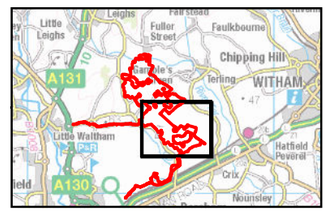
LEGEND

- Order Limits
- Survey transect route
- SE Start/End point
- Stopping point (with reference number)
- Static detector

Bat species records

- Common pipistrelle *(Pipistrellus pipistrellus)*
- Soprano pipistrelle *(Pipistrellus pygmaeus)*



NOTES

Coordinate System: British National Grid

ISSUE PURPOSE

Environmental Statement

PINS REFERENCE NUMBER

EN010118

FIGURE TITLE

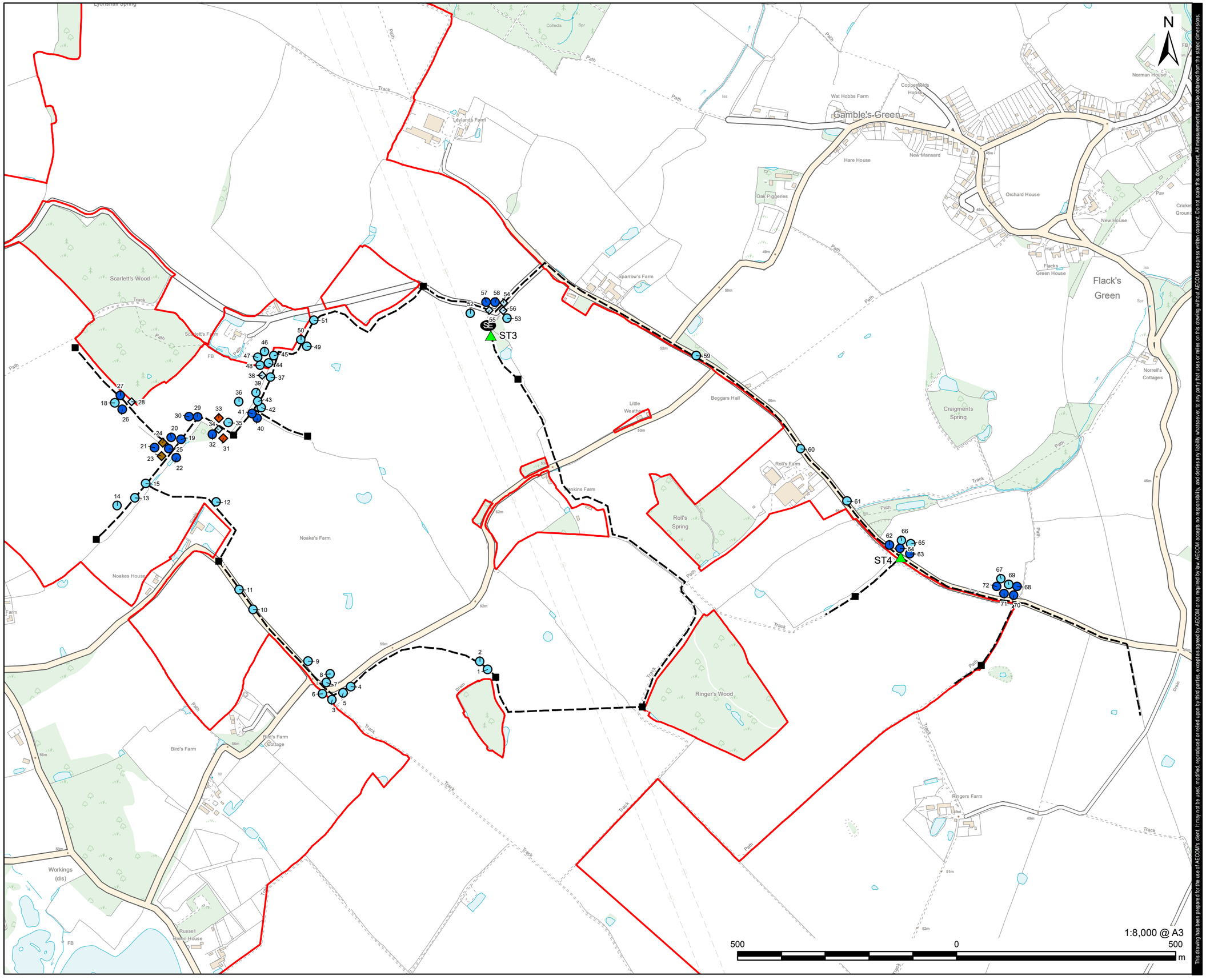
Bat Survey
Spring Transect 1

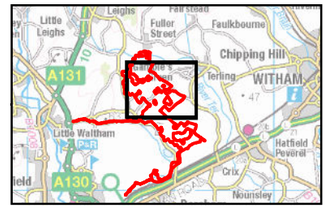
FIGURE NUMBER

Figure
A5.1

Revision: 0 Drawn: BF Checked: MP Approved: PD Date: 2022-01-21

Filename: W:\Active Projects\Longfield Solar Farm Chelmsford\GIS\02_Maps\ECO_ES_8l_3_Bat_Transect.mxd





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LEGEND

- Order Limits
- Survey transect route
- SE Start/End point
- Stopping point (with reference number)
- Static detector

Bat species records

- Barbastelle bat *(Barbastella barbastellus)*
- Common pipistrelle *(Pipistrellus pipistrellus)*
- Soprano pipistrelle *(Pipistrellus pygmaeus)*
- *Pipistrellus spec.*
- Brown Long-eared bat *(Plecotus auritus)*

NOTES

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ISSUE PURPOSE

Environmental Statement

PINS REFERENCE NUMBER

EN010118

FIGURE TITLE

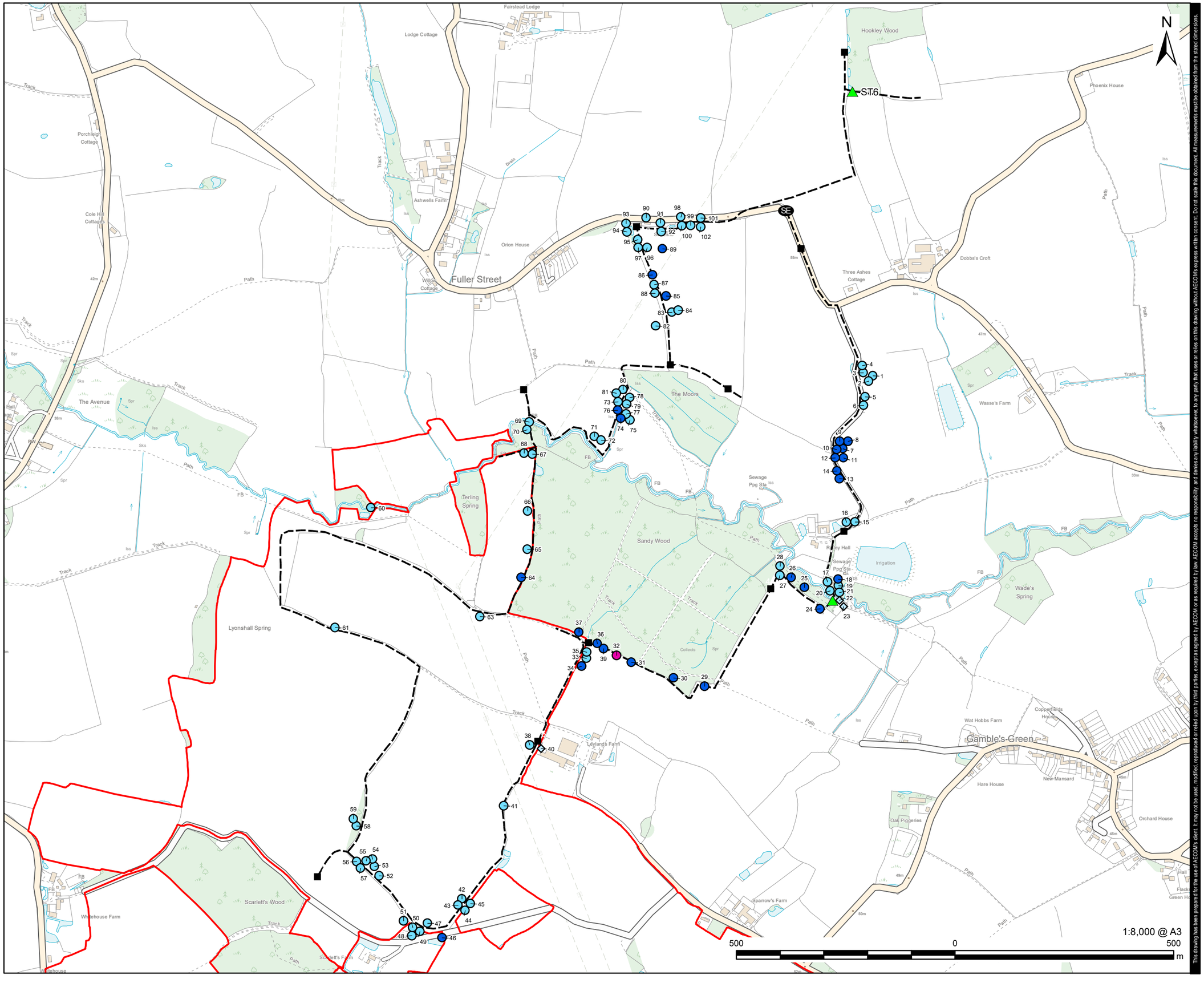
Bat Survey
Spring Transect 2

FIGURE NUMBER

Figure
A5.2

Revision: 0 Drawn: BF Checked: MP Approved: PD Date: 2022-01-21

Filename: W:\Active Projects\Longfield Solar Farm Chelmsford\GIS\02_Maps\ECO_ES_8I_3_Bat_Transect.mxd



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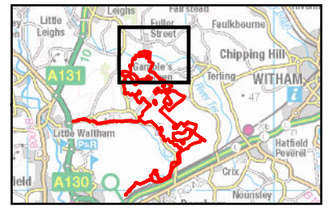
LEGEND

- Order Limits
- Survey transect route
- SE — Start/End point
- Stopping point (with reference number)
- Static detector

Bat species records

- *Myotis spec.*
- Common pipistrelle *(Pipistrellus pipistrellus)*
- Soprano pipistrelle *(Pipistrellus pygmaeus)*
- *Pipistrellus spec.*



NOTES

Coordinate System: British National Grid

ISSUE PURPOSE

Environmental Statement

PINS REFERENCE NUMBER

EN010118

FIGURE TITLE

Bat Survey
Spring Transect 3

FIGURE NUMBER

Figure
A5.3

Revision: 0 Drawn: BF Checked: MP Approved: PD Date: 2022-01-21

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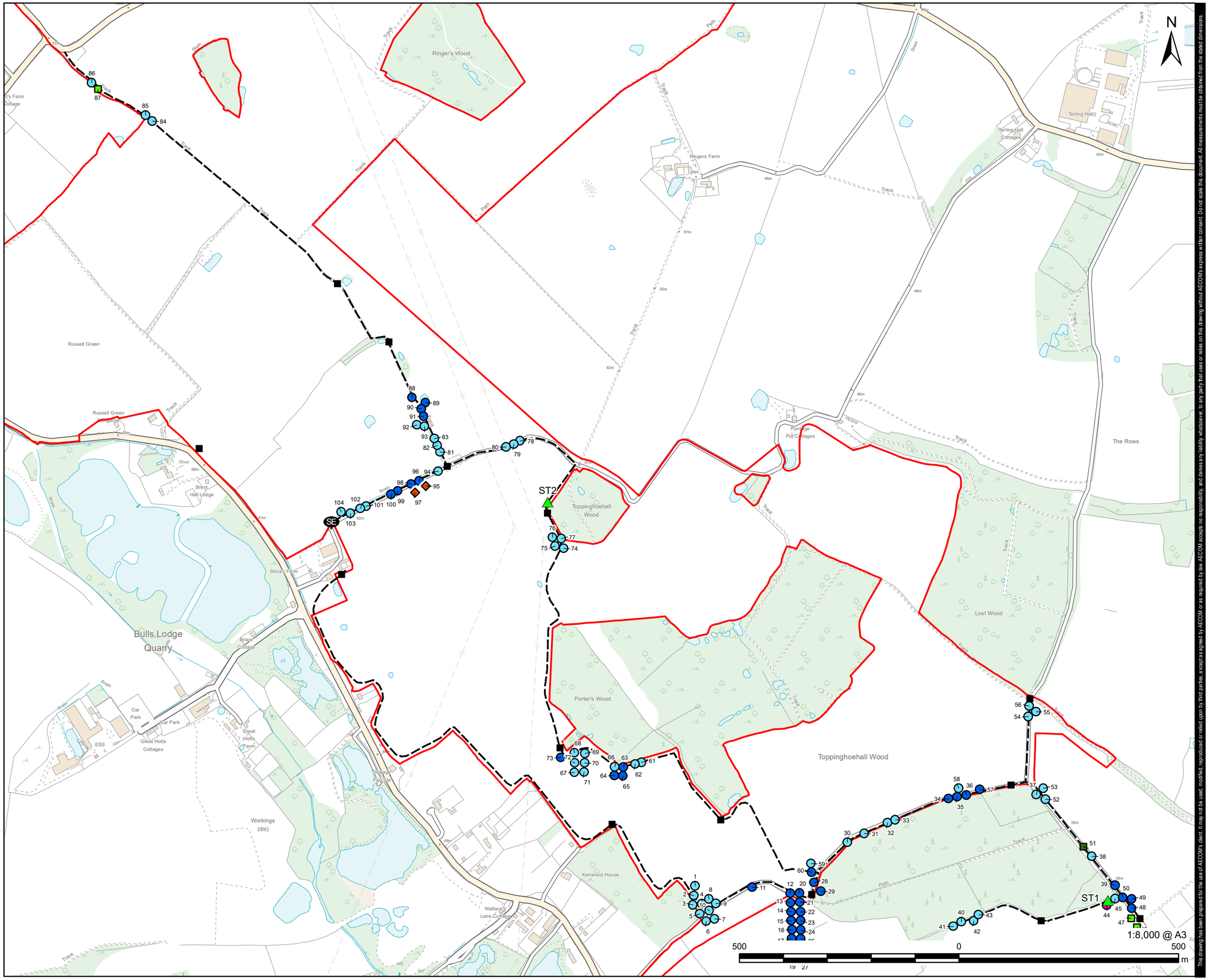

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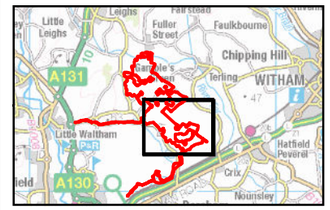
LEGEND

- Order Limits
- Survey transect route
- SE Start/End point
- Stopping point (with reference number)
- Static detector

Bat species records

- Barbastelle bat *(Barbastella barbastellus)*
- *Myotis spec.*
- Noctule *(Nyctalus noctula)*
- *Nyctalus spec.*
- Common pipistrelle *(Pipistrellus pipistrellus)*
- Soprano pipistrelle *(Pipistrellus pygmaeus)*



NOTES

ISSUE PURPOSE

Environmental Statement

PINS REFERENCE NUMBER

EN010118

FIGURE TITLE

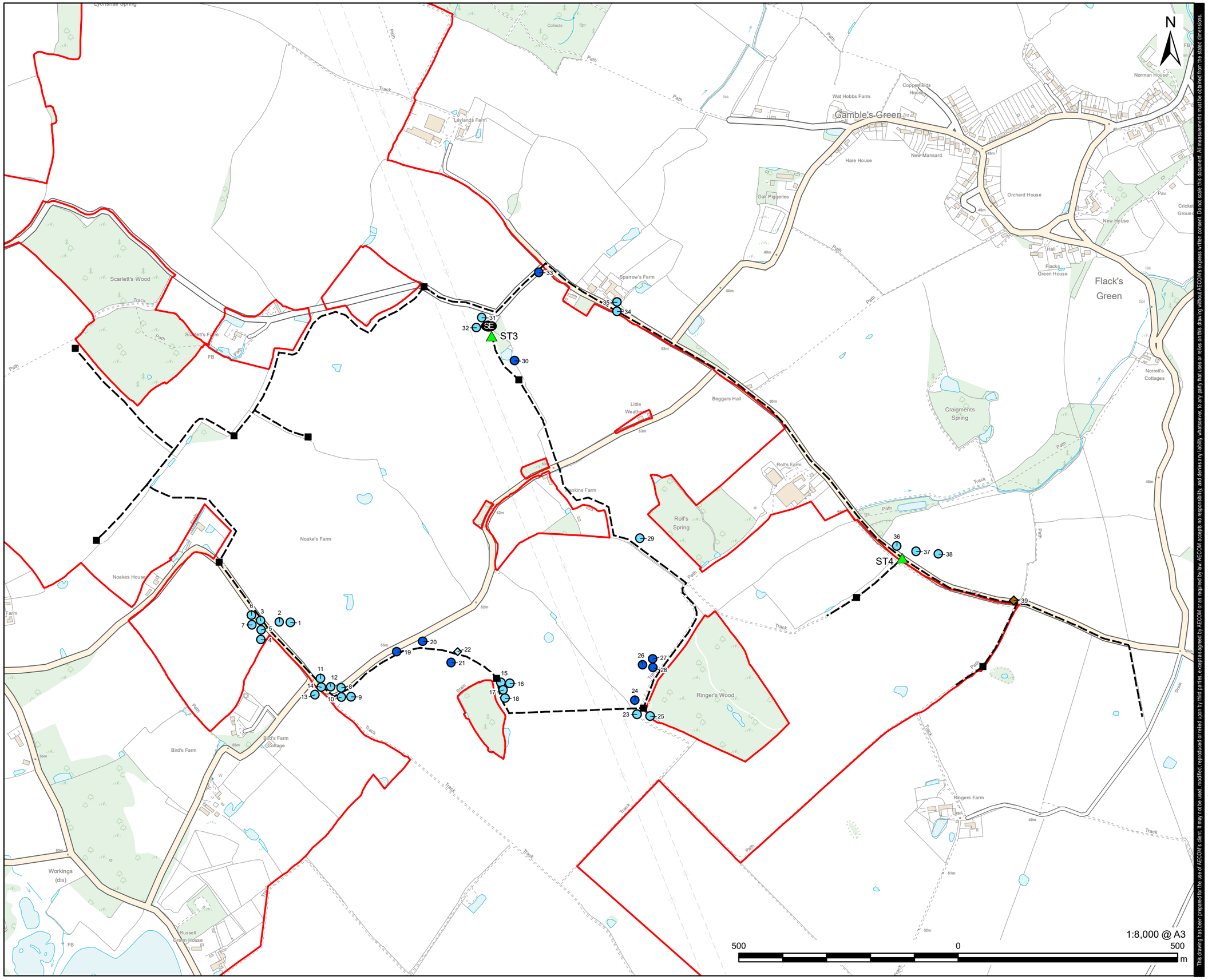
Bat Survey
Summer Transect 1

FIGURE NUMBER

Figure A5.4

Revision: 0 Drawn: BF Checked: MP Approved: PD Date: 2022-01-21

Filename: W:\Active Projects\Longfield Solar Farm Chelmsford\GIS\02_Maps\ECO_ES_8l_3_Bat_Transect.mxd



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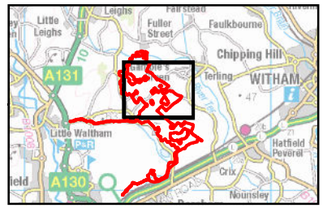
LEGEND

- Order Limits
- Survey transect route
- Start/End point
- Stopping point (with reference number)
- Static detector

Bat species records

- Common pipistrelle *(Pipistrellus pipistrellus)*
- Soprano pipistrelle *(Pipistrellus pygmaeus)*
- *Pipistrellus spec.*
- Brown Long-eared bat *(Plecotus auritus)*



NOTES

Coordinate System: British National Grid

ISSUE PURPOSE

Environmental Statement

PINS REFERENCE NUMBER

EN010118

FIGURE TITLE

Bat Survey
Summer Transect 2

FIGURE NUMBER

Figure
A5.5

Revision: 0 Drawn: BF Checked: MP Approved: PD Date: 2022-01-21

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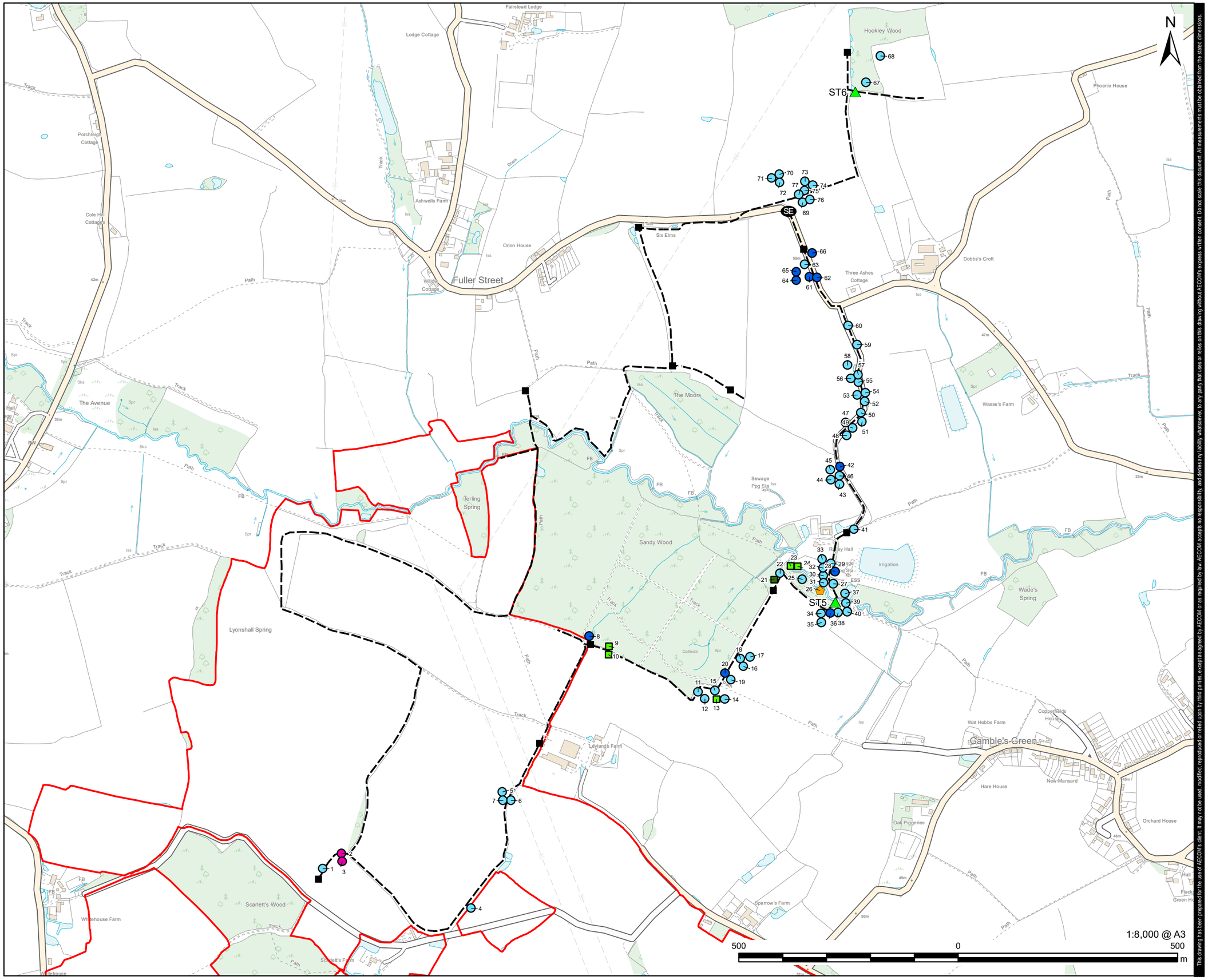

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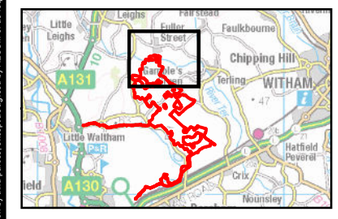
LEGEND

- Order Limits
- Survey transect route
- SE Start/End point
- Stopping point (with reference number)
- Static detector

Bat species records

- Serotine bat *(Eptesicus serotinus)*
- *Myotis spec.*
- Noctule *(Nyctalus noctula)*
- *Nyctalus spec.*
- Common pipistrelle *(Pipistrellus pipistrellus)*
- Soprano pipistrelle *(Pipistrellus pygmaeus)*



NOTES

Coordinate System: British National Grid

ISSUE PURPOSE

Environmental Statement

PINS REFERENCE NUMBER

EN010118

FIGURE TITLE

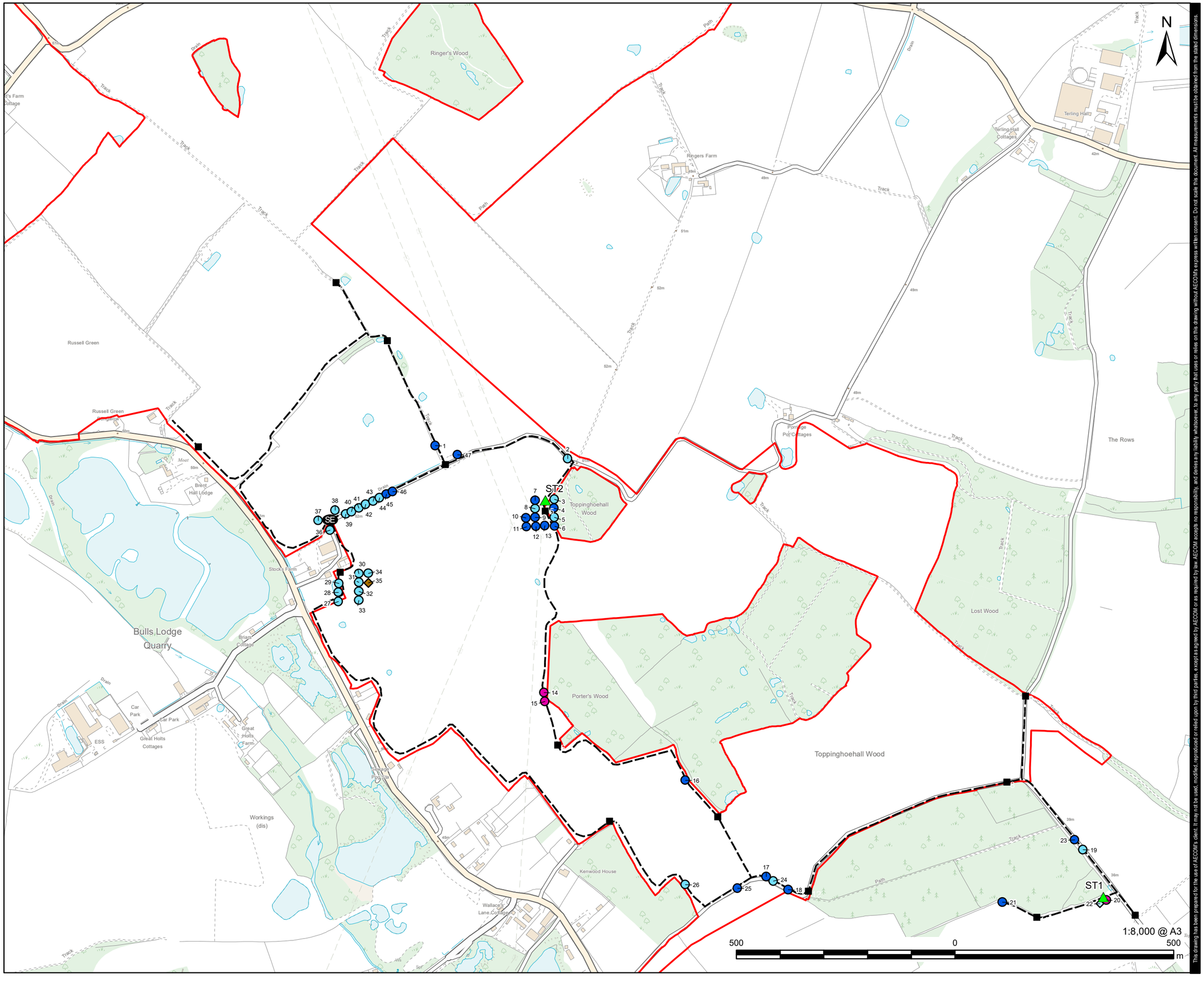
Bat Survey
Summer Transect 3

FIGURE NUMBER

Figure
A5.6

Revision: 0 Drawn: BF Checked: MP Approved: PD Date: 2022-01-21

Filename: W:\Active Projects\Longfield Solar Farm Chelmsford\GIS\02_Maps\ECO_ES_8_3_Bat_Transect.mxd



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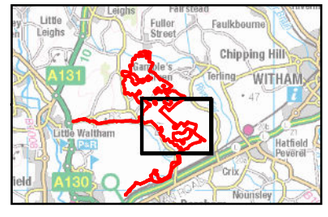
LEGEND

- Order Limits
- Survey transect route
- SE — Start/End point
- Stopping point (with reference number)
- Static detector

Bat species records

- *Myotis spec.*
- Common pipistrelle *(Pipistrellus pipistrellus)*
- Soprano pipistrelle *(Pipistrellus pygmaeus)*
- *Pipistrellus spec.*
- Brown Long-eared bat *(Plecotus auritus)*



NOTES

Coordinate System: British National Grid

ISSUE PURPOSE

Environmental Statement

PINS REFERENCE NUMBER

EN010118

FIGURE TITLE

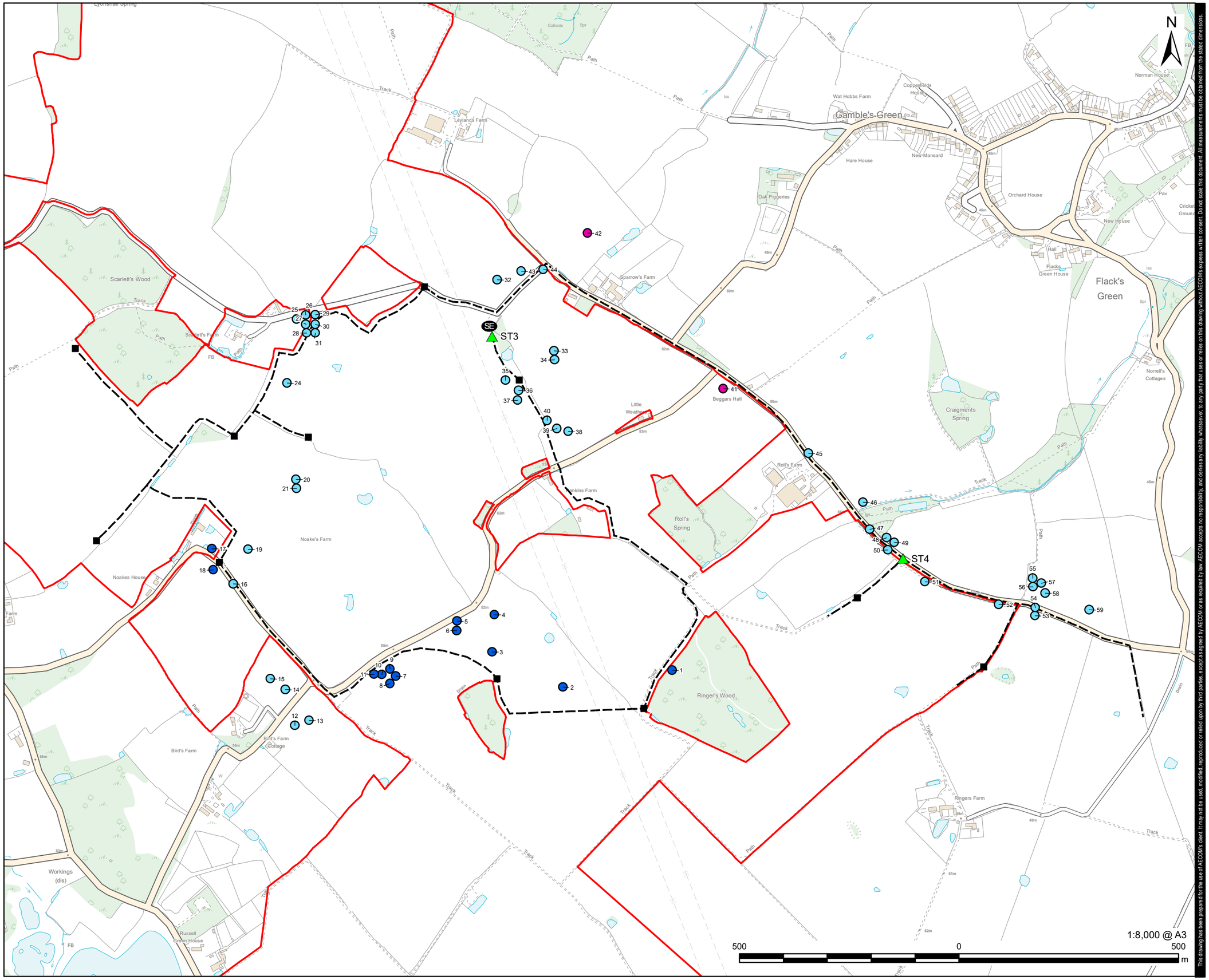
Bat Survey
Autumn Transect 1

FIGURE NUMBER

Figure
A5.7

Revision: 0 Drawn: BF Checked: MP Approved: PD Date: 2022-01-21

Filename: W:\Active Projects\Longfield Solar Farm Chelmsford\GIS\02_Maps\ECO_ES_8I_3_Bat_Transect.mxd



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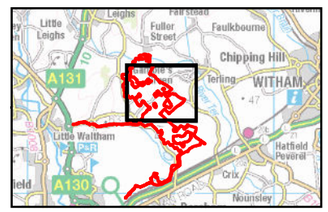
LEGEND

- Order Limits
- Survey transect route
- SE Start/End point
- Stopping point (with reference number)
- Static detector

Bat species records

- *Myotis spec.*
- Common pipistrelle *(Pipistrellus pipistrellus)*
- Soprano pipistrelle *(Pipistrellus pygmaeus)*



NOTES

ISSUE PURPOSE

Environmental Statement

PINS REFERENCE NUMBER

EN010118

FIGURE TITLE

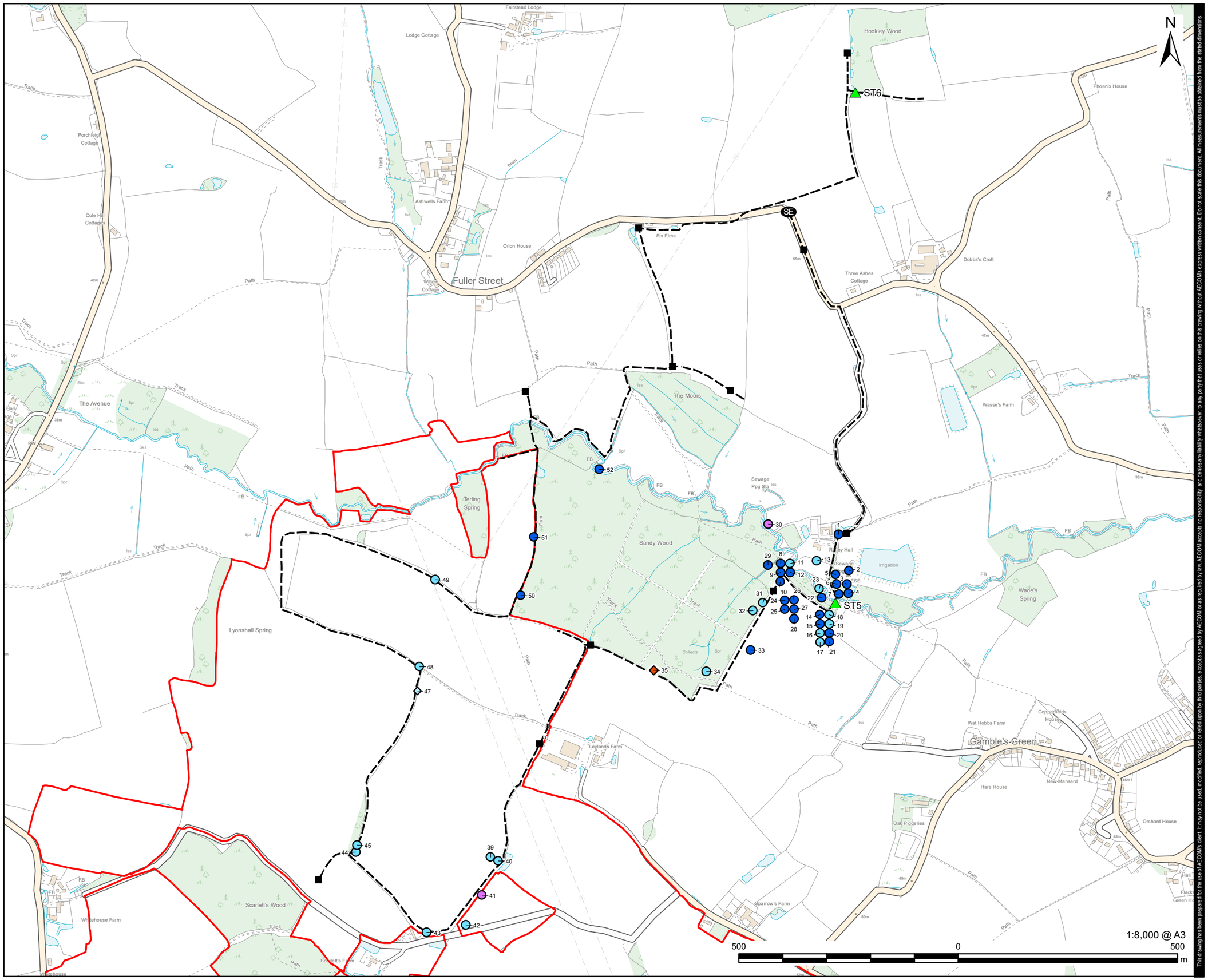
Bat Survey
Autumn Transect 2

FIGURE NUMBER

Figure
A5.8

Revision: 0 Drawn: BF Checked: MP Approved: PD Date: 2022-01-21

Filename: W:\Active Projects\Longfield Solar Farm Chelmsford\GIS\02_Maps\ECO_ES_8I_3_Bat_Transect.mxd



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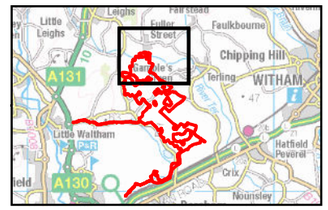
LEGEND

- Order Limits
- Survey transect route
- SE — Start/End point
- Stopping point (with reference number)
- Static detector

Bat species records

- Barbastelle bat *(Barbastella barbastellus)*
- Daubenton's bat *(Myotis daubentonii)*
- Common pipistrelle *(Pipistrellus pipistrellus)*
- Soprano pipistrelle *(Pipistrellus pygmaeus)*
- *Pipistrellus spec.*



NOTES

Coordinate System: British National Grid

ISSUE PURPOSE

Environmental Statement

PINS REFERENCE NUMBER

EN010118

FIGURE TITLE

Bat Survey
Autumn Transect 3

FIGURE NUMBER

Figure
A5.9

8.2 Annex B – Preliminary Bat Roost Assessment Method

Table 4: Survey Methodology for Assessing the Potential Roost Features (PRFs) of Trees & Buildings

Trees

Surveys can be undertaken at any time of year but should preferably be carried out when the trees are not in full leaf, to aid the viewing of PRFs. Any constraints to surveys should always be noted.

The scoping survey to identify the existence of PRFs should include checks for the presence of the following features that bats might be able to use to determine features with the potential to support bats in accordance with criteria in **Table 5**:

- natural holes (*e.g.*, knot holes) arising from naturally shed branches, or branches previously pruned back to the branch collar;
- 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 (both vertical and horizontal);
- partially detached or loose, platy bark;
- cankers (caused by localized bark death) in which cavities have developed;
- other hollows or cavities, including butt rots;
- compression forks with included bark, forming potential cavities;
- crossing stems or branches with suitable space between for roosting;
- ivy stems with diameters in excess of 50 mm with suitable roosting space behind (or where a roosting space can be seen where a mat of thinner stems has left a gap between the mat and the trunk);
- bird and bat boxes on trees; or other features that offer a place of shelter.

NOTE Roosts of some species can occur very low on trees so PRFs can be found at all heights.

Buildings

Bats utilise many different features in buildings for places of shelter and roosting. Features associated with each building are visually inspected for their suitability for use by roosting bats. Equipment includes close focusing binoculars and powerful spot-lamps are used to study the walls, eaves and roofs of the buildings. Inspection mirrors and endoscopes are used as required.

Features that should be observed, noted and graded (in accordance with criteria in **Table 5**) during the External and Internal survey of buildings includes:

- bats are able to enter a roosting cavity through a small gaps at least 20mm wide. However, bats usually also require an area to land that is adjacent to the entrance hole and has a rough surface. Such features are looked for during the inspection.
- features include; gaps in ridge tiles (where mortar is missing) gaps under roof tiles or slates, lead flashing around chimney stacks and around dormer windows, gaps under the fascia's and soffits, weatherboarding, missing mortar from joints in stone/ brickwork, roof valleys and hips.
- the most effective method of determining the presence of bat activity within a building is by the presence of their droppings. Bats deposit droppings in both roost and social areas, but the use of such sites by bats can change due to prevailing weather conditions or the time of year. Special attention should be paid

to the areas directly below any potential access/ egress point in an attempt to identify any accumulation of bat droppings.

No work involving multi-sectional ladders over 5 m in height was undertaken as part of the survey. No access inside properties was undertaken.

Table 5: Criteria used to describe the level of suitability of a Potential Roost Feature (PRF) to support roosting bats.

Suitability / Risk	Description of Roosting Habitats
NEGLIGIBLE	Structure or tree with no or very limited roosting opportunities for bats. Feature may be isolated from foraging habitat.
LOW	Structure or tree one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (*i.e.* unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain PRF(s) but with none seen from the ground or features seen with only very limited roosting potential with a limited number of roosting opportunities. Low proximity and connectivity to low or moderate quality foraging habitat.
MODERATE	Structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed). Often will have some connectivity and proximity to moderate or high quality foraging habitat.
HIGH	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially longer periods of time due to their size, shelter one or more species of bat. With good connectivity to high quality foraging habitat.
CONFIRMED ROOST	Presence of bats or evidence of bats. Confirmation of roost status may require further Roost Classification Survey.

Notes:

Collins, 2016 (Ref 1-5) uses the terms negligible, low, moderate and high to assess habitat suitability for bats as per the levels shown in the table above. The BS 8596:2015 Surveying for bats in trees and woodland uses the term 'Risk' when assigning these categories to PRFs. In the absence of an industry standard this table can be used to help the ecologist determine the level of Habitat Suitability of PRFs to provide suitable roosting opportunities for bats.

The NEGLIGIBLE category is used where a feature has been inspected and found not to contain any features of use to bats, and hence provides confirmation that a feature has been inspected or considered.

For building/structures PRFs assessed at LOW to HIGH Risk further surveys are likely to be required (in accordance with standard survey guidance to attempt to determine roost presence/absence). For tree PRFs assessed at MODERATE to HIGH Risk further

Suitability / Risk	Description of Roosting Habitats
	surveys are likely to be required (in accordance with standard survey guidance to attempt to determine roost presence/absence (see Ref 1-5). CONFIRMED ROOSTS would require Roost Characterisation Surveys to inform planning/mitigation requirements if impacts are predicted.

8.3 Annex C - Valuing Bat Roosts Foraging and Commuting Habitats in Ecological Impact Assessment

Tables and valuation method for bat roosts, foraging and commuting habitats are based on Wray et al (Ref 1-9), with the IUCN conservation status given for each species based on recent guidance in Mathews *et al* (Ref 1-10).

Table 6: Categorising bats by distribution and rarity

Rarity within range (UK)	Species and IUCN conservation status in England
Rarest (popn. under 10,000)	Greater horseshoe (*Rhinolophus ferrumequinum*) Bechstein's (*Myotis bechsteinii*) Alcathoe (*Myotis alcathoe*) (Data Deficient) Greater Mouse-eared (*Myotis myotis*) (Critically Endangered) Barbastelle (*Barbastella barbastellus*) (Vulnerable) Grey long-eared (*Plecotus austriacus*)
Rarer (popn. 10,000 – 100,000)	Lesser horseshoe (*Rhinolophus hipposideros*) Whiskered (*Myotis mystacinus*) (Data Deficient) Brandt's (*Myotis brandtii*) (Data Deficient) Daubenton's (*Myotis daubentonii*) Natterer's (*Myotis nattereri*) Leisler's (*Nyctalus leisleri*) (Near Threatened) Noctule (*Nyctalus noctula*) Nathusius' Pipistrelle (*Pipistrellus nathusii*) (Near Threatened) Serotine (*Eptesicus serotinus*) (Vulnerable)
Common (popn. Over 100,000)	Common Pipistrelle (*Pipistrellus pipistrellus*) Soprano Pipistrelle (*Pipistrellus pygmaeus*) Brown long-eared (*Plecotus auritus*)

Table 7: Valuing Bat Roosts

Geographic frame of reference	Roost Types
District, Local or Parish	Feeding perches (common species) Individual bats (common species) Small numbers of non-breeding bats (common species) Mating sites (common species)
County	Maternity sites (common species) Small numbers of hibernating bats (common and rarer species) Feeding perches (rarer/rarest species) Individual bats (rarer/rarest species) Small numbers of non-breeding bats (rarer/rarest species)
Regional	Mating sites (rarer/rarest species) including well used swarming sites Maternity sites (rarer species) Hibernation sites (rarest species) Significant hibernation sites for rarer/rarest species or all species assemblages
National/UK	Maternity sites (rarest species)

Geographic frame of reference	Roost Types
	Sites meeting Site of Special Scientific Interest guidelines
International	Special Area of Conservation sites

Table 8: Valuing Commuting Routes with Scoring

Species	Number of bats #	Roosts/potential roosts nearby	Type and complexity of linear features
Common (2)	Individual bats (5)	None (1)	Absence of (other) linear features (1)
		Small number (3)	Unvegetated fences/walls and large field sizes (2)
Rarer (5)	Small number of bats (10)	Moderate number/Not known (4)	Walls, gappy or flailed hedgerows, isolated well grown hedgerows, and moderate field sizes (3)
		Large number of roosts, or close to a nationally important/protected site for the species (5)	Well-grown and well-connected hedgerows/tree lines, small field sizes (4)
Rarest (20)	Large number of bats (20)	Close to or within an internationally important/ protected site for the species (20)	Complex network of mature well-established hedgerows, tree line, small fields and rivers/streams (5)

Individual bats 1 or 2, Small numbers 3 to 10, Large numbers>10 bats

Table 9: Valuing Foraging Areas with Scoring

Species	Number of bats #	Roosts/potential roosts nearby	Type and complexity of linear features
Common (2)	Individual bats (5)	None (1)	Industrial or other site without established vegetation (1)
		Small number (3)	Suburban areas or intensive arable land (2)
Rarer (5)	Small number of bats (10)	Moderate number/Not known (4)	Isolated woodland patches, less intensive arable

Species	Number of bats #	Roosts/potential roosts nearby	Type and complexity of linear features
			and/or small towns and villages (3)
		Large number of roosts, or close to a nationally important site for the species (5)	Larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4)
Rarest (20)	Large number of bats (20)	Close to or within a SAC for the species (20)	Mosaic of pasture, woodlands and wetland areas (5)

Individual bats 1 or 2, Small numbers 3 to 10, Large numbers>10 bats

Scores in the four columns of each table above A5 and A6 are added up to provide an overall score to help determine the value or importance of commuting routes and foraging areas as per **Table 10**.

Table 10: Scoring System for Valuing Commuting and Foraging Bats

Geographic frame of reference	Score
International	>50
National	41 – 50
Regional	31 – 40
County/District*	21 – 30
Local	11 – 20
Not important (Site Level only)	1 - 10

* Note that County and District has been combined to correspond to CIEEM EcIA guidelines (Ref 1-8) based on guidance table below.

Table 11: Importance of Ecological Features

Importance of ecological features	Typical descriptors and examples of criteria
International or European	An internationally designated site or candidate site including Special Protection Area (SPA), potential SPAs (pSPAs); Special Area of Conservation (SAC), candidate or possible

Importance of ecological features	Typical descriptors and examples of criteria
	SACs (cSACs or pSACs[1]) and Ramsar sites (wetlands of international importance). Biogenetic Reserves, World Heritage Sites and Biosphere Reserves. Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such. Resident or regularly occurring populations of species which may be considered at an international or European level[2] where: • the loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale; • the population forms a critical part[3] of a wider population at this scale; or • the species is at a critical phase[4] of its life cycle at this scale.
UK or National	Sites designated at UK or national level *e.g.* Site of Special Scientific Interest (SSSI), Marine Protection Area (MPA) including Marine Conservation Zones (MCZ) and National Nature Reserve (NNR). Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such. Areas of key or priority habitats identified in the UK Post-2010 Biodiversity Framework *i.e.* UK Biodiversity Action Plan (BAP), including those published in accordance with Section 41 of the Natural Environment and Rural Communities Act (2006) and those considered to be of principal importance for the conservation of biodiversity. Areas of ancient woodland Resident or regularly occurring populations of species which may be considered at a UK or a national level[5] where: • the loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale; • the population forms a critical part of a wider population at this scale; or • the species is at a critical phase of its life cycle at this scale.
Regional	Habitats or populations of species of value at a regional level (*i.e.* East Anglia). Areas of key or priority habitat identified as being of Regional value in the appropriate National Character Area (NCA). Key or priority habitat or species listed within the Highways England (HE) / Highways Agency (HA) BAP. Resident or regularly occurring populations of species which may be considered at a regional level[6] where: • the loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale;

Importance of ecological features	Typical descriptors and examples of criteria
	• the population forms a critical part of a wider population at this scale; or • the species is at a critical phase of its life cycle at this scale.
County or Unitary Authority or District	Habitats or populations of species of value at a County (*i.e.* Essex) level or District (*e.g.* Chelmsford or Braintree). Designated sites, such as County Wildlife Site (CWS), Local Wildlife Site (LWS) or Sites of Importance for Nature Conservation (SINC) and Local Nature Reserve (LNR) designated in the county or unitary authority area *i.e.* District context. Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such. Areas of key or priority habitats identified in the Local Biodiversity Action Plan (LBAP). Resident or regularly occurring populations of species which may be considered at a County (or District) level[7] where: • the loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale; • the population forms a critical part of a wider population at this scale; or, • the species is at a critical phase of its life cycle at this scale.
Local	Habitats or species populations of value in a local (*i.e.* within ~ 5km of the site) context. Designated sites include LNRs designated in the local context. Trees that are protected by Tree Preservation Orders (TPOs). Areas of habitat or populations and, or communities of species considered to appreciably enrich the habitat resource within the local context (such as veteran trees), including features of value for migration, dispersal or genetic exchange.
Site	Habitat that is of value in the context of the site only. Populations of common and widespread species. A degraded/ impoverished example of a common or widespread habitat in the local area.

1. pSACs are sites which have been formally advised by to UK Government but have not yet been submitted to the European Commission. These sites should be valued at an international (European) level on the basis that they meet the relevant selection criteria for a SAC but are not yet designated as such.
2. Such species include those listed within the Directive 2009/147/EC on the Conservation of wild birds (*i.e.* EC Birds Directive) (codified version of Council Directive 79/409/EEC as amended) or animal/ plant species listed within Council Directive 92/43/EEC on the Conservation of natural habitats and of wild flora and fauna (*i.e.* Habitats Directive).

Importance of ecological features	Typical descriptors and examples of criteria

3. Such populations include sub-populations that are essential to maintenance of metapopulation dynamics *e.g*. critical emigration/ immigration links between otherwise discrete populations.
4. Seasonal activity or behaviour upon which survival or reproduction depends.
5. Species which may be considered at the UK or national level means; birds, other animals and plants which receive legal protection in the basis of their conservation interest (those listed within the Wildlife and Countryside Act 1981 (as amended) Schedule 1, 5 and 8); species listed for their principal importance for biodiversity (in accordance with the Natural Environment and Communities Act 2006 Section 41 England); priority species listed within the UK Post 2010 Biodiversity Framework (*i.e.* UKBAP); or species listed within the Red Data Book.
6. Such species include those listed in the appropriate Natural Character Area and key/ priority species listed on the 2002 HABAP
7. Such species include those at county level (*i.e.* Essex) including unitary authority area *i.e.* District level (*i.e.* Chelmsford); as listed on the LBAPs; and listed as a county designated site.

*As well as assigning importance there is also a need to identify all legally protected species that could be affected by the Scheme in order that measures can be taken to ensure that adherence to the relevant legislation is observed. This may include the adoption of mitigation and appropriate licensing which is acceptable to Natural England.

8.4 Annex D – Survey Results

Table 12: Preliminary Roost Assessment

Feature / Photo Ref.	Tree Species	Height m	DBH cm	Description/ number of trees	PRF Description	Bat signs	Roost Suitability[3]
758	Elm	30	60	Mature roadside tree	Bark fissures, callus, knot hole south gap in hedge.		M
759	Dead Oak	6	80	Dead oak	Lifted bark, small hole		M
760	Oak	25	80	Mature oak	Vertical split, callus folds		M
761	Oak	27	100	Mature oak, pollarded dead wood	Lifted bark, dead wood, large hollow		H
762	Treeline + shrubs	Up to 25	10-50	Ash, Maple, oak, (30 trees)			N–M
763	Oak	25	50	Standard tree	Hole underside of NW bough 6m high.		M
764	Oak	25	60	Standard tree	A few small holes shallow, callus folds.		L
765	Two oaks	25	55	2 trees each has 3 stems.	Lifted bark, decay cavity on limb 5, 5m high. (photo 8)		L
766	Oak	30	1.2m	Large standard.	Various holes, primary cuts, upward facing hole SE side 10m.		H

[3] H = High, M = Moderate, L=Low, N = Negligible Roost Suitability

Feature / Photo Ref.	Tree Species	Height m	DBH cm	Description/ number of trees	PRF Description	Bat signs	Roost Suitability[3]
767	Oak	20	1m	Pollarded, 4 main dead stems, ivy cover.	Splits, lifted bark, decay on the end of the branches.		H
768	Dead oak	6	60	Dead truck with icy cover.	Ivy cover, decay gap		L
769	Oak	20	1m	Pollarded, large central decay hole.	Vertical split along main trunk, rot hole, lifted bark.		H
770	Oak	30	1.4m	Veteran oak.	Hazard beam, large pruning cut hole, lifted bark.		H
771	Hedge with trees	Up to 25	60-80	8 mature oaks.	Various features.		L to H
772	3 oaks	25	80 – 1m	3 mature oaks	Pruning wound hole in the middle of the tree.		M
773	Oak	18	50	Mature tree	No obvious features, minor split east side bough.		L
774	3 oaks	15	20 – 40	In hedge	Minor dead wood, small gap in trunk.		L
775	Oak	20	50	In hedge. A few dead limbs.	Minor dead wood no obvious features.		L
776	Oak	25	30-50	m/s	Dead wood gaps.		M
777	Sycamore	18	40	m/s	No obvious. Some ivy cover.		L

Feature / Photo Ref.	Tree Species	Height m	DBH cm	Description/ number of trees	PRF Description	Bat signs	Roost Suitability[3]
778	Wood/ scrub	20	30	Scrub + scattered trees (Poplar, and hawthorn)	None visible.		N
779	Oak	20	90	Wide crown spread	Various holes from pruning cuts.		H
780	Oak	28	1.1m	Large standard	Large hole 7m high NE side.		H
781	Copse	Up to 25	10-80	10 trees. Ash and oak.	Various not surveyed in detail.		N to H
782	Hedge + trees	Up to 20	15-40	Oak, malus sp., ash, hawthorn, blackthorn, Rosa sp., field maple,	Various not surveyed in detail. 10 trees (young)		H
783	Woodland	Up to 30	Up to 1m	300 trees, ash and oak.	Many features. Not surveyed in detail.		H
784	Oak	24	60	Standard oak	No features, all visible.		N
785	Oak	22	50	Standard oak	No features, all visible.		N
786	Oak	12	30	Along hedge/ ditch.	None		N
787	Oak	16	40	Along hedge/ ditch.	Minor dead wood split on bough.		L
788	Black poplar	30	50-80	8 trees around pond.	1 large split, 2 with holes see photo 32 and 33.		H

Feature / Photo Ref.	Tree Species	Height m	DBH cm	Description/ number of trees	PRF Description	Bat signs	Roost Suitability[3]
789	Hedge with trees.	Up to 20	20-50	10 trees along hedge. Oak and 1 Aspen.	A few minor holes. Lifted bark.		L
790	Oak	20	90	Standard	Lifting bark, decay gaps, primary cut callus.		H
791	Oak	20	70	Standard	Lifting bark, dead wood but exposed gaps.		M
792	Oak	26	80	Standard	Hazard beam 10m up west side, lift bark.		H
793	Oak	18	30-40	Twin stemmed.			N
794	Oak	20	40	Standard	A few minor holes 5m above the ground.		L
795	Tree line	Up to 25	Up to 80	Multiple mature oak	25-30 trees outside boundary		Up to H
796	Tree line	10-15	20-30	Lime, ash, oak	Roadside. 40 trees.		N-L
797	Woodland	30	n/a	Mixed plantation some mature oak.	100 trees outside of Order limits.		H
798	Hedge + trees	Up to 20	20-40	5m high line of ash, oaks, prunus sp.	15 trees		N to L
799	Oak	30	1.2m	Standard trees	Large central cavity 12m up SW fissure.		H

Feature / Photo Ref.	Tree Species	Height m	DBH cm	Description/ number of trees	PRF Description	Bat signs	Roost Suitability[3]
800	3 Ash trees	20	10-30	Young multi stemmed tree	One stem with hole 8m high NW side		N-M
801	Copse	30	10-80	10 mature and young trees.	Ivy covered oaks and black poplar.		L-H
802	Copse	30	50-90	8 oaks and black poplar.	A few minor crevices.		L-M
803	Garden trees	26	Up to 1m	Mature oaks and leylandii.	Buildings (house) not surveyed.		N
804	Ash	14	15-30	Young multi-stemmed trees.	In hedge with no features.		N
805	Ash, Oaks, Lime	25	30-60	Oak and ash along hedge dry ditch. 20 trees.	Decay in ash including hollow trunk.		L to H
806	Oak	18	60	Oak in hedge.	No features.		N
807	Oak	25	90	Oak in scrub by pond.	Lifted bark callus fold and decay.		H
808	Oak	25	1m	Standard tree.	North bough 10m up bark uplift and tear outs. Suitable.		H
809	Oak	25	90	Standard tree	Minor bark uplift.		L
810	Oak	20	80	Standard tree	Rot hole, north side 3m.		H

Feature / Photo Ref.	Tree Species	Height m	DBH cm	Description/ number of trees	PRF Description	Bat signs	Roost Suitability[3]
811	Oak	24	1m	Standard tree	Some minor dead wood.		L
812	Hedge + trees	15-20	20-80	12 younger oaks + 2 mature	Not surveyed in detail.		M
813	Oak	25	80	Standard decay + callus	Exposed but sun exposed. Truck uplift callus.		M
814	Copse	30	20-80	*Salix sp.* and oak 30-40 trees.	Adjacent, numerous features/ deadwood.		H
815	Oak	25	1.2m	Standard tree on hedge.	Decay in heart trunk. Large cavities, and vertical splits.		H
816	2 oaks	10	25 -30	Young trees.	None		N
817	Woodland	Up to 30.		Large oaks and ash woods.	Outside boundary		H
818	Oak	18	40	Semi-mature oaks along hedgerow.	None		N
819	Oak	15	40	Semi-mature oaks along hedgerow.	None		N
820	Woods	25	20-60	Mature oak, ash, and sycamore trees. Roughly 50.	Some holes in ash lots of features.		H
821	Oak	20	75	A free-standing tree.	Numerous holes on bough with callus folds.		H

Feature / Photo Ref.	Tree Species	Height m	DBH cm	Description/ number of trees	PRF Description	Bat signs	Roost Suitability[3]
822	Oak	18	60	A free-standing tree.	Ivy covered features but no obvious features.		H
823	Oak	22	80	A free-standing tree.	Dead wood, lifted bark, minor holes and crevices.		H
824	Oak	16	90	Standard tree	Large callus on trunk, some holes, central dead wood.		H
825	Tree line on hedge	10-25	20-80	40 trees. Ash, field maple, and oak.	Numerous features. Not surveyed in detail. Woodpecker holes.		N to H
826	Oak	23	1.1m	Isolated in field. Exposed.	Some deadwood high up large hole with jackdaws.		M
827	Oak	25	1m	Isolated in field. Exposed.	Some callus folds around deadwood exposed splits.		M
828	Copse with pond.	28	30 – 90	1 x oak, 3 x poplars + scrub.	Oaks with holes.		H oaks (N-L poplars)
829	Line of trees	30	20 – 50	2 x poplars, 2 x oak.			N to L
830	Oak	20	30 – 50	Multi stemmed 3 oaks.	1 hazard beams, no other signs.		L
831	Oak	20	70	Standard.	Numerous holes/ deadwood high up.		H
832	Oak	25	90	Standard.	Deadwood callus folds, in crown and side branches.		H

Feature / Photo Ref.	Tree Species	Height m	DBH cm	Description/ number of trees	PRF Description	Bat signs	Roost Suitability[3]
833	Oak	20	30	Standard.	Ivy covered in places.		L
834	Oak	25	80	Standard.	Major deadwood, split vertical, bark uplift.		H
835	Oak	25	85	Standard.	Hole up high on trunk and side branch.		H
836	Oak	18	90	Standard.	Snapped branches, hazard beams, deadwood callus, uplifted bark especially near top.		H
837	Hedge with tree.	Up to 15.	20 – 30	4 ash and a field maple.	No features.		N
838	Oak	16	50	Standard tree along hedge.	No obvious features, ivy covered.		L
839	Oak	22	1m	Standard tree along hedge.	Downward facing features; holes, deadwood, and a hazard beam.		H
840	Oak	18	80	Standard tree along hedge.	A couple of possible exposed holes 10m up.		M
841	Ash	12	30	Standard tree along hedge.	None.		N
842	Copse	25	n/a	Oak, ash, sycamore, and *Prunus sp*. 40-50 trees.	Not surveyed in detail, deadwood.		H

Feature / Photo Ref.	Tree Species	Height m	DBH cm	Description/ number of trees	PRF Description	Bat signs	Roost Suitability[3]
843	Tree line.	Up to 25.	20 - 80	Ulmus minor, oak, and ash.	A few oaks, not surveyed in detail, deadwood, and lifted bark.		N to H
844	Tree line hedge.	20	Up to 1m.	2 mature oaks and 20 other trees including oak and ash.	Roadside hedge oaks and deadwood.		N to M
845	Wood	25	n/a	Oak and ash 300 – 400 trees.	Not surveyed.		H
846	Hedge	15	20 – 40	4 to 5 trees. Oaks and Field maple.			N to L
847	Oak	25	1m		Dead wood, split bark, and calluses.		
848	Tree hedge line	20	Up to 1m	6 oaks, field maple, and ash.	Multiple features not surveyed in detail.		H
849	Tree line + hedge.	20	Up to 1m	10 oaks and an ash.	Multiple features not surveyed in detail. Deadwood, splits. (see oaks photo 114)		H
850	Oak	16	80	Standard tree.	Minor crevices. Limited potential.		L
851	2 oak trees.	12	40	Standard tree.	None		N
852	2 Ash trees.	12	10 – 30	Multiple stemmed P standard trees.	None		N

Feature / Photo Ref.	Tree Species	Height m	DBH cm	Description/ number of trees	PRF Description	Bat signs	Roost Suitability[3]
853	2 Ash trees.	14	30 – 40	Standard.	None, exposed.		N
854	Oak	22	80	Standard.	Callus folds, dead wood, and bark uplift.		M
855	Ash	17	30	Standard.	None		N
856	Oak	20	80	Standard.	Minor bark uplift, callus around deadwood.		L
857	Woodland	25	n/a	Woodland 200+ trees.	Black poplar, oak, hornbeams, and ash.		H
858	Oak	22	1m	Standard alone on wood edge.	Low down hole no bat with split limb 10m high, other dead wood high up.		H
859	Old woods	25	n/a	Larger woods. Oak, ash, and birch.	Lots of features old oaks.		H
860	Dead oak.	10	90	Dead	Woodpecker holes sheltered hollow cavity.		H
861	Woodland	10	90	“Lost wood”	Oaks, beech, pine, and ash.		H
862	Woodland	25	n/a		Toppenhall but mixed plantation. Oaks, beech, pine, and ash.		H
863	Tree line + hedge	20	n/a	Oaks, ash, and blackthorn.	15 mature trees.		N to H

Feature / Photo Ref.	Tree Species	Height m	DBH cm	Description/ number of trees	PRF Description	Bat signs	Roost Suitability[3]
864	Woods/ scrub	22	n/a	Woods and scrub. Hazel, oak, field maple, blackthorn, privet, and ash.	Mostly mature oaks.		N to H
865	Oak	20	50	Standard	Outside wood field edge. No obvious features minor dead wood.		L
866	Hedge and oak.	20	50 – 60	Multi stemmed standard trees, 20 oaks in ash hedge.	Not surveyed in detail, *prunus spinosa.*		H
867	Barns outside of Order limits.				Wooden Timber gaps and access holes. Large *salix sp*. (Negligible)		H
868	Salix *sp*.	10		Multistemmed.	No features.		N
869	Oak	16	30	Hedge and standard tree.	None		N
870	Hornbeam	15	1m	Pollarded large trunk.	Numerous gaps		H
871	Oak	20	40	Standard	None		N
872	Oak	18	40	Standard	None		N
873	4 trees	15	10 – 20	Ash + field maple multi-stemmed.	None		N

Feature / Photo Ref.	Tree Species	Height m	DBH cm	Description/ number of trees	PRF Description	Bat signs	Roost Suitability[3]
874	Oak	15	40	Standard	Exposed, no features.		N
875	Oak	15	40	Standard	Exposed, no features.		N
876	Oak	15	40	Standard	Pruning cut hole, no signs.		L
877	Oak	15	40	Standard	Exposed no features.		N
878	Oak	15	40	Standard	Exposed no features.		N
879	Oak	20	90	Standard	Bark uplift, decay, callus fold 10m high.		H
880	Oak	21	1m	Standard	Bark uplift, exposed transverse cracks and damage.		M
881	Oak	17	50	Standard	No obvious features. Minor dead wood features, high up.		L
882	Hedge trees	15	10	10 elm, 2 oak, along hedge.	Off Order limits.		L
883	Oak	20	1.2m	Oak	Large butt rot extending up the trunk. Hole further up 7m.		H
884	Oak	22	1.1m	Standard oak	Large hole 2.5m. south-east facing transverse split in bough.		H

Feature / Photo Ref.	Tree Species	Height m	DBH cm	Description/ number of trees	PRF Description	Bat signs	Roost Suitability[3]
885	Hedge tree	20	10-20	Young dead elm. Oak, ash, field maple, and hazel.	25-30 trees. Young 5m tall lime on hedge. Hornbeam, *Prunus spinosa,* and guelder rose.		N
886	Oak	18	80	Mature standard	Ivy covered, a few rot holes on boughs.		M
887	Oak	20	90	Mature standard	Callus fold. Rotten bough holes in pruning cuts, and lifted bark.		H
888	Oak	20	1m	Mature standard	Hole south side 5m. Lifted bark.		H
889	Oak	21	90	Mature standard	Numerous holes, hazard beam, lifted bark, ivy cover.		H
890	Ash	18	10-35	Multistemmed.	Hazard beam with hole (no bats) 2m up.		L
891	Woodland	22	n/a	Various ash, oak, hornbeam.	Not surveyed in detail 50-60 trees woodpecker holes decay etc.		N to H
892	Tree line	20	20-40	15 ash multistemmed.	Various holes due to decay.		L to H
893	Oak	22	80	Standard tree.	Minor holes around dead branches, ivy covered.		M
894	Tree line	20	20 – 40	2 oak, multiple ash, small leaved lime.	Limited features.		L

Feature / Photo Ref.	Tree Species	Height m	DBH cm	Description/ number of trees	PRF Description	Bat signs	Roost Suitability[3]
895	Oak	20	1m	Standard	Lifted bark around dead wood.		M
896	3 ash trees	16	20-40	2 multistemmed, 1 standard tree.			N
897	2 oak	12	30	1 dead, 1 standard			N
898	Hedge with trees	18	20-40	30 oak trees	Numerous features, not surveyed.		H
899	Hedge with trees	16	20 -40	8 oaks, 2 field maple multistemmed.	A few minor crevices lifted bark		N to L
900	Hedge with trees		n/a	Ash, hawthorn, oak	Adjacent lane, old oak hedge.		H
911	Ash	20	30	Ash	None		N
912	Ash	20	30	Ash	None		N
913	Oak	18	30	Oak	None		N
914	Oak	20	1.2m	Old pollard	No obvious features some ivy cover.		L
915	Oak	18	1m		Lots of ivy, lifted bark.		M
916	Oak	22	1.1m	Tree over hanging road.	Lifted bark. Minor holes, and dead wood.		M

Feature / Photo Ref.	Tree Species	Height m	DBH cm	Description/ number of trees	PRF Description	Bat signs	Roost Suitability[3]
917	Oaks, lines of trees	10 to 20	15 to 80	Line of trees x 13	3 mature, 10 young a few features.		N to L
918	Oak	20	80	Standard	Lifted bark west side 10m up.		M
919	Oak	20	80	Standard	Large hole 8m up on east side.		H
920	Line of oak	15 – 20	50 – 70	Standard trees, semi-mature trees.	16 trees, nothing obvious.		N to L
921	Line of ash/ oak	10 – 15	10-30	Standard young trees.	15 young trees, ash and oak.		N
922	Oak	20	1.2m	Mature standard	Large central cavity, 3m up callus fold, lifted bark.		H
923	Oak	8	90	Standard major trunk rot.	Large central rot cavity from 1m up to 3m uplifted bark.		H
924	Ash	20	1.5m	Multistemmed mature.	Some ivy + couple of hazard beams on defunct hedge.		L
925	Ash	20	1.7m	Multistemmed mature.	Central cavity no signs. Hole 5m up on east side.		M
926	Oak	22	90	Standard	Some cut boughs with gaps, hazard beams, callus fold wound, uplift bark, dead limbs,		H
924	Oak	20	90	Standard	Some deadwood high up, exposed.		M

Feature / Photo Ref.	Tree Species	Height m	DBH cm	Description/ number of trees	PRF Description	Bat signs	Roost Suitability[3]
925	Oak	16	60	Standard	1 hole in dead limb west wide 6m high. Isolated exposed in middle of the field.		L
926	Cedar of Lebanon	18	1.3m	Standard. Broken top trunk.	Large hole at top trunk, cavity with dead branches, lifted bark, etc.		H
930	Ash	16	70	Standard	Large rot area in main trunk 8m up.	Exposed	H
931	Hedge + trees	25	n/a	25-30 trees	Outside Order limits, species include, elm, ash, and oak.		N + H
932	Woodland	25	n/a	Woodland with oak and ash.	Mature broadleaved woodland. Trees have multiple features.		N + H
933	Scattered trees	12	10-20	Ash, field maple, and 8 hawthorn.			N
934	Oak	18	70	Standard.	Minor split east bough, lifted bark exposed.		L
935	Oak	20	80	Standard in hedge.	Uplifted bark, dead wood, not fully visible.		H
936	Hedge	10	10-20	Hedge + young trees	A few dead elm, 10-12 young trees, no obvious features.		N-L
937	Woods	10	n/a	Plantation semi-mature trees.	Plantation; bird cherry, oak, ash, hawthorn.		H
938	Ash	16	20-30	Multi-stemmed ash.	n/a		N

Feature / Photo Ref.	Tree Species	Height m	DBH cm	Description/ number of trees	PRF Description	Bat signs	Roost Suitability[3]
939	Oak	20	80	Standard tree in hedge.	Cavity around dead bark. 6m up north facing side.		H
940	Oak	12	75	Standard. Previous oak pollard.	Holes in the top of the trunk 6-7m up, mostly upward facing.		M
941	Oak	11	60	Standard	Minor deadwood.		L
942	Hege + trees	20	20-80	12 Standard trees in hedge.	Outside Order limits boundary; oak, ash, field maple		H
943	Young oak/ ash	8	15-30	15 trees young hedge near road.	None		N
944	Oak	20	1.1m	Standard.	Uplifted bark around damaged limb, east 6m up.		M
945	Oak	13	30	Standard in hedge.	None		N
946	Hedge trees	12	10-25cm	Young semi mature trees. 25-30 trees.	None		N
947	Field maple	9	40	Semi mature standard.	West facing woodpecker hole 4m up + central cavity no signs.		M
948	Oak	10	70	Dying stands	Some lifted bark, large cracks northside.		M
949	Oak	20	1m	Standard	Large vertical splits in dead trunk uplifted bark.		H

Feature / Photo Ref.	Tree Species	Height m	DBH cm	Description/ number of trees	PRF Description	Bat signs	Roost Suitability[3]
950	Dead oak	10	80	Standard tree, dead.	Vertical splits, exposed lifted bark holes wood worm.		M
951	Field maple	22	80	Standard	Numerous rot holes >10m SW/S facing.		H
952	Oak	23	1m	Standard	A few minor woodpecker holes, callus folds around dead bough.		M
953	3 oaks	20	70-90	2 standard trees, and 1 pollarded tree.	Numerous features. Hazard beam, dead wood, lifted bark.	No access.	M-H
954	Crack willow	18	60	2 standard trees.	Bough overhanging a pond. Large hole + deadwood main trunk.		H
955	Broadleaved plantation	30	Up to 80	Standard hybrid poplars.	Vertical split highly suitable.		H
956	Oak	22	1m	Standard	A few minor holes, ivy cover.		M
957	Oak	24	1.1m	Standard	Numerous features. Decay holes, dead wood.		H
958	Cricket bat willow	10 – 20	5-30	Standard	20 trees/ saplings. No features.		N
959	Broadleaved semi mature woodlands	n/a	n/a	Oak, ash, hazels, field maple, hawthorn, lime,	Not surveyed.		H

Feature / Photo Ref.	Tree Species	Height m	DBH cm	Description/ number of trees	PRF Description	Bat signs	Roost Suitability[3]
960	Hedge trees	12-18	60-80	3 standard oak trees.	Large splits on trunk high up.		M-H
961	Hedge trees	10	20-40	12 hedge trees consisting on; ash, field maple, and oak.	No obvious features.		N-L
962	Oak	13	40	Hedge oak	Hazard beam, nothing visible, minor		L
963	Oak	18	1m	Standard hedge oaks.	Hole south facing bough, minor dead wood, uplifted bark.		H
964	Oak	14	80	Standard oaks.	Minor dead wood, south bough uplifted bark.		M
965	Oak	15	70	Standard.	Large central cavity in trunk.		H
966	Oak	17	80	Standard.	Various fissures in trunk, dead wood, and splits.		H
967	Oak	13	50	Standard.	Exposed hole from snapped bough 10m up		M
968	Oak	15	90	Standard.	Splits in dead bough, split trunk, ivy		H
969	Oak	20	85	Standard.	Hole with hole, 5m up, transverse splits on west bough.		H

Feature / Photo Ref.	Tree Species	Height m	DBH cm	Description/ number of trees	PRF Description	Bat signs	Roost Suitability[3]
970	Oak	18	90	Standard.	Cavity 8m high. Trunk uplift. Dead wood in crown.		H
971	Oak	12	70	Standard.	Large hole west side, 4m high.		H
972	Woods/copse	n/a	n/a	Mature ash and oak + prunus sp. 10-12 trees.	Numerous holes dead wood bark or oaks.		H
973	Hedge trees	15-18	50-80	6 oak trees.	Boundary hedge. All trees with various features.		M-H
974	Oak	16	1.2m	Standard	Central cavity crevices in bark, and lifted bark.		H
975	Ash	15	60	Standard tree on hedge, along with oak trees.	Cavity bit exposed, callus fold top, other deadwood, and uplifted bark.		M
976	Oak	20	75	Standard	Minor gaps around small dead branches.		M
977	Oak	14	40	Standard	Minor dead wood, no obvious features.		N-L
978	Woods	n/a	n/a	Ash, oak, broadleaved woods with semi mature trees.	Outside.		H
979	Oaks	18	70	Standard trees.	Minor callus fold on dead bough possibly.		L

Feature / Photo Ref.	Tree Species	Height m	DBH cm	Description/ number of trees	PRF Description	Bat signs	Roost Suitability[3]
980	Oak	20	70	Oak	Oak with lifted bark. Numerous features.		H
981	Woods	n/a	n/a	Semi mature plantation of field maple, hornbeam, and ash.	No obvious features, minor deadwood.		L
982	Oak	13	55	Standard	Small rot cavity in east limb 6m up + centred cavity.		H
983	Oak	12	60	Standard in hedge	Nothing visible ivy covered		M
984	Oak	14	50	Standard in hedge	Hazard beam + split. 10m up + a few minor holes.		M
985	Oak	20	65	Standard in hedge	Minor crevices in bark high up, nothing obvious.		L
986	Trees in hedge	10-15	10-30	3 semi mature oaks, >30 elm and field maple.	A few minor holes on oaks.		N–L
987	Woods	n/a	n/a	Oak/ ash.	Adjacent land.		H
988	Tree line of 5 oaks.	12-15	20-40	Semi-mature oaks	Minor dead wood, nothing very good.		N-L
989	Oak	15	90	Pollarded oak	Numerous hazard beams 5m up.		H
990	Oak	16	70	Pollarded oak	Minor dead wood cavities.		M

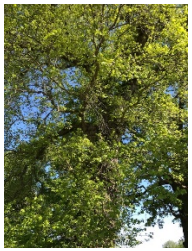
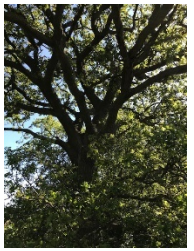
Feature / Photo Ref.	Tree Species	Height m	DBH cm	Description/ number of trees	PRF Description	Bat signs	Roost Suitability[3]
991	Oak	18	90	Pollarded oak	Numerous disease holes in main trunk 3-6m up.		H
992	Oak	12	80	Pollarded oak	Dead ivy and large open cavity.		L
993	Oak	22	1m	Standard oak	Splits in dead wood, a few holes in boughs.		H
994	Wood	22	30-90	Mature 0aks 40-50	Adjacent.		H
995	Salix alba	20	45	Standard	One minor hole (small) around dead branch.		L
996	Tree line	n/a	n/a	Ash, Salix, hazel, and elm.	Nothing obvious along river.		N–L
997	Oak	13	50	Standard	A few minor bark crevices, nothing obvious.		L
998	Woods	n/a	n/a	Mature oak/ash woods	Tree line north no surveyed.		H
999	Tree line	22	10-30	Ash, oak, hazel, and elm.	Along river, mostly young multi-stemmed. Cricket bat willows.		N-M
1000	Oak	20	1.4m	Veteran	Large central cavity. Main limbs with holes.		H
1001	Tree line	24	10-40	Ash, elm, and hazel	A few holes in hazel and some ash dieback.		N-M

Feature / Photo Ref.	Tree Species	Height m	DBH cm	Description/ number of trees	PRF Description	Bat signs	Roost Suitability[3]
1002	Tree line	22	30-45	Ash x 5	Holes and ivy cover.		H
1003	Oak	16	35	Standard in tree line.	Some, ivy, numerous dead trees, nothing obvious.		L
1004	Woods	28	Up to 90	Mature oak, black poplar, Salix fragilis, Salix alba planted.	Not surveyed.		H
1005	Oak	18	50	Standard tree on line of trees/ hedge.	Minor dead wood		H
1006	Oak	20	90	Standard tree on hedge.	Ivy covered, numerous, small cavities around dead branches hole in bough.		H
1007	Tree line/ hedge	Up to 20	10-40	Oak, field maple, lime, semi-mature.	40-50 trees minor features not surveyed in detail.		N-L
1008	Copse	Up to 25	60-90	Pollarded semi-mature wood. 3 mature oak.	Various features in oaks.		L-H
1009	Tree line	20	Up to 80	Near road, mainly oaks, 8 trees.	Ivy covered, numerous features.		N-M
1010	Tree line	20	Up to 60	Oak, field maple, ash, 15-20 trees.	Ivy covered, numerous features.		N-H
1011	Oak	22	1.2m	Veteran oak	Cavity on bough to west, dead wood splits in crown.		H

Feature / Photo Ref.	Tree Species	Height m	DBH cm	Description/ number of trees	PRF Description	Bat signs	Roost Suitability[3]
1012	Oak	25	1.5m	Oak	Dead wood		H
1013	Oak	25	1.5m	Oak	Few splits in bough.		H
1014	Hedge with mature oaks.	22	1m	Large dead wood.	Numerous splits, smaller oaks with dead wood. 60cm x 15m.		H
1015	Mature oak	20	60	Mature oak.	Flaky bark, callus fold.		M
1016	Woods	15-20	60-80	12-15 mature oaks.			H
1017	Dead Ash	15	60		Holes, and uplifted bark.		H
1018	Oak	12	80	Mature/veteran ask	Large hollow 2m high, exposed, no signs of bats		L
1019	Line of trees	15	20-40	6 semi-mature trees			L
1020	Hedge line with a few young trees	5 to 8	10 -25	Hedgeline and young trees	None		N
1021	Woods	15-20	10 – 1m	Mature broad-leaved woodland with estimated 150 to 200 trees including oak and ash.	Not surveyed.		H
1022	Woods	15-20	10 – 1m	Young mixed plantation woodland and scrub, Line of	Not surveyed.		H

Feature / Photo Ref.	Tree Species	Height m	DBH cm	Description/ number of trees	PRF Description	Bat signs	Roost Suitability[3]
				mature trees including willows, along Boreham Brook.			
1023	Line of trees	15m	10 to 40m	Scattered semi-mature trees	Not surveyed.		H
1024	Oak	15m	50	Mature, minor cracked bark high up no signs.			L
1025	Woods	15-20	10 – 1m	Mature broad-leaved woodland with estimated 50 to 100 trees including oak and ash and some younger planted trees to south.	Not surveyed.		H
1026	Woods	15-20	5 – 20	Young mixed plantation woodland and scrub.			L
1027	Line of trees	15m	10 to 30	Scattered young/semi-mature trees along railway	Not surveyed.		L
1028	Line of trees	15-20	20 to 70cm	Line of mature trees including willows, along Boreham Brook.	Not surveyed.		H

Table 13: Photographs with feature/photo reference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		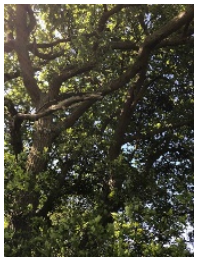			
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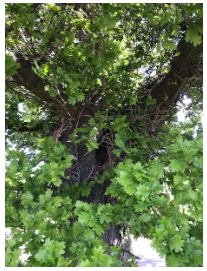			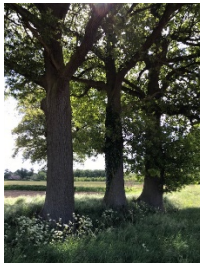	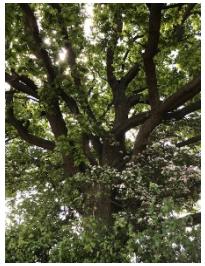	
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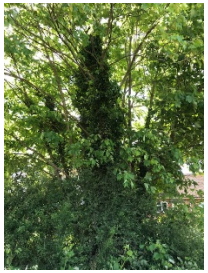

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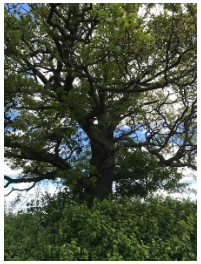

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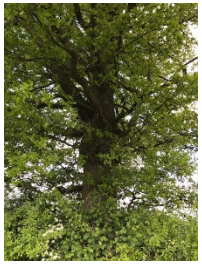

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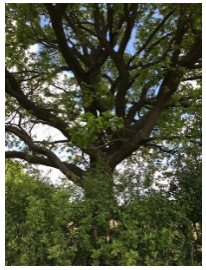

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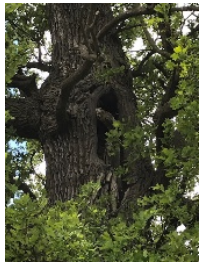

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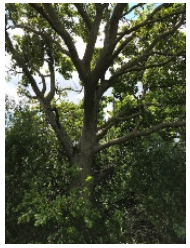

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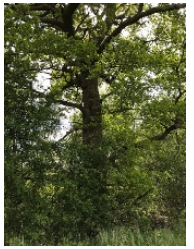

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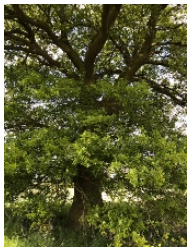	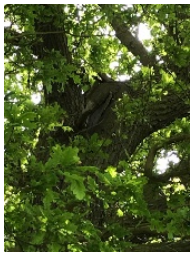				
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				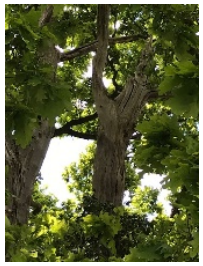	
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		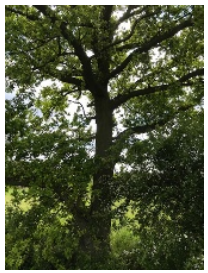			
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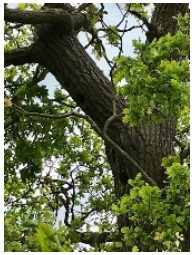

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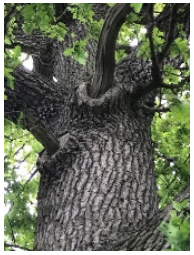

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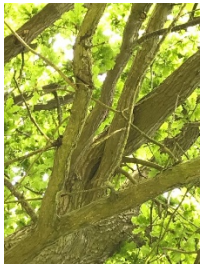

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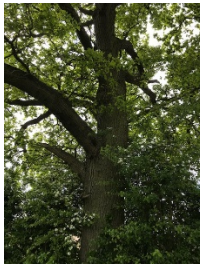

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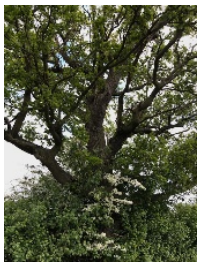

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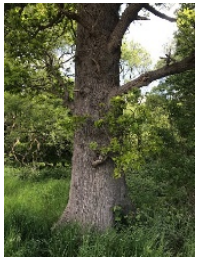

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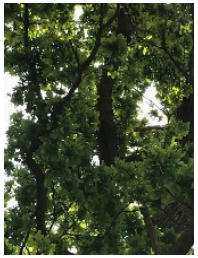

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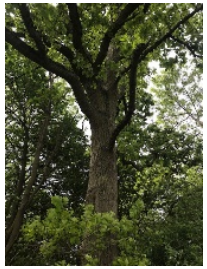

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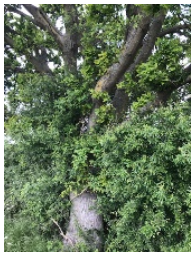

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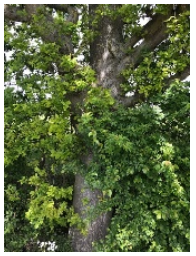

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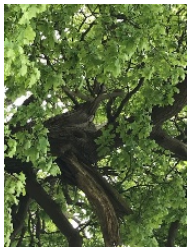

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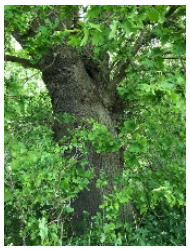

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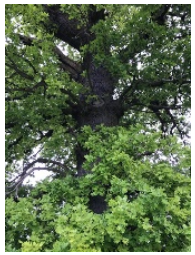

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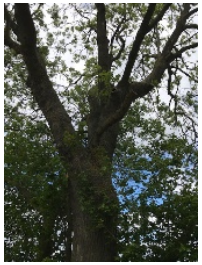

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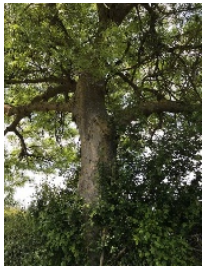

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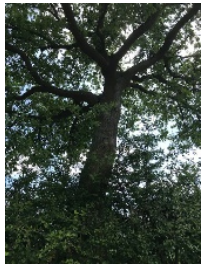

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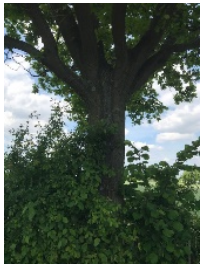

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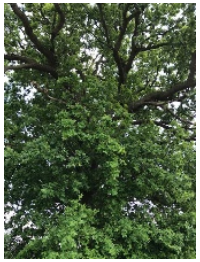

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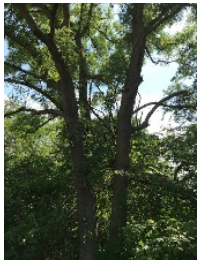

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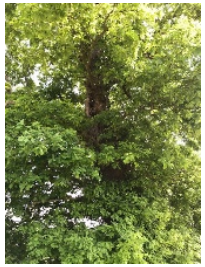

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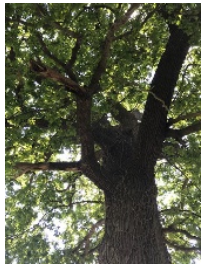

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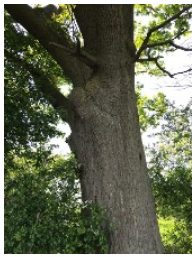

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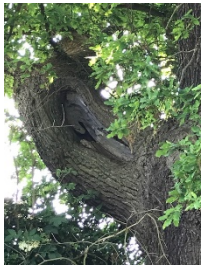

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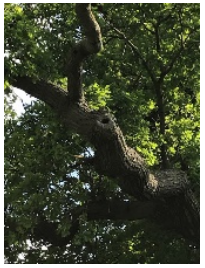

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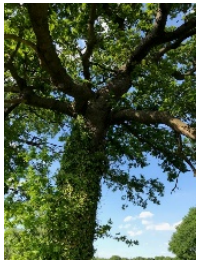

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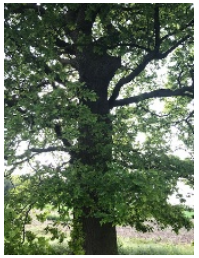

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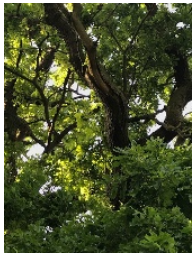

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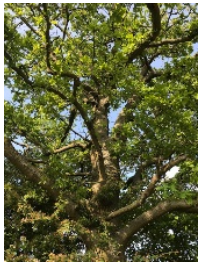

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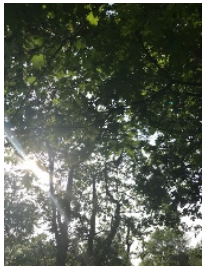

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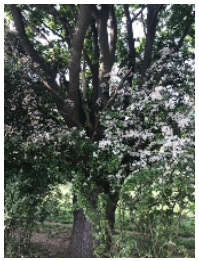

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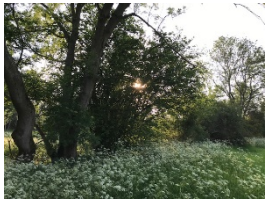

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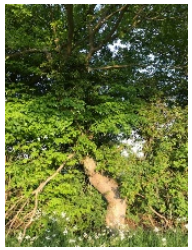

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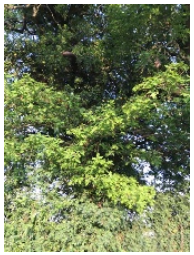

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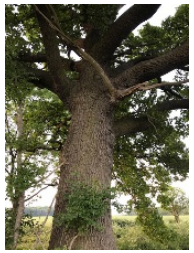

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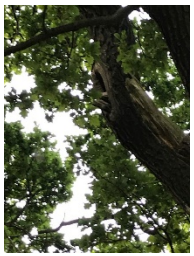

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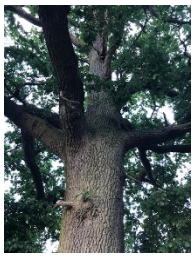

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Table 14: Bat Activity Survey Results - Transect results

Key

Beaufort wind force scale: 0 = No wind, 1 = Light air *smoke drifts*, 2 = Light Breeze *leaves rustle*, 3 = Gentle Breeze *small twigs move*, 4 = Mod Breeze *small branches move,* 5 = Fresh Breeze *small trees sway*, 6 = Strong Breeze *large branches move*, 7 = Mod Gale *whole trees in motion*
Rain Scale: 0-none, 1-drizzle 2-shower 3-rain 4-downpour 5-flood.
Oktas cloud scale: 0 = complete absence of cloud (fine), 1 = cloud amount of 1 eighth or less, but not zero (fine), 2 = 2/8 of sky covered (fine), 3 = 3/8 of sky covered (partly cloudy), 4 = 4/8 of sky covered (partly cloudy), 5 = 5/8 of sky covered (partly cloudy), 6 = 6/8 of sky covered (cloudy), 7 = 7/8 of sky covered (cloudy), 8 = sky completely covered (overcast**).**

All species table entries represent a single bat pass. For locations see **Figure 5, Annex A**.

Transect	Surveyor	Date	Sunset/rise
Spring 1	SS/DP	20-05-20	20:55
Weather	**Rain**	**Wind**	**Temp start**
Dry/warm	0	1	23
Temp end	**Cloud**	**Start time**	**Finish time**
16	1	20:55	23:50
Equipment	**Verified**		
Anabat Scout	MP		
Label	**Timestamp / file name**	**Name**	
1	2020-05-20 21-45-34	Pipistrellus pygmaeus	
2	2020-05-20 21-47-48	Pipistrellus	
3	2020-05-20 21-47-57	Pipistrellus pygmaeus	
4	2020-05-20 21-48-18	Pipistrellus pipistrellus	
5	2020-05-20 21-48-18	Pipistrellus pygmaeus	
6	2020-05-20 21-48-26	Pipistrellus pipistrellus	
7	2020-05-20 21-48-26	Pipistrellus pygmaeus	
8	2020-05-20 21-48-38	Pipistrellus pipistrellus	
9	2020-05-20 21-48-51	Pipistrellus pipistrellus	
10	2020-05-20 21-49-02	Pipistrellus pipistrellus	
11	2020-05-20 21-51-05	Pipistrellus pipistrellus	
12	2020-05-20 22-00-03	Pipistrellus pipistrellus	
13	2020-05-20 22-00-16	Pipistrellus pipistrellus	
14	2020-05-20 22-01-23	Pipistrellus pipistrellus	
15	2020-05-20 22-01-50	Pipistrellus pygmaeus	
16	2020-05-20 22-04-42	Pipistrellus pipistrellus	
17	2020-05-20 22-05-06	Pipistrellus pipistrellus	
18	2020-05-20 22-06-34	Pipistrellus pygmaeus	
19	2020-05-20 22-08-15	Pipistrellus pipistrellus	
20	2020-05-20 22-08-27	Pipistrellus pipistrellus	

21	2020-05-20 22-08-50	Pipistrellus pygmaeus
22	2020-05-20 22-13-02	Pipistrellus pipistrellus
23	2020-05-20 22-13-15	Pipistrellus pipistrellus
24	2020-05-20 22-16-24	Pipistrellus pipistrellus
25	2020-05-20 22-17-53	Pipistrellus pipistrellus
26	2020-05-20 22-19-21	Pipistrellus pipistrellus
27	2020-05-20 22-25-13	Pipistrellus pygmaeus
28	2020-05-20 22-37-31	Pipistrellus pipistrellus
29	2020-05-20 22-39-55	Pipistrellus pipistrellus
30	2020-05-20 22-41-52	Pipistrellus pygmaeus
31	2020-05-20 22-42-40	Pipistrellus pygmaeus
32	2020-05-20 22-49-58	Pipistrellus pipistrellus
33	2020-05-20 22-51-51	Pipistrellus pipistrellus
34	2020-05-20 22-57-49	Pipistrellus pygmaeus
35	2020-05-20 23-01-02	Pipistrellus pipistrellus
36	2020-05-20 23-09-31	Pipistrellus pipistrellus
37	2020-05-20 23-11-09	Pipistrellus pipistrellus
38	2020-05-20 23-15-46	Pipistrellus pipistrellus
39	2020-05-20 23-16-34	Pipistrellus pipistrellus
40	2020-05-20 23-18-16	Pipistrellus pipistrellus
41	2020-05-20 23-18-32	Pipistrellus pipistrellus
42	2020-05-20 23-18-42	Pipistrellus pipistrellus
43	2020-05-20 23-19-25	Pipistrellus pipistrellus
44	2020-05-20 23-19-37	Pipistrellus pipistrellus
45	2020-05-20 23-19-50	Pipistrellus pipistrellus
46	2020-05-20 23-20-03	Pipistrellus pipistrellus
47	2020-05-20 23-23-20	Pipistrellus pipistrellus
48	2020-05-20 23-25-56	Pipistrellus pipistrellus
49	2020-05-20 23-31-37	Pipistrellus pygmaeus
50	2020-05-20 23-32-10	Pipistrellus pygmaeus
51	2020-05-20 23-33-16	Pipistrellus pipistrellus
52	2020-05-20 23-35-45	Pipistrellus pygmaeus
53	2020-05-20 23-36-36	Pipistrellus pipistrellus
54	2020-05-20 23-36-52	Pipistrellus pipistrellus
55	2020-05-20 23-50-06	Pipistrellus pipistrellus
56	2020-05-20 23-50-19	Pipistrellus pipistrellus

Transect	Surveyor	Date	Sunset/rise
Spring 2	MP/KD	20-05-20	20:55
Weather	**Rain**	**Wind**	**Temp start**
Dry/warm	0	1	23
Temp end	**Cloud**	**Start time**	**Finish time**
16	1	20:50	23:00
Equipment	**Verified**		
Batlogger M	MP		
Label	**Recording**	**Timestamp**	**Species Text**
1	21130027	20-05-20 21:31	Pipistrellus pipistrellus
2	21130028	20-05-20 21:31	Pipistrellus pipistrellus
3	21130058	20-05-20 21:37	Pipistrellus pipistrellus
4	21130066	20-05-20 21:38	Pipistrellus pipistrellus
5	21130089	20-05-20 21:42	Pipistrellus pipistrellus
6	21130106	20-05-20 21:46	Pipistrellus pipistrellus
7	21130110	20-05-20 21:47	Pipistrellus pipistrellus
8	21130111	20-05-20 21:47	Pipistrellus pipistrellus
9	21130113	20-05-20 21:47	Pipistrellus pipistrellus
10	21130122	20-05-20 21:49	Pipistrellus pipistrellus
11	21130128	20-05-20 21:51	Pipistrellus pipistrellus
12	21130141	20-05-20 21:54	Pipistrellus pipistrellus
13	21130150	20-05-20 21:59	Pipistrellus pipistrellus
14	21130152	20-05-20 22:00	Pipistrellus pipistrellus
15	21130171	20-05-20 22:05	Pipistrellus pipistrellus
16	21130187	20-05-20 22:08	Pipistrellus pipistrellus
17	21130196	20-05-20 22:09	Pipistrellus pipistrellus
18	21130198	20-05-20 22:10	Pipistrellus pipistrellus
19	21130210_1	20-05-20 22:13	Pipistrellus pygmaeus
20	21130210_2	20-05-20 22:13	Pipistrellus pygmaeus
21	21130211	20-05-20 22:13	Pipistrellus pygmaeus
22	21130212	20-05-20 22:13	Pipistrellus pygmaeus
23	21130215	20-05-20 22:14	Plecotus auritus
24	21130216	20-05-20 22:14	Plecotus auritus
25	21130217	20-05-20 22:14	Pipistrellus pygmaeus
26	21130221	20-05-20 22:15	Pipistrellus pygmaeus
27	21130223_1	20-05-20 22:15	Pipistrellus pygmaeus
28	21130223_2	20-05-20 22:15	Pipistrellus spec.
29	21130227_1	20-05-20 22:16	Pipistrellus pygmaeus
30	21130227_2	20-05-20 22:16	Pipistrellus pygmaeus
31	21130230	20-05-20 22:17	Barbastella barbastellus

32	21130231	20-05-20 22:17	Pipistrellus pygmaeus
33	21130232_1	20-05-20 22:17	Barbastella barbastellus
34	21130232_2	20-05-20 22:17	Pipistrellus spec.
35	21130235	20-05-20 22:18	Pipistrellus pipistrellus
36	21130238	20-05-20 22:19	Pipistrellus pipistrellus
37	21130242	20-05-20 22:21	Pipistrellus pipistrellus
38	21130243_1	20-05-20 22:21	Pipistrellus spec.
39	21130246	20-05-20 22:21	Pipistrellus pipistrellus
40	21130247_1	20-05-20 22:21	Pipistrellus pygmaeus
41	21130247_2	20-05-20 22:21	Pipistrellus pygmaeus
42	21130248	20-05-20 22:22	Pipistrellus pipistrellus
43	21130249	20-05-20 22:22	Pipistrellus pipistrellus
44	21130250_1	20-05-20 22:22	Pipistrellus pipistrellus
45	21130250_2	20-05-20 22:22	Pipistrellus pipistrellus
46	21130251_1	20-05-20 22:22	Pipistrellus pipistrellus
47	21130251_2	20-05-20 22:22	Pipistrellus pipistrellus
48	21130252	20-05-20 22:22	Pipistrellus pipistrellus
49	21130258	20-05-20 22:23	Pipistrellus pipistrellus
50	21130259	20-05-20 22:23	Pipistrellus pipistrellus
51	21130300	20-05-20 22:34	Pipistrellus pipistrellus
52	21130315	20-05-20 22:36	Pipistrellus pipistrellus
53	21130323	20-05-20 22:38	Pipistrellus pipistrellus
54	21130329	20-05-20 22:40	Pipistrellus spec.
55	21130330	20-05-20 22:40	Pipistrellus spec.
56	21130331	20-05-20 22:40	Pipistrellus spec.
57	21130332	20-05-20 22:40	Pipistrellus pygmaeus
58	21130333	20-05-20 22:41	Pipistrellus pygmaeus
59	21130336	20-05-20 22:42	Pipistrellus pipistrellus
60	21130337	20-05-20 22:43	Pipistrellus pipistrellus
61	21130338	20-05-20 22:44	Pipistrellus pipistrellus
62	21130340	20-05-20 22:44	Pipistrellus pygmaeus
63	21130341	20-05-20 22:45	Pipistrellus pygmaeus
64	21130342	20-05-20 22:45	Pipistrellus pygmaeus
65	21130344_2	20-05-20 22:45	Pipistrellus pipistrellus
66	21130345	20-05-20 22:45	Pipistrellus pipistrellus
67	21130347	20-05-20 22:46	Pipistrellus pipistrellus
68	21130348	20-05-20 22:47	Pipistrellus pygmaeus
69	21130349	20-05-20 22:47	Pipistrellus pipistrellus
70	21130350	20-05-20 22:47	Pipistrellus pygmaeus
71	21130351	20-05-20 22:47	Pipistrellus pygmaeus

72	21130352	20-05-20 22:47	Pipistrellus pygmaeus

Transect	Surveyor	Date	Sunset/rise
Spring 3	MP/KD	21-05-20	20:56
Weather	**Rain**	**Wind**	**Temp start**
Dry/warm	0	1 to 0	21
Temp end	**Cloud**	**Start time**	**Finish time**
18	6	20:50	23:05
Equipment	**Verified**		
Batlogger M	MP		

Label	Recording	Timestamp	Species Text
1	21130039	21-05-20 21:21	Pipistrellus pipistrellus
2	21130040	21-05-20 21:21	Pipistrellus pipistrellus
3	21130043_1	21-05-20 21:22	Pipistrellus pipistrellus
4	21130043_2	21-05-20 21:22	Pipistrellus pipistrellus
5	21130052	21-05-20 21:23	Pipistrellus pipistrellus
6	21130054	21-05-20 21:23	Pipistrellus pipistrellus
7	21130065	21-05-20 21:25	Pipistrellus pygmaeus
8	21130066	21-05-20 21:25	Pipistrellus pygmaeus
9	21130067	21-05-20 21:25	Pipistrellus pygmaeus
10	21130068	21-05-20 21:26	Pipistrellus pygmaeus
11	21130069	21-05-20 21:26	Pipistrellus pygmaeus
12	21130070	21-05-20 21:26	Pipistrellus pygmaeus
13	21130071_1	21-05-20 21:26	Pipistrellus pygmaeus
14	21130071_2	21-05-20 21:26	Pipistrellus pygmaeus
15	21130085	21-05-20 21:28	Pipistrellus pipistrellus
16	21130090	21-05-20 21:29	Pipistrellus pipistrellus
17	21130093	21-05-20 21:30	Pipistrellus pipistrellus
18	21130095	21-05-20 21:30	Pipistrellus pygmaeus
19	21130096	21-05-20 21:30	Pipistrellus pipistrellus
20	21130097_1	21-05-20 21:31	Pipistrellus pipistrellus
21	21130097_2	21-05-20 21:31	Pipistrellus pipistrellus
22	21130101	21-05-20 21:32	Pipistrellus spec.
23	21130103	21-05-20 21:32	Pipistrellus spec.
24	21130109	21-05-20 21:33	Pipistrellus pygmaeus
25	21130116	21-05-20 21:34	Pipistrellus pygmaeus
26	21130117	21-05-20 21:34	Pipistrellus pygmaeus
27	21130119	21-05-20 21:35	Pipistrellus pipistrellus
28	21130120	21-05-20 21:35	Pipistrellus pipistrellus
29	21130144	21-05-20 21:39	Pipistrellus pygmaeus
30	21130152	21-05-20 21:40	Pipistrellus pygmaeus

31	21130161	21-05-20 21:42	Pipistrellus pygmaeus
32	21130163	21-05-20 21:42	Myotis spec.
33	21130165	21-05-20 21:42	Pipistrellus pygmaeus
34	21130168	21-05-20 21:43	Pipistrellus pipistrellus
35	21130170	21-05-20 21:44	Pipistrellus pygmaeus
36	21130171	21-05-20 21:44	Pipistrellus pipistrellus
37	21130176	21-05-20 21:45	Pipistrellus pygmaeus
38	21130179	21-05-20 21:45	Pipistrellus pygmaeus
39	21130200_1	21-05-20 21:48	Pipistrellus pipistrellus
40	21130200_2	21-05-20 21:48	Pipistrellus spec.
41	21130212	21-05-20 21:50	Pipistrellus pipistrellus
42	21130229	21-05-20 21:54	Pipistrellus pipistrellus
43	21130230	21-05-20 21:54	Pipistrellus pipistrellus
44	21130231	21-05-20 21:54	Pipistrellus pipistrellus
45	21130237	21-05-20 21:54	Pipistrellus pipistrellus
46	21130241	21-05-20 21:55	Pipistrellus pygmaeus
47	21130242	21-05-20 21:56	Pipistrellus pipistrellus
48	21130243	21-05-20 21:56	Pipistrellus pipistrellus
49	21130244	21-05-20 21:56	Pipistrellus pipistrellus
50	21130245	21-05-20 21:56	Pipistrellus pipistrellus
51	21130247	21-05-20 21:56	Pipistrellus pipistrellus
52	21130257	21-05-20 21:58	Pipistrellus pipistrellus
53	21130259	21-05-20 21:58	Pipistrellus pipistrellus
54	21130261	21-05-20 21:58	Pipistrellus pipistrellus
55	21130262_1	21-05-20 21:58	Pipistrellus pipistrellus
56	21130263_1	21-05-20 21:58	Pipistrellus pipistrellus
57	21130264	21-05-20 21:58	Pipistrellus pipistrellus
58	21130265	21-05-20 21:59	Pipistrellus pipistrellus
59	21130266	21-05-20 21:59	Pipistrellus pipistrellus
60	21130271_1	21-05-20 22:00	Pipistrellus pipistrellus
61	21130338	21-05-20 22:10	Pipistrellus pipistrellus
62	21130349_1	21-05-20 22:14	Pipistrellus pygmaeus
63	21130380_1	21-05-20 22:21	Pipistrellus pipistrellus
64	21130390_1	21-05-20 22:23	Pipistrellus pygmaeus
65	21130394	21-05-20 22:23	Pipistrellus pipistrellus
66	21130405	21-05-20 22:25	Pipistrellus pipistrellus
67	21130414	21-05-20 22:27	Pipistrellus pipistrellus
68	21130415	21-05-20 22:27	Pipistrellus pipistrellus
69	21130429	21-05-20 22:30	Pipistrellus pipistrellus
70	21130431	21-05-20 22:31	Pipistrellus pipistrellus

71	21130449	21-05-20 22:35	Pipistrellus pipistrellus
72	21130450	21-05-20 22:35	Pipistrellus pipistrellus
73	21130460	21-05-20 22:37	Pipistrellus pipistrellus
74	21130462	21-05-20 22:37	Pipistrellus pygmaeus
75	21130464_1	21-05-20 22:38	Pipistrellus pipistrellus
76	21130464_2	21-05-20 22:38	Pipistrellus pygmaeus
77	21130465	21-05-20 22:38	Pipistrellus pipistrellus
78	21130466	21-05-20 22:38	Pipistrellus pipistrellus
79	21130467	21-05-20 22:38	Pipistrellus pipistrellus
80	21130472	21-05-20 22:38	Pipistrellus pipistrellus
81	21130473	21-05-20 22:39	Pipistrellus pipistrellus
82	21130475	21-05-20 22:39	Pipistrellus pipistrellus
83	21130476	21-05-20 22:40	Pipistrellus pipistrellus
84	21130477	21-05-20 22:40	Pipistrellus pipistrellus
85	21130508	21-05-20 22:46	Pipistrellus pygmaeus
86	21130509	21-05-20 22:46	Pipistrellus pygmaeus
87	21130510_1	21-05-20 22:46	Pipistrellus pipistrellus
88	21130510_2	21-05-20 22:46	Pipistrellus pipistrellus
89	21130512	21-05-20 22:47	Pipistrellus pygmaeus
90	21130515	21-05-20 22:48	Pipistrellus pipistrellus
91	21130522_1	21-05-20 22:48	Pipistrellus pipistrellus
92	21130522_2	21-05-20 22:48	Pipistrellus pipistrellus
93	21130533	21-05-20 22:50	Pipistrellus pipistrellus
94	21130534	21-05-20 22:50	Pipistrellus pipistrellus
95	21130535	21-05-20 22:50	Pipistrellus pipistrellus
96	21130536	21-05-20 22:50	Pipistrellus pipistrellus
97	21130537	21-05-20 22:50	Pipistrellus pipistrellus
98	21130538_1	21-05-20 22:51	Pipistrellus pipistrellus
99	21130538_2	21-05-20 22:51	Pipistrellus pipistrellus
100	21130539	21-05-20 22:51	Pipistrellus pipistrellus
101	21130541	21-05-20 22:51	Pipistrellus pipistrellus
102	21130542	21-05-20 22:51	Pipistrellus pipistrellus

Transect	Surveyor	Date	Sunset/rise
Summer 1	SS/DP	10-07-20	21:14
Weather	**Rain**	**Wind**	**Temp start**
Dry/mild	0	2 to 0	15
Temp end	**Cloud**	**Start time**	**Finish time**
13	7	21:14	0:05
Equipment	**Verified**		
Anabat Scout	MP		
Label	**Timestamp / file name**	**Name**	
1	2020-07-10 21-47-21	Pipistrellus pipistrellus	
2	2020-07-10 21-47-27	Pipistrellus pipistrellus	
3	2020-07-10 21-48-19	Pipistrellus pipistrellus	
4	2020-07-10 21-48-29	Pipistrellus pipistrellus	
5	2020-07-10 21-48-42	Pipistrellus pipistrellus	
6	2020-07-10 21-48-54	Pipistrellus pipistrellus	
7	2020-07-10 21-49-07	Pipistrellus pipistrellus	
8	2020-07-10 21-49-18	Pipistrellus pipistrellus	
9	2020-07-10 21-49-31	Pipistrellus pipistrellus	
10	2020-07-10 21-49-44	Pipistrellus pipistrellus	
11	2020-07-10 21-51-31	Pipistrellus pygmaeus	
12	2020-07-10 21-53-04	Pipistrellus pygmaeus	
13	2020-07-10 21-53-10	Pipistrellus pygmaeus	
14	2020-07-10 21-53-22	Pipistrellus pygmaeus	
15	2020-07-10 21-53-34	Pipistrellus pygmaeus	
16	2020-07-10 21-53-45	Pipistrellus pygmaeus	
17	2020-07-10 21-53-57	Pipistrellus pygmaeus	
18	2020-07-10 21-54-09	Pipistrellus pygmaeus	
19	2020-07-10 21-54-21	Pipistrellus pygmaeus	
20	2020-07-10 21-54-40	Pipistrellus pygmaeus	
21	2020-07-10 21-54-52	Pipistrellus pygmaeus	
22	2020-07-10 21-55-12	Pipistrellus pygmaeus	
23	2020-07-10 21-55-24	Pipistrellus pygmaeus	
24	2020-07-10 21-55-32	Pipistrellus pygmaeus	
25	2020-07-10 21-55-50	Pipistrellus pygmaeus	
26	2020-07-10 21-56-05	Pipistrellus pygmaeus	
27	2020-07-10 21-56-13	Pipistrellus pygmaeus	
28	2020-07-10 21-56-19	Pipistrellus pygmaeus	
29	2020-07-10 21-56-29	Pipistrellus pygmaeus	
30	2020-07-10 21-59-04	Pipistrellus pipistrellus	
31	2020-07-10 21-59-37	Pipistrellus pipistrellus	

32	2020-07-10 22-00-23	Pipistrellus pipistrellus
33	2020-07-10 22-00-38	Pipistrellus pipistrellus
34	2020-07-10 22-02-39	Pipistrellus pygmaeus
35	2020-07-10 22-02-56	Pipistrellus pygmaeus
36	2020-07-10 22-03-13	Pipistrellus pygmaeus
37	2020-07-10 22-05-30	Pipistrellus pipistrellus
38	2020-07-10 22-08-02	Pipistrellus pipistrellus
39	2020-07-10 22-09-06	Pipistrellus pygmaeus
40	2020-07-10 22-14-59	Pipistrellus pipistrellus
41	2020-07-10 22-18-42	Pipistrellus pipistrellus
42	2020-07-10 22-20-26	Pipistrellus pipistrellus
43	2020-07-10 22-20-37	Pipistrellus pipistrellus
44	2020-07-10 22-25-24	Myostis spec.
45	2020-07-10 22-26-13	Pipistrellus pipistrellus
46	2020-07-10 22-27-42	Nyctalus noctula
47	2020-07-10 22-30-18	Nyctalus noctula
48	2020-07-10 22-30-30	Pipistrellus pygmaeus
49	2020-07-10 22-30-43	Pipistrellus pygmaeus
50	2020-07-10 22-31-04	Pipistrellus pygmaeus
51	2020-07-10 22-33-05	Nyctalus spec.
52	2020-07-10 22-34-57	Pipistrellus pipistrellus
53	2020-07-10 22-35-16	Pipistrellus pipistrellus
54	2020-07-10 22-38-06	Pipistrellus pipistrellus
55	2020-07-10 22-38-15	Pipistrellus pipistrellus
56	2020-07-10 22-38-46	Pipistrellus pipistrellus
57	2020-07-10 22-44-59	Pipistrellus pygmaeus
58	2020-07-10 22-45-33	Pipistrellus pipistrellus
59	2020-07-10 22-51-29	Pipistrellus pipistrellus
60	2020-07-10 22-51-29	Pipistrellus pygmaeus
61	2020-07-10 23-03-33	Pipistrellus pipistrellus
62	2020-07-10 23-03-45	Pipistrellus pipistrellus
63	2020-07-10 23-04-09	Pipistrellus pygmaeus
64	2020-07-10 23-04-23	Pipistrellus pygmaeus
65	2020-07-10 23-04-34	Pipistrellus pygmaeus
66	2020-07-10 23-04-45	Pipistrellus pipistrellus
67	2020-07-10 23-06-55	Pipistrellus pipistrellus
68	2020-07-10 23-07-08	Pipistrellus pipistrellus
69	2020-07-10 23-08-14	Pipistrellus pipistrellus
70	2020-07-10 23-08-24	Pipistrellus pipistrellus
71	2020-07-10 23-08-39	Pipistrellus pipistrellus

72	2020-07-10 23-08-47	Pipistrellus pipistrellus
73	2020-07-10 23-09-49	Pipistrellus pygmaeus
74	2020-07-10 23-17-29	Pipistrellus pipistrellus
75	2020-07-10 23-17-36	Pipistrellus pipistrellus
76	2020-07-10 23-17-50	Pipistrellus pipistrellus
77	2020-07-10 23-18-06	Pipistrellus pipistrellus
78	2020-07-10 23-25-38	Pipistrellus pipistrellus
79	2020-07-10 23-25-49	Pipistrellus pipistrellus
80	2020-07-10 23-26-02	Pipistrellus pipistrellus
81	2020-07-10 23-29-04	Pipistrellus pipistrellus
82	2020-07-10 23-29-17	Pipistrellus pipistrellus
83	2020-07-10 23-29-30	Pipistrellus pipistrellus
84	2020-07-10 23-42-13	Pipistrellus pipistrellus
85	2020-07-10 23-42-43	Pipistrellus pipistrellus
86	2020-07-10 23-48-17	Pipistrellus pipistrellus
87	2020-07-10 23-48-30	Nyctalus noctula
88	2020-07-11 00-00-33	Pipistrellus pygmaeus
89	2020-07-11 00-00-52	Pipistrellus pygmaeus
90	2020-07-11 00-00-58	Pipistrellus pygmaeus
91	2020-07-11 00-01-11	Pipistrellus pygmaeus
92	2020-07-11 00-01-26	Pipistrellus pipistrellus
93	2020-07-11 00-01-36	Pipistrellus pipistrellus
94	2020-07-11 00-03-04	Pipistrellus pipistrellus
95	2020-07-11 00-03-39	Barbastella barbastellus
96	2020-07-11 00-03-39	Pipistrellus pygmaeus
97	2020-07-11 00-03-52	Barbastella barbastellus
98	2020-07-11 00-03-52	Pipistrellus pygmaeus
99	2020-07-11 00-04-18	Pipistrellus pygmaeus
100	2020-07-11 00-04-29	Pipistrellus pygmaeus
101	2020-07-11 00-05-12	Pipistrellus pipistrellus
102	2020-07-11 00-05-22	Pipistrellus pipistrellus
103	2020-07-11 00-05-40	Pipistrellus pipistrellus
104	2020-07-11 00-05-52	Pipistrellus pipistrellus

Transect	Surveyor	Date	Sunset/rise
Summer 2	MP/KD	20-07-20	21:04
Weather	**Rain**	**Wind**	**Temp start**
Dry/mild	0	3	17
Temp end	**Cloud**	**Start time**	**Finish time**
13	3	21:00	23:10
Equipment	**Verified**		
Batlogger M	MP		
Label	**Recording**	**Timestamp**	**Species Text**
1	21130008	20-07-20 21:37	Pipistrellus pipistrellus
2	21130010	20-07-20 21:37	Pipistrellus pipistrellus
3	21130012	20-07-20 21:37	Pipistrellus pipistrellus
4	21130013	20-07-20 21:37	Pipistrellus pipistrellus
5	21130014	20-07-20 21:37	Pipistrellus pipistrellus
6	21130015	20-07-20 21:37	Pipistrellus pipistrellus
7	21130017	20-07-20 21:38	Pipistrellus pipistrellus
8	21130018	20-07-20 21:38	Pipistrellus pipistrellus
9	21130019	20-07-20 21:38	Pipistrellus pipistrellus
10	21130020	20-07-20 21:38	Pipistrellus pipistrellus
11	21130021	20-07-20 21:38	Pipistrellus pipistrellus
12	21130022	20-07-20 21:38	Pipistrellus pipistrellus
13	21130023	20-07-20 21:38	Pipistrellus pipistrellus
14	21130024	20-07-20 21:38	Pipistrellus pipistrellus
15	21130026	20-07-20 21:38	Pipistrellus pipistrellus
16	21130027	20-07-20 21:38	Pipistrellus pipistrellus
17	21130028	20-07-20 21:38	Pipistrellus pipistrellus
18	21130029	20-07-20 21:38	Pipistrellus pipistrellus
19	21130074	20-07-20 21:46	Pipistrellus pygmaeus
20	21130077	20-07-20 21:47	Pipistrellus pygmaeus
21	21130085	20-07-20 21:48	Pipistrellus pygmaeus
22	21130086	20-07-20 21:48	Pipistrellus spec.
23	21130132	20-07-20 22:00	Pipistrellus pipistrellus
24	21130136	20-07-20 22:01	Pipistrellus pygmaeus
25	21130142	20-07-20 22:02	Pipistrellus pipistrellus
26	21130145	20-07-20 22:03	Pipistrellus pygmaeus
27	21130146	20-07-20 22:03	Pipistrellus pygmaeus
28	21130147	20-07-20 22:03	Pipistrellus pygmaeus
29	21130193	20-07-20 22:15	Pipistrellus pipistrellus
30	21130227	20-07-20 22:28	Pipistrellus pygmaeus
31	21130244	20-07-20 22:34	Pipistrellus pipistrellus

32	21130245	20-07-20 22:34	Pipistrellus pipistrellus
33	21130248	20-07-20 22:36	Pipistrellus pipistrellus
34	21130249	20-07-20 22:36	Pipistrellus pipistrellus
35	21130252	20-07-20 22:40	Pipistrellus pipistrellus
36	21130253	20-07-20 22:40	Pipistrellus pipistrellus
37	21130254	20-07-20 22:41	Pipistrellus pipistrellus
38	21130255	20-07-20 22:42	Plecotus auritus
39	21130256	20-07-20 22:42	Pipistrellus pygmaeus

Transect	**Surveyor**	**Date**	**Sunset/rise**
Summer 3	MP/KD	10-07-20	21:14
Weather	**Rain**	**Wind**	**Temp start**
Dry/mild	0	2 to 0	15
Temp end	**Cloud**	**Start time**	**Finish time**
13	7	21:10	23:20
Equipment	**Verified**		
Batlogger M	MP		
Label	**Recording**	**Timestamp**	**Species Text**
1	21130017	10-07-20 21:59	Pipistrellus pipistrellus
2	21130022	10-07-20 22:00	Myotis spec.
3	21130023	10-07-20 22:00	Myotis spec.
4	21130055	10-07-20 22:06	Pipistrellus pipistrellus
5	21130061	10-07-20 22:09	Pipistrellus pipistrellus
6	21130063	10-07-20 22:09	Pipistrellus pipistrellus
7	21130064	10-07-20 22:09	Pipistrellus pipistrellus
8	21130133	10-07-20 22:19	Pipistrellus pygmaeus
9	21130141	10-07-20 22:21	Nyctalus noctula
10	21130142	10-07-20 22:21	Nyctalus noctula
11	21130173	10-07-20 22:26	Pipistrellus pipistrellus
12	21130174	10-07-20 22:27	Pipistrellus pipistrellus
13	21130175	10-07-20 22:27	Nyctalus noctula
14	21130177	10-07-20 22:27	Pipistrellus pipistrellus
15	21130178	10-07-20 22:27	Pipistrellus pipistrellus
16	21130179	10-07-20 22:27	Pipistrellus pipistrellus
17	21130180	10-07-20 22:27	Pipistrellus pipistrellus
18	21130181	10-07-20 22:27	Pipistrellus pipistrellus
19	21130182	10-07-20 22:28	Pipistrellus pipistrellus
20	21130183	10-07-20 22:28	Pipistrellus pygmaeus
21	21130214	10-07-20 22:31	Nyctalus spec.
22	21130217	10-07-20 22:32	Pipistrellus pipistrellus
23	21130220	10-07-20 22:32	Nyctalus noctula

24	21130221	10-07-20 22:32	Nyctalus noctula
25	21130229	10-07-20 22:33	Pipistrellus pipistrellus
26	21130234	10-07-20 22:34	Eptesicus serotinus
27	21130235	10-07-20 22:34	Pipistrellus pipistrellus
28	21130236	10-07-20 22:34	Pipistrellus pygmaeus
29	21130237	10-07-20 22:34	Pipistrellus pipistrellus
30	21130239	10-07-20 22:35	Pipistrellus pipistrellus
31	21130240	10-07-20 22:35	Pipistrellus pipistrellus
32	21130241	10-07-20 22:35	Pipistrellus pipistrellus
33	21130242	10-07-20 22:35	Pipistrellus pipistrellus
34	21130243	10-07-20 22:35	Pipistrellus pipistrellus
35	21130244	10-07-20 22:35	Pipistrellus pipistrellus
36	21130245	10-07-20 22:35	Pipistrellus pygmaeus
37	21130247	10-07-20 22:36	Pipistrellus pipistrellus
38	21130248	10-07-20 22:36	Pipistrellus pipistrellus
39	21130249	10-07-20 22:36	Pipistrellus pipistrellus
40	21130250	10-07-20 22:36	Pipistrellus pipistrellus
41	21130273	10-07-20 22:38	Pipistrellus pipistrellus
42	21130305	10-07-20 22:41	Pipistrellus pygmaeus
43	21130307	10-07-20 22:41	Pipistrellus pipistrellus
44	21130308	10-07-20 22:41	Pipistrellus pipistrellus
45	21130309	10-07-20 22:42	Pipistrellus pipistrellus
46	21130312	10-07-20 22:42	Pipistrellus pipistrellus
47	21130323	10-07-20 22:43	Pipistrellus pipistrellus
48	21130324	10-07-20 22:43	Pipistrellus pipistrellus
49	21130325	10-07-20 22:43	Pipistrellus pipistrellus
50	21130327	10-07-20 22:43	Pipistrellus pipistrellus
51	21130328	10-07-20 22:43	Pipistrellus pipistrellus
52	21130329	10-07-20 22:44	Pipistrellus pipistrellus
53	21130330	10-07-20 22:44	Pipistrellus pipistrellus
54	21130331	10-07-20 22:44	Pipistrellus pipistrellus
55	21130338	10-07-20 22:44	Pipistrellus pipistrellus
56	21130339	10-07-20 22:45	Pipistrellus pipistrellus
57	21130340	10-07-20 22:45	Pipistrellus pipistrellus
58	21130342	10-07-20 22:45	Pipistrellus pipistrellus
59	21130352	10-07-20 22:46	Pipistrellus pipistrellus
60	21130355	10-07-20 22:47	Pipistrellus pipistrellus
61	21130360	10-07-20 22:48	Pipistrellus pygmaeus
62	21130361	10-07-20 22:48	Pipistrellus pygmaeus
63	21130366	10-07-20 22:49	Pipistrellus pipistrellus

64	21130368	10-07-20 22:49	Pipistrellus pygmaeus
65	21130369	10-07-20 22:49	Pipistrellus pygmaeus
66	21130370	10-07-20 22:49	Pipistrellus pygmaeus
67	21130448	10-07-20 23:00	Pipistrellus pipistrellus
68	21130457	10-07-20 23:01	Pipistrellus pipistrellus
69	21130516	10-07-20 23:07	Pipistrellus pipistrellus
70	21130517	10-07-20 23:07	Pipistrellus pipistrellus
71	21130518	10-07-20 23:07	Pipistrellus pipistrellus
72	21130519	10-07-20 23:07	Pipistrellus pipistrellus
73	21130520	10-07-20 23:07	Pipistrellus pipistrellus
74	21130521	10-07-20 23:08	Pipistrellus pipistrellus
75	21130522	10-07-20 23:08	Pipistrellus pipistrellus
76	21130523	10-07-20 23:08	Pipistrellus pipistrellus
77	21130524	10-07-20 23:08	Pipistrellus pipistrellus

Transect	**Surveyor**	**Date**	**Sunset/rise**
Autumn 1	SS/DP	09-09-20	19:29
Weather	**Rain**	**Wind**	**Temp start**
Dry/mild	0	1 to 0	17
Temp end	**Cloud**	**Start time**	**Finish time**
16	1	19:25	22:00
Equipment	**Verified**		
Anabat Scout	MP		
Label	**Timestamp / file name**	**Species**	
1	2020-09-09 19-56-56	Pipistrellus pygmaeus	
2	2020-09-09 20-05-11	Pipistrellus pipistrellus	
3	2020-09-09 20-07-28	Pipistrellus pipistrellus	
4	2020-09-09 20-07-41	Pipistrellus pygmaeus	
5	2020-09-09 20-07-49	Pipistrellus pipistrellus	
6	2020-09-09 20-07-49	Pipistrellus pygmaeus	
7	2020-09-09 20-08-06	Pipistrellus pygmaeus	
8	2020-09-09 20-08-21	Pipistrellus pipistrellus	
9	2020-09-09 20-08-21	Pipistrellus pygmaeus	
10	2020-09-09 20-08-32	Pipistrellus pygmaeus	
11	2020-09-09 20-08-44	Pipistrellus pygmaeus	
12	2020-09-09 20-08-57	Pipistrellus pygmaeus	
13	2020-09-09 20-09-07	Pipistrellus pygmaeus	
14	2020-09-09 20-16-49	Myotis spec.	
15	2020-09-09 20-17-11	Myotis spec.	
16	2020-09-09 20-25-46	Pipistrellus pygmaeus	
17	2020-09-09 20-30-55	Pipistrellus pygmaeus	

18	2020-09-09 20-32-06	Pipistrellus pygmaeus
19	2020-09-09 20-53-01	Pipistrellus pipistrellus
20	2020-09-09 20-56-14	Myotis spec.
21	2020-09-09 21-01-07	Pipistrellus pygmaeus
22	2020-09-09 21-06-43	Pipistrellus spec.
23	2020-09-09 21-09-53	Pipistrellus pygmaeus
24	2020-09-09 21-20-00	Pipistrellus pipistrellus
25	2020-09-09 21-23-55	Pipistrellus pygmaeus
26	2020-09-09 21-26-23	Pipistrellus pipistrellus
27	2020-09-09 21-47-20	Pipistrellus pipistrellus
28	2020-09-09 21-47-30	Pipistrellus pipistrellus
29	2020-09-09 21-47-48	Pipistrellus pipistrellus
30	2020-09-09 21-47-57	Pipistrellus pipistrellus
31	2020-09-09 21-48-24	Pipistrellus pipistrellus
32	2020-09-09 21-48-40	Pipistrellus pipistrellus
33	2020-09-09 21-48-49	Pipistrellus pipistrellus
34	2020-09-09 21-49-14	Pipistrellus pipistrellus
35	2020-09-09 21-50-51	Plecotus auritus
36	2020-09-09 21-54-15	Pipistrellus pipistrellus
37	2020-09-09 21-54-40	Pipistrellus pipistrellus
38	2020-09-09 21-54-53	Pipistrellus pipistrellus
39	2020-09-09 21-55-04	Pipistrellus pipistrellus
40	2020-09-09 21-55-16	Pipistrellus pipistrellus
41	2020-09-09 21-55-29	Pipistrellus pipistrellus
42	2020-09-09 21-55-42	Pipistrellus pipistrellus
43	2020-09-09 21-55-55	Pipistrellus pipistrellus
44	2020-09-09 21-56-07	Pipistrellus pipistrellus
45	2020-09-09 21-56-19	Pipistrellus pygmaeus
46	2020-09-09 21-56-30	Pipistrellus pygmaeus
47	2020-09-09 21-58-44	Pipistrellus pygmaeus

Transect	Surveyor	Date	Sunset/rise
Autumn 2	MP/KD	11-09-20	19:21
Weather	**Rain**	**Wind**	**Temp start**
Dry/mild	0	3 to 2	16
Temp end	**Cloud**	**Start time**	**Finish time**
14	6	19:20	21:35
Equipment	**Verified**		
Batlogger M	MP		

Map Label	Recording	Timestamp	Species
1	21130111	11-09-20 19:40	Pipistrellus pygmaeus
2	21130143	11-09-20 19:48	Pipistrellus pygmaeus
3	21130160	11-09-20 19:50	Pipistrellus pygmaeus
4	21130164	11-09-20 19:51	Pipistrellus pygmaeus
5	21130186	11-09-20 19:53	Pipistrellus pygmaeus
6	21130187	11-09-20 19:53	Pipistrellus pygmaeus
7	21130191	11-09-20 19:54	Pipistrellus pygmaeus
8	21130192	11-09-20 19:54	Pipistrellus pygmaeus
9	21130201	11-09-20 19:54	Pipistrellus pygmaeus
10	21130204	11-09-20 19:55	Pipistrellus pygmaeus
11	21130216	11-09-20 19:56	Pipistrellus pygmaeus
12	21130225	11-09-20 19:59	Pipistrellus pipistrellus
13	21130227	11-09-20 19:59	Pipistrellus pipistrellus
14	21130241	11-09-20 20:01	Pipistrellus pipistrellus
15	21130243	11-09-20 20:02	Pipistrellus pipistrellus
16	21130252	11-09-20 20:03	Pipistrellus pipistrellus
17	21130256	11-09-20 20:05	Pipistrellus pygmaeus
18	21130260	11-09-20 20:06	Pipistrellus pygmaeus
19	21130266	11-09-20 20:08	Pipistrellus pipistrellus
20	21130360	11-09-20 20:29	Pipistrellus pipistrellus
21	21130361	11-09-20 20:29	Pipistrellus pipistrellus
22	21130368	11-09-20 20:31	Pipistrellus pipistrellus
23	21130373	11-09-20 20:31	Pipistrellus pipistrellus
24	21130377	11-09-20 20:33	Pipistrellus pipistrellus
25	21130380	11-09-20 20:34	Pipistrellus pipistrellus
26	21130381	11-09-20 20:34	Pipistrellus pipistrellus
27	21130383	11-09-20 20:35	Pipistrellus pipistrellus
28	21130384	11-09-20 20:35	Pipistrellus pipistrellus
29	21130385	11-09-20 20:35	Pipistrellus pipistrellus
30	21130386	11-09-20 20:35	Pipistrellus pipistrellus
31	21130387	11-09-20 20:35	Pipistrellus pipistrellus

32	21130423	11-09-20 20:42	Pipistrellus pipistrellus
33	21130449	11-09-20 20:45	Pipistrellus pipistrellus
34	21130450	11-09-20 20:45	Pipistrellus pipistrellus
35	21130456	11-09-20 20:46	Pipistrellus pipistrellus
36	21130457	11-09-20 20:47	Pipistrellus pipistrellus
37	21130460	11-09-20 20:47	Pipistrellus pipistrellus
38	21130463	11-09-20 20:48	Pipistrellus pipistrellus
39	21130465	11-09-20 20:48	Pipistrellus pipistrellus
40	21130467	11-09-20 20:48	Pipistrellus pipistrellus
41	21130526	11-09-20 20:55	Myotis spec.
42	21130586	11-09-20 21:02	Myotis spec.
43	21130605	11-09-20 21:03	Pipistrellus pipistrellus
44	21130635	11-09-20 21:08	Pipistrellus pipistrellus
45	21130646	11-09-20 21:15	Pipistrellus pipistrellus
46	21130648	11-09-20 21:15	Pipistrellus pipistrellus
47	21130649	11-09-20 21:21	Pipistrellus pipistrellus
48	21130652	11-09-20 21:21	Pipistrellus pipistrellus
49	21130654	11-09-20 21:21	Pipistrellus pipistrellus
50	21130655	11-09-20 21:21	Pipistrellus pipistrellus
51	21130659	11-09-20 21:24	Pipistrellus pipistrellus
52	21130662	11-09-20 21:24	Pipistrellus pipistrellus
53	21130663	11-09-20 21:24	Pipistrellus pipistrellus
54	21130664	11-09-20 21:24	Pipistrellus pipistrellus
55	21130669	11-09-20 21:27	Pipistrellus pipistrellus
56	21130670	11-09-20 21:27	Pipistrellus pipistrellus
57	21130671	11-09-20 21:28	Pipistrellus pipistrellus
58	21130675	11-09-20 21:29	Pipistrellus pipistrellus
59	21130680	11-09-20 21:29	Pipistrellus pipistrellus

Transect	Surveyor	Date	Sunset/rise
Autumn 3	MP/KD	09-09-20	19:29
Weather	**Rain**	**Wind**	**Temp start**
Dry/mild	0	1 to 0	17
Temp end	**Cloud**	**Start time**	**Finish time**
16	1	19:20	21:30
Equipment	**Verified**		
Batlogger M	MP		

Map Label	Recording	Timestamp	Species
1	21130114	09-09-20 19:51	Pipistrellus pygmaeus
2	21130140	09-09-20 19:55	Pipistrellus pygmaeus
3	21130141	09-09-20 19:55	Pipistrellus pygmaeus
4	21130142	09-09-20 19:55	Pipistrellus pygmaeus
5	21130143	09-09-20 19:55	Pipistrellus pygmaeus
6	21130144	09-09-20 19:55	Pipistrellus pygmaeus
7	21130145	09-09-20 19:56	Pipistrellus pygmaeus
8	21130146	09-09-20 19:56	Pipistrellus pygmaeus
9	21130147	09-09-20 19:56	Pipistrellus pygmaeus
10	21130148	09-09-20 19:56	Pipistrellus pygmaeus
11	21130149	09-09-20 19:56	Pipistrellus pipistrellus
12	21130150	09-09-20 19:56	Pipistrellus pygmaeus
13	21130151	09-09-20 19:57	Pipistrellus pipistrellus
14	21130157	09-09-20 19:57	Pipistrellus pygmaeus
15	21130158	09-09-20 19:57	Pipistrellus pygmaeus
16	21130159	09-09-20 19:57	Pipistrellus pipistrellus
17	21130162	09-09-20 19:58	Pipistrellus pipistrellus
18	21130163	09-09-20 19:58	Pipistrellus pipistrellus
19	21130168	09-09-20 19:59	Pipistrellus pipistrellus
20	21130178	09-09-20 20:00	Pipistrellus pygmaeus
21	21130179	09-09-20 20:00	Pipistrellus pygmaeus
22	21130180	09-09-20 20:00	Pipistrellus pygmaeus
23	21130182	09-09-20 20:01	Pipistrellus pipistrellus
24	21130184	09-09-20 20:01	Pipistrellus pygmaeus
25	21130185	09-09-20 20:01	Pipistrellus pygmaeus
26	21130186	09-09-20 20:01	Pipistrellus pygmaeus
27	21130187	09-09-20 20:01	Pipistrellus pygmaeus
28	21130188	09-09-20 20:02	Pipistrellus pygmaeus
29	21130197	09-09-20 20:03	Pipistrellus pygmaeus
30	21130212	09-09-20 20:06	Myotis daubentonii
31	21130221	09-09-20 20:08	Pipistrellus pipistrellus

32	21130223	09-09-20 20:08	Pipistrellus pipistrellus
33	21130227	09-09-20 20:09	Pipistrellus pygmaeus
34	21130232	09-09-20 20:11	Pipistrellus pipistrellus
35	21130249_2	09-09-20 20:14	Barbastella barbastellus
36	21130318	09-09-20 20:25	Pipistrellus pipistrellus
37	21130319	09-09-20 20:25	Pipistrellus pipistrellus
38	21130320	09-09-20 20:26	Pipistrellus pipistrellus
39	21130324	09-09-20 20:27	Pipistrellus pipistrellus
40	21130325	09-09-20 20:27	Pipistrellus pipistrellus
41	21130329	09-09-20 20:29	Myotis daubentonii
42	21130333	09-09-20 20:30	Pipistrellus pipistrellus
43	21130337	09-09-20 20:32	Pipistrellus pipistrellus
44	21130353	09-09-20 20:37	Pipistrellus pipistrellus
45	21130356	09-09-20 20:38	Pipistrellus pipistrellus
46	21130399	09-09-20 20:45	Pipistrellus pipistrellus
47	21130431	09-09-20 20:49	Pipistrellus spec.
48	21130439	09-09-20 20:50	Pipistrellus pipistrellus
49	21130463	09-09-20 20:53	Pipistrellus pipistrellus
50	21130535	09-09-20 21:03	Pipistrellus pygmaeus
51	21130561	09-09-20 21:05	Pipistrellus pygmaeus
52	21130631	09-09-20 21:16	Pipistrellus pygmaeus

Table 15: Static Detector Survey Results[4] (see static detector locations on Figure A5, Annex A)

Date 2020 /Location	PIPI	PIPY	NYNO	NYLE	MYSP	PLAU	BABA	EPSE	PISP	Species no.	Total	Nights	hrs/nt	BAI per hr	Activity Level
Spring															
Spring - ST1	584	17	5	4	1		1	1	1	7	614	9	8.00	8.53	moderate to high
Spring - ST2	247	25	8		5	5	4		2	6	296	5	8.25	7.18	moderate to high
Spring - ST3	487	325	2	27	1	3	1	1	16	8	863	5	8.25	20.92	high
Spring - ST4	605	205	10	46		4	6	1	2	7	879	5	8.25	21.31	high
Spring - ST5	37	13	1	7						4	58	5	8.25	1.41	low to moderate
Spring - ST6	31	3		1		1			3	4	39	5	8.25	0.95	low
Summer - ST1	126	87	5	17	3		1		2	6	241	10	7.75	3.11	moderate
Summer - ST2	314	41	7	10	12	6	2			7	392	10	7.75	5.06	moderate
Summer - ST3	1105	337	8	6	5	4	2		2	7	1469	10	7.75	18.95	moderate to high
Summer - ST4	2031	106	7	5	5	9		5	2	7	2170	10	7.75	28.00	high
Summer - ST5	150	3	2	2	1					5	158	10	7.75	2.04	low to moderate
Summer - ST6	15	1		1						3	17	7	8.00	0.30	low
Autumn - ST1	126	88	5	17	3		1		1	6	241	9	11.50	2.33	low to moderate
Autumn - ST2	98	107	28	5	1	5	1		3	7	248	8	11.50	2.70	moderate
Autumn - ST3	1037	281	26		13	39	12		26	6	1434	6	11.50	20.78	high
Autumn - ST4	112	206	4	3	7	8	2		96	7	438	7	11.50	5.44	moderate
Autumn - ST5	86	4	30	21	2	2	1		9	7	155	11	11.50	1.23	low
Autumn - ST6	48	14	7	4	1	3				6	77	12	11.50	0.56	low
Total Passes	7239	1863	155	176	60	89	34	8	165		**9789**				

[4] Species abbreviations: PIPI - common pipistrelle, PIPY - Soprano Pipistrelle, NYNO - noctule, NYLE – Leisler's, MYSP - Myotis species, PLAU - brown long eared bat, BABA – barbastelle, EPSE – serotine, PISP – common or Soprano Pipistrelle (including social call)

Table 16: Weather Conditions Static Surveys

Date	Minimum Temperature (°C)	Maximum Temperature (°C)	Minimum wind mph	Max. Wind mph	Rain
13-May	2.0	11.0	3	16	None
14-May	0.0	13.0	2	13	None
15-May	0.0	17.0	2	8	None
16-May	5.0	16.0	0	10	None
17-May	4.0	19.0	0	10	None
18-May	9.0	23.0	3	14	None
19-May	11.0	24.0	1	9	None
20-May	11.0	26.0	1	13	None
21-May	12.0	26.0	1	9	None
22-May	12.0	21.0	7	22	Light rain/drizzle
23-May	10.0	18.0	7	24	Light rain/drizzle
24-May	10.0	20.0	1	14	None
25-May	8.0	24.0	1	9	None
26-May	9.0	25.0	1	13	None
27-May	9.0	23.0	1	14	None
10-Jul	11.0	18.0	5	12	Light rain/drizzle
11-Jul	9.0	19.0	1	12	None
12-Jul	7.0	22.0	1	8	None
13-Jul	11.0	23.0	3	13	Light rain/drizzle
14-Jul	14.0	20.0	3	9	Light rain/drizzle
15-Jul	10.0	18.0	1	10	Light rain/drizzle
16-Jul	14.0	21.0	1	10	Light rain/drizzle
17-Jul	16.0	26.0	1	9	None
18-Jul	13.0	22.0	2	12	None
19-Jul	13.0	19.0	3	10	Light rain/drizzle
09-Sep	10.0	14.0	3	14	Light rain/drizzle
10-Sep	7.0	18.0	0	9	None
11-Sep	12.0	22.0	2	18	None

12-Sep	12.0	25.0	5	18	None
13-Sep	10.0	20.0	5	12	None
14-Sep	6.0	22.0	2	7	None
15-Sep	8.0	25.0	2	10	None
16-Sep	10.0	17.0	1	8	Light rain/drizzle
17-Sep	8.0	18.0	2	12	None
18-Sep	4.0	18.0	1	7	None
19-Sep	5.0	21.0	1	12	None
20-Sep	8.0	20.0	1	16	None
21-Sep	12.0	22.0	7	16	None
22-Sep	14.0	23.0	5	18	Light rain/drizzle
23-Sep	13.0	19.0	6	17	Light rain/drizzle
24-Sep	16.0	19.0	8	17	Light rain and thunderstorms
25-Sep	14.0	19.0	6	16	Light rain/drizzle
26-Sep	13.0	20.0	7	20	Light rain/drizzle
27-Sep	11.0	18.0	8	26	Light rain and thunderstorms
28-Sep	10.0	19.0	8	21	Light rain/drizzle
29-Sep	12.0	19.0	8	22	Light rain/drizzle
30-Sep	9.0	17.0	3	15	Light rain/drizzle