Stonestreet Green Solar

Environmental Statement
Volume 4: Appendices
Chapter 9: Biodiversity
Appendix 9.5: Baseline Survey Reports
Appendices 9.5g - 9.5n

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Stonestreet Green Solar

Appendix 9.5g: Breeding Bird Survey Report

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1. EXECUTIVE SUMMARY

S.1 This Breeding Bird Survey Report has been prepared on behalf of EPL 001 Limited ('The Applicant'). This report details the results of a breeding bird survey (territory mapping) of the Site consisting of four to five survey visits each survey season (varying by survey 'parcel' and overall totalling 23 visits) dates between 12th May 2020 and 7th June 2022 in relation to the Development Consent Order ('DCO') application for Stonestreet Green Solar ('The Project').

S.2 The objective of the breeding bird survey (supplemented by desk study) was to record the species, distributions, and numbers of breeding birds within and adjacent to the Site, with emphasis on any protected and notable species, Additionally, the survey was used to estimate the breeding status of each species and the number of breeding territories likely to be present within the Site.

S.3 The survey visits were conducted by experienced bird surveyors, and the survey method was broadly based on the 'line-transect' territory-mapping method.

S.4 The main findings of this breeding bird survey for the Site are: -

- A total of 55 bird species were recorded, with 51 directly using the Site. Of these, 29 are notable species as follows:
- 11 are listed as a Species of Principal Importance: cuckoo, skylark, starling, song thrush, house sparrow, dunnock, yellow wagtail, bullfinch, linnet, yellowhammer, reed bunting.
- 11 are red status species: cuckoo, skylark, house martin starling, mistle thrush, nightingale, house sparrow, yellow wagtail, linnet, greenfinch and yellowhammer.
- 13 are amber status species: greylag goose, mallard, stock dove, woodpigeon, sparrowhawk, kestrel, rook, whitethroat, wren, song thrush, dunnock, bullfinch and reed bunting.
- Two species using the Site: kingfisher and Cetti's warbler, are listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) (WCA).

S.5 The Site is assessed to be of Local (district) importance for breeding skylark and of County importance for breeding yellowhammer. Additionally, the railway embankment adjacent to the north-east land parcels of the Site is of Local (district) importance for breeding nightingale, though this will not be impacted by The 'Project'.

S.6 The Site is assessed overall to be of Local importance for its breeding bird assemblage.

S.7 Impacts on bird breeding and foraging habitats will be avoided and minimised by design, and new habitats for breeding and foraging birds will be created on Site, to ensure that the ecological importance of the local bird population can be maintained and improved wherever possible.

S.8 The associated **ES Volume 2, Chapter 9: Biodiversity (Doc Ref. 5.2)** and **Outline Landscape and Ecological Management Plan ('LEMP') (Doc. Ref. 7.10)** provides detail of avoidance, mitigation and compensation measures relating birds.

2. INTRODUCTION

INTRODUCTION

2.1. This Breeding Bird Survey Report has been prepared on behalf of EPL 001 Limited ('The Applicant'). This report details the results of a breeding bird survey (territory mapping) of the Site conducted on 23 dates between 12th May 2020 and 7th June 2022 in relation to the Development Consent Order ('DCO') application for Stonestreet Green Solar ('The Project').

2.2. This Breeding Bird Survey Report is **Appendix 9.5g** to **ES Volume 2, Chapter 9: Biodiversity (Doc Ref. 5.2).**

THE PROJECT

2.3. The 'Project' comprises the construction, operation and decommissioning of solar photovoltaic ('PV') arrays and energy storage, together with associated infrastructure and an underground cable connection to the existing National Grid Sellindge Substation.

2.4. The 'Project' will include a generating station (incorporating solar arrays) with a total capacity exceeding 50 megawatts ('MW'). The agreed grid connection for The 'Project' will allow the export and import of up to 99.9 MW of electricity to the grid. The 'Project' will connect to the existing National Grid Sellindge Substation via a new 132 kilovolt ('kV') substation constructed as part of The 'Project' and cable connection under the Network Rail and High Speed 1 ('HS1') railway.

2.5. The location of The 'Project' is shown on **ES Volume 3, Figure 1.1: Site Location Plan (Doc Ref. 5.3).** The 'Project' will be located within The 'Order limits' (the land shown on the **Works Plans (Doc Ref. 2.3)** within which The 'Project' can be carried out). The 'Order limits' plan is provided as **ES Volume 3, Figure 1.2: The 'Order Limits' (Doc Ref. 5.3).** Land within The 'Order limits' is known as the Site.

SITE DESCRIPTION

2.6. The Site area is approximately 192 ha located Aldington to the south-east of Ashford in Kent. The Project lies within the administrative areas of Kent County Council ('KCC') and Ashford Borough Council ('ABC') local authorities. Further information on the Project, including proposed infrastructure and design, is provided in **ES Volume 2, Chapter 3: Project Description (Doc Ref. 5.2)**.

2.7. The Site comprises agricultural fields delineated by hedgerows and tree belts. It extends to approximately 192 hectares and is currently predominantly used for arable cropping and grazing.

2.8. The Site also supports hedgerow, parcels of woodland, drainage ditches, ponds and arable field margins. The East Stour River flows in an east to west direction within, and adjacent to, the northern part of the Site.

2.9. Fields are described in relation to the Project as follows:

- The South Western Area, Fields 1 to 9.

- The Central Area, Fields 10 to 19 and 23 to 25.
- The South Eastern Area, Fields 20 to 22.
- The Northern Area, Fields 26 to 29.
- Project Substation (location of the Project Substation, in the north western section of Field 26).
- 'Cable Route Corridor' (export of electricity from the Project at 132 kilovolt ('kV') via underground cables (the 'Grid Connection Cable') to the Sellindge Substation). 'Cable Route Crossing' (use of an existing cable duct under the High Speed 1 / Channel Tunnel Rail Link ('HS1') railway or through Horizontal Directional Drilling ('HDD') beneath HS1 for the Cable Route Corridor).
- Sellindge Substation (location of the existing Sellindge Substation).

SCOPE OF WORKS

2.10. This report details the results of a breeding bird survey (territory mapping) of the Site conducted on 23 dates between 12th May 2020 and 7th June 2022.

2.11. Over this period the survey area changed as fields were included and removed as alterations to the extent of the Site was made.

2.12. The associated **ES Volume 2, Chapter 9: Biodiversity (Doc Ref. 5.2)** and **Outline Landscape and Ecological Management Plan ('LEMP') (Doc. Ref. 7.10)** provides detail of avoidance, mitigation and compensation measures relating birds.

2.13. Details of long-term habitat management prescriptions that will benefit the local bird population are not included in this report. Instead, these measures are to be set out in the associated **Outline LEMP (Doc Ref. 7.10)**.

ASSESSMENT OBJECTIVES

2.14. The objectives of the survey and report are to: -

- Record the species, distributions, and numbers of breeding birds within and adjacent to the Site, with emphasis on any protected and notable species (as defined in Section 4),
- Estimate the breeding status of each species and the number of breeding territories likely to be present within the Site; and
- Assess the overall ecological importance of the Site for breeding birds.

3. METHODOLOGY

DESK STUDY

3.1. A data search of all bird records within 1km of the Site was undertaken by the Kent and Medway Biological Records centre ('KMBRC') on 7th April 2022, with an updated desk study undertaken in August 2023.

3.2. A review of the returned records from KMBRC focused on declining farmland bird species, rare breeding birds as listed by the Rare Breeding Birds Panel (RBBP, 2022) and other relevant red listed species.

3.3. Other documents were reviewed to inform evaluation and assessment as follows:

- Published Kent Bird Reports covering a five year period of 2016 to 2020 (KOS, 2017-2022).
- the Kent Breeding Bird Atlas 2008-13 (KOS, 2015).
- British Trust for Ornithology (BTO) Kent breeding bird survey trends for skylark and yellowhammer (BTO, undated).
- Statutory and non-statutory designated site citations within 1km of the Site.
- Local Wildlife Site (LWS) criteria (Kent Wildlife Trust ('KWT'), 2022).

SURVEY METHOD

Field survey methodology

3.4. The survey was undertaken based on a standard territory mapping (Common Birds Census) methodology for surveying breeding birds, as detailed in Bibby et al (2000) and Gilbert et al (1998).

3.5. During the survey, all species either seen or heard were recorded and any signs of breeding activity were noted. Birds were recorded using the standardised British Trust for Ornithology (BTO) two-letter species codes and standardised behaviour codes (Bibby *et al*., 2000).

3.6. All bird species seen during the survey were recorded and signs of activity and behaviour were noted. Most survey effort was focussed on declining farmland species that are listed as Species of Principal Importance (SPI), red and amber status species (Stanbury *et al.*, 2021) and/or are listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended).

3.7. Consequently, birds flying overhead (and not using the Site) and/or some common and widespread species may have been missed on specific survey visits. Records of feral pigeon (*Columba livia*) were not made.

3.8. The Site was surveyed on foot so that the surveyor passed within 50m of most points within the Site. Where fields are particularly large, the distance between the surveyor and points on Site is likely to have exceeded 50m. See Annex 2 for the survey route.

3.9. Clusters of bird registrations indicate the presence of a territory. A minimum of two registrations recorded ten days apart is required to determine a cluster. A single nest recorded with eggs or young can qualify as a cluster even if no adults are observed. The extent of a territory is estimated based on the number of registrations and the specific behaviours recorded (Bibby *et al*., 2000).

3.10. Species maps, indicating the estimate of territories present on-site for the most significant species of conservation concern recorded, are provided in Annex 3 of this report. These maps are used to determine key habitats and assess potential impacts of the 'Project' upon the bird species present on Site.

3.11. Breeding evidence was assigned to four categories: confirmed, probable, possible and non-breeding, using the standard BTO criteria, presented in Table 1. In some circumstances, the field evidence was unclear and professional judgement has been used, in combination with the field evidence, to assign breeding status.

Table 1: Evidence used to assign breeding status.

Non-Breeder	Possible Breeder	Probable Breeder	Confirmed Breeder
Migrant	Observed in suitable habitat	Pair in suitable habitat	Distraction behaviour
Summering	Singing male	Permanent territory	Used nest or eggshells found from this season
Fly-over		Courtship and display	Recently fledged young or downy young
		Visiting probable nest site	Adults entering or leaving nest site, indicating occupied nest
		Agitated behaviour	Adults carrying faecal sac or food for young
		Brood patch on incubating bird	Nest containing eggs
		Nest building or excavating	Nest with young seen or heard

3.12. For the purposes of the breeding bird survey, the Site has been split into survey areas (refer to Table 2).

Table 2: Breeding bird survey areas and Fields (refer to Fig 1 for the field locations).

Survey area	Fields
A	1, 2, 3, 4, 5, 6, 7, 8, 9 Majority of the South Western Area
B	10, 11, 12, 13, 14, 15, 16, 17 Southern half of The Central Area
C	24, 25, 26, 27, 28, 29 The Northern Land Area and northern half of The Central Area
D	20, 21, 22 The South Eastern Land Area
E	18, 19, 23 Northen half of The Central Land Area
F	26, 27, 28, 29 The Northern Land Area

Survey dates, personnel and weather conditions

3.13. Four breeding bird survey visits to areas A, B, C and D were conducted between 15th May 2020 and 12th June 2020.

3.14. Four breeding bird survey visits to area E and F were conducted between 12th April 2022 and 7th June 2022.

3.15. The breeding bird survey of the Site was conducted by a competent expert.

3.16. Details of the associated weather conditions for each survey visit are provided in the Table 3. Bird survey visits generally commenced just after sunrise to be completed by mid-morning, though generally much earlier.

3.17. Survey visits were not conducted during periods of prolonged heavy rain, strong wind (above Beaufort 4) or fog.

Table 3: Details of the associated weather conditions for each survey visit.

Date	Area	Surveyor	Weather
12/05/2020	C (Fields 24-29)	Laragh Smyth, John Young	Sunrise: 05:08 Start: 05:20. Dry, good visibility, 20% cloud cover, light wind. End: 07:10. Dry, 20% cloud cover, good visibility, light wind.
12/05/2020	D (Fields 20-22)	Laragh Smyth, John Young	Sunrise: 05:08 Start: 07:40. Dry, good visibility, 20% cloud cover. End: 08:30. Dry, 20% cloud cover, good visibility, light wind.
14/05/2020	C (Fields, 16-29)	Laragh Smyth, John Young	Sunrise: 05:08 Start: 03:30. Dry, light wind. End: 04:55. Dry, light wind.
14/05/2020	B (Fields 10-17)	Laragh Smyth, John Young	Sunrise: 05:07 Start: 05:30. Dry, good visibility, 10% cloud cover, light wind. End: 07:50. Dry, 40% cloud cover, good visibility, moderate wind.
15/05/2020	A (Fields 1-9)	Laragh Smyth, John Young	Sunrise: 05:05 Start: 05:20. Dry, good visibility, 0% cloud cover, light wind. End: 08:10. Dry, 80% cloud cover, good visibility, light wind.
19/05/2020	D	Laragh Smyth, John Young	Sunrise: 04:58 Start: 05:05. Dry, 30% cloud cover, good visibility, light wind. End: 06:15. Dry, 40% cloud cover, good visibility, light wind.

Date	Area	Surveyor	Weather
19/05/2020	C	Laragh Smyth, John Young	Sunrise: 04:58 Start: 06:25. Dry, 20% cloud cover, good visibility, light wind. End: 07:55. Dry, 10% cloud cover, good visibility, light wind.
21/05/2020	B	Laragh Smyth, John Young	Sunrise: 04:56 Start: 05:10. Dry, 30% cloud cover, good visibility. End: 07:10. Dry, 60% cloud cover, good visibility.
26/05/2020	A	Laragh Smyth John Young	Sunrise: 04:50 Start: 05:15. Dry, 10% cloud cover, good visibility, light wind. End: 08:20. Dry, 10% cloud cover, good visibility, light wind.
27/05/2020	C	John Young	Sunrise: 04:49 Start: 05:15. Dry, good visibility, light wind, 10% cloud cover. End: 06:45. Dry, good visibility, light wind, 10% cloud cover.
27/05/2020	D	John Young	Sunrise: 04:49 Start: 07:00. Dry, good visibility, light wind, 10% cloud cover. End: 07:55. Dry, good visibility, light wind, 10% cloud cover.
29/05/2020	B	Laragh Smyth, John Young	Sunrise: 04:48 Start: 05:15. Dry, good visibility, light wind, 10% cloud cover. End: 07:30. Dry, good visibility, light wind, 10% cloud cover.

Date	Area	Surveyor	Weather
05/06/2020	A	Laragh Smyth, John Young	Sunrise: 04:44 Start: 05:15. Dry, good visibility, light wind, 100% cloud cover. End: 08:48. Dry, good visibility, moderate wind, 80% cloud cover.
08/06/2020	D	John Young	Sunrise: 04:41 Start: 05:40. Light drizzle, good visibility, moderate wind, 100% cloud cover. End: 06:50. Light drizzle, moderate visibility, light wind, 100% cloud cover.
08/06/2020	C	John Young	Sunrise: 04:41 Start: 07:15. Dry, good visibility, light wind, 100% cloud cover. End: 08:45. Dry, good visibility, light wind, 100% cloud cover.
10/06/2020	B	Laragh Smyth, John Young	Sunrise: 04:41 Start: 05:16. Dry, good visibility, light wind, 80% cloud cover. End: 07:30. Dry, good visibility, light wind, 80% cloud cover.
12/06/2020	A	Laragh Smyth, John Young	Sunrise: 04:41 Start: 05:15. Dry, good visibility, moderate wind, 90% cloud cover. End: 11:10. Dry, good visibility, moderate wind, 90% cloud cover.
12/04/2022	F (Fields 26-29)	Laragh Smyth Samantha Dawson	Sunrise: 06:06 Start: 07:00, good visibility. End: 10:16, good visibility.
12/04/2022	E (Fields 18, 19, 23)	Laragh Smyth Samantha Dawson	Sunrise: 06:06 Start: 07:00, good visibility. End: 10:16, good visibility.

Date	Area	Surveyor	Weather
04/05/2022	F	Laragh Smyth Louise Gower	Sunrise: 05:22 Start: 06:06, light drizzle, good visibility, light wind. End: 09:51.
04/05/2022	E	Laragh Smyth Louise Gower	Sunrise: 05:22 Start: 07:00, good visibility. End: 10:16, good visibility.
26/05/2022	F	Laragh Smyth Louise Gower	Sunrise: 04:51 Start: 05:23, Fog lifted at 06:15 then dry. Visibility poor until 06:15 then good. End: 10:00, moderate wind, visibility good.
26/05/2022	E	Laragh Smyth, Louise Gower	Sunrise: 04:51 Start: 05:23, Fog lifted at 06:15 then dry. Visibility poor until 06:15 then good. End: 10:00, moderate wind, visibility good.
07/06/2022	E	Laragh Smyth, Louise Gower	Sunrise: 04:42 Start: 05:15, Light wind, good visibility. End: 08:15, Light wind, good visibility.
07/06/2022	F	Laragh Smyth, Louise Gower	Sunrise: 04:42 Start: 05:15, Light wind, good visibility. End: 08:15, Light wind, good visibility.

ASSESSMENT AND EVALUATION

Assessment criteria

3.18. The assessment of the ornithological importance of the Site during the breeding season was made by evaluating any species afforded special statutory protection or those included on one, or more, of the lists of species of conservation interest, as detailed in within Annex 1. These include:

- species listed on Annex 1 of the EU Birds Directive or a qualifying feature of potentially functionally linked internationally designated sites;

- species listed on Schedule 1 of the WCA, 1981 (as amended);
- priority bird species in the UK;
- species listed as priority species or additional species of interest within Kent; and
- species included in the Birds of Conservation Concern (BoCC) Red and Amber Lists (Stanbury *et al*. 2020).

3.19. Additionally, assemblages have been assessed against the criteria for LWS designation within the Kent LWS Selection Criteria (Kent Wildlife Trust, 2022).

3.20. A comparison between population sizes present within the Site with the national and county breeding population estimates for certain species was also taken into account. National estimates for breeding birds are published in the paper *'Population estimates of birds in Great Britain and the United Kingdom'* (Woodward et al., 2020). The BTO Bird Atlas 2007-2011 (Balmer et. al., 2013) was also reviewed for species information on a national level and to inform the above assessment criteria.

3.21. Information on the population status of breeding bird species at a county level was sourced from the latest available issues of the Kent Bird Reports (Kent Ornithological Society, 2016-2020)

3.22. Information on populations of nationally rare species was sourced from the most recently published paper by the Rare Breeding Birds Panel (RBBP) (Hollings M. and the Rare Breeding Birds Panel, 2020).

Importance of bird populations (Valuation)

3.23. To inform assessment of the importance of the bird populations, their biodiversity importance has been defined with reference to geographical levels, based on guidance provided in the Chartered Institute of Ecology and Environmental Management (CIEEM)'s *'Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland'* (CIEEM, 2018) ('EcIA Guidelines') as well as professional judgement.

3.24. These assessment criteria (set out in Table 4) have been used in conjunction an assessment of species status, abundance and diversity to assess the biodiversity importance of the bird populations recorded during the surveys.

Table 4: Biodiversity Valuation of Ornithological Features

Biodiversity Valuation	Description and examples of criteria
International or European	Resident or regularly occurring populations of species which may be considered of importance at an international or European level (1) where: • the loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale;

Biodiversity Valuation	Description and examples of criteria
	• the population forms a critical part (2) of a wider population at this scale; or • the species is at a critical phase (3) of its life cycle at this scale.
UK or National	Areas of habitats with priority species 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 NERC Act (2006) and those considered to be of principal importance for the conservation of biodiversity. Resident or regularly occurring populations of species which may be considered of value at a UK or a national level (4) 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	Populations of species of value at a regional level (i.e., South-east England). Resident or regularly occurring populations of species which may be considered of value at a regional 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.
County	Populations of species of value at a County (i.e. Kent) level Resident or regularly occurring populations of species which may be considered of value at a County (or District) (6) level 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.

Biodiversity Valuation	Description and examples of criteria
Local	Species populations of value in a local (i.e., within ~ 2 km of the Site) or District (e.g. Ashford). context. 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.
Negligible (Site)	Habitats and associated species that is of value in the context of the Site only. Populations of common and widespread species

1 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 or 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).

2 Such populations include sub-populations that are essential to maintenance of metapopulation dynamics, e.g., critical emigration and, or immigration links between otherwise discrete populations.

3 Seasonal activity or behaviour upon which survival or reproduction depends.

4 Species which may be considered at the UK or national level mean: birds, other animals and plants which receive legal protection on 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. UK Biodiversity Action Plan (UKBAP)), or species listed within the Red Data Book.

5 Such species include those listed in the appropriate Natural Character Area description.

6 Such species include those at county level (i.e. Kent) including unitary authority area i.e. District level (i.e. South-east England); 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 proposed 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 are acceptable to Natural England.

3.25. Only ecological features within the Site and/or Zol assessed as being of importance at a local level or above have been taken forward for future assessment within the

EcIA. Those assessed as being at below a local level of importance, for example at the ZoI level, have been scoped out of the assessment process.

3.26. A summary of the potential impacts of the 'Project' upon important bird species, have been assessed based on the location of birds within the Site and/or foraging areas combined with those areas most likely to be impacted by The 'Project' works. These impacts are discussed further within **ES Volume 2, Chapter 9: Biodiversity (Doc Ref. 5.2)**.

ZONE OF INFLUENCE

3.27. The ZoI of a Project is defined by the EcIA Guidelines as "*…the area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities*" (CIEEM, 2018).

3.28. The ZoI is determined by the source / type of impact, the potential pathway(s) for that impact and the location and sensitivity of the ecologically important feature(s) beyond the boundary.

3.29. The potential impact(s) of a project are not always limited to the boundaries of the Site concerned. A project may also have the potential to result in impacts upon ecologically important sites, habitats or species that are located beyond the Site boundaries.

3.30. The potential ZoI of a project in relation to breeding birds is used to determine the extents of the breeding bird survey study area.

3.31. A review of the Project proposals confirmed that they will likely result in loss of suitable on-Site bird breeding and foraging habitat, including habitat loss of limited amounts of field margin, hedgerow and other boundary habitats and extensive loss of open arable habitats that are suitable for ground-nesting bird species that require open farmland habitats for nesting. Works may also result in impacts on individual animals (e.g., destruction of active nests during site works).

3.32. Furthermore, the ZoI is likely to be influenced by the Project design including lighting and noise during both the construction and operational phases.

3.33. Additionally, the ZoI is also likely to be influenced by management of any remaining habitats with the Site and effects on adjacent land parcels.

3.34. These potential impacts could adversely affect the ecological importance of the local and wider breeding bird populations, including for species such as skylark (*Alauda arvensis*) and yellowhammer (*Emberiza citrinella*), whose territories may cover the Site as well as adjacent off-Site areas.

3.35. Therefore, in the absence of appropriate avoidance, mitigation and compensation measures, the potential ZoI of the Project, in relation to breeding birds, is likely to extend to the Site and those habitats that fall within c.100-200m beyond this (Whittingham *et al.*, 2004).

3.36. This ZoI was used to establish the required extents of the breeding bird survey, which included all suitable on-Site habitat, and relevant adjacent off-site habitats (boundary scrub, treelines and hedgerows), also noting any obvious territorial behaviour that encompassed both the Site and adjacent off-Site fields.

SURVEY LIMITATIONS

3.37. An ecological survey represents a ‘snapshot’ in time of the ecological condition of a site. The ecological character of a site can change substantially throughout both the course of a year, and from year to year impacting on the extent and quality of habitats potential to support protected species.

3.38. The aim of a desk study is to help characterise the baseline context of the Site and provide valuable background information that would not be captured by a single site survey alone. Information obtained during a desk study was dependent upon people and organisations having made and submitted records for the area of interest. As such, a lack of records for a particular habitat or species does not necessarily mean that the habitats or species do not occur in the study area. Likewise, the presence of records for particular habitats and species does not automatically mean that these still occur within the area of interest or are relevant in the context of the 'Project'.

3.39. Surveys were not conducted at night, shortly prior to sunrise or at dusk. However, one nocturnal visit was undertaken to survey for nightingale (*Luscinia megarhynchos*).Therefore, species that are most active during this period, such as owl species, were unlikely to be recorded.

3.40. To control for time of day effects, the transect route was altered on each of the survey visits.

3.41. Bird surveys were conducted within the optimum period for detecting breeding birds and overall there are no material limitations to the survey results.

3.42. Overall, there are no significant limitations to the survey results.

4. SURVEY RESULTS

DESK STUDY

Biological records

4.1. Of those relevant potential rare breeding species, the review of the returned records from KMBRC indicate that the following species occurred within the search area over the last 10 years (dates are of the most recent summer record): cattle egret (*Bubulcus ibis*) on 14/04/2019, little egret on 01/06/2019, pochard (*Aythya ferina*) on 01/04/2013, turtle dove (*Streptopelia turtur*) on 17/05/2018, quail (*Coturnix coturnix*) on 20/06/2012 and lesser-spotted woodpecker (*Dendrocopos minor*) on 06/03/2017.

4.2. The review of the returned records indicate that the following additional farmland bird species occurred within the data search area over the last 10 years: corn bunting (*Emberiza calandra*) on 18/06/2015.

4.3. Other relevant records of red listed species are: spotted flycatcher (*Muscicapa striata*) on 06/07/2017 and marsh tit (*Poecile palustris*) on 11/04/2016.

4.4. Within the returned records turtle dove, spotted flycatcher, marsh tit and corn bunting were confirmed as a breeding species however, the year of confirmed breeding is not listed.

4.5. Results returned from KMBRC of statutory and non-statutory designated sites indicate that there are no statutory sites within data search area and five LWS' providing woodland and pasture habitats. Given the required bird criteria (KWT, 2022), it is unlikely that these LWS have been designated for their breeding bird assemblages.

Designated sites context

4.6. A number of international designations of breeding and passage ornithological interest are present within 10km of the Site, as follows:

- Dungeness Romney Marsh and Rye Bay Ramsar and SPA is located approximately 6.5km to the south-west of the Site, at its closest point;

4.7. The relevant breeding and passage ornithological qualifying features and interest for these internationally designated sites is summarised below.

Dungeness Romney Marsh and Rye Bay Ramsar

4.8. The Site qualifies under Criterion 5 because it regularly supports:

- *'20,000 or more waterbirds: • In the non-breeding season, the Site regularly supports 34,957 individual waterbirds (5 year peak mean 2002/3 – 2006/7). '*

4.9. The Site qualifies under Criterion 6 because it regularly supports over 1% of the individuals in the populations of the following species or subspecies of waterbird in any season:

Dungeness Romney Marsh and Rye Bay SPA

4.10. The Site qualifies under Article 4.1 of the Directive (2009/147/EC) as it is used regularly by 1% or more of the Great Britain populations of the following species listed in Annex I in any season:

- '*Qualifying features with revised counts*
- *Common tern Sterna hirundo 188 pairs - breeding (5 year mean 2011-2015) 1.9 % of GB population Annex 1*
- *Sandwich tern Sterna albifrons 420 pairs - breeding (5 year mean 2011-2015) 3.8 % of GB population Annex 1*
- *Qualifying features with counts remaining as at 2016 classification using data in Departmental Brief published in 2010*
- *Avocet Recurvirostra avosetta 31 pairs – breeding (5 year mean 2004-2008) 3.5% of GB population Annex 1*
- *Little tern Sternula albifrons 35 pairs – breeding (5 year mean 1992-1996) 1.5% of GB population Annex 1*
- *Aquatic warbler Acrocephalus paludicola 2 individuals – passage (5 year mean 2004-2008) 6.1% of GB population Annex 1*
- *Marsh harrier Circus aeruginosus 4 females – breeding (5 year mean 2004-2008) 2% of GB population Annex 1*
- *Mediterranean Gull Larus melanocephalus 56 pairs – breeding (2004- 2008) 52.2% of GB population Annex 1'*

4.11. The Site also qualifies under article 4.2 of the Directive (2009/147/EC) due to:

' as it is used regularly by over 20,000 waterbirds (waterbirds as defined by the Ramsar Convention) in any season: During the period 2002/03 – 2006/07, Dungeness, Romney Marsh and Rye Bay SPA (including proposed extensions) supported an average peak of 34,625 individual waterbirds in the non-breeding season, comprised of almost 16,000 wildfowl and over 19,000 waders.'

4.12. Due to the international importance of these sites, the presence of any qualifying species is addressed within the evaluation.

4.13. A review of other statutory and non-designated sites within 2km found that other designated sites were designated primarily for their habitats without detailed ornithological criteria. As a result, where species assemblages may be relevant to connected designated site habitats, these are reviewed but focus is made upon the internationally designated sites listed above.

FIELD SURVEY

Overall results (all survey areas combined)

4.14. 55 species were recorded across all the survey areas of the Site during the survey visits.

4.15. Of these, the following were seen flying over of the Site and making no direct use of it: swift (*Apus apus*), herring gull (*Larus argentatus*), cormorant (*Phalacrocorax*

carbo) and red kite (*Milvus milvus*). Therefore, 51 species were recorded directly using the Site.

4.16. Of the 51 species that directly use the Site:

- 11 are red status species: cuckoo (*Cuculus canorus*), skylark, house martin (*Delichon urbicum*), starling (*Sturnus vulgaris*), mistle thrush (*Turdus viscivorus*), nightingale, house sparrow (*Passer domesticus*), yellow wagtail (*Motacilla flava*), linnet (*Linaria cannabina*), greenfinch (*Chloris chloris*) and yellowhammer; and
- 13 are amber status species: greylag goose (*Anser anser*), mallard (*Anas platyrhynchos*), stock dove (*Columba oenas*), woodpigeon (*Columba palumbus*), sparrowhawk (*Accipiter nisus*), kestrel (*Falco tinnunculus*), rook (*Corvus frugilegus*), whitethroat (*Curraca communis*), wren (*Troglodytes troglodytes*), song thrush (*Turdus philomelos*), dunnock (*Prunella modularis*), bullfinch (*Pyrrhula pyrrhula*) and reed bunting (*Emberiza schoeniclus*).

4.17. Of the species that use the Site, 11 are listed as a Species of Principal Importance: cuckoo, skylark, starling, song thrush, house sparrow, dunnock, yellow wagtail, bullfinch, linnet, yellowhammer, reed bunting.

4.18. Two species using the Site: kingfisher (*Alcedo atthis*) and Cetti's warbler (*Cettia cetti*) are listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) (WCA).

4.19. Of the 51 species that directly use the Site, 11 species were recorded as 'confirmed breeders', 13 were 'probable breeders', and 21 were 'possible breeders.'

4.20. Based on the survey results, estimates of the number of territories across the Site for skylark are 39 to 46, for linnet five to eight and for yellowhammer 31 to 42.

4.21. The table is followed by sections providing a species breakdown by survey area

Table 5: Results of Breeding Bird Results by Survey Area

Species	BTO code	Status	Flyover only	Area A between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area B between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area C between 10/11/2020 and 20/02/2021 and Area F between 30/12/2021 and 04/03/2022. Notes	Flyover only	Area D between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area E between 30/11/2021 and 04/03/2022. Notes	Largest observed single survey count
Red-legged partridge	RL	No status	-	Possible breeder, adults in suitable habitat. Two on 26/05/2020 and one on 12/06/2020	-	NR	-	NR	-	NR	-	NR	Peak count of 2 Area A
Pheasant *Phasianus colchicus*	PH	No status	-	Possible breeder, adult in suitable habitat. One on 26/05/2020.	-	Possible breeder, adult in suitable habitat. Singles on 14/05/2020, 29/05/2020 and 10/06/2020.	-	Area C Possible breeder, adults in suitable habitat. Recorded on most survey visits.	-	Possible breeder, adult in suitable habitat. Single on 19/05/2020.	-	NR	Present throughout Site
Greylag goose	GJ	Amber: WL, WI	-	NR	Y	Non-breeder. Flying over on 29/05/2020.	-	Area C Non-breeder. Eight in Field 28 and 29 on 04/05/2020, Area F Non-breeder. 20 in Field 26 on 26/05/2022.	-	NR	-	NR	Peak count of 20 Area C
Mandarin duck *Aix galericulata*	MN	No status	-	NR	-	NR	-	Area C Probable breeder, pair in suitable habitat. A pair in the East Stour River between Fields 27	-	NR	-	NR	Recorded in Area C only (pair)

Species	BTO code	Status	Flyover only	Area A between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area B between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area C between 10/11/2020 and 20/02/2021 and Area F between 30/12/2021 and 04/03/2022. Notes	Flyover only	Area D between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area E between 30/11/2021 and 04/03/2022. Notes	Largest observed single survey count
								and 28 on 08/06/2020.					
Mallard	MA	Amber: WDMp1/2	-	NR	-	NR	-	Area C Probable breeder, pair in suitable habitat. A male flying over Field 28 on 12/05/2020 and a pair within the East Stour River between Fields 25 and 24.	-	NR	-	NR	Recorded in Area C only (pair)
Swift	SI	Red: BDP1	Y	Non-breeder. Passage migrant, 262 over the survey area on 05/06/2020.	-	NR	-	NR	-	NR	-	NR	Flyover only
Cuckoo	CK	Section 41 species. Red: BDp2, DBMp1		Possible breeder. adult in suitable habitat that contains brood parasitic species. Single on 15/05/2020.	-	NR	-	NR	-	NR	-	NR	Recorded in Area A only (single)
Stock dove	SD	Amber: BI	Y	Non-breeder although suitable breeding habitat occurs within the woodland blocks	-	NR	-	Area C Non-breeder. Probable breeder within Backhouse Wood adjacent to	-	Possible breeder, adults in suitable habitat. Two on 19/05.	-	NR	At least two territories present

Species	BTO code	Status	Flyover only	Area A between 10/11/2020 and 20/02/2021.	Flyover only	Area B between 10/11/2020 and 20/02/2021.		Area C between 10/11/2020 and 20/02/2021 and Area F between 30/12/2021 and 04/03/2022.	Flyover only	Area D between 10/11/2020 and 20/02/2021.	Flyover only	Area E between 30/11/2021 and 04/03/2022.	Largest observed single survey count
				Notes		Notes	Flyover only	Notes		Notes		Notes	
				adjacent to Fields 2 to 5 Flying over only with three on 05/06/2020 and a single on 12/06/2020				Field 28 and 29, adults in suitable habitat and permanent territory.		One territory in Field 22.			
Woodpigeon	WP	Amber: BI		Possible breeder, adults in suitable habitat. Recorded on most survey visits.	-	Possible breeder, adults in suitable habitat. Recorded on most survey visits.	-	Area C Possible breeder, adults in suitable habitat. Recorded on every survey visit.	-	Possible breeder, adults in suitable habitat. Recorded on every survey visit.	-	Possible breeder, adults in suitable habitat. 18 on 04/05/2022, two on 07/06/2022.	Present throughout Site
Collared dove *Streptopelia decaocto*	CD	Green		Possible breeder, adult in suitable habitat. Single on 26/05/2020	Y	Non-breeder. Single flying over on 14/05/2020.	Y	Area C Non-breeder. A single over Field 25 on 27/05/2020.	-	NR	-	NR	Single observed in Area A, remaining recorded as flyovers only
Herring gull	HG	Section 41 species. Red: BDp2, WDp1, BI, WI	Y	Non-breeder. Recorded flying over the Site only.	Y	Non-breeder. Flying over the survey area on most visits	-	Area C Non-breeder. Flying over the area on most survey visits	Y	Recorded flying over on most survey visits.	-	NR	Flyover only
Cormorant *Phalacrocorax carbo*	CA	Green	-	NR	-	NR	Y	19/05/2020 Non-breeder. Flying over Field 24	-	NR	-	NR	Flyover only

Species	BTO code	Status	Flyover only	Area A between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area B between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area C between 10/11/2020 and 20/02/2021 and Area F between 30/12/2021 and 04/03/2022. Notes	Flyover only	Area D between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area E between 30/11/2021 and 04/03/2022. Notes	Largest observed single survey count
Grey heron *Ardea cinerea*	H.	Green	-	Non-breeder. Single on 26/05/2020.	-	NR	-	Area C Non-breeder. Flying over Field 28 on 12/05/2020. However, heronry comprising a minimum of three nests located within Backhouse Wood adjacent to Field 28 and 29.	-	NR	-	Non-breeder. Two flying over on 04/05/2022.	Breeding off Site
Little egret *Egretta garzetta*	ET	Green	-	NR	-	Non-breeder. Eight flew over Field 10 and 11 on 29/05/2020.	-	Area F Non-breeder. Singles in ditches between Fields 26 and 27 on 12/04/2022 and at the edge of the woodland strip to the east of Field 29 on 26/05/2022.	-	NR-		NR	Recorded Area B and Area F only
Red kite	KT	Schedule 1 species. Green	-	NR	-	NR	Y	Area F Non-breeder Single flying over on 31/05/2022. Whilst this individual could be a local bird, there was a movement of red kites in Kent at this time, presumably of non-	-	NR	-	NR	Flyover only

Species	BTO code	Status	Flyover only	Area A between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area B between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area C between 10/11/2020 and 20/02/2021 and Area F between 30/12/2021 and 04/03/2022. Notes	Flyover only	Area D between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area E between 30/11/2021 and 04/03/2022. Notes	Largest observed single survey count
								adult birds returning from the continent and therefore, given no other previous survey records this individual is treated as a flyover and non-breeder rather than a local foraging bird.					
Sparrowhawk	SH	Amber: BDMp1	-	Possible breeder, adult in suitable habitat. Single foraging over the area on 05/06/2020	-	NR	-	NR	-	Possible breeder, adult in suitable habitat. Single foraging over the area on 19/05/2020	-	NR	Recorded within Area A and D, peak count of 1
Buzzard *Buteo buteo*	BZ	Green	-NR		-	Possible breeder, adult in suitable habitat. Singles on 14/05/2020 and 29/05/2020	-	Area C Possible breeder, adults in suitable habitat. Two over Fields 18 and 19 and a single over Field 27 to 29 on 19/05/2020 and a single over Field 24 on 27/05/2020. Area F Confirmed breeder, nest with chicks on 07/06/2022.	-	NR	-	Possible breeder adult in suitable habitat. Single on 12/04/2022.	Confirmed breeder, recorded in Areas B, C, E and F.

Species	BTO code	Status	Flyover only	Area A between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area B between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area C between 10/11/2020 and 20/02/2021 and Area F between 30/12/2021 and 04/03/2022. Notes	Flyover only	Area D between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area E between 30/11/2021 and 04/03/2022. Notes	Largest observed single survey count
Kingfisher	KF	WCA Sch1. Green	-	NR	-	NR	-	Area C Probable breeder, adult in suitable habitat. 27/05/2020 calling kingfisher and likely nesting burrow along the banks of the East Stour River.	-	NR	-	NR	Likely breeder within Area C
Great spotted woodpecker *Dendrocopos major*	GS	Green	-	NR	-	NR	-	Area C Possible breeder, adults in suitable habitat. A single calling from trees adjacent to Field 24 on 08/06/2020. Area F Confirmed breeder, nest hole with chicks on 26/05/2022 in Field 26	-	NR	-	Confirmed breeder, nesting observed in boundary trees of Field 18 on 07/06/2022	Confirmed breeder, recorded in Areas C, E and F.
Green woodpecker *Picus viridis*	G.	Green		Possible breeder, adult in suitable habitat. Single within the woodland block adjacent to Field 5 on26/05/2020.	-	Possible breeder, adult in suitable habitat. Single on 10/06/2020	-	Area C Possible breeder, adult in suitable habitat. A single flew from Field 28 in to	-	Possible breeder, adults in suitable habitat.	-	NR	Possible breeder, recorded throughout Site

Species	BTO code	Status	Flyover only	Area A between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area B between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area C between 10/11/2020 and 20/02/2021 and Area F between 30/12/2021 and 04/03/2022. Notes	Flyover only	Area D between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area E between 30/11/2021 and 04/03/2022. Notes	Largest observed single survey count
								Backhouse Woods on 27/05/2020.					
Kestrel	K.	Amber: BDMp1/2	-	Possible breeder, adults in suitable habitat. Foraging over the area on 26/05/2020.	-	NR	-	Area C Possible breeder, adults present in suitable habitat. A single foraging over Field 24 on 27/05/2020	-	NR	-	NR	Recorded in Areas A and C, at least one pair potentially present
Jay *Garrulus glandarius*	J.	Green	-	Possible breeder, adult in suitable habitat. Single in woodland block adjacent to Field 5 on 05/06/2020.	-	NR	-	NR	-	NR	-	NR	Recorded in Area A only, single bird
Magpie *Pica pica*	G	Green	-	Possible breeder, adults in suitable habitat. Recorded on most survey visits.	-	Possible breeder, adults in suitable habitat. Recorded on most survey visits.	-	Areas C and F Possible breeder, adults present in suitable habitat.	-	NR	-	Probable breeder, pair in suitable habitat	Recorded throughout Site
Jackdaw *Corvus monedula*	JD	Green	-	Confirmed breeder, nesting 05/06	-	Possible breeder, adult in suitable habitat. Single on 29/05/2020.	-	Area C Confirmed breeder, adults using nest box in Field 28 on 27/05/2020.	-	Non-breeder. Recorded foraging within the area. Possible breeder inn adjacent buildings.	-	NR	Recorded throughout Site

Species	BTO code	Status	Flyover only	Area A between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area B between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area C between 10/11/2020 and 20/02/2021 and Area F between 30/12/2021 and 04/03/2022. Notes	Flyover only	Area D between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area E between 30/11/2021 and 04/03/2022. Notes	Largest observed single survey count
Rook	RO	Amber: ERLOB	Y	Non-breeder. Single flying over on 15/05/2020.	-	NR	-	Area F Non-breeder. Single within Field 26 on 26/05/2022.	-	NR	-	NR	Recorded in Area A and F only, as singles
Carrion crow *Corvus corone*	C.	Green		Possible breeder, adults in suitable habitat. Recorded on most survey visits.	-	Confirmed breeder, nesting.	-	Areas C and F Possible breeder, adults present in suitable habitat.	-	Possible breeder, adult in suitable habitat. Single recorded on 19/05/2020.	-	NR	Recorded throughout Site
Blue tit *Cyanistes caeruleus*	BT	Green	-	Confirmed breeder, recently fledged young on 05/06/2020.	-	Possible breeder, adults in suitable habitat. Recorded on most survey visits.	-	Areas C and F Confirmed breeder, adults with food and juveniles on 07/06/2022.	-	Probable breeder, pair in suitable habitat	-	NR	Recorded throughout Site
Great tit *Parus major*	GT	Green	-	Possible breeder, adults in suitable habitat. Recorded across the survey area on most visits.	-	Possible breeder, adults in suitable habitat. Recorded on most survey visits.	-	Areas C and F Confirmed breeder, adults with food on 07/06/2022.	-	NR	-	Probable breeder, adults in suitable habitat and permanent territory.	Recorded throughout Site
Long-tailed tit	LT	Green	-	NR	-	NR	-	NR	-	NR	-	Possible breeder, adult in suitable habitat. One on 26/05/2022.	Recorded only in Area E, single bird.

Species	BTO code	Status	Flyover only	Area A between 10/11/2020 and 20/02/2021.	Flyover only	Area B between 10/11/2020 and 20/02/2021.		Area C between 10/11/2020 and 20/02/2021 and Area F between 30/12/2021 and 04/03/2022.	Flyover only	Area D between 10/11/2020 and 20/02/2021.	Flyover only	Area E between 30/11/2021 and 04/03/2022.	Largest observed single survey count
				Notes		Notes	Flyover only	Notes		Notes		Notes	
Skylark	.	Section 41 species. Red: BDp2	-	Probable breeder, adults within suitable habitat, permanent territories, courtship and display observed. 23 on 15/05/2020, 26 on 26/05/2020, 14 on 05/06/2020 and 13 on 12/06/2020. 14 to 16 territories, comprising:- Field 1 and 2, four to five territories; Field 3, two to three territories; Field 5 and 6, seven territories; and Field 9, one territory.	-	Probable breeder, adults in suitable habitat and permanent territories. 39 on 14/05/2020, 25 on 21/05/2020, 23 on 29/05/2020 and 19 on 10/06/2020. 16 to 18 territories, comprising:- Field 10 and 11, nine; Field 12 to 16, seven to eight; and Field 17, one.	-	Area F Possible breeder, suitable habitat. Single in Field 28 on 07/06/2022. One to two recorded in the large cereal field to the south of the East Stour River 12/04/2022, 04/05/2022 and 07/06/2022.	-	NR	-	Probable breeder, adults in suitable habitat and permanent territories. Nine on 12/04/2022, 17 on 04/05/2022, 26 on 26/05/2022 and 12 on 07/06/2022. Nine to 12 territories, comprising:- Field 19, seven to 10; and Field 18, two.	Distributed throughout Site with regular recording of 20+ birds per survey. Territory estimates between 39 and 46 when combining yearly observations
Swallow	SL	Green	-	Non-breeder. Single foraging over the survey area on 05/06/2020.	-	Non-breeder. Two foraging over the area on 21/05/2020.	-	Area C Non-breeder, a single foraging over Field 15 on 27/05/2020.	-	Non-breeder, although likely to be breeding in adjacent buildings. Single foraging over the area on 12/05/2020.	-	NR	Non-breeding, foraging over Site

Species	BTO code	Status	Flyover only	Area A between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area B between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area C between 10/11/2020 and 20/02/2021 and Area F between 30/12/2021 and 04/03/2022. Notes	Flyover only	Area D between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area E between 30/11/2021 and 04/03/2022. Notes	Largest observed single survey count
House martin	HM	Red: BDp2	-	NR	-	Non-breeder. Single foraging over Field 17 on 29/05/2020	-	NR	-	NR	-	NR	Non-breeding, foraging over Site
Cetti's warbler	CW	WCA Sch1. Green	-	Possible breeder, adults in suitable habitat. Two on 15/05/2020.	-	NR	-	NR	-	NR	-	NR	Peak of two in Area A only
Chiffchaff	CC	Green	-	Probable breeder, adults in suitable habitat and permanent territory. Singles on all survey visit dates. One to two territories, within woodland blocks adjacent to Fields 4 and 5.	-	Probable breeder, adults in suitable habitat and permanent territories. Singles on all survey visit dates. One to two territories, comprising:- Field 10 to 15, one; and Field 17, one.	-	Area C Possible breeder, adult in suitable habitat. A single recorded in Field 24 on 27/05/2020. Singing birds recorded on most dates within Backhouse Woods adjacent to Field 28 and 29. Area F Probable breeder, adult in suitable habitat and permanent territory. One to two on most visits. One territory within the woodland strip	-	NR	-	Probable breeder, adults in suitable habitat and permanent territory. Singles on 12/04/2022, 04/05/2022. Field 23, one territory.	Recorded throughout Site with at least three territories and likely more when combining yearly observations

Species	BTO code	Status	Flyover only	Area A between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area B between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area C between 10/11/2020 and 20/02/2021 and Area F between 30/12/2021 and 04/03/2022. Notes	Flyover only	Area D between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area E between 30/11/2021 and 04/03/2022. Notes	Largest observed single survey count
								to the east of Field 27.					
Blackcap *Sylvia atricapilla*	BC	Green	-	Probable breeder, adults in suitable habitat and permanent territories. Eight on 15/05/2020, six on 26/05/2020, seven on 05/06/2020 and five on 12/06/2020. Seven to nine territories, comprising:- Field 3, one; Field 7, three; Field 5 and 6, two to three; and Field 9, two.	-	Probable breeder, adults in suitable habitat and permanent territories. Two on 14/05/2020, one on 21/05/2020, Four on 29/05/2020 and one on 10/06/2020. Field 17, two to four territories.	-	Area C Probable breeder, adults in suitable habitat and permanent territories. Seven on 12/05/2020, three on 19/05/2020, five on 27/05/2020 and four on 08/06/2020. Four to five territories, comprising:- Field 24/25, one; Field 26, one to two; Field 27, one; and Field 28, one. Area F Probable breeder, adults in suitable habitat and permanent territory. One to two on most visits. One territory within the woodland strip to the east of Field 27.	-	Probable breeder, adults in suitable habitat and permanent territories. Two on 12/05/2020, three on 19/05/2020 and 27/05/2020 and two on 08/06/2020. Three to four territories, comprising:- Field 20 and 21, two to three; and Field 22, one.	-	Possible breeder, adult in suitable habitat. One on 07/06/2022.	Commonly recorded through all Areas of the Site and multiple territories in most parcels

Species	BTO code	Status	Flyover only	Area A between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area B between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area C between 10/11/2020 and 20/02/2021 and Area F between 30/12/2021 and 04/03/2022. Notes	Flyover only	Area D between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area E between 30/11/2021 and 04/03/2022. Notes	Largest observed single survey count
Lesser whitethroat	LW	Green		Possible breeder adults in suitable habitat. Singles on 15/05/2020 and 26/05/2020	-	NR	-	NR	-	Possible breeder, adult in suitable habitat. Single on 08/06/2020.	-	NR	Combined peak count of two birds recorded during 2020
Whitethroat	WH	Amber: BDMp2		Probable breeder, adults in suitable habitat and permanent territories. Four on 15/05 and 26/05, six on 05/06 and four on 12/06. Three to five territories, comprising:- Field 1, one; Fields 3/7, one to two; Fields 4 to 6, one; and Fields 7/6 one.	-	Probable breeder, adults in suitable habitat and permanent territories. 11 on 14/05/2020, eight on 21/05/2020, three on 29/05/2020 and 10 on 10/06/2020. 11 territories, comprising:- Field 10/11, two; Field 12 to 16, five; and Field 17, four.	-	Probable breeder, suitable habitat and permanent territories. Eight on 12/05/2020, nine on 19/05/2020, 10 on 27/05/2020 and 11 on 08/06/2020. 12 to 13 territories, comprising:- Field 24, one; Field 25, three; Field 26, one; Field 27, five; and Field 28 and 29, two to three. Area F Probable breeder, suitable habitat and permanent territories. One on 04/05/2022, five on 26/05/2022 and	-	Probable breeder, adults in suitable habitat and permanent territories. Two on 12/05/2020, four on 19/05/2020, two on and 27/05/2020. Three territories, comprising:- Field 20, one; and Field 22, three.	-	Probable breeder, adults in suitable habitat and permanent territories. Nine on 04/05/2022, four on 26/05/2022 and two on 07/06/2022. Field 19, three to five territories	Recorded throughout the Site with multiple territories recorded throughout

Species	BTO code	Status	Flyover only	Area A between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area B between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area C between 10/11/2020 and 20/02/2021 and Area F between 30/12/2021 and 04/03/2022. Notes	Flyover only	Area D between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area E between 30/11/2021 and 04/03/2022. Notes	Largest observed single survey count
								three on 07/06/2022. One to three territories, comprising:- Field 27, one to two; and Field 28 and 29, one.					
Wren	WR	Amber: BI	-	Probable breeder, adults in suitable habitat and permanent territories. Nine on 15/05/2020 and 26/05/2020, five on 05/06/2020 and 12/06/2020. Seven to 10 territories, comprising:- Field 1 and 2, three; Field 5/6, one; Field 7, one to two; Field 9, one to two; and Field 8, one to two.	-	Probable breeder, adults in suitable habitat and permanent territory.	-	Area C Confirmed breeder. Family group within woodland block between Fields 27 and 29 on 27/05/2020	-	Probable breeder, adults in suitable habitat and permanent territories. Four on 12/05/2020, six on 19/05/2020, seven on 27/05/2020 and 08/06/2020. 10 territories, comprising:- Field 20 and 21, seven; and Field 22, three.	-	Possible breeder, adults in suitable habitat. Two on 12/04/2022, one on 04/05/2022, four on 07/06/2022.	Distributed throughout Site, commonly recorded and with multiple territories. At least 21 birds recorded as a combined peak count with at least 17 territories between years
Treecreeper	TC	Green	-	NR	-	Possible breeder, adult in suitable habitat.	-	Area C Confirmed breeder.	-	NR	-	NR	Recorded in Area B and C, confirmed

Species	BTO code	Status	Flyover only	Area A between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area B between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area C between 10/11/2020 and 20/02/2021 and Area F between 30/12/2021 and 04/03/2022. Notes	Flyover only	Area D between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area E between 30/11/2021 and 04/03/2022. Notes	Largest observed single survey count
Certhia familiaris						One singing at the boundary of Field 17 on 29/05/2020.		Family group within woodland block between Fields 27 and 29 on 27/05/2020					breeding in Area C
Starling	SG	Section 41 species. Red: BDp1/2	-	Possible breeder, adults in suitable habitat. Single on 26/05/2020 and recorded on most visits within the agricultural buildings at Bank Farm.	Y	Non-breeder however, likely use of the area for foraging. Two flying over on 21/05/2020.	-	Area C Possible breeder, suitable habitat. Single flying over Field 24 on 12/05/2020.	-	NR	-	NR	Possible breeding in Areas B and C, flyover of Area B
Blackbird *Turdus merula*	B.	Green		Confirmed breeder, young on 15/05/2020. Recorded across the survey area on most visits.	-	Possible breeder, adults in suitable habitat. Recorded on most survey visits.	-	Area C Probable breeder, pair in suitable habitat. One on 12/05/2020, three on 19/05/2020 and 27/05/2020 and one on 08/06.	-	Probable breeder, pair in suitable habitat. Three on 12/05/2020, two on 19/05/2020, 27/05/2020 and 08/06/2020.	-	Probable breeder, pair in suitable habitat. One on 26/05/2022, three on 07/06/2022.	Distributed throughout Site as a confirmed and probable breeder
Song thrush	ST	Section 41 species. Amber: BDMp2		Probable breeder, adults in suitable habitat and permanent territories. One on 15/05/2020, two on 26/05/2020, one on 05/06/2020	-	Possible breeder, adults in suitable habitat. Singles on 14/05/2020, 29/05/2020 and 10/06/2020.	-	Area C Possible breeder, suitable habitat, singing male. One in Field 26 on 12/05/2020 and two crossing Field 28 on 27/05/2020.	-	Probable breeder, adults in suitable habitat and permanent territories. One on 12/05/2020, two on 19/05/2020,	-	Probable breeder, adult in suitable habitat and permanent territory. Two on 12/04/2022, 04/05/2022 and	Distributed throughout Site as a probable or possible breeder. Six to eight territories

Species	BTO code	Status	Flyover only	Area A between 10/11/2020 and 20/02/2021.	Flyover only	Area B between 10/11/2020 and 20/02/2021.		Area C between 10/11/2020 and 20/02/2021 and Area F between 30/12/2021 and 04/03/2022.	Flyover only	Area D between 10/11/2020 and 20/02/2021.	Flyover only	Area E between 30/11/2021 and 04/03/2022.	Largest observed single survey count
				Notes		Notes	Flyover only	Notes		Notes		Notes	
				and two on 12/06/2020. Two to three territories, comprising:- Field 5 and 6, two; and Field 7, one.		Fields 12 to 16, one territory.		Area F Possible breeder, suitable habitat, singing male. One in Field 26 and one in Field 27 on 12/04/2022 and one in Field 17 and one in Field 19 on 26/05/2022.		one on 27/05/2020 and two on 08/06/2020. Two to three territories, comprising:- Field 20 and 21, two; and Field 22, one.		one on 26/05/2022. One territory in Field 23	present between years.
Mistle thrush	M.	Red: BDp2, BDMp1	-	NR	-	Confirmed breeder, adult carrying food at Field 17 on 29/05/2020.	-	NR	-	NR	-	Possible breeder, adult in suitable habitat. One on 07/06/2022.	Confirmed breeder, recorded in Area C and E.
Robin *Erithacus rubecula*	R.	Green	-	Probable breeder, adults in suitable habitat and permanent territories. Recorded on every survey visit across the area.	-	Possible breeder, adults in suitable habitat. Recorded on most survey visits.	-	Area C Possible breeder, adults in suitable habitat. Singles on 12/05/2020 and 19/05/2020.	-	NR	-	Confirmed breeder, recently fledged young. One on 04/05/2022 and young on 07/06/2022.	Distributed throughout Site as a confirmed, probable or possible breeder.
Nightingale	.	Red: BDMp1/2, BDMr2	-	NR	-	NR	-	Area C Probable breeder, in adjacent habitat of railway embankment. Recorded on every survey visit in suitable habitat and	-	NR	-	NR	Recorded in Area C and F in association with railway embankment only. Three territories in Area C and

Species	BTO code	Status	Flyover only	Area A between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area B between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area C between 10/11/2020 and 20/02/2021 and Area F between 30/12/2021 and 04/03/2022. Notes	Flyover only	Area D between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area E between 30/11/2021 and 04/03/2022. Notes	Largest observed single survey count
								permanent territories. Counts of one singing in dense scrub in the north – west corner of Field 26 and two singing along the railway embankment adjacent to Field 27 on 12/05/2020 and 19/05/2020. Three singing in dense scrub along the railway embankment adjacent to Field 27 on 27/05/2020. Two singing in dense scrub along the railway embankment adjacent to Field 27 on 08/06/2020 Three territories in habitat along the railway embankment adjacent to Fields 26 and 27. Area F Probable breeder, in adjacent habitat of railway embankment.					two to three territories in Area F.

Species	BTO code	Status	Flyover only	Area A between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area B between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area C between 10/11/2020 and 20/02/2021 and Area F between 30/12/2021 and 04/03/2022. Notes	Flyover only	Area D between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area E between 30/11/2021 and 04/03/2022. Notes	Largest observed single survey count
								Recorded on every survey visit in suitable habitat and permanent territories. Two singing in dense scrub along the railway embankment adjacent to Field 27 on 12/04/2022, 04/04/2022 and 26/05/2022 with three singing on 07/06/2022 Two to three territories in habitat along the railway embankment adjacent to Fields 17 and 18.					
House Sparrow	HS	Section 41 species. Red: BDp2	-	Possible breeder, adults in suitable habitat. Recorded on most visits in boundary habitats and associated with adjacent housing and within the agricultural buildings at Bank Farm.	-	Possible breeder, adults in suitable habitat. Recorded on most visits in boundary habitats and associated with adjacent housing.	-	NR	-	Non-breeder, although probable breeder in adjacent housing. Using the area for foraging with low numbers observed on most visits	-	NR	Recorded within Area A, B and E in association with adjacent farm and house buildings as a possible breeder.

Species	BTO code	Status	Flyover only	Area A between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area B between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area C between 10/11/2020 and 20/02/2021 and Area F between 30/12/2021 and 04/03/2022. Notes	Flyover only	Area D between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area E between 30/11/2021 and 04/03/2022. Notes	Largest observed single survey count
Dunnock	D.	Section41 species. Amber: BDMp2	-	Probable breeder, adults in suitable habitat, permanent territories. Three on 15/05/2020, eight on 26/05/2020, four on 05/06/2020 and six on 12/06/2020. Five to eight territories, comprising:- Field 1, one; Fields 2 to 3, two to three; Field 4, one; and Field 8, two to three.	-	Possible breeder, adults in suitable habitat. Two on 21/05 and 29/05 with three on 10/06. Two to three territories, comprising:- Field 10 to 11, one; Field 12 to 16, one; and Field 17, one.	-	Area C Probable breeder, suitable habitat and permanent territories. Two on 12/05/2020, five on 19/05/2020, three on 27/05/2020 and five on 08/06/2020. Four to five territories, comprising:- Field 25, one; Field 24, Two to three; Field 26, one; and Field 27, one.	-	Possible breeder, adults in suitable habitat. Singles on 12/05/2020 and two on 27/05/2020. One to three territories, comprising:- Field 20 and 21, two; and Field 22, one.	-	Possible breeder, adult in suitable habitat. One on 12/04/2022.	Recorded throughout Site as a probable or possible breeder. Combined twelve to nineteen territories between years.
Yellow wagtail	YW	Section 41 species. Red: BDp2, BDMp1, BDMr1/2	-	NR	-	Possible breeder, adults in suitable habitat. Four in Field 12-16 on 14/05/2020.	-	NR	-	NR	-	NR	Recorded in Area B only with a peak count of four.
Pied Wagtail *Motacilla alba*	PW	Green	-	Possible breeder, adult in suitable habitat. Single at the chicken sheds on 12/06/2020	-	NR	-	NR	-	NR	-	NR	Recorded in Area A only as a single bird.

Species	BTO code	Status	Flyover only	Area A between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area B between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area C between 10/11/2020 and 20/02/2021 and Area F between 30/12/2021 and 04/03/2022. Notes	Flyover only	Area D between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area E between 30/11/2021 and 04/03/2022. Notes	Largest observed single survey count
Chaffinch *Fringilla coelebs*	CH	Green	-	Probable breeder, adults in suitable habitat and permanent territories. Seven on 15/05/2020, eight on 26/05/2020 and 05/06/2020 and five on 12/06/2020. Seven to 10 territories, comprising:- Field 1-2, one to two; Field 3, three; Field 7, one to two; Field 5-6 one; Field 9, one; and Field 8 one.	-	Probable breeder, adults in suitable habitat and permanent territories. Eight on 14/05/2020, three on 21/05/2020, seven on 29/05/2020 and four on 10/06/2020. Four to six territories, comprising:- Field 10-11, one to two; Field 12-16 two to three; and Field 17 one.	-	Area C Probable breeder, adults in suitable habitat and permanent territories. Five on 12/05/2020, three on 19/05/2020, two on 27/05/2020 and 08/06/2020. Three to four territories, comprising:- Field 24, one; Field 26/27, one; and Field 28/29 one to two.	-	Probable breeder, adults in suitable habitat and permanent territory. Two on 12/05/2020 and 19/05/2020 and one on 27/05/2020. Field 22, one to two territories.	-	Possible breeder, adults in suitable habitat. Two on 04/05/2022.	Recorded throughout Site as a probable breeder.
Bullfinch	BF	Section 41 species. Amber: BDMp2	-	Possible breeder, adult in suitable habitat. Singles on 05/06/2020 and 12/06/2020.	-	NR	-	NR	-	NR	-	NR	Recorded in Area A only, peak count of one as a possible breeder.
Greenfinch	GR	Red: BDp1/2	-	NR	-	NR	-	NR	-	NR	-	Possible breeder, adult in suitable habitat.	Recorded in Area E only, peak count of one as a

Species	BTO code	Status	Flyover only	Area A between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area B between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area C between 10/11/2020 and 20/02/2021 and Area F between 30/12/2021 and 04/03/2022. Notes	Flyover only	Area D between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area E between 30/11/2021 and 04/03/2022. Notes	Largest observed single survey count
												One on 07/06/2022.	possible breeder.
Linnet	L.	Red: BDp2	-	Probable breeder, adult pairs in suitable habitat. Single on 15/05/2020, eight on 26/05/2020, eight on 26/05 and 16 on 05/06. Four to five territories, comprising:- Field 1-2, one to two; and Field 3, three.	-	Possible breeder, adults in suitable habitat. Six on 14/05/2020, one on 12/05/2020, three on 29/05/2020 and three on 10/06/2020. Two to three territories, comprising:- Field 10-11, one, Field 12-16, one; and Field 17, one.	-	Area C Confirmed breeder, adults with food in suitable habitat. One on 12/05/2020, four on 19/05/2020, one on 27/05/2020 and four on 08/06/2020. One to two territories, comprising:- Field 25, one; and Field 26, one within adjacent scrub boundary with railway embankment. Area F Possible breeder, suitable habitat. Five on 12/04/2022.	-	Possible breeder, adults in suitable habitat. Two on 12/05/2020 and 19/05/2020, one on 27/05/2020 and three on 08/06/2020. Two to three territories, comprising:- Field 20-21, one to two; and Field 22, one.	-	Possible breeder, adults in suitable habitat. Singles on 12/04/2022 and 04/05/2022, two on 26/05/2022 and 07/06/2022.	Recorded throughout Site as a probable or possible breeder. Nine to thirteen territories recorded from combined years, though noting this is a colonial nesting species and this represents a broad estimate.
Goldfinch *Carduelis carduelis*	GO	Green	-	Possible breeder, adults in suitable habitat. Two on 15/05/2020, three on 26/05/2020, two on	-	Possible breeder, adults in suitable habitat. One on 14/05/2020, two on 21/05/2020	-	Area C Possible breeder, adults in suitable habitat. A single on 08/06/2020.	-	Probable breeder, adults in suitable habitat and permanent territory. Singles on 12/05/2020,	-	Possible breeder, adults in suitable habitat. Three on 12/04/2022,	Distributed throughout Site as a probable or possible breeder.

Species	BTO code	Status	Flyover only	Area A between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area B between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area C between 10/11/2020 and 20/02/2021 and Area F between 30/12/2021 and 04/03/2022. Notes	Flyover only	Area D between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area E between 30/11/2021 and 04/03/2022. Notes	Largest observed single survey count
				05/06/2020 and one on 12/06/2020.		and 29/05/2020 and one on 10/06/2020. Field 10-11, one territory.				19/05/2020 and 27/05/2020. Field 20-21, one territory.		04/05/2022 and 07/06/2022.	
Yellowhammer	Y.	Section 41 species. Red: BDp2, BDMp1	-	Probable breeder, recorded on every survey visit within suitable habitat and permanent territories. Five on 15/05/2020, six on 26/05/2020, seven on 05/06/2020 and 12/06/2020. Five to seven territories, comprising:- Fields 1-3, three; Fields 4-7, one; Fields 6/9, one; Field 9, one; and Field 3/7, one.	-	Confirmed breeder, adults in suitable habitat, permanent territories ad recently fledged young. Eight on 14/05/2020, 12 on 21/05/2020, seven on 29/05/2020 and 21 on 10/06/2020. Six to seven territories, comprising:- Field 10/11, two to three; Field 12-16, three; and Field 15/17, one.	-	Area C Probable breeding, suitable habitat and permanent territories. Six on 12/05/2020, eight on 19/05/2020, seven on 27/5/2020 and nine on 08/06/2020. Six to seven territories, comprising:- Fields 25/24, three to four territories; Fields 26/28, two territories; Field 27, one territory Area F Probable breeder, suitable habitat and permanent territories. Two on 12/04/2022, one on	-	Probable breeder, adults in suitable habitat and permanent territories. Two on 12/05/2020, four on 19/05/2020, five on 27/05/2020 and four on 08/06/2020. Four to five territories, comprising:- Field 20-21, one; and Field 22, three to four.	-	Probable breeder, adults in suitable habitat and permanent territories. 14 on 12/04/2022, 15 on 04/05/2022, 14 on 26/05/2022 and 12 on 07/06/2022. Eight to 11 territories, comprising:- Field 19, six to eight; Field 18, one to two; and Field 23, one.	Distributed throughout Site as a probable or possible breeder. Thirty three to forty two territories recorded between combined years.

Species	BTO code	Status	Flyover only	Area A between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area B between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area C between 10/11/2020 and 20/02/2021 and Area F between 30/12/2021 and 04/03/2022. Notes	Flyover only	Area D between 10/11/2020 and 20/02/2021. Notes	Flyover only	Area E between 30/11/2021 and 04/03/2022. Notes	Largest observed single survey count
								04/05/2022, four on 26/05/2022 and one on 07/06/2022. Four to five territories, comprising :- Fields 26/27, two territories; Field 28-29, one to two territories; and Field/woodland strip boundary of East Stour River to the east of Field 27, one territory.					
Reed bunting	RB	Section 41 species. Amber: BDMp2	-	Probable breeder, pair in suitable habitat. Single on 20/05/2020 and a pair at the same location on 05/06/2020. One territory between Fields 3 and 4.	-	Probable breeder, adults in suitable habitat and permanent territories. Singles recorded on all survey visits. Two to three territories within boundary ditches of Fields 10 to 16.	-	Area C Probable breeder, suitable habitat and permanent territories. Three on 12/05/2020, two on 19/05/2020, four on 27/05/2020 and two on 08/06/2020. Three to four territories, comprising:- Fields 26/27, two to three territories; and	-	NR	-	Possible breeder, adults in suitable habitat. One on 04/04/2022, six on 26/05/2022 and 12 on 07/06/2022.	Recorded throughout Site with six to eight territories recorded between combined years.

Species	BTO code	Status	Flyover only	Area A between 10/11/2020 and 20/02/2021.	Flyover only	Area B between 10/11/2020 and 20/02/2021.		Area C between 10/11/2020 and 20/02/2021 and Area F between 30/12/2021 and 04/03/2022.	Flyover only	Area D between 10/11/2020 and 20/02/2021.	Flyover only	Area E between 30/11/2021 and 04/03/2022.	Largest observed single survey count
				Notes		Notes	Flyover only	Notes		Notes		Notes	
								Field 28 and 29, one territory. Area F Possible breeder, suitable habitat. Two on 26/05/2022.					

4.22. The following sections provide a breakdown by survey area.

Results for Survey Area A

4.23. 40 species were recorded during the survey visits of Area A. Of these, four species were recorded flying over Area A and not making further use of it: swift, stock dove, herring gull and rook.

4.24. Therefore, 36 species were recorded directly using Area A. Of these, six are red status species: cuckoo, skylark, starling, house sparrow, linnet and yellowhammer and nine are amber status species: woodpigeon, sparrowhawk, kestrel, whitethroat, wren, song thrush, dunnock, bullfinch and reed bunting.

4.25. Ten species are listed as a Species of Principal Importance: cuckoo, skylark, starling, song thrush, house sparrow, dunnock, bullfinch, linnet, yellowhammer and reed bunting.

4.26. Of the 36 species that directly use Area A, three were recorded as 'confirmed breeders', 12 were 'probable breeders', and 19 were possible breeders.

Results for Survey Area B

4.27. 34 species were recorded during the survey visits of Area B. Of these, four species were recorded flying over Area B and not making further use of it: greylag goose, collared dove, herring gull and starling.

4.28. Therefore, 30 species were recorded directly using Area A. Of these, seven are red status species: skylark, house martin, mistle thrush, house sparrow, yellow wagtail, linnet, yellowhammer and seven are amber status species: woodpigeon, whitethroat, wren, song thrush, dunnock and reed bunting.

4.29. Eight species are listed as a Species of Principal Importance: skylark, song thrush, house sparrow, dunnock, yellow wagtail, linnet, yellowhammer and reed bunting.

4.30. Of the 30 species that directly use Area B, two were recorded as 'confirmed breeders', seven were 'probable breeders', and 17 were possible breeders.

Results for Survey Areas C and F

4.31. 41 species were recorded during the survey visits of Areas C and F. Of these, six species were recorded flying over Area B and not making further use of it: collared dove, herring gull, cormorant, grey heron, red kite and starling.

4.32. Therefore, 35 species were recorded directly using Areas C and F. Of these, four are red status species: skylark, nightingale, linnet and yellowhammer and 11 are amber status species: greylag goose, mallard, stock dove, woodpigeon, kestrel, rook, whitethroat, wren, song thrush, dunnock and reed bunting.

4.33. Six species are listed as a Species of Principal Importance: skylark, song thrush, dunnock, linnet, yellowhammer and reed bunting.

4.34. Of those species using the survey areas, one species: kingfisher is listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) (WCA).

4.35. Of the species that directly use Areas C and F, seven were recorded as 'confirmed breeders', 12 were 'probable breeders', and 12 were possible breeders.

Results for Survey Area D

4.36. 22 species were recorded during the survey visits of Area D. Of these, two species were recorded flying over Area D and not making further use of it: herring gull and green woodpecker.

4.37. Therefore, 20 species were recorded directly using Area D. Of these, three are red status species: house sparrow, linnet and yellowhammer and seven are amber status species: stock dove, woodpigeon, sparrowhawk, whitethroat, wren, song thrush and dunnock.

4.38. Five species are listed as a Species of Principal Importance: song thrush, house sparrow, dunnock, linnet and yellowhammer.

4.39. Of the species that directly use Area D, nine were 'probable breeders', and nine were possible breeders.

Results for Survey Area E

4.40. 24 species were recorded during the survey visits of Area E. Of these, one species was recorded flying over Area E and not making further use of it: grey heron.

4.41. Therefore, 23 species were recorded directly using Area E. Of these, five are red status species: skylark, mistle thrush, linnet, greenfinch and yellowhammer and six are amber status species: woodpigeon, whitethroat, wren, song thrush, dunnock and reed bunting.

4.42. Six species are listed as a Species of Principal Importance: skylark, song thrush, dunnock, linnet, yellowhammer and reed bunting.

4.43. Of the species that directly use Area E, two were 'confirmed breeders', eight were 'probable breeders', and 13 were possible breeders.

5. EVALUATION

SUMMARY

5.1. Of the bird species recorded, given the bird species assemblage, foraging and nesting habitat present, recorded breeding evidence, territories and peak counts the Site is likely to be of ecological importance at a Local (district) level for its breeding notable bird assemblage with the exception of:

- County importance for breeding yellowhammer (based on territories and suitable habitat availability), and
- Local (district) importance for breeding skylark and nightingale (based on territories and suitable habitat availability).

5.2. Overall, the Site is assessed as supporting a typical breeding bird assemblages for intensively managed farmland with small woodland pockets and ditch habitats. The majority of birds encountered are common and widespread species of low conservation concern.

CONSERVATION STATUS

5.3. A total of 55 bird species were recorded within the Site, with 51 directly using the Site. Of these, 29 are notable species as follows:

- 11 are listed as a Species of Principal Importance: cuckoo, skylark, starling, song thrush, house sparrow, dunnock, yellow wagtail, bullfinch, linnet, yellowhammer, reed bunting.
- 11, are red status species: cuckoo, skylark, house martin starling, mistle thrush, nightingale, house sparrow, yellow wagtail, linnet, greenfinch and yellowhammer.
- 13 are amber status species: greylag goose, mallard, stock dove, woodpigeon, sparrowhawk , kestrel, rook, whitethroat, wren, song thrush, dunnock, bullfinch and reed bunting.
- Two species using the Site: kingfisher and Cetti's warbler are listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) (WCA).

5.4. Due to the large size of the Site and combination of habitats present, this assemblage is assessed as typical of the local area and county habitat types. These notable species have however been further assessed in relation to abundance, species diversity, habitat importance and ZoI, below.

DESIGNATED SITE CRITERIA

5.5. No species listed on the qualifying criteria for the Dungeness Romney Marsh and Rye Bay SPA Ramsar were recorded, therefore no further evaluation has been undertaken in respect of these sites.

SPECIES ABUNDANCE

5.6. No counts of any breeding bird species recorded within the Site approach 1% of national breeding population estimates (Woodward et al., 2020). As such, the Site did not support breeding populations of national importance for any species.

5.7. At a county level, territories recorded during the field survey were compared with those detailed within the Kent Bird Reports (Kent Ornithological Society, 2015-2019). All species were recorded in low numbers in comparison with county records aside from the species discussed below.

Yellowhammer

- Breeding bird survey trend data for Kent indicates that yellowhammer breeding populations are stabilising after a steady decline however, the trend confidence limits are wide and few breeding bird survey squares are being covered. The trend for England and the south-east continues to show a decline. Across the Site important habitats to support breeding and foraging yellowhammer occurs i.e., native species hedgerows with an understorey of mixed herbaceous vegetation adjacent to wide field margins.
- Given the recorded presence of between thirty-one to forty-two territories recorded between combined years (across the Site with confirmed or probable breeding on all survey parcels) and the widespread availability of breeding habitat, the Site is assessed to be of County importance for breeding yellowhammer.

Skylark

- Breeding bird survey trend data for Kent (Kent Ornithological Society (2015-2019) indicates that skylark breeding populations are stabilising and potentially increasing in-line with the trend for the south-east. However, the trend confidence limits are wide and few breeding bird survey squares are being covered. With the exceptions of survey Areas C, F and D, important habitats within the Site i.e. large, wide open arable fields with few high boundaries that provide suitable crop heights in spring and summer, are suitable to support breeding and foraging skylark.
- Given the estimated number of skylark territories (estimates between 39 and 46 territories) when combining yearly observations) recorded across the Site, probable breeding evidence recorded within most parcels, counts of 20+ on most visits and the widespread available nesting habitat present within the Site, the Site is assessed as being of Local (district) importance for breeding skylark.

Nightingale

- Additionally, the railway embankment adjacent to the survey Area C is of Local (district) level importance for breeding nightingale (Kent Ornithological Society (2015-2019), based upon review of Kent Bird Reports, but note this area is outside the Site, not subject to any habitat changes and unlikely to be impacted.

SPECIES DIVERSITY

5.8. Of the other bird species recorded, given the total of bird species and peak counts the Site is likely to be of ecological importance at a Local level for its breeding bird assemblage.

5.9. The Site is unlikely to Kent LWS selection criteria (which are often used to inform assessments of whether a recorded species population / assemblage may be of county level importance) but it is noted that a small number of Kent Red Data Book species (cormorant, grey heron, little egret and Cett''s warbler) have been recorded on occasion within the Site. The Site is however similar to abundant agricultural habitats within the district.

HABITAT AND DISTRIBUTION

5.10. During the breeding bird survey visits it was noted that the Site supports wide field margins with tall herbaceous vegetation that are adjacent to the crop and provides hedgerows with a dense vegetated understorey.

5.11. Bird species recorded on Site were registered utilising the woodland edges, hedgerows, scrub and ditch habitat and any adjacent gardens and associated buildings. Bird registrations within the cereal fields corresponded with foraging behaviour only, except for skylark which is a ground nesting bird that utilises cereal fields.

POTENTIAL IMPACTS FOR FURTHER ASSESSMENT

5.12. The associated **ES Volume 2, Chapter 9: Biodiversity (Doc Ref. 5.2)** and **Outline Landscape and Ecological Management Plan ('LEMP') (Doc. Ref. 7.10)** provides detail of avoidance, mitigation and compensation measures relating birds.

6. REFERENCES

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7. ANNEX 1: SUMMARY OF LEGISLATION PLANNING POLICY AND GUIDANCE

LEGISLATION

7.1. The level of protection afforded to protected species varies dependent on the associated legislation. A full list of protected species and their specific legal protection is provided within the Schedules and/or Sections of the associated legislation. Case law may further clarify the nature of the legal protection afforded to species.

7.2. The legal protection afforded to protected species overrides all planning decisions.

Wildlife and Countryside Act 1981 (as amended)

7.3. The legislative provisions for the protection of wild birds in the UK are contained primarily in Sections 1-7 of the Wildlife and Countryside Act (WCA) 1981 (as amended).

7.4. When breeding, all birds, their nest, eggs and nestlings are afforded protection under the Wildlife and Countryside Act 1981, as updated by the 'Countryside Right of Way Act 2000'). Therefore, it is an offence to:

- intentionally kill, injure or take any wild bird;
- intentionally take, damage or destroy the nest of any wild bird while it is in use or being built; and
- intentionally take or destroy the eggs of any wild bird.

7.5. Additionally, special penalties exist for offences related to species listed on Schedule 1 of the Wildlife and Countryside Act, 1981 (as amended) for which there are additional offences for disturbing these birds at their nest, or their dependent young. Schedule 1 birds cannot be intentionally or recklessly disturbed when nesting and there are increased penalties for doing so. Generally, no licences are available for disturbance during a development even in circumstances where that development is consented including a valid planning permission.

Conservation of Habitats and Species Regulations 2017

7.6. A number of bird species recorded in the UK (including those that are resident, overwintering and migratory) are protected at a European level under the European Commission (EC) Directive of the Conservation of Wild Birds 2009 (2009/147/EC). The Directive applies to 193 bird species or sub-species which are:

- a. in danger of extinction;
- b. rare, or have restricted local distribution;
- c. vulnerable to specific changes in their habitat; or
- d. in need of particular attention for reasons of the specific nature of their habitat.

7.7. These species are afforded enhanced legal protection and EU member states have a responsibility to maintain the populations of these species at a level that corresponds to their ecological, scientific and cultural requirements (Article 2). This

Directive was transposed into English law through the Conservation of Habitats and Species Regulations 2017 (as amended).

The UK is no longer a member of the European Union (EU). EU legislation as it applied to the UK on 31 December 2020 is now a part of UK domestic legislation. EU legislation which applied directly or indirectly to the UK before 31 December 2020 has been retained in UK law as a form of domestic legislation known as 'retained EU legislation'.

7.8. The Secretary of State for the Environment, Food and Rural Affairs and Welsh Ministers have made changes to parts of the Conservation of Habitats and Species Regulations 2017 (referred to as the 2017 Regulations) so that they operate effectively. Most of these changes involve transferring functions from the European Commission to the appropriate authorities in England. All other processes or terms in the 2017 Regulations remain unchanged and existing guidance is still relevant.

7.9. Species listed on Annex 1 of the Directive are those for which the UK Government is required to take special conservation measures including the designation of land as Special Protection Areas (SPAs) to ensure the survival and reproduction of these species throughout their distributions.

7.10. These sites in the UK no longer form part of the EU's Natura 2000 ecological network. The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (referred to as the 2019 Regulations) have created a national site network on land.

7.11. These sites are automatically included within the Bern Convention Emerald Network; a network of core breeding and resting sites that are protected for rare and threatened species. Any references to Natura 2000 in the 2017 Regulations and in guidance now refers to the new national site network.

Natural Environment and Rural Communities Act 2006 (as amended)

7.12. Section 41 (S41) of the Natural Environment and Rural Communities (NERC) Act (2006) requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. The S41 list is used to guide decision-makers, including local and regional authorities, in implementing their duty under Section 40 of the act to have regard to the conservation of biodiversity in England when carrying out their normal functions.

7.13. Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 has been used to identify habitats and species considered to be a conservation priority at a national scale. These are also called Habitats or Species of Principal Importance. The importance of these habitats and species are recognised in the National Planning Policy Framework (NPPF) (Ministry of Housing, Communities & Local Government, 2019).

7.14. The list of 49 bird 'priority species' comprises those identified as requiring action under the UK Biodiversity Action Plan (UKBAP), which continue to be regarded as species of conservation priority under the UK Post-2010 Biodiversity Framework (succeeded the UKBAP in July 2012).

PLANNING POLICY

National Planning Policy Framework (NPPF)

7.15. In addition to primary legislation, the government published the National Planning Policy Framework on 19th February 2019. Within the NPPF, Chapter 15 is headed *Conserving and enhancing the natural environment* (Paragraphs 174 to 188).

7.16. Of relevance are the following statements: -

'Planning policies and decisions should contribute to and enhance the natural and local environment by… minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures (Paragraph 180d).

7.17. Paragraph 181 states that: -

'Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries.'

7.18. To protect and enhance biodiversity and geodiversity, plans should: -

'a) Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including: the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation (Paragraph 174a)*; and*

b) promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.' (Paragraph 185a).

7.19. When determining planning applications, local planning authorities should apply the following principles (Paragraph 186): -

'a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;

b) development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the Site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;

c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and

d) development whose primary objective is to conserve or enhance biodiversity should be supported, while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.'

7.20. In addition to the above, Paragraph 187 confirms that the following should be afforded the same protection as sites that are included within the definition at Regulation 8 of the Conservation of Habitats and Species Regulations 2017 (Special Areas of Conservation, Sites of Community Importance, Special Protection Areas and any relevant Marine Sites): -

a) potential Special Protection Areas and possible Special Areas of Conservation;

b) listed or proposed Ramsar sites; and

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

7.21. Paragraph 188 states that: -

'The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site.'

7.22. This statement applies to the assessment of effects in relation to all confirmed, possible, potential and/or proposed designated sites of international importance, as identified in paragraph 7.19 of this Annex (above).

GUIDANCE

Birds of Conservation Concern (BoCC)

7.23. Although it does not offer any legal protection, Birds of Conservation Concern 5 (Stanbury et al., 2021) provides guidance on the conservation status of UK bird species. Thus, it can be used to inform judgements on the ecological importance of bird populations and the habitats that they rely on, particularly at a local level.

7.24. The Birds of Conservation Concern (BoCC) assigns bird species red and amber status based on a set of criteria that are summarised in the following table. Red status species are those species of highest conservation concern and green status species are those of low or no conservation concern. Amber status species are those species of some conservation concern.

Table 6: Birds of Conservation Concern (BoCC) red and amber list criteria.

Criteria	BoCC Status Code	Description
Red list	HD	Historical decline in breeding population.

Criteria	BoCC Status Code	Description
	BDp[1] / BDp[2]	Severe breeding population decline over 25 years / longer term.
	BDr[1] / BDr[2]	Severe breeding range decline over 25 years / longer term.
	WDp[1] / WDp[2]	Severe non-breeding population decline over 25 years / longer term.
	WDr[1]	Severe non-breeding range decline over 25 years.
	IUCN	Globally threatened – CR (critically endangered) EN (endangered) VU (vulnerable).
Amber list	BDMp[1] / BDMp[2]	Moderate breeding population decline over 25 years / longer term.
	WDMp[1] / WDMp[2]	Moderate non-breeding population decline over 25 years / longer term.
	BDMr[1] / BDMr[2]	Moderate breeding range decline over 25 years / longer term.
	WDMr[1]	Moderate non-breeding range decline over 25 years.
	ERLOB	Threatened in Europe – CR (critically endangered) EN (endangered) VU (vulnerable).
	HDrec	Historical decline in breeding population in recovery.
	BR / WR	Breeding rarity / non-breeding rarity.
	BL / WL	Breeding localisation / non-breeding localisation.
	BI / WI	Breeding bird of international importance / non-breeding bird of international importance.

Criteria	BoCC Status Code	Description
Green	N/A	Green list species are not of conservation concern and include all other commonly occurring birds in the UK..
Other	N/A	Non-native species (e.g. Canada goose (*Branta canadensis*), feral pigeon (*Columba livia domestica*)) are not afforded Red, Amber or Green list status

Kent Local Wildlife Site Selection criteria

7.25. In Kent an individual LWS can be selected for birds if it meets the criteria within Kent LWS Selection Criteria (Kent Wildlife Trust, 2022). These guidelines state that the criterion for selection of LWS applies to birds as follows:

> '*Birds*
>
> *133) A set of criteria has been established by Kent Ornithological Society, as the relevant expert organisation, for the selection of Wildlife Sites on the basis of their bird fauna (which is here taken to mean the naturally occurring populations of wild birds on a site). The criteria are based on established criteria for the selection of Sites of Special Scientific Interest, and on the Kent Red Data Book.*
>
> *134) The criteria are intended to be applied to areas of habitat which are more-or-less discrete and homogenous. For example, a large block of woodland should not be treated as part of the same site as a large block of farmland. However, an intimately mixed area of small fields, hedges and small woods may be treated as a unit, as may the mix of scrub, swamp, marsh and open water vegetation associated with flood plains or around abandoned quarries.*
>
> *135) The criteria have been designed to recognise*
>
> *a) The rarity of certain breeding and wintering bird species;*
>
> *b) Birds which may be considered vulnerable because their populations are in decline;*
>
> *c) Birds which are vulnerable because of their colonial nesting habitats;*
>
> *d) Birds which may be considered vulnerable because their non-breeding populations are*
>
> *concentrated in a small number of sites; and*
>
> *e) Sites of importance for the presence of a diversity of species.*
>
> *A site should be selected as a Local Wildlife Site if it can be considered as a single, identifiable unit (as explained above) in terms of its bird fauna and where*

• It is occupied regularly by at least 2.5% of the county population of any one or more bird species, based on the most recent and authoritative data;

OR

• It is occupied regularly as a breeding site by species with a Kent population of 50 or fewer territories;

OR

• It holds ten or more Kent Red Data Book 2 (KRDB2) species in the breeding season;

OR

• It holds three or more Kent Red Data Book 3 (KRDB3) species at the appropriate time of year (normally this should not include a combination of breeding and wintering species);

OR

• It holds one of the five largest colonies of colonial seabirds (with the exception of herring gull and black-headed gull), grey heron, little egret or sand martin;

OR

• It is occupied regularly by 5% or more of the county population of any one or more species in non-breeding seasons, based on the most recent and authoritative data;

OR

• It has been recorded as being regularly used in recent years by at least 50 breeding bird species;

OR

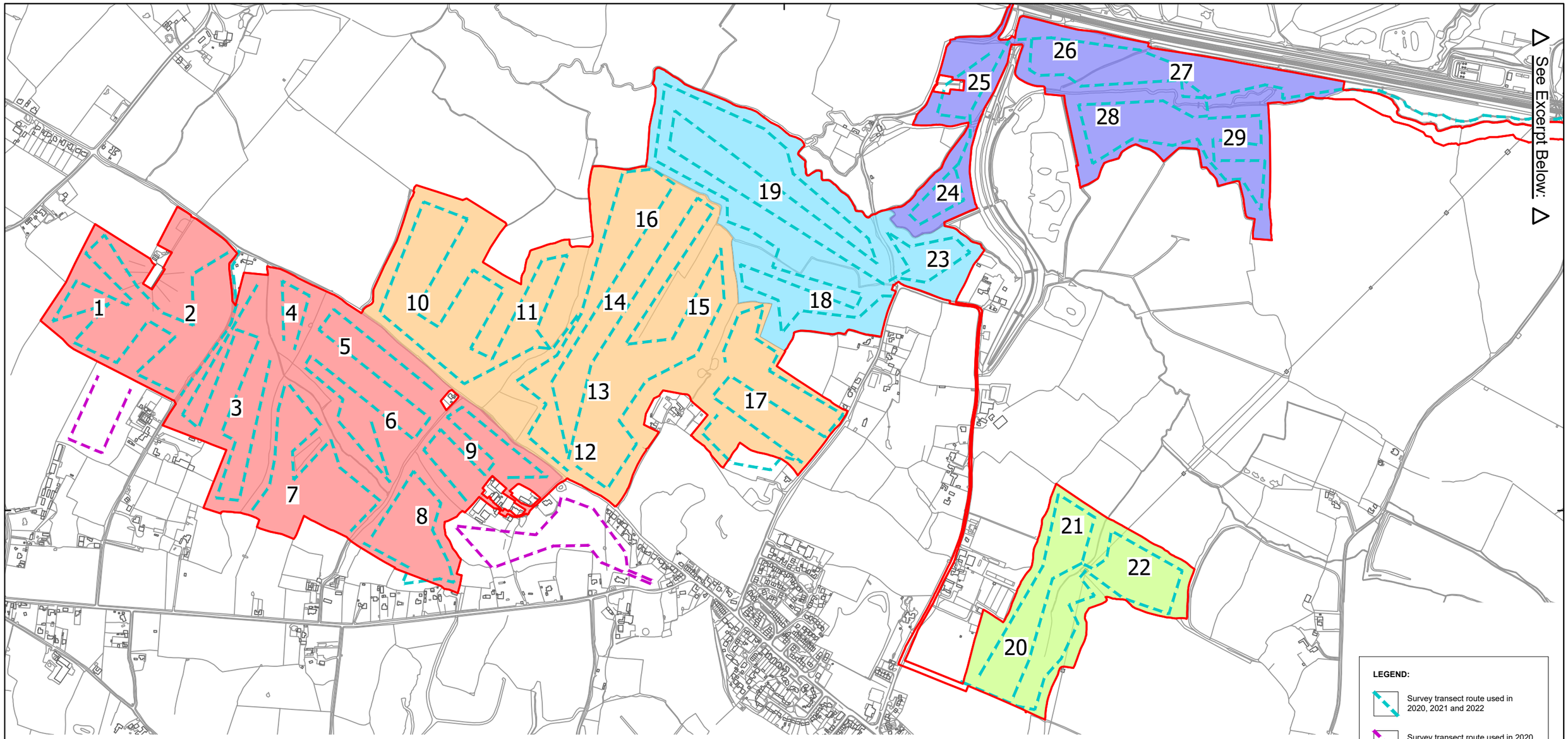
• It has been recorded as being regularly used in recent years by at least 60 wintering bird species;

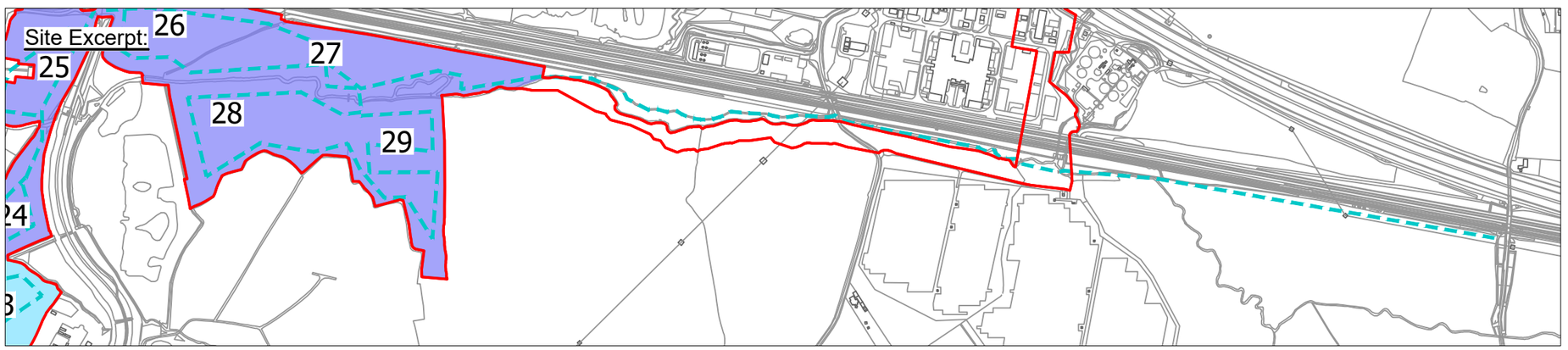
OR

• It has been recorded as being regularly used in recent years by at least 100 passage bird species.'

8. ANNEX 2: BREEDING BIRD SURVEY ROUTES

[SEE OVERLEAF]





LEGEND:

- Survey transect route used in 2020, 2021 and 2022
- Survey transect route used in 2020 only
- Survey area A, encompassing field numbers: 1, 2, 3, 4, 5, 6, 7, 8, and 9
- Survey area B, encompassing field numbers: 10, 11, 12, 13, 14, 15, 16, and 17
- Survey area D, encompassing field numbers: 20, 21, and 22
- Survey area E, encompassing field numbers: 18, 19, and 23
- Survey area C & F, encompassing field numbers: 24, 25, 26, 27, 28 and 29
- Order limits
  Total area approx: 191.538 ha.

0 100 200 m

1:10000

rev.	rev. date	auth.	rev. note
C01	14/05/24	MW	Cleint approved for submission.

client. **EPL 001 Limited**

project. **Stonestreet Green Solar**
Land North And West Of Aldington
Kent

drawing no. **5535-LLB-XX-XX-DR-Ec-0057** rev. **C01**

drawing title. **Breeding Bird Survey Routes**

suit. **A4**

APFP **5(2)(i)(ii)**

rev date. **14/05/24**

scale. **1:10000**

sheet. **A3**

drawn. **NA**

checked. **MW**

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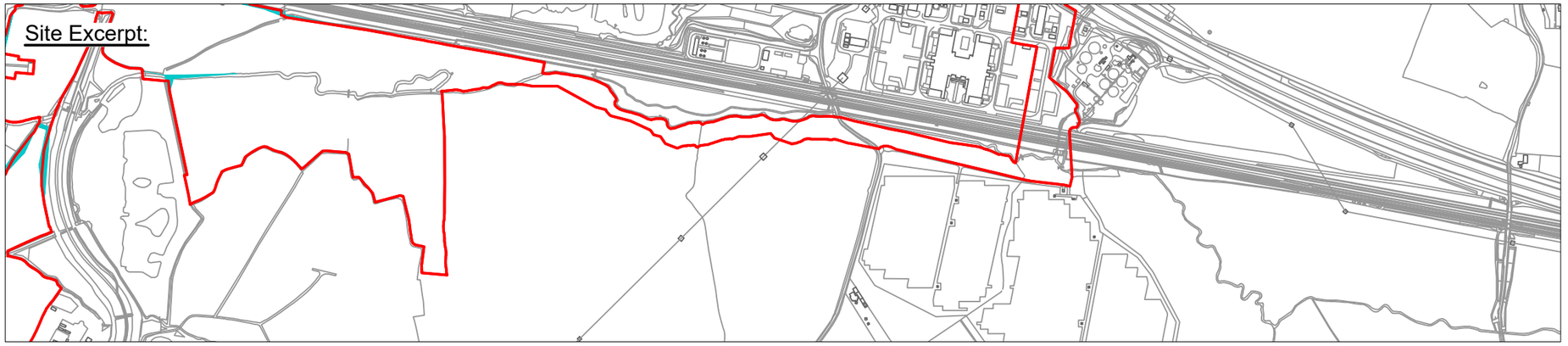
9. ANNEX 3: IMPORTANT AREAS FOR YELLOWHAMMER AND SKYLARK

[SEE OVERLEAF]

△ See Excerpt Below: △

Site Excerpt:



LEGEND:

- Area of importance - Yellowhammer in summer
- Area of importance - Skylarks in summer
- Order limits
  Total area approx: 191.538 ha.

0 100 200 m

1:10000

rev.	rev. date	auth.	rev. note
C01	14/05/24	MW	Cleint approved for submission.

client. **EPL 001 Limited**

project.
Stonestreet Green Solar
Land North And West Of Aldington
Kent

drawing no. **5535-LLB-XX-XX-DR-Ec-0059** rev. **C01**

drawing title.
Important Areas Breeding Yellowhammer and Skylark

suit. **A4**
APFP **5(2)(I)(ii)**

rev date. **14/05/24**
scale. **1:10000**
sheet. **A3**
drawn. **NA**
checked. **MW**

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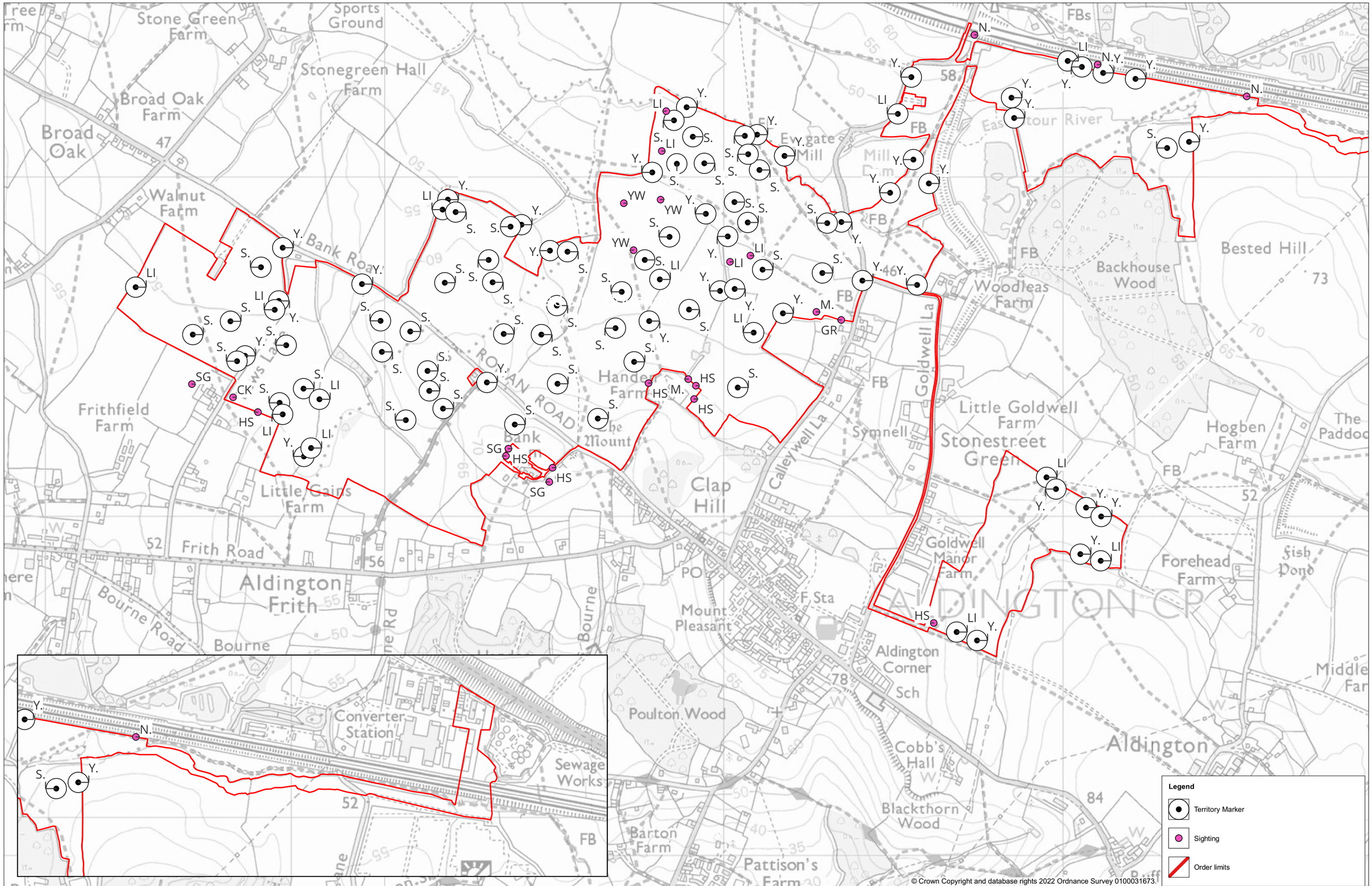
10. ANNEX 4: INDICATIVE TERRITORY MAPS FOR SELECTED SPECIES OF CONSERVATION IMPORTANCE

[SEE OVERLEAF]



0 100 200 m

1:10000

rev.	rev. date	auth.	rev. note

rev.	rev. date	auth.	rev. note

client. **EPL 001 Limited**

project. **Stonestreet Green Solar**
Land North And West Of Aldington
Kent

drawing no. **5535-LLB-XX-XX-DR-Ec-0066** rev. **C01**

drawing title **Indicative Territory Maps for Selected Species of Conversation Importance** suit. **A4**

APFP. **5(2)(I)(ii)**

rev date. **14.05.24**
scale. **1:10000**
sheet. **A3**
drawn. **NA**
checked. **MW**

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Stonestreet Green Solar

Appendix 9.5h: Bat Activity (Transect and Static) Survey Report

CONTENTS

1. EXECUTIVE SUMMARY

S.1 This Bat Activity Survey Report has been prepared on behalf of EPL 001 Limited ('the Applicant') to detail the results of bat activity surveys of the Site in relation to the Development Consent Order ('DCO') application for Stonestreet Green Solar ('the Project'). The surveys incorporated:

- Seven walked transect routes sampling bat activity across the entire Site. 44 transect survey visits were carried out in total.
- A static detector survey of the Site from May to October 2020 (inclusive), and from May to October 2022 (inclusive). Eighteen sampling locations were utilised with a recording survey effort of over approximately 3315 static detector hours in total.

S.2 The Site was assessed as having broadly moderate suitability for foraging and commuting bats, with the varying levels of suitability across on-Site habitats generally as follows:

- River habitats, woodland and waterbodies are of high suitability.
- Hedgerows, neutral grassland, scrub and the more structurally diverse field margins are of high to moderate suitability habitat depending on condition. Some of these features provide additional commuting habitat linkages as a network across the Site and to higher quality habitat areas located beyond the Site boundary.
- Improved grassland and arable fields are generally of low to negligible suitability for foraging bats.

S.3 The combined survey results confirmed that common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, brown long-eared bat, Myotis species (primarily Daubenton's bat, but with some confirmed recording of Natterer' bat), noctule, serotine and Leisler's bat use the Site.

S.4 During the transect survey bats were frequently observed commuting and foraging along hedgerow margins and tree lines throughout the Site, and along the course of the East Stour River within and adjacent to the northern part of the Site. The majority of recorded activity was attributed to common pipistrelle and soprano pipistrelle but with Myotis and brown long-eared bat occurring regularly.

S.5 The vast majority of bat passes (approximately 95%) recorded during the static detector survey were from common and soprano pipistrelle (over 15,000 passes by each species). The remaining recorded passes comprised Myotis species (over 1,100 (3.4% of all calls)), noctule (310 passes), serotine (247 passes), brown long-eared bat (57 passes), Leisler's (125 passes), with a very low number of passes of other species, including Nathusius' pipistrelle (16 passes).

S.6 Overall given the size of the Site and the mix of habitats present (including woodland, watercourses and grassland), the range of species and levels of bat activity recorded is not unusual and is likely to be reflective of bat use of the wider local landscape beyond the Site boundary, which supports similar habitat types.

S.7 The surveys recorded mostly common bat species that are widespread in the county (and UK) and would be expected to be found in similar habitats elsewhere in the county. The numbers of passes recorded for the uncommon and rarer species described above is a

product of the extensive survey effort and the large size of the Site and would be expected to be recorded, with only low numbers of passes recorded for these species, representing a small proportion of the total data set.

S.8 Based on the range of bat species recorded at the Site and known to occur within the wider local area, and the abundance within the local area (and across the districts and county) of habitats similar to those present on Site, the Site is assessed as being of local importance for forging and commuting bats.

S.9 To ensure delivery of a coordinated and integrated ecology strategy, measures relating to foraging and commuting bats are not detailed in this report. Detail of bat-related avoidance, mitigation, compensation and enhancement measures are included in the **ES Volume 2, Chapter 9: Biodiversity (Doc Ref. 5.2)** and the **Outline Landscape and Ecology Management Plan (LEMP) (Doc Ref. 7.10)**. As such, both reports should be read in full.

2. INTRODUCTION

2.1 This Bat Activity Survey Report has been prepared on behalf of EPL 001 Limited ('the Applicant') to detail the results of bat activity surveys (inclusive of walked transects and deployment of static detectors associated with these transects) of the Site during May to October 2020 and April to October 2022 in relation to the Development Consent Order (DCO) application for Stonestreet Green Solar ('the Project').

2.2 This Bat Activity Survey Report is **Appendix 9.5h** to **ES Volume 2, Chapter 9: Biodiversity (Doc Ref. 5.2)**.

THE PROJECT

2.3 The Project comprises the construction, operation and decommissioning of solar photovoltaic ('PV') arrays and energy storage, together with associated infrastructure and an underground cable connection to the existing National Grid Sellindge Substation.

2.4 The Project will include a generating station (incorporating solar arrays) with a total capacity exceeding 50 megawatts ('MW'). The agreed grid connection for the Project will allow the export and import of up to 99.9 MW of electricity to the grid. The Project will connect to the existing National Grid Sellindge Substation via a new 132 kilovolt ('kV') substation constructed as part of the Project and cable connection under the Network Rail and High Speed 1 ('HS1') railway.

2.5 The location of the Project is shown on **ES Volume 3, Figure 1.1: Site Location Plan (Doc Ref. 5.3)**. The Project will be located within the Order limits (the land shown on the **Works Plans (Doc Ref. 2.3)** within which the Project can be carried out). The Order limits plan is provided as **ES Volume 3, Figure 1.2: Order Limits (Doc Ref. 5.3)**. Land within the Order limits is known as the 'Site'.

SITE DESCRIPTION

2.6 The Site area is approximately 192 ha located Aldington to the south-east of Ashford in Kent. The Project lies within the administrative areas of Kent County Council ('KCC') and Ashford Borough Council ('ABC') local authorities. Further information on the Project, including proposed infrastructure and design, is provided in **ES Volume 2, Chapter 3: Project Description (Doc Ref. 5.2)**.

2.7 The Site also supports hedgerow, parcels of woodland, drainage ditches, ponds and arable field margins. The East Stour River flows in an east to west direction within, and adjacent to, the northern part of the Site.

2.8 Fields are described in relation to the Project as follows:

- The South Western Area, Fields 1 to 9.
- The Central Area, Fields 10 to 19 and 23 to 25.
- The South Eastern Area, Fields 20 to 22.
- The Northern Area, Fields 26 to 29.
- Project Substation (location of the Project Substation, in the north western section of Field 26).

- 'Cable Route Corridor' (export of electricity from the Project at 132 kilovolt ('kV') via underground cables (the 'Grid Connection Cable') to the Sellindge Substation). 'Cable Route Crossing' (use of an existing cable duct under the High Speed 1 / Channel Tunnel Rail Link ('HS1') railway or through Horizontal Directional Drilling ('HDD') beneath HS1 for the Cable Route Corridor).
- Sellindge Substation (location of the existing Sellindge Substation).

SCOPE OF WORKS

2.9 This report details the results of bat activity surveys (inclusive of walked transects and deployment of static detectors associated with these transects) of the Site during May to October 2020 and April to October 2022.

2.10 Note that the 2020 survey area encompasses the original 2020 scheme extents while the 2022 survey area encompassed areas added to the Site boundary since 2020. These survey extents are detailed within the *Method* section of this report.

2.11 Details of avoidance, mitigation, compensation and enhancement measures relating to bats are not included in this report. These measures are set out in the **ES Volume 2, Chapter 9: Biodiversity (Doc Ref. 5.2)** and the **Outline LEMP (Doc Ref. 7.10)**.

SURVEY OBJECTIVES

2.12 The objectives of the survey and report are to: -

- Identify the bat species that use the Site;
- Determine the level of Site use by the species present;
- Identify how these bat species utilise on-Site habitats - based on the type and/or frequency of bat activity recorded (foraging and/or commuting);
- Identify any important bat foraging and/or commuting habitats; and
- Assess the geographic level of importance of on-Site habitats for commuting and foraging bats.

3. METHODOLOGY

DESK STUDY

3.1 A biological records search was undertaken by Kent and Medway Biological Records Centre ('KMBRC') in 2020, April 2022 and updated in August 2023. The data obtained through this search includes records of bats. The search radius was 5km, measured from the Site boundary.

3.2 Records obtained within the ten-year period prior to the date of the record search are considered 'recent.' Records older than this are considered 'historical.'

3.3 The Multi-Agency Geographic Information for the Countryside ('MAGIC') website was used to identify approved European Protected Species ('EPS') bat mitigation licences located within 5 km of the Site.

3.4 A search was also undertaken using the KMBRC data and 'MAGIC' for internationally designated sites (Special Areas of Conservation (SACs)) designated for bats within 10km; other statutory sites designated for bats within 5km and any relevant non-statutory sites within 1km.

PRELIMINARY HABITAT ASSESSMENT

3.5 A PEA site visit (**ES Volume 4, Appendix 9.4: Preliminary Ecological Appraisal (Doc Ref. 5.4)**) was undertaken by a competent expert on various dates in 2022 (during spring and summer), to update the habitat baseline.

3.6 The initial site visit included an assessment of the suitability of on-Site and adjacent habitats for roosting, foraging and commuting bats.

3.7 Further updated baseline habitat survey work, including habitat condition assessment, was also conducted in June to July 2023. A habitat assessment of the previously inaccessible Sellindge substation area was carried out on 10th January.

3.8 An overall bat habitat suitability assessment was also carried out using a review of aerial photography, results of habitat surveys and desk study results to assess the overall suitability of the Site for commuting and foraging bats.

3.9 The Site was then categorised according to the following categories (adapted from Table 4.1 within the *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins, 2016)) in order to determine and focus further survey effort: -

- **Negligible suitability:** Negligible habitat features present that are likely to be used by commuting or foraging bats.
- **Low suitability:** Habitat that could be used by small numbers of commuting bats such as hedgerow or unvegetated stream but isolated, i.e., not well connected to the surrounding landscape by other habitats. Suitable but isolated habitat that could be used by small numbers of foraging bats, such as a lone tree (not in a parkland situation) or a patch of scrub.
- **Moderate suitability:** Continuous habitat, connected to the wider landscape that could be used by bats for commuting, such as lines of trees and scrub or linked back

gardens. Habitat that is connected to the wider landscape that could be used for bats for foraging such as trees, scrub, grassland or water.

- **High suitability:** Continuous, high-quality habitat that is well connected to the wider landscape and is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High quality habitat that is well connected to the wider landscape and is likely to be used regularly by foraging bats, such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close, and connected by suitable foraging and/or commuting habitat, to known roosts.

ACTIVITY TRANSECTS

FIELD METHOD

3.10 A bat activity survey, comprising five dusk visits between May and October 2020 (inclusive) was undertaken in accordance with current good practice guidance (BCT, 2016).

3.11 Each transect route comprised 17 predetermined spot counts along the route, in 'high' or 'moderate' suitability areas for bats. The transect routes (Transect 1, 2, 3, 4 and 5) are shown in Annex 2. Surveyors spent five minutes at each spot count and five minutes on each walk between allocated stopping points. Each transect started at sunset and continued for approximately 2 hours and 50 minutes.

3.12 On two of the five survey visits, all five transect routes were walked in reverse. Transect routes were completed in reverse to ensure adequate sampling of bat activity at different times along the transect route and account for any time-space recording bias.

3.13 Surveyors were equipped with a BatScanner detector and a BatLogger M detector with a built-in recording device.

3.14 In 2022, a repeat activity survey was conducted, comprising eight dusk visits between April and October, inclusive.

3.15 During the first 2022 activity survey, on 26th April 2022, fourteen surveyors walked seven predetermined routes to record bat activity. This survey covered the same five transect routes as the 2020 survey, plus two additional routes on land which had been acquired as an extension of the Site in the intervening period (Transect 6 and 7, as shown in Annex 2).

3.16 All subsequent 2022 activity surveys covered Transect 6 and 7 only.

3.17 In total 44 transect survey visits were carried out.

3.18 Each transect route comprised 12 to 17 predetermined spot counts along the route, in 'high' or 'moderate' suitability areas for bats. The transect routes are shown in Annex 2. Surveyors spent five minutes at each spot count and five minutes on each walk between allocated stopping points. Each transect started at sunset and continued for at least 1 hour and 55 minutes.

3.19 On three of the 2022 survey visits, routes 6 and 7 were walked in reverse.

3.20 Surveyors were equipped with a BatLogger M detector with a built-in recording device, Wildlife Acoustics EchoMeter Touch 2 connected to tablet or an Anabat Walkabout detector with built-in recording device.

DATA ANALYSIS

3.21 For all 2020 and 2022 survey recordings, BatExplorer or Kaleidoscope software was used to verify species identifications when required or when identification was uncertain.

3.22 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.

3.23 For transect data, relative bat activity level descriptions have been interpreted to assist discussion and evaluation. No guidance is available on what constitutes low, moderate or high bat activity based on the number of passes recorded during a transect. This report uses a relative descriptive scale has been used where: -

- Very Low Activity is a mean of less than 2 bat passes per hour.
- Low Activity is a mean of 2 to 25 bat passes per hour.
- Moderate Activity is a mean of 26 to 99 bat passes per hour.
- High Activity is a mean of over 100 bat passes per hour.

3.24 Note the number of passes per transect has also been reviewed in a relative, internal dataset context through review of percentiles of total recorded passes per transect (0-20th percentiles, 21st-40th percentiles, 41st-60th percentiles, 61st-80th percentiles and 81st-100th percentiles).

SURVEY DATES, PERSONNEL AND WEATHER CONDITIONS

3.25 Tables 1 and 2 provide details of the timings, survey personnel and weather conditions recorded during the transect survey visits.

Table 1: Survey details for bat activity transect visits in 2020

Date of survey visit	Start time (sunset)	Finish time	Surveyors	Weather conditions (start / end)
18/05/2020	20:45	23:35	Marc Horsted, Emily Cummins, John Young, Louise Gower, Peter Walker, Samuel Durham, Nikki Stapleton, Nina Rygh, Philip Ames, Emily Thomson	- 20% / 0% cloud cover; - 2 / 1 wind on BF scale; - 14°C / 10°C; and no rain
15/06/2020	21:13	00:03	Emily Cummins, Peter Walker, Laragh Smyth, Nina Rygh, Victoria Harrison, Marc Horsted, John Young, Louise Gower, Samuel Durham	- 10% / 25% cloud cover; - 0 / 0 wind on BF scale; - 18°C / 16°C; and no rain
30/07/2020	20:45	23:35	Samuel Durham, John Young, Emily Cummins, Nikki Stapleton, Philip Ames, Emily Thomson, Nina Rygh, Samantha Dawson, Peter Walker	- 0% / 0% cloud cover; - 2 / 3 wind on BF scale; - 22°C / 20°C; and no rain

Date of survey visit	Start time (sunset)	Finish time	Surveyors	Weather conditions (start / end)
17/09/2020	19:05	21:55	Samuel Durham, Victoria Harrison, Louise Gower, Emily Cummins, Fran Jordan, Nikki Stapleton, Laragh Smyth, Philip Ames, Naomi Cornwell, Marc Horsted	- 10% / 0% cloud cover; - 3 / 1 wind on BF scale; - 17°C / 15°C; and no rain
22/10/2020	17:48	20:38	Emily Cummins, John Young, Fran Jordan, Louise Gower, Marc Horsted, Philip Ames, Nikki Stapleton, Laragh Smyth, Naomi Cornwell, Jack Bage	- 0% / 0% cloud cover; - 2 / 1 wind on BF scale; - 15°C / 13°C; and no rain

3.26 The 2020 survey visits were carried out by a competent expert.

Table 2: Survey details for bat activity transects in 2022

Date of survey visit	Start time (sunset)	Finish time	Surveyors	Weather conditions (start / end)
26/04/2022	20:10	23:00	Marc Horsted, Davey Monk, Laragh Smyth, Luis Santiago, Jaimé Turner, Samantha Dawson, Nathan Reynolds, John Young, Bradley Rivers, Jason Armstrong, Sarah Putnam, Samuel Durham, Andrew Bodey, Philip Ames	- 9°C / 6°C - 20% / 100% cloud cover; - 2 / 1 wind on BF scale; - No rain
30/05/2022	21:00	23:25 (Transect 6)	Laragh Smyth, Sarah Putnam	80% / 10% cloud cover; 1 / 1 wind on BF scale; 10°C / 9°C; and no rain
31/05/2022	21:01	23:46 (Transect 7)	Johnathan Fletcher, John Young	70% / 20% cloud cover; 1 / 0 wind on BF scale; 12°C / 11°C; and no rain
16/06/2022	21:14	23:29 (Transect 6), 23:49 (Transect 7)	Laragh Smyth, Jess Callaghan, Sarah Putnam, Jason Armstrong	60% / 60% cloud cover; 1 / 1 wind on BF scale; 21°C / 16°C; and no rain
25/07/2022	20:54	23:09 (Transect 6). 23:49 (Transect 7)	Jason Armstrong, Jonathan Fletcher, John Young	90% / 30% cloud cover; 2 / 3 wind on BF scale; 19°C / 17°C; and no rain

Date of survey visit	Start time (sunset)	Finish time	Surveyors	Weather conditions (start / end)
22/08/2022	20:04	21:59 (Transect 7), 22:19 (Transect 6)	Jason Armstrong, Sarah Putnam, Louise Gower, Jonathan Fletcher	85% / 85% cloud cover; 0 / 0 wind on BF scale; Light drizzle / no rain; and 20°C / 18°C
26/09/2022	18:46	20:41 (Transect 7), 21:01 (Transect 6)	Laragh Smyth, Davey Monk, Marc Horsted, Greg Holland	100% / 100% cloud cover; 2 / 3 wind on BF scale; No rain / light drizzle; and 15°C / 12°C
03/10/2022	18:31	20:31 (Transect 7), 20:41 (Transect 6)	John Young, Marc Horsted, Laragh Smyth, Sarah Putnam	100% / 30% cloud cover; 0 / 0 wind on BF scale; 15°C / 11°C; and no rain

3.27 The 2022 survey visits were carried out by a competent expert.

STATIC DECTECTOR SURVEY

FIELD METHOD

3.28 Remote surveys to record bats across consecutive nights using static detectors were set up across 16 locations within the Site between May and October 2020, and across two locations within the Site between May and October 2022, in accordance with current good practice guidance (BCT, 2016).

3.29 The locations of the static detectors were selected to: -

- Understand the importance of the different areas on Site for bats.
- Increase the likelihood or recording all bat species that use the Site.

3.30 Detectors were set up to record from sunset to sunrise for the recommended minimum of five consecutive nights per season in spring, summer and autumn (see deployment dates and weather conditions in Annex 4).

3.31 Four Elekon Batlogger A+ static detectors were rotated between the 16 locations throughout the 2020 survey period. The static detectors were set to record from sunset to sunrise and were collected and repositioned after a minimum of four days in the field. All microphones were located at least 1m above the ground, mounted on trees and clear of vegetation between the adjacent habitats and the microphone.

3.32 Two Elekon Batlogger A+ static detectors were used in two locations (location A and B) throughout the 2022 survey period. The static detectors were set to record from sunset to sunrise, and the batteries and memory cards were changed after a minimum of five days in the field.

DATA ANALYSIS

3.33 Recordings were analysed through BatExplorer software. It is not possible to determine whether consecutive bat calls are from multiple individual bats passing or from one single bat repeatedly passing the detector. Therefore, each sound file is counted as a single pass by a single bat. An activity index is used to calculate relative level of bat activity on each location by dividing bat passes by recording hours.

3.34 Note that, as per transect surveys, the term 'pass' is defined as a single file made up of bat sound pulses of a single species, i.e., this may be one bat in a file or many bats in a single file.

3.35 Passes per hour ('pph') = total number of single bat calls/number of hours recorded**.**

3.36 This reflects the relative activity levels and therefore relative importance of the surrounding habitat.

3.37 Note that due to species, seasonal and spatial variation in activity, pph has been presented in a number of contexts in order to aid evaluation as follows:

- 'Overall mean pph' for entire assemblage and for individual species. The mean pph provides an overall assessment of activity across the entire Site and season.
- Pph has also been presented temporally to assist accounting for seasonal variations in activity. Due to the staggered deployment and rotation of static detectors this has been broadly sub-divided into the following categories broadly analogous with key seasonal periods in the bat activity cycle: -

  - May and June (late spring / early summer).

  - July and August (main summer period).

  - September and October (autumn).

3.38 These temporal categories are used to present 'monthly / seasonal pph values', as activity during some periods is likely to be higher or lower than the overall mean pph.

3.39 Pph is also presented spatially (by location) to assist in accounting for variations in activity across the Site. While deployment locations did vary between 2020 and 2022, the overall survey effort effect is accounted for by pph and broad comparisons can be made. This is presented as a 'location pph' to assist descriptions of spatial variations in activity.

3.40 Limited guidance is available on what constitutes low to high bat activity on a Site based on number of passes or pph. A relative scale has been therefore used following the protocol recommended by Ecobat (www.ecobat.org.uk) where, in the context of comparison within the data set, the following descriptions are used: -

- low activity: 0-20th percentiles;
- low to moderate activity: 21st-40th percentiles;
- moderate activity: 41st-60th percentiles;
- moderate to high activity: 61st-80th percentiles; and
- high activity: 81st-100th percentiles.

SURVEY AREA

3.41 The transect routes (Transect 1 to 7) are shown in Annex 2, broadly corresponding to the following land parcels and fields shown on the **Works Plans (Doc Ref. 2.3)** as follows:

- Transect 1: Northern Area and northern half of The Central Area, Fields 24 to 25 and Fields 26 to 29,
- Transect 2: South Eastern Area, Fields 20 to 22 and including an additional field south of the Site,
- Transect 3: southern half of The Central Area, Fields 10 to 17,
- Transect 4: eastern half of The South Western Area, Fields 4, 5, 6, 8 and 9 and including an additional field east of the Site,
- Transect 5: western half of The South Western Area, Fields 1, 2, 3 and 7,
- Transect 6: northern half of The Central Area, Fields 18, 19 and 23, and
- Transect 7: Northern Area, Fields 26 to 29 and including an additional field east of the Site (overlaps with Transect 1).

3.42 Static detectors were placed along or adjacent to the corresponding activity transects within areas that were assessed as being of 'high' and 'moderate' suitability for foraging and commuting bats during the PEA.

3.43 Annex 3 shows the detailed locations where the static detectors were placed, noting that areas 1-4 differ from the transect routes. The locations are summarised below.

- Detectors 1a, 1b, 1c and 1d were placed within fields, hedgerows and tree lines within the area covered by activity Transect 1. This area comprised the northern-most part of the Site, adjacent to the railway line.
- Detectors 2a, 2b, 2c and 2d were placed within fields, hedgerows and tree lines within the area covered by activity Transect 2. This area comprised the small parcel of agricultural fields immediately east of the village of Aldington.
- Detectors 3a, 3b, 3c and 3d were placed within fields, hedgerows and tree lines within the area covered by activity Transect 3 and 4. This area comprised the agricultural fields on either side of Bank Road, north and west of the village of Aldington.
- Detectors 4a, 4b, 4c and 4d were placed within fields, hedgerows and tree lines within the area covered by activity Transect 5. This area comprised the agricultural fields in the western-most part of the Site, bisected by Laws Lane.
- Detector A was placed along a tree-lined bank of the East Stour River on the north side of the Site. This area was also covered by activity Transect 7.
- Detector B was placed along a tree line within one of the newly acquired fields, close to the geographic centre of the Site. This area was also covered by activity Transect 6.

3.44 A very broad description of the habitats in proximity to each static detector location is provided below, noting that only rudimentary evaluation in respect of habitat is provided within this report given the multi-variables affecting results (such as season, weather,

variation in deployment lengths encountered on a given deployment) and that the habitat type below are crude descriptions and do not fully reflect the connecting habitat network.

3.45 When described as a linear or area habitat, this broadly indicates whether the larger tree / hedgerow / shrub vegetation represents a linear connecting route or where the location is in proximity to a larger expanse of such habitat (i.e., a woodland)

3.46 Locations are however presented as a guide to assist later discussion on individual locations.

Table 3: Static detector location broad habitat types

Location	Field reference	Habitat	Linear or area habitat connectivity
1a	Field 26	Arable field 1	Linear
1b	Field 25	Arable field 2	Linear
1c	Field 28	Open riverbank, East Stour River	Area
1d	Field 29	Woodland edge, Backhouse Wood	Area
2a	Field 20	Hedgerow with stream	Linear
2b	Field 22	Hedgerow	Linear
2c	Field 22	Arable field 1	Area
2d	South of field 22 (now off Site)	Arable field 2	Area
3a	Field 10	Hedgerow 1	Linear
3b	Field 6	Hedgerow 2	Linear
3c	East of Field 8 (now off Site)	Arable Field 1	Area
3d	Field 9	Arable field 2	Area
4a	Field 1	Double hedgerow	Linear
4b	Field 3	Ditch, field margin and scattered trees	Linear
4c	Field 6	Small woodland with stream	Area
4d	Field 7	Small woodland and wide arable field margin	Area
A	Field 19	Tree lined riverbank	Area
B	Field 27	Arable field tree line edge	Linear

SURVEY DATES AND WEATHER CONDITIONS

3.47 Annex 4 provides full details of the survey effort (deployment nights, rotation, and recorded hours) for static detectors. In total approximately 3315 static detector hours were recorded (using night average lengths provided in Annex 4).

3.48 During 2020, detectors were rotated simultaneously as a group of four between the transect locations broadly as follows:

3.49 May and June (late spring / early summer):

- Late May / early April - Transect 1 (1a, 1b, 1c, 1d).
- Early June - Transect 2 (2a, 2b, 2c, 2d).
- Mid-June – Transect 3 (3a, 3b, 3c, 3d).
- Late-June - Transect 4 (4a, 4b, 4c, 4d).

3.50 July and August (main summer period):

- Mid-July - Transect 1 (1a, 1b, 1c, 1d).
- Mid to late July - Transect 2 (2a, 2b, 2c, 2d).
- Late July – Transect 3 (3a, 3b, 3c, 3d).
- Late July / early August Transect 4 (4a, 4b, 4c, 4d).
- Mid-August - Transect 1 (1a, 1b, 1c, 1d).

3.51 September and October (autumn):

- Mid-October - Transect 1 (1a, 1b, 1c, 1d).
- Mid-October – Transect 3 (3a, 3b, 3c, 3d).
- Mid-October - Transect 2 (2a, 2b, 2c, 2d).
- Late October - Transect 4 (4a, 4b, 4c, 4d).

3.52 During 2022, detectors were deployed simultaneously (unless otherwise indicated) at the two locations during the following periods:

3.53 May and June (late spring / early summer):

- Late May.
- Mid-June.

3.54 July and August (main summer period):

- Mid July (A only).
- Late August.

3.55 September and October (autumn):

- Early to mid-October.
- Early to mid-October.

ASSESSMENT AND EVALUATION

3.56 BCT (2016) and the *Bat Workers Manual* (JNCC, 2004) have been used to: -

- Assess the suitability of habitats for foraging and commuting bats;
- Inform the scope of survey works required to assess the bat species that utilise the Site for foraging and/or commuting, and the level and type of Site use by these species; and
- Interpret the results of the bat activity survey undertaken.

3.57 The Guidelines for Ecological Impact Assessment (CIEEM, 2018) ('EcIA Guidelines') were used as guidance to determine the ecological importance of the Site for bats.

ZONE OF INFLUENCE (ZOI)

3.58 The potential impacts of a project are not always limited to the boundaries of the Site concerned. The area over which a project may impact ecologically important features is known as the Zone of Influence ('ZoI').

3.59 The ZoI is determined by the source / type of impact, the potential pathway(s) for that impact and the location and sensitivity of the ecologically important feature(s) beyond the Site boundary.

3.60 In the absence of mitigation and compensation, the Project could result in disturbance of foraging and / or commuting bats that might use the on-Site and boundary habitats and would likely result in adverse effects upon the wider local populations of bats. Lighting associated with the Project could also result in adverse effects upon roosting and foraging bats.

3.61 Based on the Core Sustenance Zones ('CSZ's) for the eight species of bat recorded frequently using the Site, the ZoI of the Project, in relation to foraging and commuting bats and in the absence of mitigation, is likely to extend to 4 km from the Site boundary. This is based on the highest estimated CSZ values provided by the Bat Conservation Trust (BCT, 2016) for the species recorded regularly foraging / feeding on Site during the bat activity survey, i.e., noctule (*Nyctalus noctula*) and serotine (*Eptesicus serotinus*), which both have a CSZ of 4 km. The other bat species recorded regularly foraging / feeding on Site have smaller estimated CSZs.

3.62 Details of the proposed mitigation measures relating to commuting and foraging bats that will be delivered, and the lighting-related mitigation measures that will be implemented, is set out in **ES Volume 2**, **Chapter 9: Biodiversity (Doc Ref. 5.2)** and the **Outline LEMP (Doc Ref. 7.10)**.

3.63 The ZoI of the Project in relation to foraging and commuting bats extends beyond the Site boundary. If the bat mitigation and compensation measures set out within the above-referenced documents are effectively implemented, the ZoI in relation to foraging and commuting bats will be minimised.

SURVEY LIMITATIONS

3.64 An ecological survey represents a 'snapshot' in time of the ecological condition of a site. The ecological character of a site can change substantially throughout both the course of a

year, and from year to year impacting on the extent and quality of habitats potential to support protected species.

3.65 The aim of a desk study is to help characterise the baseline context of the Site and provide valuable background information that would not be captured by a single Site survey alone. Information obtained during a desk study was dependent upon people and organisations having made and submitted records for the area of interest. As such, a lack of records for a particular habitat or species does not necessarily mean that the habitats or species do not occur in the study area. Likewise, the presence of records for particular habitats and species does not automatically mean that these still occur within the area of interest or are relevant in the context of the project.

3.66 Common pipistrelle (*Pipistrellus pipistrellus*) and soprano pipistrelle (*P. Pygmaeus*) can echolocate at the same frequency. All frequency calls above 52 kHz were classified as soprano pipistrelle.

3.67 *Myotis* calls are difficult to identify to species level and have therefore been identified as '*Myotis* species' which can include Alcathoe bat (*M. alcathoe*), Bechstein's bat (*M. bechsteinii*), Brandt's bat (*M. brandtii*), Daubenton's bat (*M. daubentonii*), whiskered bat (*M. mystacinus*) and Natterer's bat (*M. nattereri*).

3.68 Bat detectors have some bias towards louder echolocations, and can therefore under record quieter bats, such as the brown long-eared (*Plecotus auritus*) bat, or higher-flying species such as the noctule.

3.69 A number of survey dates were subject to data corruption or loss. Where this occurs, this is stated within the results and any associated minor limitations to the survey or evaluation are clearly stated. This often equates to removing such survey visits / deployments from detailed analysis but using available data to show presence of species, where this can be determined.

TRANSECT SURVEY

3.70 During activity surveys, there is a risk of surveyors mistaking their position on a route in the absence of visible landmarks. To mitigate this limitation, routes were drawn to follow field margins and tramlines to aid navigation in the dark while still surveying suitable areas of habitat.

3.71 Terrain difficulties may be encountered during an activity survey which were not visible on aerial imaging when the transect route was initially planned out and/or which may be unsafe to traverse in the dark. Any *ad hoc* route alterations were noted by surveyors on paper maps during the survey, and the transect was redrawn prior to the next survey along that route to ensure that all surveyors were following the same, safe, path.

3.72 Survey visits with partially corrupted or lost audio data have been analysed in respect of the presence of species but have been excluded from analysis of activity levels. This is stated when discussing results and evaluation.

STATIC DETECTOR SURVEY

3.73 The static detectors were powered by batteries and carried SD cards with either 16 GB or 32 GB of memory, and on some occasions the detectors could not complete a full survey period (5 days) due to low battery, full memory or equipment malfunction. As the survey

effort was maximised by gathering data from the bat activity transect survey, the loss of some data is therefore not considered to be a significant limitation.

3.74 The number and schedule of deployment of static detectors did vary from BCT good practice guidance to accommodate the large size and extent of the Site. Given the large number of recording nights and hours, coupled with the geographic spread achieved, the deployment was however assessed as appropriate for the Site.

3.75 A number of failures of static detectors were encountered during both 2020 and 2022, however due to the large dataset recorded across the entire Site (over 3,000 static recording hours) these failures represent a small proportion of the overall data set and would not significantly alter the bat assemblage or activity levels recorded.

3.76 The number and schedule of deployment of static detectors did vary during 2022 from those specified within BCT good practice guidance (generally a five-day static deployment per transect). The survey did however function as an update of the already extensive and geographically spread 2020 static detector sampling effort. Coupled with the extensive duration of static deployment within the Site during 2022 and as a supplement to the 2020 data, this is not assessed as a limitation and is accounted for within the evaluation of survey results.

3.77 Note that static data analysis includes all dates sampled, without removal of dates for poor weather conditions. Review of the data set shows that weather (temperatures and rainfall) were generally favourable during the recording period and bat passes were recorded on almost all nights, with generally at least ten passes per night (and usually more). The inclusion of all recording nights is also reflective of the Site across the year. Analysis is included to account for the effect of including periods where bat activity is often lower (particularly October) and the data set has been assessed against season and month to account for such effects. On balance, the inclusion of all data provides a more comprehensive assessment of the Site and while some passes per hour values would be adjusted if some nights were to be removed, the overall assessment of the Site would not be affected.

3.78 These limitations do not preclude a robust assessment of the Site's importance for bats; therefore, the objectives of this report are considered fulfilled.

LIFESPAN OF SURVEY DATA

3.79 If more than 18 months elapse between the completion of surveys (October 2022) and the commencement of works, a suitably experienced ecologist will need to undertake a site visit and review the validity of this report. Additional bat survey work may be required within the period May to October - to ensure the status of the on-Site habitat has not changed and to provide up-to date survey data. In this instance, a suitably experienced ecologist should be consulted for advice.

3.80 Note that unless habitats change significantly in future years, the baseline presented in this report is expected to be remain similar for bat activity and foraging (in terms of species assemblage and habitat use) but that roost status could alter for this mobile species group.

4. RESULTS

DESK STUDY

4.1 The KMBRC data search returned recent records of eight bat species within 5km of the Site, including serotine, Daubenton's bat, whiskered bat, Natterer's bat, soprano pipistrelle, common pipistrelle, brown long-eared bat and noctule.

4.2 The closest recorded maternity roost was a soprano pipistrelle maternity roost of 396 bats in June 2012, located *c.*2.1 km south of the Site at the closest point. The most recent maternity roost was a brown long-eared maternity roost of 20 bats in July 2018, located *c.*3.8 km north of the Site.

4.3 The closest hibernation record was a hibernating serotine bat in 1992, located *c.*5.4 km northwest of the Site at the closest point.

4.4 A search of Natural England's MAGIC website returned eight records of granted EPS bat mitigation licences within 5km of the Site. Species listed on these licences included common pipistrelle, soprano pipistrelle, brown long-eared bat and serotine. These records relate to five non-breeding roosts and three maternity roosts. No records of hibernation roosts were identified through the MAGIC search.

4.5 No internationally designated sites (SACs) for bats were identified within 10km of the Site and no other statutory designated sites (i.e. SSSIs) designated for bats were identified within 5km. No detail of the reasons for designation of Local Wildlife Sites ('LWSs') was provided through the KMBRC data search.

HABITAT ASSESSMENT

4.6 Several on-Site trees support suitable roosting features for bats.

4.7 The PEA highlighted the on-Site hedgerow, woodland, arable field margins and river habitat provided suitable foraging habitat for bats. On-Site hedgerow and river habitats, and the vegetated railway corridor adjacent to the Site, provide suitable commuting opportunities for bats.

4.8 In accordance with BCT criteria, the Site was assessed as having broadly moderate suitability for foraging and commuting bats, with the varying levels of suitability across Site habitats generally as follows:

- River habitats, woodland and waterbodies are assessed as being of high suitability.
- Hedgerows, neutral grassland, scrub and the more structurally diverse field margins are assessed as being of high to moderate suitability habitat depending on condition. Some of these features provide additional commuting habitat linkages as a network across the Site and to higher quality habitat areas located beyond the Site boundary.
- Improved grassland and arable fields are generally assessed as being of low to negligible suitability for foraging bats.

4.9 These habitats are also connected to suitable off-Site foraging and commuting habitat in all directions.

ACTIVITY TRANSECTS

4.10 The bat activity survey recorded an assemblage of at least seven species, as shown in Table 4.

Table 4: Transect assemblage and proportions of relative abundance by species

Key to Species: PIPI - common pipistrelle, PIPY - soprano pipistrelle, NYNO - noctule, EPSE – serotine, PLAU - brown long eared bat, MYSP (unknown Myotis species).

	Species recorded as present						
	PIPI	PIPY	NYNO	EPSE	PLAU	MYSP	Total
Recorded as present during 44 transect surveys	43	38	12	8	16	24	44
Species Present as Percentage (%) of all transects	97.73	86.36	27.27	18.18	36.36	54.55	100

4.11 Bats were recorded on almost all survey visits apart from transect 6 in September 2022. Common pipistrelle was recorded on almost all surveys with soprano pipistrelle being the secondly most encountered species. *Myotis* species and brown-long eared bat was also frequently recorded with noctule and serotine regular.

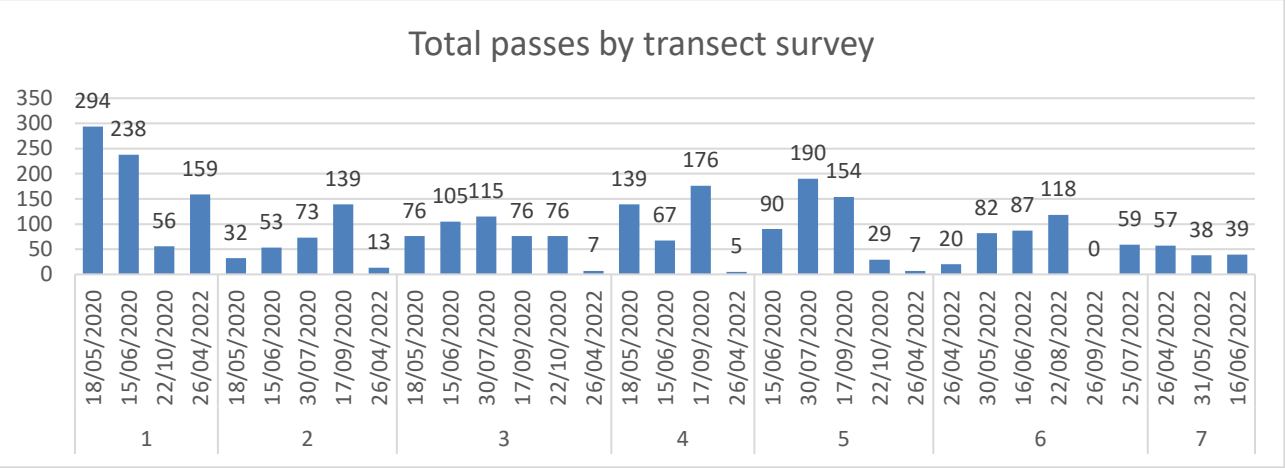
4.12 Common pipistrelle, soprano pipistrelle, *Myotis* species, noctule and brown long-eared bats were recorded using the river course and hedgerow margins across the Site for foraging and commuting.

4.13 Tables 3 and 4 provide a detailed summary of the activity survey results for each transect route from May to October 2020 and from April to October 2022. Activity levels have been provided in accordance with the descriptive criteria supplied in method section 3.23.

4.14 Further detailed results of the activity transect surveys are provided in Annex 5 (species present and passes data) and Appendices 6 and 7 (observation data).

4.15 Summary graphs from the data provided in Annex 5 are provided below to provide an illustration on the relative activity levels recording during transects (noting some transects have been excluded where recorded pass numbers are not comparable due to detector type or data corruption).

Table 5: Chart showing total recorded passes by location and date:



4.16 The chart below shows total passes recorded during each survey (using only transect surveys where pass data is in a directly comparable format). Each transect is treated as broadly comparable as each transect was broadly similar in terms of duration (i.e., passes recorded per hour).

4.17 Key observations from the chart show:

- Transect 1: May and June have the overall highest recorded activity levels, though of all the data set only May 2020 has activity levels in the region of 'high'.
- The remaining highest activity levels occur on the following surveys (i.e., the 81st-100th percentiles) which were all classed as 'moderate' activity:

a. Transect 1, April 2020,

b. Transect 4, July and September 2020, and

c. Transect 5, July and September 2020.

- Transects 6 and 7 have generally lower activity levels, especially when accounting for the restricted analysed month set (April through July).
- Early (April) and late (October) generally have activity levels lower than the mid-season (May to August) months though exceptions occur including Transect 1 April 2022 and Transect 7 April 2022.
- Lowest activity levels occur on the following survey visits (i.e., the 0-20th percentiles) and constitute 'very low' or 'low' activity:

d. Transect 2, April 2020,

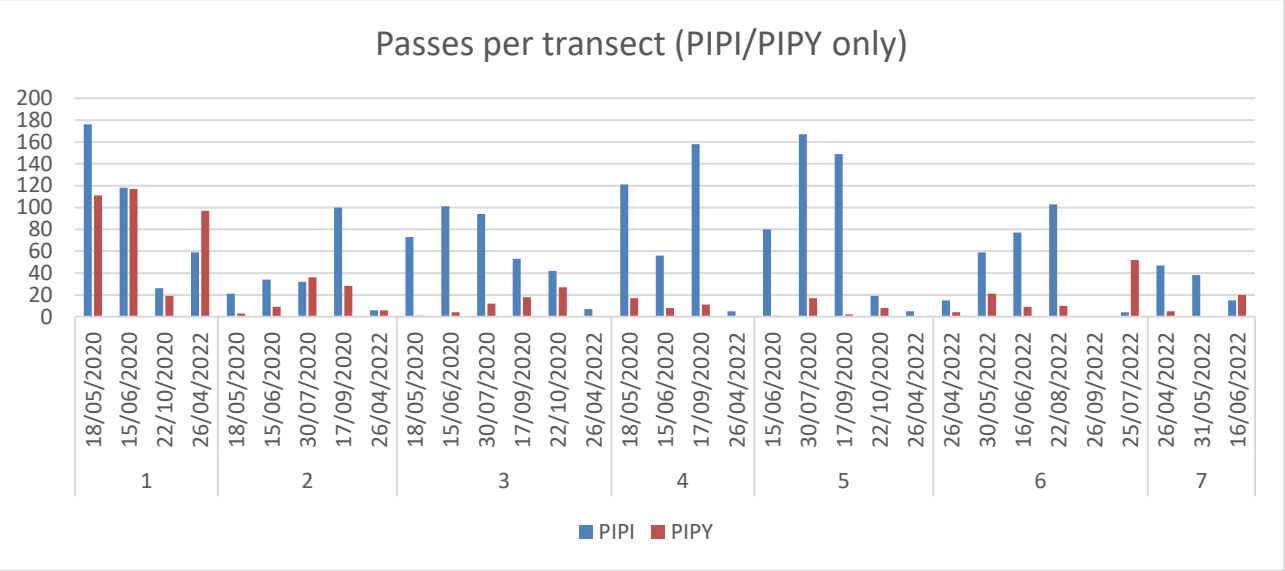
e. Transect 3, April 2022,

f. Transect 5, April 2022 and October 2022, and

g. Transect 6, April 2022 and September 20022.

4.18 The passes recorded during each transect are shown by species in the following charts. Common and soprano pipistrelle represent the majority of all recorded passes and are shown in a separate chart to the remaining species.

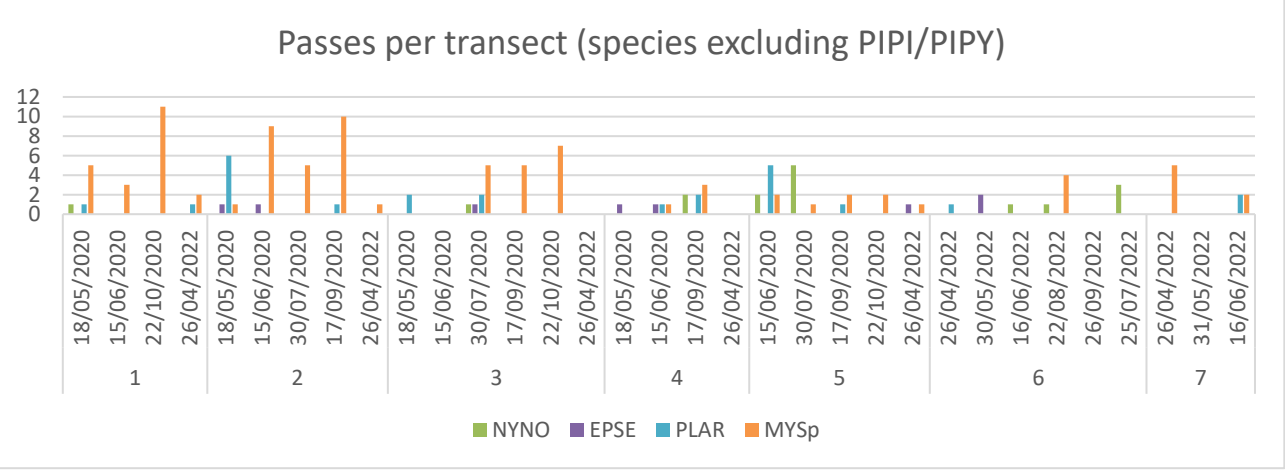
Table 6: Chart showing recorded passes by species by location and date (pipistrelle only)



4.19 Broadly, common pipistrelle is the most frequently recorded species across all transects with Transects 1, 4 and 5 appearing to show highest activity levels by this species. Trends generally follow those for total combined passes though noting the Transect 1 peak is reduced in comparison (i.e., being overall similar to Transect 4 and 5).

4.20 Soprano pipistrelle is notably correlated to Transect 1 with some other smaller peaks occurring elsewhere (i.e., Transect 6, July). Recorded passes are generally much lower than common pipistrelle throughout the remainder of the transects.

Table 7: Chart showing recorded passes by species by location and date (remaining species)

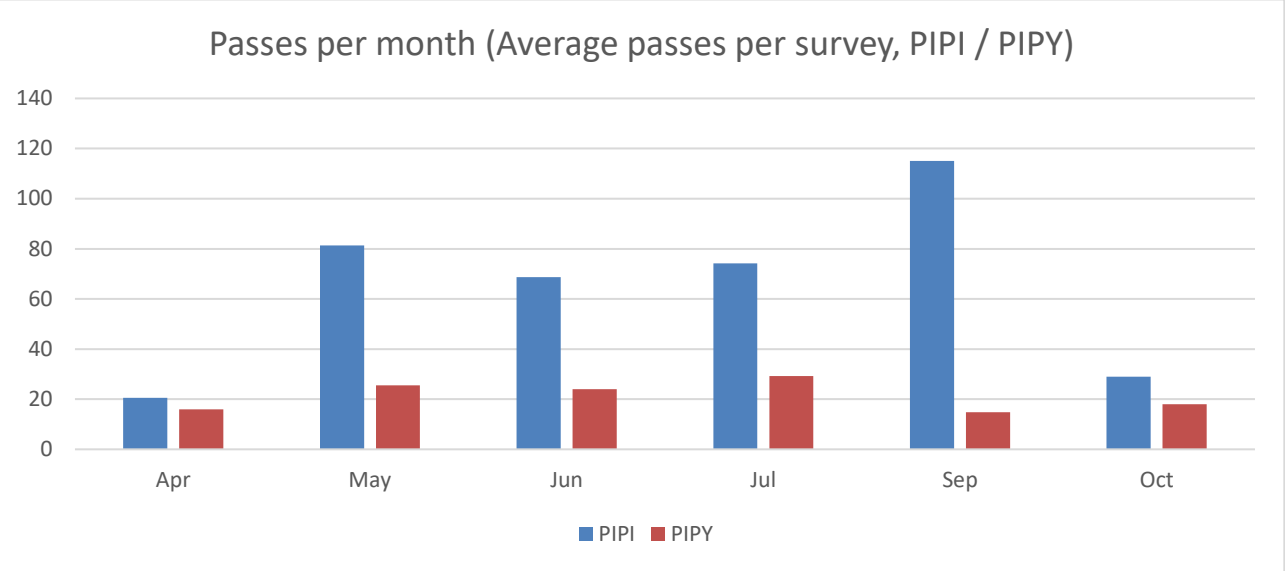


4.21 Myotis are the most frequently recorded species (if an aggregate total of all Myotis (sp.) bats recorded is applied) after pipistrelle, with notable peaks within Transects 1, 2 and 3 but also with occasionally occurring smaller peaks within Transects 6 and 7.

4.22 Brown long-eared bat has some small peaks within Transects 2, 3 and 5 but is otherwise limited to a few passes elsewhere.

4.23 Serotine and noctule are generally limited to a few passes across most transects, but with some small peaks within Transect 5.

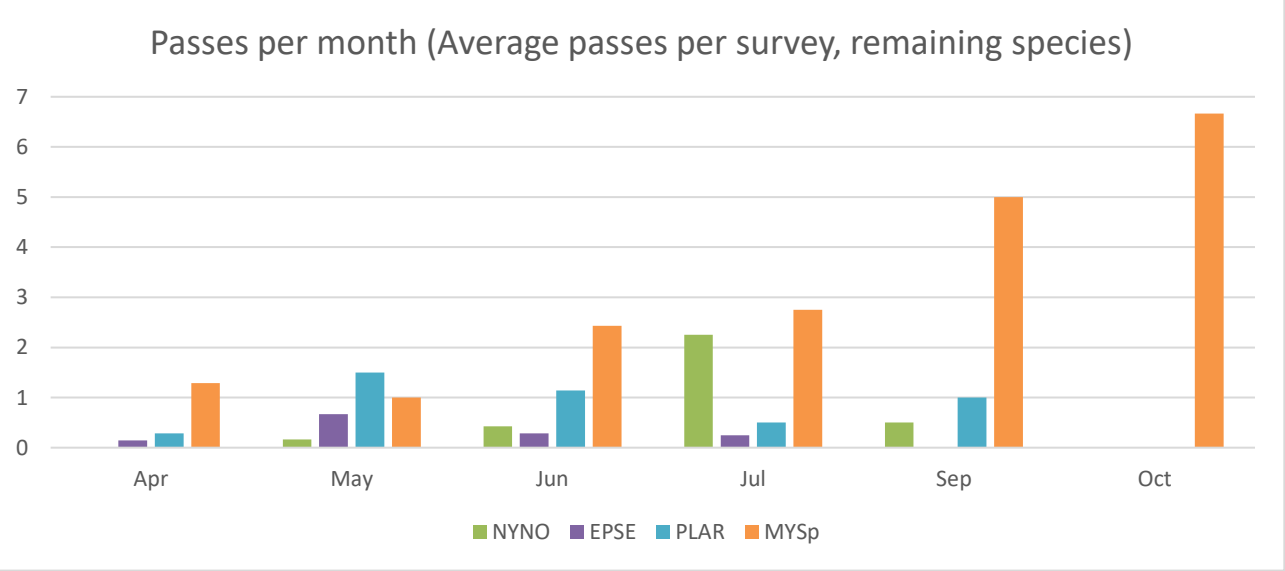
Table 8: Chart showing total recorded passes by location and date:



4.24 The results have also been broken down by month and this time weighted by average per transect (due to different numbers of transect data sets being available each month affecting the combined totals).

4.25 September is shown to have the highest average number of passes with a sharp decrease into October. Common pipistrelle is again shown to comprise most of the activity but with an apparent variation across months, while soprano pipistrelle activity is by comparison relatively constant.

Table 9: Chart showing total recorded passes by location and date:



4.26 Other species comprise a very limited portion of the data set but there is an apparent trend of increasing Myotis activity in autumn and a peak of noctule activity in July with brown long-eared activity generally constant through May to September.

4.27 In addition to the species assemblage, number of passes and relative activity levels recorded, a number of surveyor observations were also made. This includes information which is not readily captured by the charts above and includes which areas within a transect bats are utilising and information recorded from visual sightings (habitat use, flight height, direction etc).

4.28 The Table 10 below provides a brief one-line summary of surveyor observations from each transect survey visit, with the more detailed survey notes presented in Annex 5 and Annex 6.

Table 10: Summary of transect bat activity observations:

Date of survey visit	Recorded bat assemblage across all transects	Summary of activity
18/05/2020	Common pipistrelle, soprano pipistrelle, *Myotis* species, noctule, serotine, brown long-eared	Transect 1: unseen foraging activity. Transect 2: unseen foraging activity. Transect 3: bats seen foraging and feeding. Transect 4: bats seen commuting and foraging along hedgerows. Transect 5: no activity.
15/06/2020	Common pipistrelle, soprano pipistrelle, *Myotis* species, noctule, serotine, brown long-eared	Transect 1: bats seen commuting and foraging along hedgerows. Transect 2: bats seen commuting and foraging along hedgerows. Transect 3: unseen foraging activity. Transect 4: bats seen foraging and feeding. Transect 5: bats seen commuting and foraging along hedgerows.
30/07/2020	Common pipistrelle, soprano pipistrelle, *Myotis* species, noctule, serotine, brown long-eared	Transect 1: unseen foraging activity. Transect 2: bats seen commuting and foraging along hedgerows. Transect 3: bats seen foraging and feeding. Transect 4: bats seen commuting and foraging along hedgerows. Transect 5: bats seen foraging and feeding.
17/09/2020	Common pipistrelle, soprano pipistrelle, *Myotis* species, noctule, brown long-eared	Transect 1: low level of unseen activity. Transect 2: foraging and feeding along hedgerows. Transect 3: foraging and feeding along hedgerows. Transect 4: bats seen foraging and commuting along hedgerows. Transect 5: bats seen foraging and feeding.

Date of survey visit	Recorded bat assemblage across all transects	Summary of activity
22/10/2020	Common pipistrelle, soprano pipistrelle, *Myotis* species, brown long-eared	Transect 1: one bat commuting along river. Transect 2: one bat commuting along hedgerow. Transect 3: low level of unseen activity. Transect 4: foraging and feeding along hedgerows. Transect 5: low level of unseen activity.
26/04/2022	Common pipistrelle, soprano pipistrelle, *Myotis* species, serotine, brown long-eared	Transect 1: foraging and feeding along hedgerows. Transect 2: low level of unseen activity. Transect 3: one bat commuting along hedgerow. Transect 4: foraging and feeding along hedgerows. Transect 5: low level of foraging activity. Transect 6: low level of foraging activity. Transect 7: low level of foraging activity.
30/05/2022	Common pipistrelle, soprano pipistrelle, serotine	Transect 6: foraging and feeding along hedgerows.
31/05/2022	Common pipistrelle, soprano pipistrelle, UID	Transect 7: foraging along river.
16/06/2022	Common pipistrelle, soprano pipistrelle, *Myotis* species, noctule, brown long-eared	Transect 6: foraging along hedgerows. Low level of activity. Transect 7: low level of unseen activity.
25/07/2022	Common pipistrelle, soprano pipistrelle, *Myotis* species, noctule	Transect 6: foraging and feeding along tree lines and hedgerows. Transect 7: low level of foraging activity.
22/08/2022	Common pipistrelle, soprano pipistrelle, *Myotis* species, noctule	Transect 6: foraging and feeding along hedgerows. Transect 7: bats commuting along river.
26/09/2022	Common pipistrelle	Transect 6: one bat commuting along tree line. Transect 7: no activity.
03/10/2022	Common pipistrelle, soprano pipistrelle, *Myotis* species, noctule	Transect 6: low level of foraging and commuting activity. Transect 7: foraging and feeding along river.

STATIC DETECTORS

SPECIES ASSEMBLAGE

4.29 At least nine bat species were recorded across the Site by static detectors, including common pipistrelle, soprano pipistrelle, noctule, brown long-eared bat, serotine, Leisler's bat (*Nyctalus leisleri*), Nathusius' pipistrelle and *Myotis* species (Daubenton's and Natterers confirmed, with the possibility of smaller numbers of passes of other species being present as unidentified *Myotis* species).

4.30 The vast majority of passes (approximately 95% of all static data) were from common and soprano pipistrelle (over 15,000 passes by each species).

4.31 The remaining recorded passes comprised Myotis species (over 1,100 (3.4% of all calls) and appeared to mainly attributed to Daubenton's bats from sampling review), noctule (310 passes), serotine (247 passes), brown long-eared bat (57 passes), Leisler's bat (125 passes), with a very low number of passes of other species, including Nathusius' Pipistrelle (16 passes).

4.32 These passes are further quantified as pph for the Site as a whole in the table below, as well as pph for all species combined (overall bat pph) in Table 9.

Table 11: Summary of static data by species, total passes and average passes per hour throughout combined survey period.

Key to Species: PIPI - common pipistrelle, PIPY - soprano pipistrelle, PINA - Nathusius' pipistrelle, NYNO - noctule, NYLE – Leisler's bat, EPSE – serotine, PLAU - brown long eared bat, MYSP (unknown Myotis species)

Activity measure	Time / Location	Species recorded & recorded passes								All species combined
		PIPI	PIPY	PINA	NYNO	NYLE	EPSE	PLAU	MYSP	
Total passes	All locations and dates	15625	15055	16	320	11	239	149	1112	3527
Passes per hour (pph)		4.712	4.540	0.005	0.097	0.003	0.072	0.045	0.0335	9.810
Percentage of total calls		48.0%	46.3%	0.0%	0.9%	0.0%	0.7%	0.5%	3.4%	100%

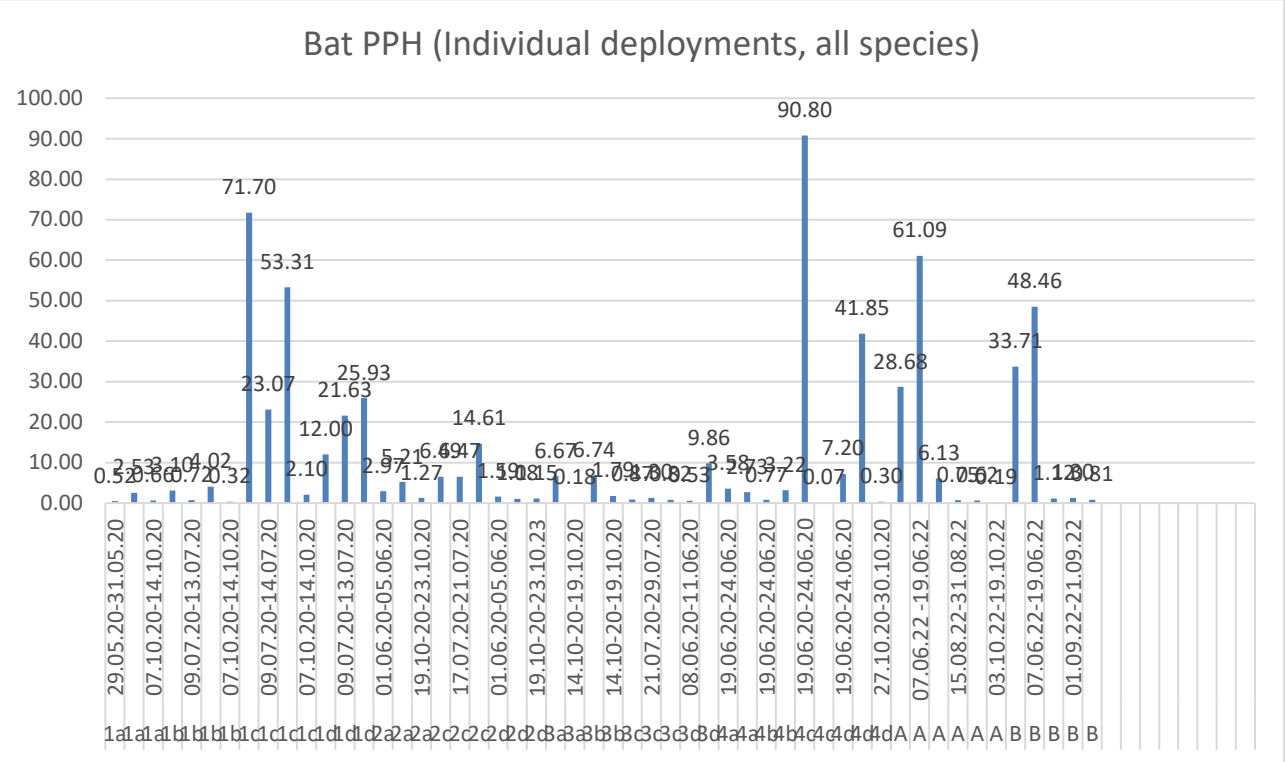
RELATIVE ACTIVITY LEVELS

4.33 The results of static detector surveys with species recorded and relative passes per hour is summarised below for the whole Site overall, by month and by location with detailed results in Annex 4.

Overall (comparison of each deployment, for all species)

4.34 A summary table showing the pph values for all species combined is shown below for all individual deployments (i.e., a static detector at one location for a continuous duration). This data is also provided in Annex 4, but the below allows a quick visual comparison of deployments.

Table 12: Bat pph values (all species combined) for each static deployment



4.35 The highest activity (combined for all species) on site (80 to 100% percentiles, see *Method* section) as summarised above was recorded in descending order at the following locations:

- June 2020 at location 4c;
- Late May 2020 at location 1c;
- June 2022 at location A;
- August 2020 at location 1c;
- June 2022 at location B;
- Late July to early August 2020 at location 4d.

4.36 The above had pph values ranging between 90 to 40, with this 90% percentile having significantly greater pph than the remaining dataset.

4.37 The remaining locations within the highest 80 to 100% percentiles had pph values of 23 to 34 as follows:

- May 2022 at locations B and A;
- August 2020 at location 1d;
- July 2020 at location 1c.

4.38 The lowest activity levels (1 to 20% percentiles, see method Section) had pph values between 0.07 to 0.33 as summarised on Chart 1 was recorded in ascending order at the following locations:

- October 2020 at locations 4a, 4c and 3a;
- October 2022 at location A;
- October 2020 at location 4d and 1b.

4.39 The remaining locations within the lowest quartile range were as follows (pph in range 0.5 to 0.7):

- May 2020 at location 1a;
- June 2020 at location 3d (though note very few hours recorded and so likely not representative);
- September 2022 at location A;
- October 2020 at location 1a.

Temporal (by season)

4.40 To provide a summary understanding of the use of the Site by bats temporally (by month and season), the pph data has been merged for each location to provide a summary analysis of activity at each location.

4.41 Charts are presented for the following data:

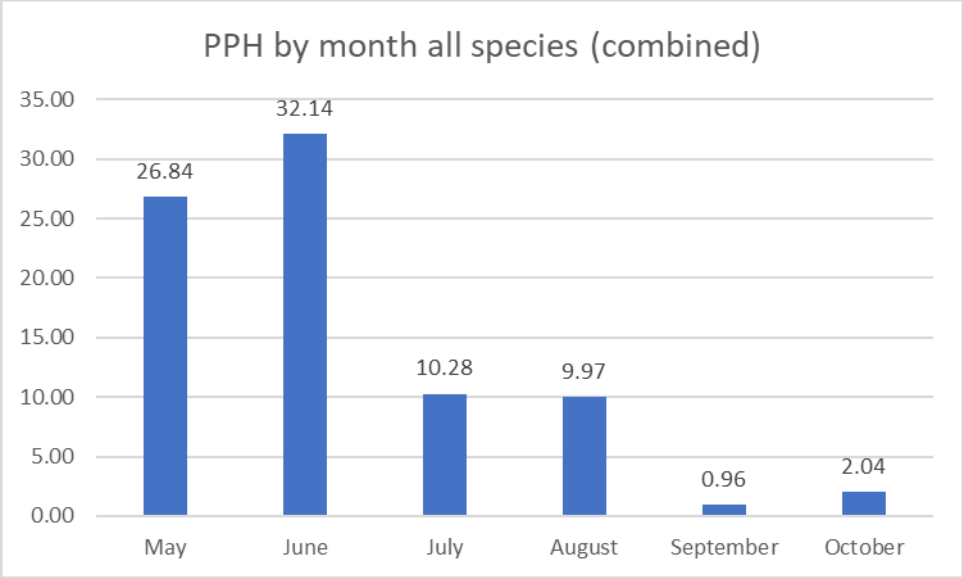
- Pph for all bat activity recorded at each location, and
- Pph for each location broken down by species.

4.42 Review of the monthly data sets indicates a few limitations when data is divided down this way, but is also of value when assessing the data set as a whole. These limitations have been factored into discussion but overall have not been assigned as significant due to the size of the overall data set (each month had at least 197 hours of recording (May) to over 1200 (October) and data obtained across two years.

- May - not all locations were recorded as deployments started in late May - data is restricted to locations 1a-1d, A and B.
- September - September deployments were only made at locations A and B during 2022 and so spatially the data set is restricted, though still with over 400 hours of recording time.
- October - significantly longer recorded hours due to increased night length, with some longer deployments. Overall, the results appear reflective of the reduced activity levels in these months.

4.43 Data is described by month but noting that review of the season (i.e., combined May and July and September to October), is more reflective as this encompasses all locations when the months are combined.

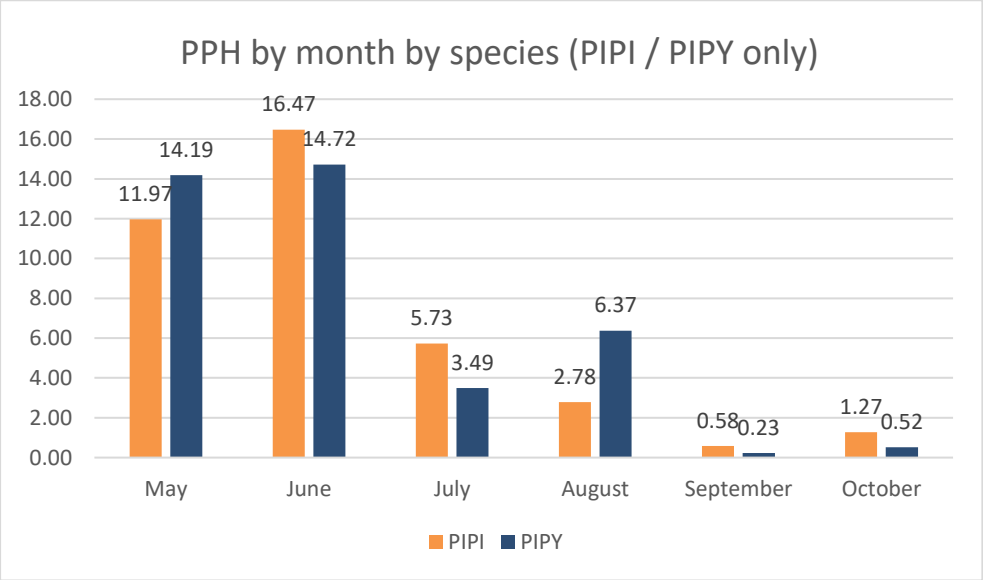
Table 13: Bat pph values (all species combined) for each month



4.44 Overall recorded pph was highest in the spring months (May / June) with a substantial decrease into the summer July and August) and again further reduced activity into autumn.

4.45 The limited data sets in May and September (only certain locations recorded during these months) do not appear to affect the overall trend, as the following month in both cases has a similar activity level.

Table 14: Bat pph values (common and soprano pipistrelle) for each month

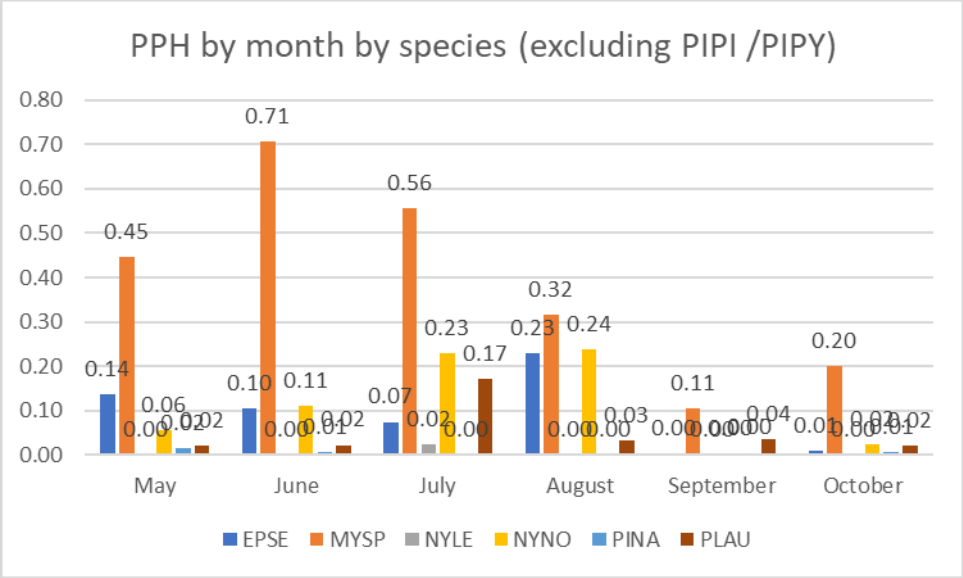


4.46 Pipistrelle activity for both species appears to follow the overall trend for the combined species pph.

4.47 Some notable variation occurs in August where pph levels are much higher for soprano pipistrelle. Soprano pipistrelle levels in autumn (September and October) are also about half that of common pipistrelle.

4.48 The monthly activity levels for the remaining species assemblage are shown in the following graph.

Table 15: Bat pph values (species excluding common and soprano pipistrelle) for each month



4.49 The third most abundant species group (Myotis species) broadly follows the combined species trend, though with a much greater level of July than August activity and also sustained activity into October compared to other species.

4.50 Noctule activity occurs in May and June at similar levels, increases to another sustained level in July and August but is near absent from the autumn data.

4.51 Serotine activity is present in May to July (at a relatively constant pph) has a peak within August but is almost absent from the autumn months.

4.52 Brown long-eared bat has a noticeable peak in July, it is present in all other months but at much lower pph values of 0.02-0.04.

4.53 Nathusius' pipistrelle is recorded at the start and end of the season only, with some of lowest pph values of 0.01-0.02 in May, June and October only. Leisler's bat is recorded in July only.

Spatial (by location)

4.54 To provide a summary understanding of the use of the Site by bats spatially, the pph data has been merged for each location to provide a summary analysis of activity at each location.

4.55 Charts are presented for the following data:

- Pph for all bat activity recorded at each location, and

- Pph for each location broken down by species.

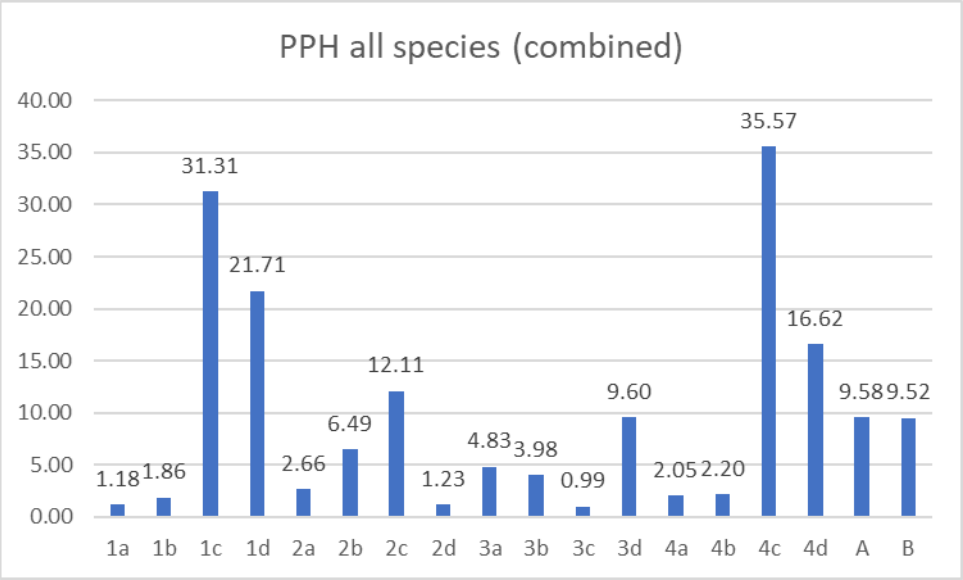
4.56 Note also that as locations 1a through to 4d were recorded during 2020 and that A and B were recorded in 2022, the spatial analysis also gives some indication of variation between years.

4.57 Review of the monthly data sets indicate a few limitations as follows:

- It should be noted that 2b was subject to fewer recording hours (23 hours and only during June) than most other locations, and this is taken to account within evaluation. The remaining 2022 locations did however have a broadly similar recording effort in terms of total survey hours, though unavoidable variation in season would have occurred due to rotation between location groups 1-4.
- Likewise, A and B were subject to greater recording hours (in the region of 750) during 2022 compared to most 2020 locations subject to between 70 and 200 hours.
- Location 3d was mainly limited to recordings during October 2020 due to equipment failures but did achieve approximately 70 hrs of recording.
- Locations 4a, 4c and 4d include some late October periods of very low pph (but note other mid and late October locations did have much higher pph's).

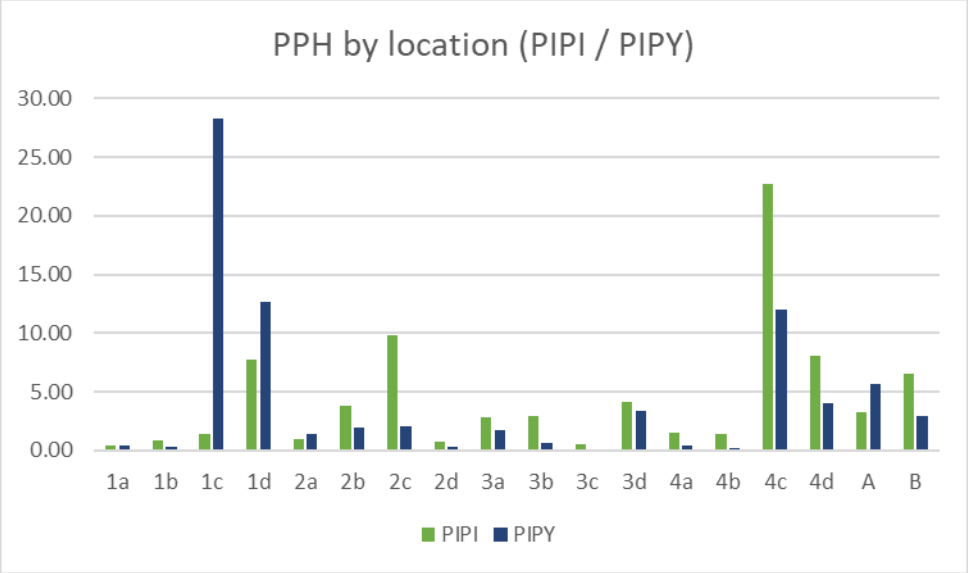
4.58 Overall, as descried for temporal analysis, a suitability large data set is available to provide robust analysis of the bat assemblage and associated activity levels.

Table 16: Bat pph values (all species combined) for each location



4.59 The combined pph for all species clearly show locations 1c and 4c to be the most active in terms of pph.

Table 17: Bat pph values (common and soprano pipistrelle only) for each location

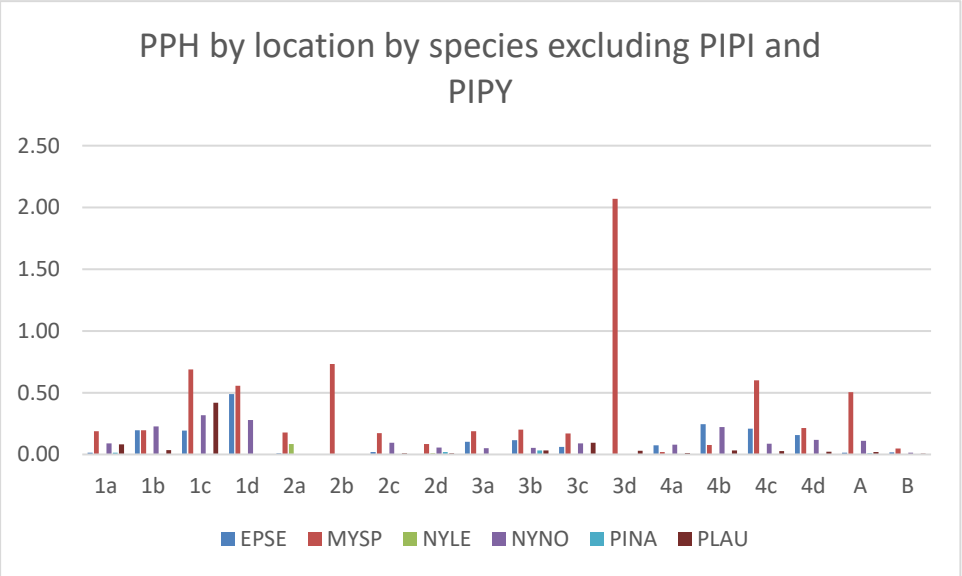


4.60 Pph for the most abundant species (common and soprano pipistrelle) have been shown separately to other 'rarer' species, as these two species comprise approximately 95% of the dataset (note data labels have been removed to improve readability).

4.61 A notable peak of soprano pipistrelle is present at location 1c, with lower peaks at 1d and 4c. Soprano pipistrelle was recorded at all locations but notably with relatively low pph value at a number of locations such as 1a, 1b, 2d, 3b, 4a and 4b and almost absent from 3c.

4.62 Common pipistrelle has a notable peak at location 4c, with pph near between 10.0 and 5.0 at 1d, 2c, 4d and B. It is slightly more evenly distributed between locations than soprano pipistrelle, though locations with relatively small pph values (<1.0) are present (1a, 1b, 2a, 3c and 4b).

Table 18: Bat pph values (species excluding common and soprano pipistrelle) for each location



4.63 Pph for the remaining species has been shown separately to avoid pipistrelle data clutter (note data labels have been removed to improve readability).

4.64 A notable Myotis activity peak is present at location 3d, with also activity levels higher than other species at 1c, 1d, 2b, 4c and A and activity recorded at most locations.

4.65 Noctule was recorded at most locations but without a noticeable peak and only absent at 2a, 2b and 3d.

4.66 Brown long-eared bat activity is generally well under 0.5 pph, but recorded at most locations with a notable peak at location 1c.

4.67 The highest serotine activity is associated with location 1d (approx. 0.5 pph) but with passes returned from approximately half the other locations.

4.68 Leisler's bat activity was restricted to pph of 0.09 or less at only locations 2a and 2d. Nathusius's pipistrelle was slightly more widespread, recorded at locations 1a, 2d, 3b and A, but at 0.03 pph or less.

5. EVALUATION

5.1 An evaluation of the survey results is provided below in terms of the recorded species diversity (assemblage), distribution across Site, relative activity levels recorded and overall importance of the Site.

5.2 **ES Volume 2, Chapter 9: Biodiversity (Doc Ref. 5.2)** and the **Outline LEMP (Doc Ref. 7.10)** provide details of avoidance, mitigation, compensation and enhancement measures relating to bats.

ASSEMBLAGE

5.3 At least nine bat species were recorded across the Site; common pipistrelle, soprano pipistrelle, noctule, brown long-eared bat, serotine, Leisler's bat, Nathusius's pipistrelle and *Myotis* species (Daubenton's and Natterers confirmed with the possibility of smaller numbers of passes of other species being present as unidentified *Myotis* species).

5.4 The assemblage was predominately comprised of common and soprano pipistrelle activity, with *Myotis* activity also assessed as well represented. Noctule and brown long-eared bat are likely to be regularly using the Site at low levels, with the remaining species using the Site only on occasion.

5.5 The assemblage is representative of the mix of habitats present within the Site including watercourse and woodland associated species.

HABITATS AND DISTRIBUTION

5.6 The network of local woodlands adjacent to Site, linked by hedgerows within a mixed pasture, arable and woodland wider landscape mosaic, is of good quality foraging and commuting habitat for bats. Watercourses and woodland areas tended to correlate to the highest recorded levels of bat activity with arable fields generally being low, though the arable field locations 2c and 3d did return overall pph values similar to some woodland areas, and location 2a with a stream and hedgerow was among one of the static locations with the lowest pph values.

5.7 Common pipistrelle activity was distributed across the Site and was recorded on the majority of transects, though with a notable activity peak at static location 4c. 4c may potentially indicate a preferred foraging ground or roost location adjacent to two small woodland blocks in this location, especially as notable peaks occurred within the late June peak breeding season.

5.8 The presence of watercourses is notable and appears to correlate with the recording of Myotis species (primarily the riparian habitat associated Daubenton's) and soprano pipistrelle. The watercourses may explain the presence of soprano pipistrelle through the Site as a major component of all recorded static activity, while soprano was recorded less frequently during the transect surveys (of which large survey areas were located away from water).

5.9 Brown long-eared bats were recorded in a relatively even distribution across the Site, indicating that this species is likely present throughout the Site and landscape. As a relatively sedentary and common species, this may indicate roosts in buildings and trees throughout the adjacent landscape, though note that pph levels were generally very low.

More frequent recording during transects than during statics may show that this species is thinly distributed throughout the Site and/or under-recorded by static detectors.

5.10 Noctule and serotine were recorded throughout the Site but at low activity levels and these recordings may indicate bats commuting across the Site. Some peaks of activity do occur (serotine at 1d) but within the context of pph values below 0.5.

5.11 The limited numbers of the remaining recorded bats are likely attributed to individuals commuting throughout the Site as passage species and unlikely to be making significant use of the Site.

RELATIVE ACTIVITY

5.12 While the number of bats utilising a Site cannot be quantified (as stated within the Section 3 *Method*) an indication of relative abundance is achievable from review of the activity levels (passes per hour) from static detector data and frequency of species encountered during transect surveys.

5.13 It was noted that some periods of transect survey and static detector deployment recorded very few bat passes with some correlation to arable field areas.

5.14 Activity from both transects and static detectors identified common and soprano as being the most common species within the Site. These two species comprised approximately 95% of the static data recorded, generally evenly divided between these species, though variations occur by location and season.

5.15 Myotis species were relatively well represented on Site, as comprising approximately 3.4% of the static data and recorded during over half of the transect survey visits. While detailed analysis of all Myotis calls was not undertaken, sampling carried out of the data set confirmed that the majority of the calls that could be identified to a likely species were probably Daubenton's bat with a smaller number of Natterer's bat present within the sample.

5.16 Brown long-eared bat was recorded occasionally on transect surveys and consistently during static surveys and is likely under-recorded due to its known difficulty in detection. This is potentially supported by this species being recorded during over a third of all the transect survey visits, though normally as only one or a few passes per visit.

5.17 Noctule was recorded frequently during transect survey visits (over a quarter of visits) and was present within static data during most months and locations, though at low pph levels.

5.18 Serotine was recorded during approximately a fifth of the transect survey visits (though as single or a few passes per transect) and regularly but as a small number of passes (0.7% of all recorded passes) from the static detectors.

5.19 The remaining species were recorded only from static data and generally at very low pph levels, so are likely to only utilise the Site periodically.

EVALUATION

5.20 A brief description of the species recorded in a county and national context is provided below.

5.21 Common and soprano pipistrelle comprise the majority of the recorded bat activity and represent the majority of the use of the Site by bats. These species are assessed as common both at county level and nationally:

- Common pipistrelle is described as common within Kent (Kent Bat Group website, accessed 04/05/23) with a mean estimated population for England around 1,870,000 (JNCC, 2021).
- Soprano pipistrelle is described as common in Kent (Kent Bat Group website, accessed 04/05/23with a mean estimated population for England around 2,980,000 (JNCC, 2021). As such, soprano pipistrelles are considered to be of up to local importance for biodiversity.

5.22 The relative conservation importance of the remaining species is summarised as follows:

- Daubenton's is described in Kent as 'common near water' (Kent Bat Group website, accessed 04/05/23), with a mean estimated population for England around 682,000 (JNCC, 2021).
- Natterer's bat is described in Kent as 'scarce' (Kent Bat Group website, accessed 04/05/23) with a mean estimated population for England around 312,000 (JNCC, 2021).
- Brown long-eared bat is described as common within Kent (Kent Bat Group website, accessed 04/05/23) with a mean estimated population for England around 607,000 (JNCC,2021).
- Serotine populations for Kent are described as widespread but declining (Kent Bat Group website, accessed 04/05/23), with a mean national estimated population of 136,000 (JNCC, 2021). Insufficient data is available for an accurate estimate of population nationally or within the county.
- Noctule is described as generally uncommon, declining (Kent Bat Group website, accessed 04/05/23), with a mean national estimated population of 565,000 (JNCC, 2021).
- Leislers bat is described as 'scarce, may be under-recorded' within Kent (Kent Bat Group website, accessed 04/05/23) and described as uncommon but widespread throughout England but with insufficient data is available for an accurate estimate of population nationally or within the county (JNCC, 2021).
- Nathusius's pipistrelle is described as 'scarce, often migrant' within Kent (Kent Bat Group website, accessed 04/05/23 and rare but widespread throughout Great Britain with insufficient data available for an accurate estimate of population nationally or within the county (JNCC, 2021). The few passes recorded are likely representative of the large recording effort capturing occasional commuting or migratory flights across the district.

5.23 The relative ecological importance of any bat populations associated with the Site has been determined taking into account the principles described in *Valuing Bats in Ecological Assessment* (Wray, Wells & Mitchell Jones, 2010). Particular consideration has been given to their distribution and rarity at different geographical levels, value of roosts, commuting and foraging areas. For this evaluation, reference has also been made to:

- UK Mammals: Species Status and Population Trends (Matthews et al, 2018);
- Mammals of the British Isles Handbook (Harris et al, 2008);
- The State of the UK's Bats: National Bat Monitoring Programme Populations Trends 2017 (Bat Conservation Trust, 2017); and
- National Bat Monitoring Programme Annual Report 2021 (JNCC, 2021)

5.24 Overall, given the size of the Site, mix of habitats present (including woodland, watercourses and grassland) such a range of species reflects these habitats and is likely reflective of the wider similar landscape present beyond the Site across the district.

5.25 The surveys recorded mostly common bat species that are widespread in the county (and UK) and would be expected to be found in similar habitats elsewhere in the county. Passes of the uncommon and rarer species described above reflect the extensive survey effort and size of the Site and would be expected to be recorded, with none of these species being recorded as large number of passes or as a large proportion of the data set.

5.26 Based on the range of bat species recorded at the Site and known to occur within the wider local area, and taking into consideration the prevalence of similar habitat types across the wider districts and county, the Site is assessed as being of local importance for forging and commuting bats.

6. REFERENCES

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Mathews, Fiona & Kubasiewicz, Laura & Gurnell, John & Harrower, Colin & Mcdonald, Robbie & Shore, Richard. (2018). A Review of the Population and Conservation Status of British Mammals. 10.13140/RG.2.2.28059.31521.

7. ANNEX 1: LEGISLATION

7.1 The Conservation of Habitats and Species Regulations 2017 (as amended) and the Wildlife and Countryside Act 1981 (as amended) afford legal protection to bats.

7.2 The specific legal protection afforded to bats can be found within the Sections and Schedules of the relevant legislation and relevant case law.

7.3 In general, any person and/or activity that: -

- Damages or destroys a breeding or resting place of bats. (This is sometimes referred to as the strict liability or absolute offence);
- Deliberately captures, injures or kills a bat/s;
- Deliberately disturbs bats, and in particular disturbance likely to impair animals' ability to survive, breed or nurture young, their ability to hibernate and migrate and disturbance likely to have a significant effect on local distribution and abundance;
- Intentionally or recklessly disturbs a bat/s while occupying a structure or place used for shelter and/or protection (Wildlife and Countryside Act 1981 (as amended)); and
- Intentionally or recklessly obstructs access to any structure or place that bat / bats use for shelter or protection (Wildlife and Countryside Act 1981 (as amended)).

…may be guilty of an offence.

7.4 The legislation applies to bat roosts even when they are not occupied.

7.5 Actions affecting multiple animals can be construed as separate offences and therefore penalties can be applied per animal impacted.

7.6 Under certain circumstances licences can be granted by the Statutory Nature Conservation Organisation (Natural England in England) to permit actions that would otherwise be unlawful.

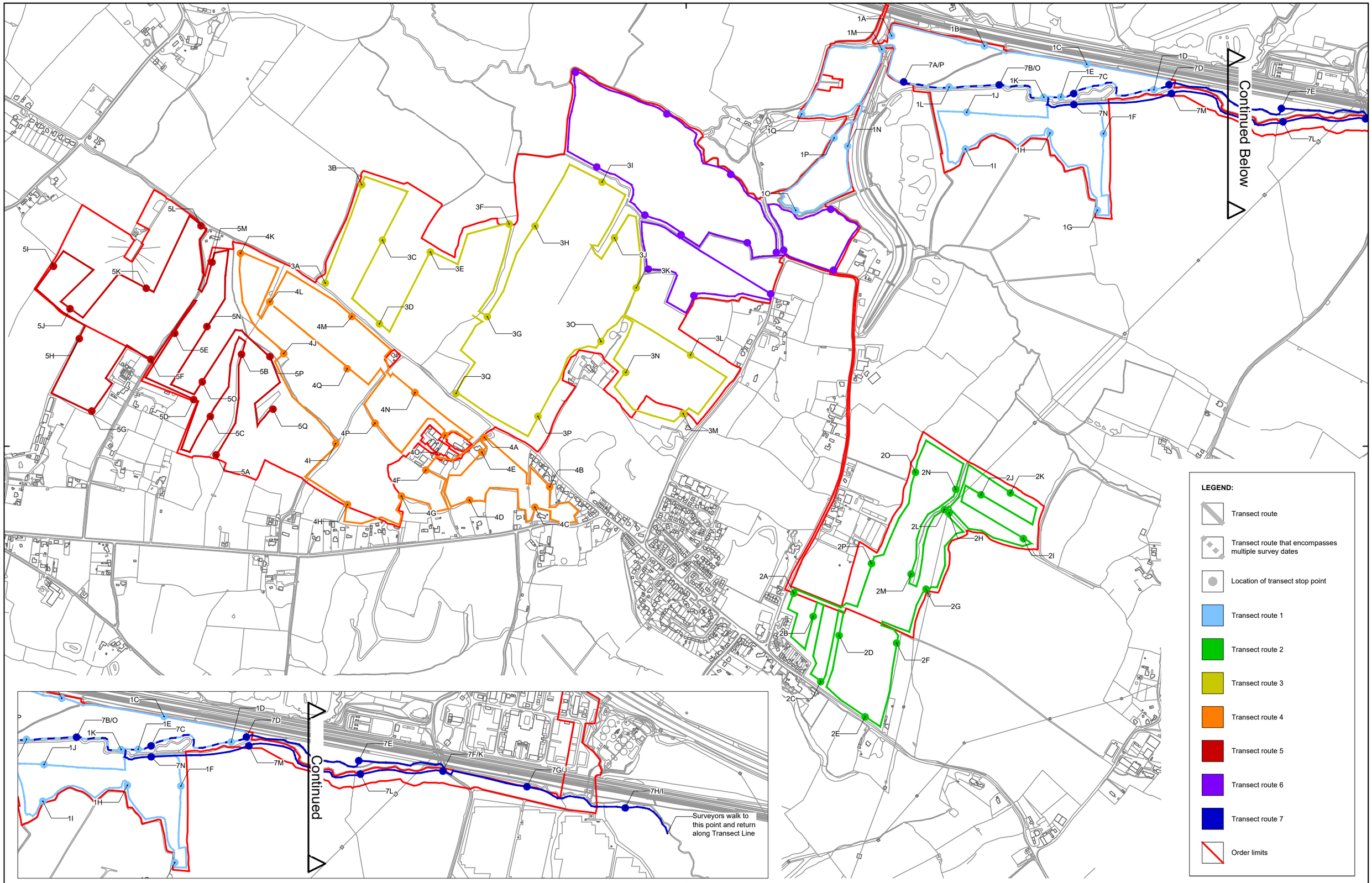
7.7 There are some very specific defences associated with the Conservation of Habitats and Species Regulations 2017, however these are unlikely to apply to construction related projects. The Sections of the Regulations provide further details of these defences.

7.8 The Wildlife and Countryside Act (1981) includes defence for those aspects of the legislation that apply to bats. These defences are unlikely to apply to construction related projects and do not apply to those acts included in the Conservation of Habitats and Species Regulations 2017. The Schedules of the Act provide further details of defences.

7.9 Local authorities have obligations under sections 40 and 41 of the Natural Environment and Rural Communities Act ('NERC') 2006 to have regard to the purpose of conserving biodiversity in carrying out their duties. Seven bat species are listed on Section 41 the NERC Act.

8. ANNEX 2: ACTIVITY TRANSECT ROUTES PLAN

[SEE OVERLEAF]



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client. **EPL 001 Limited**

project. **Stonestreet Green Solar**
Land North And West Of Aldington
Kent

drawing no. **5535-LLB-XX-XX-DR-Ec-0053** rev. **C01**

drawing title. **Activity Transect Routes Plan** suit. **A4**

APFP **5(2)(i)(ii)**

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drawn. **NA**
checked. **MW**

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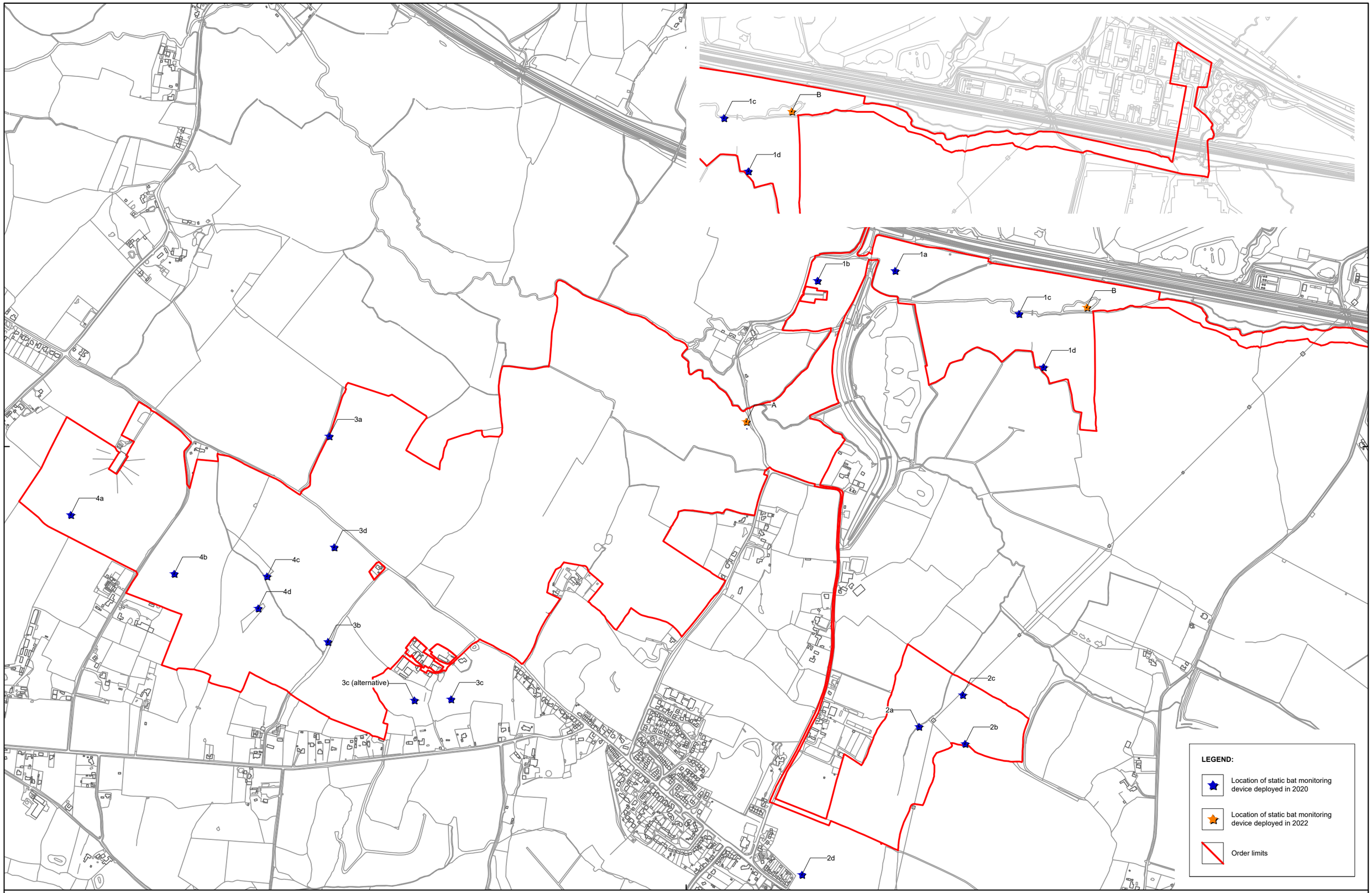
9. ANNEX 3: STATIC DETECTOR LOCATIONS PLAN

[SEE OVERLEAF]



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rev.	rev. date	auth.	rev. note

client. **EPL 001 Limited**

project.

Stonestreet Green Solar

Land North And West Of Aldington

Kent

drawing no. **5535-LLB-XX-XX-DR-Ec-0054** rev. **C01**

drawing title. suit. **A4**

Static Detector Locations Plan APFP **5(2)(l)(ii)**

rev date. **14/05/24**

scale. **1:10000**

sheet. **A3**

drawn. **NA**

checked. **MW**

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10. ANNEX 4: STATIC DETECTOR RESULTS

Detailed static detector survey, presented as passes per night per species and for all species combined

Location	Period	Average Night Length	Recorded Nights	Recorded Hours	Species total passes								Total Passes	Number of species	Species passes per hour (pph)								Bat PPH (all species)	Percentile activity level (all species)
					EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU			EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU		
1a	29.05.20-31.05.20	7.75	3	23.25	0	2	0	1	0	5	2	2	12	5	0.00	0.09	0.00	0.04	0.00	0.22	0.09	0.09	0.52	12%
1b	29.05.20-31.05.20	7.75	3	23.25	0	6	0	2	0	54	8	2	72	5	0.00	0.26	0.00	0.09	0.00	2.32	0.34	0.09	3.10	54%
1c	29.05.20-31.05.20	7.75	3	23.25	0	1	0	0	0	19	1647	0	1667	3	0.00	0.04	0.00	0.00	0.00	0.82	70.84	0.00	71.70	98%
1d	29.05.20-31.05.20	7.75	3	23.25	16	12	0	3	0	130	118	0	279	5	0.69	0.52	0.00	0.13	0.00	5.59	5.08	0.00	12.00	77%

Location	Period	Average Night Length	Recorded Nights	Recorded Hours	Species total passes								Total Passes	Number of species	Species passes per hour (pph)								Bat PPH (all species)	Percentile activity level (all species)
					EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU			EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU		
2a	01.06.20-05.06.20	7.75	4	31	0	7	0	0	0	32	53	0	92	3	0.00	0.23	0.00	0.00	0.00	1.03	1.71	0.00	2.97	52%
2b	01.06.20-05.06.20	7.75	3	23.25	0	17	0	0	0	88	46	0	151	3	0.00	0.73	0.00	0.00	0.00	3.78	1.98	0.00	6.49	67%
2c	01.06.20-05.06.20	7.75	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	Excluded
2d	01.06.20-05.06.20	7.75	3	23.25	0	3	0	2	0	23	9	0	37	4	0.00	0.13	0.00	0.09	0.00	0.99	0.39	0.00	1.59	42%
3a	08.06.20-11.06.20	7.5	0	0	0	0	0	0	0	0	0	0	0	0									#DIV/0!	Excluded

Location	Period	Average Night Length	Recorded Nights	Recorded Hours	Species total passes								Total Passes	Number of species	Species passes per hour (pph)								Bat PPH (all species)	Percentile activity level (all species)
					EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU			EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU		
3b	08.06.20-11.06.20	7.5	0	0	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	Excluded
3c	08.06.20-11.06.20	7.5	4	30	2	2	0	0	0	20	2	0	26	4	0.07	0.07	0.00	0.00	0.00	0.67	0.07	0.00	0.87	29%
3d	08.06.20-11.06.20	7.5	0.25	1.875	0	0	0	0	0	0	0	1	1	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.53	13%
4a	19.06.20-24.06.20	7.5	6	45	12	1	0	10	0	127	10	1	161	6	0.27	0.02	0.00	0.22	0.00	2.82	0.22	0.02	3.58	58%
4b	19.06.20-24.06.20	7.5	5	37.5	0	2	0	5	0	20	2	0	29	4	0.00	0.05	0.00	0.13	0.00	0.53	0.05	0.00	0.77	23%

Location	Period	Average Night Length	Recorded Nights	Recorded Hours	Species total passes								Total Passes	Number of species	Species passes per hour (pph)								Bat PPH (all species)	Percentile activity level (all species)
					EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU			EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU		
4c	19.06.20-24.06.20	7.5	6	45	24	67	0	10	0	2609	1373	3	4086	6	0.53	1.49	0.00	0.22	0.00	57.98	30.51	0.07	90.80	100%
4d	19.06.20-24.06.20	7.5	5	37.5	0	1	0	3	0	223	43	0	270	4	0.00	0.03	0.00	0.08	0.00	5.95	1.15	0.00	7.20	73%
1a	09.07.20-13.07.20	7.75	5	38.75	3	8	0	2	0	34	49	2	98	6	0.08	0.21	0.00	0.05	0.00	0.88	1.26	0.05	2.53	48%
1b	09.07.20-13.07.20	7.75	5	38.75	1	3	0	0	0	14	10	-	28	4	0.03	0.08	0.00	0.00	0.00	0.00	0.36	0.26	0.72	19%
1c	09.07.20-13.07.20	7.75	5	38.75	0	43	0	2	0	146	633	70	894	5	0.00	1.11	0.00	0.05	0.00	3.77	16.34	1.81	23.07	83%

Location	Period	Average Night Length	Recorded Nights	Recorded Hours	Species total passes								Total Passes	Number of species	Species passes per hour (pph)								Bat PPH (all species)	Percentile activity level (all species)
					EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU			EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU		
1d	09.07.20-13.07.20	7.75	3	23.25	0	2	0	0	0	9	492	0	503	4	0.00	0.09	0.00	0.00	0.00	0.39	21.16	0.00	21.63	81%
2a	17.07.20-21.07.20	8	3.5	28	1	6	10	0	0	85	44	0	146	5	0.04	0.21	0.36	0.00	0.00	3.04	1.57	0.00	5.21	62%
2b	17.07.20-21.07.20	8	0	0	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	Excluded
2c	17.07.20-21.07.20	8	4	32	2	10	0	10	0	141	43	1	207	7	0.06	0.31	0.00	0.31	0.00	4.41	1.34	0.03	6.47	65%
2d	17.07.20-21.07.20	8	3	24	0	3	1	0	0	9	13	0	26	4	0.00	0.13	0.04	0.00	0.00	0.38	0.54	0.00	1.08	31%

Location	Period	Average Night Length	Recorded Nights	Recorded Hours	Species total passes								Total Passes	Number of species	Species passes per hour (pph)								Bat PPH (all species)	Percentile activity level (all species)
					EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU			EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU		
3a	21.07.20-29.07.20	8	5.25	42	6	10	0	3	0	161	100	0	280	5	0.14	0.24	0.00	0.07	0.00	3.83	2.38	0.00	6.67	69%
3b	21.07.20-29.07.20	8	5.25	42	8	17	0	5	0	195	56	2	283	6	0.19	0.40	0.00	0.12	0.00	4.64	1.33	0.05	6.74	71%
3c	21.07.20-29.07.20	8	6.25	50	4	11	0	8	0	38	2	2	65	7	0.08	0.22	0.00	0.16	0.00	0.76	0.04	0.04	1.30	38%
4d	21.07.20-29.07.20	8	0	0	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	Excluded
4a	30.07.20-05.08.20	8.75	7	61.25	0	1	0	3	0	108	54	1	167	5	0.00	0.02	0.00	0.05	0.00	1.76	0.88	0.02	2.73	50%

Location	Period	Average Night Length	Recorded Nights	Recorded Hours	Species total passes								Total Passes	Number of species	Species passes per hour (pph)								Bat PPH (all species)	Percentile activity level (all species)
					EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU			EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU		
4b	30.07.20-05.08.20	8.75	6	52.5	22	5	0	15	0	109	15	3	169	6	0.42	0.10	0.00	0.29	0.00	2.08	0.29	0.06	3.22	56%
4c	30.07.20-05.08.20	8.75	0	0	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	Excluded
4d	30.07.20-05.08.20	8.75	6	52.5	5	114	0	3	0	1953	112	10	2197	7	0.10	2.17	0.00	0.06	0.00	37.20	2.13	0.19	41.85	90%
1a	05.08.20-11.08.20	0	0	0										0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	Excluded
1b	05.08.20-11.08.20	9	7	63	45	24	0	33	0	98	51	2	253	7	0.71	0.38	0.00	0.52	0.00	1.56	0.81	0.03	4.02	60%

Location	Period	Average Night Length	Recorded Nights	Recorded Hours	Species total passes								Total Passes	Number of species	Species passes per hour (pph)								Bat PPH (all species)	Percentile activity level (all species)
					EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU			EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU		
1c	05.08.20-11.08.20	9	5.5	49.5	28	56	0	47	0	61	2446	1	2639	6	0.57	1.13	0.00	0.95	0.00	1.23	49.41	0.02	53.31	94%
1d	05.08.20-11.08.20	9	6	54	33	42	0	25	0	642	658	0	1400	5	0.61	0.78	0.00	0.46	0.00	11.89	12.19	0.00	25.93	85%
1a	07.10.20-14.10.20	13	5.5	71.5	0	16	2	6	2	10	5	6	47	7	0.00	0.22	0.03	0.08	0.03	0.14	0.07	0.08	0.66	17%
1b	07.10.20-14.10.20	13	6	78	1	8	0	4	1	7	2	2	25	7	0.01	0.10	0.00	0.05	0.01	0.09	0.03	0.03	0.32	10%
1c	07.10.20-14.10.20	13	4.5	58.5	5	17	0	5	0	7	89	0	123	5	0.09	0.29	0.00	0.09	0.00	0.12	1.52	0.00	2.10	46%

Location	Period	Average Night Length	Recorded Nights	Recorded Hours	Species total passes								Total Passes	Number of species	Species passes per hour (pph)								Bat PPH (all species)	Percentile activity level (all species)
					EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU			EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU		
1d	07.10.20-14.10.20	0	0	0	0	0	0	0	0	0	0	0	0	4	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	Excluded
3a	14.10-20-19.10.20	13.25	1.25	16.5625	0	1	0	0	0	1	1	0	3	4	0.00	0.06	0.00	0.00	0.00	0.06	0.06	0.00	0.18	4%
3b	14.10-20-19.10.20	13.25	4	53	3	2	0	0	3	79	7	1	95	6	0.06	0.04	0.00	0.00	0.06	1.49	0.13	0.02	1.79	44%
3c	14.10-20-19.10.20	13.25	5	66.25	3	12	0	5	0	19	3	12	54	6	0.05	0.18	0.00	0.08	0.00	0.29	0.05	0.18	0.82	27%
3d	14.10-20-19.10.20	13.25	5	66.25	0	141	0	0	0	283	228	1	653	4	0.00	2.13	0.00	0.00	0.00	4.27	3.44	0.02	9.86	75%

Location	Period	Average Night Length	Recorded Nights	Recorded Hours	Species total passes								Total Passes	Number of species	Species passes per hour (pph)								Bat PPH (all species)	Percentile activity level (all species)
					EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU			EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU		
2a	19.10-20-23.10.23	13.75	4.25	58.4375	0	8	0	0	0	0	66	0	74	2	0.00	0.14	0.00	0.00	0.00	0.00	1.13	0.00	1.27	37%
2b	19.10-20-23.10.23	0	0	0	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	Excluded
2c	19.10-20-23.10.23	13.75	5.25	72.1875	0	8	0	0	0	878	169	0	1055	4	0.00	0.11	0.00	0.00	0.00	12.16	2.34	0.00	14.61	79%
2d	19.10-20-23.10.23	13.75	4.25	58.4375	0	3	0	4	2	48	9	1	67	6	0.00	0.05	0.00	0.07	0.03	0.82	0.15	0.02	1.15	21%
4a	27.10.20-30.10.20	14	4	56	0	1	0	0	0	1	2	0	4	3	0.00	0.02	0.00	0.00	0.00	0.02	0.04	0.00	0.07	35%

Location	Period	Average Night Length	Recorded Nights	Recorded Hours	Species total passes								Total Passes	Number of species	Species passes per hour (pph)								Bat PPH (all species)	Percentile activity level (all species)
					EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU			EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU		
4b	27.10.20-30.10.20	14	3.25	45.5	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0%
4c	27.10.20-30.10.20	14	5	70	0	2	0	0	0	0	3	0	5	2	0.00	0.03	0.00	0.00	0.00	0.00	0.04	0.00	0.07	0%
4d	27.10.20-30.10.20	14	4.25	59.5	0	2	0	0	0	15	0	1	18	3	0.00	0.03	0.00	0.00	0.00	0.25	0.00	0.02	0.30	8%
A	26.05.22-01.06.22	7.75	6.5	50.375	5	60	0	3	2	1002	373	0	1445	6	0.10	1.19	0.00	0.06	0.04	19.89	7.40	0.00	28.68	87%
B	26.05.22-01.06.22	7.75	7	54.25	6	7	0	2	1	1156	657	0	1829	6	0.11	0.13	0.00	0.04	0.02	21.31	12.11	0.00	33.71	88%

Location	Period	Average Night Length	Recorded Nights	Recorded Hours	Species total passes								Total Passes	Number of species	Species passes per hour (pph)								Bat PPH (all species)	Percentile activity level (all species)
					EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU			EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU		
A	07.06.22 - 19.06.22	7.5	11.5	86.25	3	210	0	12	3	1228	3813	0	5269	6	0.03	2.43	0.00	0.14	0.03	14.24	44.21	0.00	61.09	96%
B	07.06.22-19.06.22	7.5	12	90	6	8	0	8	0	3054	1280	5	4361	6	0.07	0.09	0.00	0.09	0.00	33.93	14.22	0.06	48.46	92%
A	06.07.22-11.07.22	7.75	6	46.5	1	40	0	66	0	114	64	0	285	5	0.02	0.86	0.00	1.42	0.00	2.45	1.38	0.00	6.13	63%
A	15.08.22-31.08.22	9.5	15	142.5	0	21	0	0	0	61	25	0	107	3	0.00	0.15	0.00	0.00	0.00	0.43	0.18	0.00	0.75	21%
B	22.08.22-31.08.22	9.5	10	95	1	2	0	0	0	77	26	0	106	4	0.01	0.02	0.00	0.00	0.00	0.81	0.27	0.00	1.12	33%

Location	Period	Average Night Length	Recorded Nights	Recorded Hours	Species total passes								Total Passes	Number of species	Species passes per hour (pph)								Bat PPH (all species)	Percentile activity level (all species)
					EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU			EPSE	MYSP	NYLE	NYNO	PINA	PIPI	PIPY	PLAU		
A	01.09.22-21.09.22	11.25	19	213.75	1	31	0	1	2	46	36	15	132	7	0.00	0.15	0.00	0.00	0.01	0.22	0.17	0.07	0.62	15%
B	01.09.22-21.09.22	11.25	19	213.75	0	14	0	0	0	200	64	0	278	3	0.00	0.07	0.00	0.00	0.00	0.94	0.30	0.00	1.30	40%
A	03.10.22-19.10.22	13	17	221	0	21	0	1	0	18	3	0	43	4	0.00	0.10	0.00	0.00	0.00	0.08	0.01	0.00	0.19	6%
B	03.10.22-22.10.22	13	20	260	0	3	0	1	0	168	39	0	211	5	0.00	0.01	0.00	0.00	0.00	0.65	0.15	0.00	0.81	25%

Summary of static detector weather conditions[1].

Date	Minimum temperature (°C)	Maximum Temperature (°C)	Average Minimum wind mph	Average Max. Wind mph	Nights with Rain*
29.05.20-31.05.20	8	20	6	17	None
01.06.20-05.06.20	10	25	4	25	3rd - Light
08.06.20-11.06.20	7	17	9	18	10th - Light 11th - Heavy
19.06.20-24.06.20	10	29	6	21	20th - Light
09.07.20-13.07.20	8	21	6	16	13th - Heavy
17.07.20-21.07.20	9	20	4	14	18th - Heavy
21.07.20-29.07.20	9	25	4	21	25th - Heavy 26th - Light
30.07.20-05.08.20	9	20	4	16	1st - Light 4th - Light
05.08.20-11.08.20	14	25	4	16	10th - Light
14.10-20-19.10.20	5	15	3	14	19th Light
19.10-20-23.10.23	7	17	5	14	19th - Light 20th - Heavy 21st - Heavy
26.05.22-01.06.22	6	17	3	20	30th - Light
07.06.22-19.06.22	7	24	4	18	9th - Light 18th - Light 19th- Light

[1] Includes review of historical weather data available at https://www.timeanddate.com/weather/@2656956/historic?

Date	Minimum temperature (°C)	Maximum Temperature (°C)	Average Minimum wind mph	Average Max. Wind mph	Nights with Rain*
06.07.22-11.07.22	12	27	3	18	None
15.08.22-31.08.22	13	25	4	15	16th - Light
01.09.22-21.09.22	5	24	2	17	3rd - Light 4th -Heavy 13th - Light
03.10.22-19.10.22	7	19	4	24	4th - Light 6th - Light 14th - Light

*Rain defined as drizzle, light or heavy over a 6hr period as shown within historical weather data

11. ANNEX 5: TRANSECT SURVEY 2020 AND 2022 SPECIES PRESENCE AND PASSES TABLE

Transect	Dates	Species recorded & number of passes								Relative activity (all species combined)	Percentile of all species combined
		PIPI	PIPY	NYNO	EPSE	PLAU	MYSP	UNID	Total passes		
1 (2020)	18/05/2020	176	111	1	-	1	5	-	294	High	100%
	15/06/2020	118	117	-	-	-	3	-	238	High	97%
	30/07/2020*	8(P)	11(P)	-	2 (p)	-	-	-	21	Est low	Excluded
	17/09/2020**	7(P)	2(P)	-	-	-	-	2(P)	11	Est low	Excluded
	22/10/2020	26	19	-	-	-	11	-	56	Low	34%
1 (2022)	26/04/2022	59	97	-	-	1	2	-	159	Moderate	88%
2 (2020)	18/05/2020	21	3	-	1	6	1	-	32	Low	22%
	15/06/2020	34	9	-	1	-	9	-	53	Low	31%
	30/07/2020	32	36	-	-	-	5	-	73	Moderate	47%
	17/09/2020	100	28	-	-	1	10	-	139	Moderate	78%
	22/10/2020**	4(P)	1(p)	-	-	2(P)	-	-	7	Est very low / low	Excluded
2 (2022)	26/04/2022	6	6	-	-	-	1	-	13	Very low	13%
3 (2020)	18/05/2020	73	1	-	-	2	-	-	76	Moderate	50%
	15/06/2020	101	4	-	-	-	-	-	105	Moderate	69%
	30/07/2020	94	12	1	1	2	5	-	115	Moderate	72%
	17/09/2020	53	18		-	-	5	-	76	Moderate	50%
	22/10/2020	42	27	-	-	-	7	-	76	Moderate	50%
3 (2022)	26/04/2022	7	-	-	-	-	-	-	7	Very low	6%
4 (2020)	18/05/2020	121	17	-	1	-	-	-	139	Moderate	78%
	15/06/2020	56	8	-	1	1	1	-	67	Low	45%
	30/07/2020**	26(P)	4(P)	1(P)	-	1(P)	-	-	32	Est low	Excluded
	17/09/2020	158	11	2	-	2	3	-	176	Moderate	91%
	22/10/2020**	21(P)	8(P)	-	-	1(P)	-	-	30	Est low	Excluded
4 (2022)	26/04/2022	5	-	-	-	-	-	-	5	Very low	3%

Transect	Dates	Species recorded & number of passes								Relative activity (all species combined)	Percentile of all species combined
		PIPI	PIPY	NYNO	EPSE	PLAU	MYSP	UNID	Total passes		
5 (2020)	18/05/2020*	23(P)	1(P)	-	-	-	1(P)	-	25	Low est	Excluded
	15/06/2020	80	1	2	-	5	2	-	90	Moderate	66%
	30/07/2020	167	17	5	-	-	1	-	190	Moderate	94%
	17/09/2020	149	2	-	-	1	2	-	154	Moderate	84%
	22/10/2020	19	8	-	-	0	2	-	29	Low	19%
5 (2022)	26/04/2022	5	-	-	1	-	1	-	7	Very low	6%
6 (2022)	26/04/2022	15	4	-	-	1	-	-	20	Low	16%
	30/05/2022	59	21	-	2	-	-	-	82	Moderate	59%
	16/06/2022	77	9	1	-	-	-	-	88	Moderate	63%
	25/07/2022	4	52	3	-	-	-	-	59	Low	41%
	22/08/2022	103	10	1	-	-	4	-	118	Moderate	75%
	26/09/2022**	-	-	-	-	-	-	-	0	Very low	0%
	03/10/2022**	21(P)	2(P)	-	-	-	1(P)	-	24	Est low	Excluded
7 (2022)	26/04/2022	47	5	-	-	-	5	-	57	Low	38%
	31/05/2022	38	-	-	-	-	-	-	38	Low	25%
	16/06/2022	15	20	-	-	2	2	-	39	Low	28%
	25/07/2022**	15(P)	15(P)	1(P)				4 (P)	35	Est low	Excluded
	22/08/2022**	6(P)	3(P)	1(P)	-	-	-	1(P)	11	Est very low / low	Excluded
	26/09/2022**	2(P)	-	-	-	-	-	1(P)	3	Est Very low	Excluded
	03/10/2022**	7(P)	1(P)	1(P)	-	-	-	2(P)	11	Est very low / low	Excluded

*Note that a different detector model was used on these dates, appearing to produce fewer individual pass files. Number of passes recorded is marked as P to indicate that the species was present, but number of passes may not be comparable to the rest of the dataset.

**Complete recording analysis was not available for these nights due to data corruption or other storage issues and as such an estimate from saved survey

recordings and forms has been made. P marked for species presence. Again, number of passes likely not comparable to rest of dataset.

Where values for number of passes may not be comparable to the rest of the dataset, activity levels have been stated as estimates (est).

12. ANNEX 5: 2020 TRANSECT RESULTS

Survey summary of activity transects on 18/05/2020 - Transect 1.

Time	Species	Location of bat(s)	Activity
21:15-21:19	Common pipistrelle, soprano pipistrelle	Point D	Near constant feeding buzzes and foraging calls recorded. No bats seen.
21:20-21:24	Common pipistrelle, soprano pipistrelle	Walk to point E	
21:25-21:29	Soprano pipistrelle	Point E	
21:30-21:34	Common pipistrelle, soprano pipistrelle	Walk to point F	
21:40-21:44	Common pipistrelle, soprano pipistrelle	Walk to point G	
21:45-21:49	Common pipistrelle, noctule	Point G	Brief passes, unseen.
21:55-21:59	Brown long-eared	Point H	
22:00-22:04	Common pipistrelle, noctule	Walk to point I	
22:05--22:09	Common pipistrelle, soprano pipistrelle	Point I	Near constant feeding buzzes and foraging calls recorded. No bats seen.
22:10-22:14	Common pipistrelle, soprano pipistrelle	Walk to point J	
22:20-22:24	Common pipistrelle, soprano pipistrelle	Walk to point K	
22:25-22:29	Common pipistrelle, Myotis	Point K	
22:30-22:34	Common pipistrelle, soprano pipistrelle	Walk to point L	
22:35-22:39	Myotis	Point L	
22:40-22:44	Common pipistrelle	Walk to point M	
22:55-22:59	Common pipistrelle	Point N	Brief passes, unseen.
23:00-23:04	Common pipistrelle	Walk to point O	
23:15-23:19	Common pipistrelle, soprano pipistrelle	Point P	
23:20-23:24	Common pipistrelle, soprano pipistrelle	Walk to point Q	

Time	Species	Location of bat(s)	Activity
23:30-23:35	Soprano pipistrelle	Walk to end	

Survey summary of activity transects on 18/05/2020 - Transect 2.

Time	Species	Location of bat(s)	Activity
21:10-21:14	Common pipistrelle	Walk to point D	Single pass, unseen.
21:25-21:29	Common pipistrelle	Point E	Feeding buzzes and foraging calls recorded. No bats seen.
21:30-21:34	Common pipistrelle	Walk to point F	
21:35-21:39	Soprano pipistrelle	Point F	Brief passes, unseen.
21:40-21:44	Common pipistrelle	Walk to point G	
21:45-21:49	Soprano pipistrelle, noctule	Point G	
21:55-21:59	Common pipistrelle	Point H	
22:00-22:04	Common pipistrelle	Walk to point I	
22:10-22:14	Common pipistrelle	Walk to point J	
22:50-22:54	Common pipistrelle	Walk to point N	
23:00-23:04	Common pipistrelle	Walk to point O	

Survey summary of activity transects on 18/05/2020 - Transect 3.

Time	Species	Location of bat(s)	Activity
21:25-21:29	Common pipistrelle	Point E	Feeding buzzes and foraging calls recorded. Bats observed foraging over and around hedgerows.
21:30-21:34	Common pipistrelle	Walk to point F	
21:35-21:39	Common pipistrelle, soprano pipistrelle	Point F	
21:40-21:44	Common pipistrelle	Walk to point G	
21:45-21:49	Common pipistrelle	Point G	
21:50-21:54	Common pipistrelle	Walk to point H	
22:10-21:14	Common pipistrelle	Walk to point J	Brief passes, unseen.
22:20-22:24	Common pipistrelle	Walk to point K	
22:25-22:29	Common pipistrelle brown long-eared	Point K	
23:00-23:04	Common pipistrelle	Walk to point O	

Time	Species	Location of bat(s)	Activity
23:10-23:14	Common pipistrelle, brown long-eared	Walk to point P	
23:30-23:34	Common pipistrelle	Walk to end	

Survey summary of activity transects on 18/05/2020 - Transect 4.

Time	Species	Location of bat(s)	Activity
21:10-21:14	Common pipistrelle	Walk to point D	Near constant feeding buzzes and foraging calls recorded. One bat observed commuting along boundary hedge.
21:15-21:19	Common pipistrelle	Point D	
21:30-21:34	Common pipistrelle	Walk to point F	Near constant feeding buzzes and foraging calls recorded. Two bats observed foraging around barn.
21:35-21:39	Common pipistrelle	Point F	
21:40-21:44	Common pipistrelle	Walk to point G	
21:50-21:54	Common pipistrelle	Walk to point H	Feeding buzzes and foraging calls recorded. No bats seen.
22:00-22:04	Common pipistrelle	Walk to point I	
22:05-22:09	Common pipistrelle	Point I	
22:20-22:24	Common pipistrelle	Walk to point K	
22:25-22:29	Common pipistrelle, soprano pipistrelle	Point K	
22:30-22:34	Common pipistrelle	Walk to point L	
22:35-22:39	Common pipistrelle	Point L	
22:40-22:44	Common pipistrelle	Walk to point M	
22:50-22:54	Common pipistrelle	Walk to point N	
22:55-22:59	Common pipistrelle	Point N	
23:10-23:14	Common pipistrelle	Walk to point P	

Survey summary of activity transects on 18/05/2020 - Transect 5.

Time	Species	Route	Location	Activity
20:45-23:35	Common pipistrelle, Myotis species	5	Full route walked.	Note no activity observed, but some files reviewed in later analysis

Survey summary of activity transect on 15/06/2020 - Transect 1.

Time	Species	Route	Location of bat(s)	Activity
21:43-21:47	Soprano pipistrelle	1	Walk to point N	One bat observed commuting east to west along hedgerow.
21:48-21:52	Soprano pipistrelle	1	Point N	Brief passes, unseen.
21:53-21:57	Common pipistrelle, soprano pipistrelle	1	Walk to point M	
21:58-22:02	Common pipistrelle	1	Point M	
22:03-22:07	Soprano pipistrelle	1	Walk to point B from M (misdirected)	
22:08-22:12	Soprano pipistrelle	1	Point B (misdirected)	
22:18-22:22	Common pipistrelle, soprano pipistrelle	1	Walk to point L from B (returning to route)	
22:28-22:32	Common pipistrelle, soprano pipistrelle	1	Point K	Frequent foraging activity recorded. No bats seen.
22:33-22:37	Common pipistrelle, soprano pipistrelle	1	Walk to point J	Continuous feeding and foraging activity from two bats.
22:38-22:42	Common pipistrelle, soprano pipistrelle	1	Point J	
22:43-22:47	Common pipistrelle, soprano pipistrelle	1	Walk to point I	
22:48-22:52	Common pipistrelle, soprano pipistrelle, Myotis	1	Point I	Brief passes, unseen.
22:53-22:57	Soprano pipistrelle	1	Walk to point H	
23:08-23:12	Common pipistrelle	1	Point G	
23:23-23:27	Common pipistrelle, soprano pipistrelle	1	Walk to point E	
23:28-23:32	Common pipistrelle, soprano pipistrelle	1	Point E	Frequent pipistrelle foraging activity recorded, with occasional brief passes by other species. No bats seen.
23:33-23:37	Common pipistrelle, soprano pipistrelle	1	Walk to point D	
23:38-23:42	Common pipistrelle, soprano pipistrelle	1	Point D	
23:43-23:47	Myotis	1	Walk to point C	

Time	Species	Route	Location of bat(s)	Activity
23:48-23:52	Common pipistrelle	1	Point C	

Survey summary of activity transect on 15/06/2020 - Transect 2.

Time	Species	Location of bat(s)	Activity
21:53-21:57	Soprano pipistrelle	Walk to point L	Single pass, unseen.
21:58-22:02	Soprano pipistrelle	Point L	One bat observed commuting north to south along tree line.
22:13-22:17	Serotine	Walk to point J	Brief passes, unseen.
22:23-22:27	Common pipistrelle	Walk to point I	
22:28-22:32	Common pipistrelle, soprano pipistrelle	Point I	Bats observed foraging along hedgerows.
22:33-22:37	Common pipistrelle	Walk to point H	Feeding buzzes and foraging calls recorded. No bats seen.
22:48-22:52	Common pipistrelle, soprano pipistrelle	Point G	
22:53-22:57	Common pipistrelle, soprano pipistrelle, Myotis	Walk to point F	
23:03-23:07	Common pipistrelle	Walk to point E	
23:13-23:17	Common pipistrelle	Walk to point D	
23:28-23:32	Common pipistrelle	Point C	
23:38-23:42	Common pipistrelle	Point B	
23:43-23:47	Common pipistrelle, soprano pipistrelle, myotis	Walk to point A	
23:48-23:52	Common pipistrelle, soprano pipistrelle	Point A	

Survey summary of activity transect on 15/06/2020 - Transect 3.

Time	Species	Location of bat(s)	Activity
21:48-21:52	Common pipistrelle, soprano pipistrelle	Point N	Near continuous feeding buzzes and foraging calls recorded. No bats seen.
21:53-21:57	Common pipistrelle	Walk to point M	
21:58-22:02	Common pipistrelle	Point M	
22:03-22:07	Common pipistrelle	Walk to point L	
22:18-22:22	Common pipistrelle	Point K	
22:23-22:37	Common pipistrelle	Walk to point J	

Time	Species	Location of bat(s)	Activity
22:28-22:32	Common pipistrelle	Point J	
22:33-22:37	Common pipistrelle, soprano pipistrelle	Walk to point I	
23:03-23:07	Common pipistrelle	Walk to point F	Single pass, unseen.

Survey summary of activity transect on 15/06/2020 - Transect 4.

Time	Species	Location of bat(s)	Activity
22:43-22:47	Common pipistrelle	Walk to point H	Feeding buzzes and foraging calls recorded. No bats seen.
22:53-22:57	Common pipistrelle	Walk to point G	
22:58-23:02	Common pipistrelle	Point G	
23:03-23:07	Soprano pipistrelle	Walk to point F	
23:08-23:12	Common pipistrelle	Point F	
23:13-23:17	Common pipistrelle, soprano pipistrelle	Walk to point E	Two bats observed foraging around barn.
23:18-23:22	Serotine	Point E	Feeding buzzes and foraging calls recorded. No bats seen.
23:28-23:32	Brown long-eared	Point D	
23:33-23:37	Soprano pipistrelle	Walk to point C	
23:38-23:42	Common pipistrelle	Point C	
23:43-23:47	Common pipistrelle, Myotis	Walk to point B	
23:48-23:52	Soprano pipistrelle	Point B	Single passes, unseen.
23:53-23:57	Common pipistrelle	Walk to point A	

Survey summary of activity transect on 15/06/2020 - Transect 5.

Time	Species	Location of bat(s)	Activity
21:48-21:52	Common pipistrelle	Walk to point M	One bat observed commuting north to south along hedgerow.
21:53-21:57	Common pipistrelle	Point M	Two bats observed foraging continuously over gardens.
21:58-22:02	Common pipistrelle	Walk to point L	
22:03-22:07	Soprano pipistrelle	Point L	Single passes, unseen.
22:08-22:12	Noctule	Walk to point K	
22:23-22:27	Common pipistrelle	Point J	Feeding buzzes and foraging calls recorded. No bats seen.
22:28-22:32	Common pipistrelle	Walk to point I	
22:48-22:52	Brown long-eared	Walk to point G	
22:53-22:57	Soprano pipistrelle	Point G	
23:03-23:07	Common pipistrelle, brown long-eared	Point F	
23:08-23:12	Common pipistrelle, soprano pipistrelle, Myotis	Walk to point E	
23:13-23:17	Common pipistrelle, Myotis, brown long-eared	Point E	Brief passes, unseen.
23:43-23:47	Myotis	Point B	
23:48-23:52	Common pipistrelle	Walk to point A	
23:53-23:57	Common pipistrelle	Point A	

Survey summary of activity transect on 30/07/2020 - Transect 1.

Time	Species	Location of bat(s)	Activity
21:20-21:28	Common pipistrelle, soprano pipistrelle	Walk to point E	Feeding buzzes and foraging calls recorded. No bats seen.
21:29-21:36	Common pipistrelle, soprano pipistrelle	Point E	
21:37-21:42	Common pipistrelle	Walk to point F	
21:43-21:49	Common pipistrelle	Point F	
21:50-22:01	Common pipistrelle, soprano pipistrelle, serotine	Walk to point G	
22:02-22:09	Common pipistrelle, soprano pipistrelle	Point G	
22:10-22:14	Common pipistrelle	Walk to point H	
22:15-22:19	Common pipistrelle	Point H	
22:20-22:29	Common pipistrelle, soprano pipistrelle	Walk to point I	
22:30-22:34	Common pipistrelle	Point I	
22:35-22:39	Common pipistrelle, soprano pipistrelle	Walk to point J	Near constant feeding and foraging activity recorded. No bats seen.
22:50-22:54	Common pipistrelle	Point K	Unseen. Low levels of activity.
23:10-23:14	Common pipistrelle	Point M	
23:15-23:19	Common pipistrelle	Walk to point N	
23:40-23:51	Common pipistrelle	Point P	
23:56-00:00	Common pipistrelle	Point Q	

Survey summary of activity transect on 30/07/2020 - Transect 2.

Time	Species	Location of bat(s)	Activity
21:05-21:09	Noctule	Point C	Single pass, unseen.
21:20-21:24	Common pipistrelle	Walk to point E	One bat observed foraging around hedgerow.
21:30-21:34	Soprano pipistrelle	Walk to point F	Single pass, unseen.
21:35-21:39	Common pipistrelle, soprano pipistrelle	Point F	Low level of activity. One bat seen commuting along hedgerow.
21:40-21:44	Common pipistrelle, soprano pipistrelle	Walk to point G	Bats observed foraging and commuting along hedgerows.
21:45-21:49	Soprano pipistrelle	Point G	
21:50-21:54	Common pipistrelle, soprano pipistrelle	Walk to point H	
21:55-21:59	Common pipistrelle, soprano pipistrelle	Point H	
22:05-22:09	Soprano pipistrelle	Point I	Unseen. Low level of feeding and foraging activity.
22:15-22:19	Common pipistrelle	Point J	
22:20-22:24	Common pipistrelle	Walk to point K	
22:30-22:34	Common pipistrelle	Walk to point L	
22:45-22:49	Soprano pipistrelle	Point M	
22:50-22:54	Common pipistrelle, soprano pipistrelle, Myotis	Walk to point N	
23:05-23:09	Common pipistrelle, soprano pipistrelle	Point O	
23:10-23:14	Common pipistrelle	Walk to point P	
23:15-23:19	Common pipistrelle	Point P	

Survey summary of activity transect on 30/07/2020 - Transect 3.

Time	Species	Location of bat(s)	Activity
21:15-21:19	Noctule	Point D	Low level of feeding and foraging activity. Low numbers of bats observed foraging along hedgerows.
21:35-21:39	Common pipistrelle	Point F	
21:40-21:44	Common pipistrelle	Walk to point G	
21:45-21:49	Common pipistrelle	Point G	
21:50-21:54	Common pipistrelle	Walk to point H	
21:55-21:59	Common pipistrelle, soprano pipistrelle	Point H	
22:00-22:04	Serotine	Walk to point I	One bat observed foraging around trees.
22:05-22:09	Common pipistrelle	Point I	Brief passes, unseen.
22:10-22:14	Common pipistrelle, soprano pipistrelle	Walk to point J	Near constant feeding and foraging activity recorded. No bats seen.
22:15-22:19	Common pipistrelle	Point J	
22:20-22:24	Common pipistrelle, soprano pipistrelle	Walk to point K	
22:25-22:29	Common pipistrelle, soprano pipistrelle, brown long-eared	Point K	
22:30-22:34	Common pipistrelle	Walk to point L	
22:40-22:44	Common pipistrelle, soprano pipistrelle, Myotis	Walk to point M	Brief passes, unseen.
22:45-22:49	Common pipistrelle	Point M	
23:05-23:09	Common pipistrelle	Point O	
23:10-23:14	Common pipistrelle	Walk to point P	
23:15-23:19	Common pipistrelle, soprano pipistrelle	Point P	

Survey summary of activity transect on 30/07/2020 - Transect 4.

Time	Species	Location of bat(s)	Activity
21:05-21:09	Common pipistrelle	Point C	Single pass, unseen.
21:10-21:14	Common pipistrelle	Walk to point D	Bats observed foraging and commuting east to west along hedgerows.
21:15-21:19	Common pipistrelle	Point D	
21:20-21:24	Common pipistrelle	Walk to point E	One bat observed commuting north to south along hedgerow.
21:30-21:34	Soprano pipistrelle	Walk to point F	Feeding buzzes and foraging calls recorded. Bats observed foraging around hedgerows and trees, and commuting along tree lines.
21:35-21:39	Soprano pipistrelle	Point F	
21:40-21:44	Common pipistrelle	Walk to point G	
21:45-21:49	Common pipistrelle	Point G	
21:50-21:54	Common pipistrelle, soprano pipistrelle	Walk to point H	
21:55-21:59	Common pipistrelle, Myotis	Point H	
22:00-22:04	Soprano pipistrelle	Walk to point I	
22:05-22:09	Soprano pipistrelle	Point I	
22:15-22:19	Common pipistrelle	Point J	
22:20-22:24	Common pipistrelle, soprano pipistrelle, noctule	Walk to point K	Single passes, unseen.
22:30-22:34	Common pipistrelle	Walk to point L	Bats observed foraging and commuting east to west along hedgerow.
22:35-22:39	Common pipistrelle	Point L	Unseen. Low level of activity.
22:45-22:49	Noctule	Point M	
22:50-22:54	Common pipistrelle	Walk to point N	
22:55-22:59	Soprano pipistrelle	Point N	
23:15-23:19	Common pipistrelle	Point P	

Survey summary of activity transect on 30/07/2020 - Transect 5.

Time	Species	Location of bat(s)	Activity
21:15-21:19	Soprano pipistrelle	Point D	Single passes, unseen.
21:25-21:29	Noctule	Point E	
21:30-21:34	Common pipistrelle, soprano pipistrelle	Walk to point F	
21:35-21:39	Common pipistrelle, soprano pipistrelle, noctule	Point F	Feeding buzzes and foraging calls recorded. Bats observed foraging over arable land.
21:40-21:44	Common pipistrelle	Walk to point G	
21:45-21:49	Common pipistrelle	Point G	
21:50-21:54	Common pipistrelle	Walk to point H	
21:55-21:59	Common pipistrelle	Point H	
22:05-22:09	Common pipistrelle	Point I	Feeding buzzes and foraging calls recorded. No bats seen.
22:10-22:14	Common pipistrelle	Walk to point J	
22:15-22:19	Common pipistrelle	Point J	
22:35-22:39	Common pipistrelle	Point L	Brief passes, unseen.
22:40-22:50	Common pipistrelle	Walk to point M	
22:55-22:59	Common pipistrelle	Walk to point N	
23:00-23:04	Common pipistrelle	Point P	Near constant feeding and foraging activity. No bats seen.
23:05-23:09	Common pipistrelle, soprano pipistrelle	Walk to point Q	

Survey summary of activity transect on 17/09/2020 - Transect 1.

Time	Species	Location of bat(s)	Activity
19:27-19:32	Soprano pipistrelle	Point D	Unseen. Low levels of feeding and foraging activity recorded.
20:17-20:22	Soprano pipistrelle	Point I	
20:50-20:55	Common pipistrelle, unidentified bat	Point L	
21:15-21:20	Common pipistrelle, soprano pipistrelle	Point N	
21:30-21:35	Common pipistrelle	Walk to point P	

Survey summary of activity transect on 17/09/2020 - Transect 2.

Time	Species	Location of bat(s)	Activity
20:00-20:04	Common pipistrelle	Walk to point G	Brief passes, unseen.
20:05-20:09	Common pipistrelle, Myotis	Point G	
20:10-20:14	Common pipistrelle	Walk to point H	
20:15-20:19	Common pipistrelle	Point H	
20:25-20:29	Common pipistrelle	Point I	Feeding buzzes and foraging calls recorded. No bats seen.
20:30-20:34	Common pipistrelle	Walk to point J	
20:35-20:39	Common pipistrelle, Myotis	Point J	
20:40-20:44	Common pipistrelle, soprano pipistrelle, Myotis	Walk to point K	Near constant feeding and foraging activity. At least four bats seen foraging along hedgerow.
20:45-20:49	Common pipistrelle, soprano pipistrelle	Point K	
20:50-20:54	Common pipistrelle, soprano pipistrelle	Walk to point L	
21:05-21:09	Common pipistrelle, brown long-eared	Point M	Feeding buzzes and foraging calls recorded. No bats seen.
21:20-21:24	Common pipistrelle, soprano pipistrelle	Walk to point O	Near constant feeding and foraging activity. At least three bats seen foraging along hedgerow.
21:25-21:29	Common pipistrelle, soprano pipistrelle	Point O	Brief passes, unseen.
21:30-21:34	Common pipistrelle	Walk to point P	

Survey summary of activity transect on 17/09/2020 - Transect 3.

Time	Species	Location of bat(s)	Activity
19:55-19:59	Common pipistrelle	Point F	Single pass, unseen.
20:00-20:04	Common pipistrelle	Walk to point G	Near constant feeding and foraging activity around tree.
20:05-20:09	Common pipistrelle	Point G	
20:10-20:14	Common pipistrelle	Walk to point H	
20:30-20:34	Common pipistrelle, soprano pipistrelle, Myotis	Walk to point J	Feeding buzzes and foraging calls recorded. No bats seen.
20:35-20:39	Common pipistrelle, soprano pipistrelle	Point J	
20:40-20:44	Common pipistrelle, soprano pipistrelle	Walk to point K	
20:50-20:54	Common pipistrelle	Walk to point L	
20:55-20:59	Soprano pipistrelle	Point L	
21:00-21:04	Common pipistrelle	Walk to point M	
21:05-21:09	Common pipistrelle	Walk to point N	
21:20-21:24	Common pipistrelle	Walk to point O	
21:25-21:29	Common pipistrelle	Point O	
21:30-21:34	Common pipistrelle	Walk to point P	

Survey summary of activity transect on 17/09/2020 - Transect 4.

Time	Species	Location of bat(s)	Activity
19:25-19:29	Common pipistrelle	Point C	Single pass, unseen.
19:35-19:39	Common pipistrelle, noctule	Point D	One bat observed commuting east to west along hedgerow.
19:45-19:49	Common pipistrelle	Point E	Brief passes, unseen.
19:50-19:54	Common pipistrelle	Walk to point F	
19:55-19:59	Common pipistrelle	Point F	Three bats observed in flight.
20:05-20:09	Common pipistrelle, soprano pipistrelle	Point G	Feeding buzzes and foraging calls recorded. No bats seen.
20:10-20:14	Common pipistrelle	Walk to point H	
20:15-20:19	Common pipistrelle	Point H	
20:20-20:24	Common pipistrelle	Walk to point I	Multiple bats observed commuting along hedgerow.
20:45-20:49	Common pipistrelle, soprano pipistrelle,	Point K	Brief passes, unseen.
20:50-20:54	Common pipistrelle	Walk to point L	
20:55-20:59	Common pipistrelle, soprano pipistrelle, brown long-eared	Point L	
21:00-21:04	Common pipistrelle	Walk to point M	
21:30-21:34	Common pipistrelle, Myotis	Walk to point P	
21:35-21:39	Common pipistrelle	Point P	

Survey summary of activity transect on 17/09/2020 - Transect 5.

Time	Species	Location of bat(s)	Activity
19:30-19:34	Noctule	Walk to point D	Single passes, unseen.
19:45-19:49	Common pipistrelle	Point E	
19:50-19:54	Common pipistrelle	Walk to point F	Feeding buzzes and foraging calls recorded. At least two bats seen foraging.
20:05-20:09	Common pipistrelle	Point G	
20:25-20:29	Common pipistrelle	Point I	
20:37	Brown long-eared	Walk to Point K	Single pass unseen
20:55-20:59	Common pipistrelle, *Myotis* species	Point L	Brief passes, unseen.
21:00-21:04	Common pipistrelle	Walk to point M	Near constant feeding and foraging activity. At least two bats seen.
21:05-21:09	Common pipistrelle, Myotis	Point M	Single passes, unseen.
21:10-21:14	Common pipistrelle	Walk to point N	
21:30-21:34	Common pipistrelle, UID	Walk to point P	
21:35-21:39	Common pipistrelle	Point P	Near constant feeding and foraging activity. At least two bats seen.
21:40-21:44	Common pipistrelle, soprano pipistrelle	Walk to point Q	Single passes, unseen.
21:45-21:49	Soprano pipistrelle	Point Q	

Survey summary of activity transect on 22/10/2020 - Transect 1.

Time	Species	Route	Location of bat(s)	Activity
18:18-18:22	Common pipistrelle	1	Point D	One bat observed in flight.
18:33-18:37	Common pipistrelle	1	Walk to point F	Feeding buzzes and foraging calls recorded. No bats seen.
18:38-18:42	Common pipistrelle	1	Point F	
18:43-18:47	Common pipistrelle	1	Walk to point G	
18:48-18:52	Soprano pipistrelle	1	Point G	
18:53-18:57	Common pipistrelle, soprano pipistrelle	1	Walk to point H	
18:58-19:02	Common pipistrelle, Myotis	1	Point H	

Time	Species	Route	Location of bat(s)	Activity
19:08-19:12	Soprano pipistrelle	1	Point I	Brief passes, unseen.
19:28-19:32	Myotis	1	Point K	
19:33-19:37	Myotis	1	Walk to point L	One bat seen flying along river.
20:03-20:07	Myotis	1	Walk to point O	Single pass, unseen.

Survey summary of activity transect on 22/10/2020 - Transect 2.

Time	Species	Route	Location of bat(s)	Activity
18:11-18:15	Common pipistrelle	2	Point D	Single passes, unseen.
18:30-18:34	Common pipistrelle, soprano pipistrelle	2	Point F	
18:52-18:55	Brown long-eared	2	Point H	
19:01-19:04	Common pipistrelle	2	Point I	
19:51-19:55	Brown long-eared	2	Point N	One bat observed in flight.

Survey summary of activity transect on 22/10/2020 - Transect 3.

Time	Species	Route	Location of bat(s)	Activity
18:38-18:42	Common pipistrelle	3	Point F	Feeding buzzes and foraging calls recorded. No bats seen.
18:43-18:47	Common pipistrelle	3	Walk to point G	
18:48-18:52	Common pipistrelle	3	Point G	Brief passes, unseen.
18:53-18:57	Common pipistrelle	3	Walk to point H	
18:58-19:02	Common pipistrelle	3	Point H	
19:08-19:12	Common pipistrelle, soprano pipistrelle	3	Point I	Feeding buzzes and foraging calls recorded. No bats seen.
19:18-19:22	Common pipistrelle, soprano pipistrelle, Myotis	3	Point J	
19:23-19:27	Common pipistrelle, soprano pipistrelle	3	Walk to point K	
19:38-19:42	Soprano pipistrelle	3	Point L	Brief passes, unseen.
19:53-19:57	Soprano pipistrelle, Myotis	3	Walk to point N	
19:58-20:02	Myotis	3	Point N	

Time	Species	Route	Location of bat(s)	Activity
20:03-20:07	Common pipistrelle, Myotis	3	Walk to point O	

Survey summary of activity transect on 22/10/2020 - Transect 4.

Time	Species	Route	Location of bat(s)	Activity
18:08-18:12	Common pipistrelle, soprano pipistrelle	4	Point C	Bats observed foraging around hedgerows and over arable land.
18:13-18:17	Common pipistrelle	4	Walk to point D	
18:18-18:22	Common pipistrelle	4	Point D	
18:23-18:27	Common pipistrelle, soprano pipistrelle, brown long-eared	4	Walk to point E	
18:33-18:37	Common pipistrelle	4	Walk to point F	Low levels of activity. Bats seen commuting along hedgerows and flying around open grassland.
18:38-18:42	Common pipistrelle	4	Point F	
18:48-18:52	Common pipistrelle	4	Point G	
18:58-19:02	Common pipistrelle	4	Point H	Single passes, unseen.
20:03-20:07	Common pipistrelle	4	Walk to point O	
20:08-20:12	Common pipistrelle	4	Point O	
20:18-20:22	Common pipistrelle	4	Point P	

Survey summary of activity transect on 22/10/2020 - Transect 5.

Time	Species	Route	Location of bat(s)	Activity
18:38-18:42	Common pipistrelle, soprano pipistrelle, Myotis	5	Walk to point L	Brief passes, unseen.
18:43-18:47	Common pipistrelle, soprano pipistrelle	5	Point L	Feeding buzzes and foraging calls recorded. No bats seen.
18:48-18:52	Common pipistrelle	5	Walk to point K	
19:28-19:32	Common pipistrelle, Myotis	5	Walk to point G	Brief passes, unseen.
19:33-19:37	Common pipistrelle	5	Point G	Feeding buzzes and foraging calls recorded. No bats seen.
19:38-19:42	Soprano pipistrelle	5	Walk to point F	Brief passes, unseen.
19:48-19:52	Soprano pipistrelle	5	Walk to point E	

13. ANNEX 6: 2022 TRANSECT RESULTS

Survey summary of activity transect on 26/04/2022 - Transect 1.

Time	Species	Location of bat(s)	Activity
20:40-20:44	Common pipistrelle	Point D	Near constant feeding buzzes and foraging calls recorded. Two bats observed foraging.
20:45-20:49	Soprano pipistrelle	Walk to point E	Feeding buzzes and foraging calls recorded. No bats seen
20:50-20:54	Soprano pipistrelle	Point E	
20:55-20:59	Common pipistrelle, soprano pipistrelle	Walk to point F	
21:00-21:04	Common pipistrelle	Point F	Single pass, unseen.
21:30	Brown long-eared	Point I	Single pass, unseen.
21:50-21:54	Soprano pipistrelle Myotis	Point K	Single pass, unseen.
21:55-21:59	Soprano pipistrelle	Walk to point L	
22:05-22:09	Soprano pipistrelle, Myotis species	Walk to point M	

Survey summary of activity transect on 26/04/2022 - Transect 2.

Time	Species	Location of bat(s)	Activity
20:50-20:54	Common pipistrelle	Point E	Foraging, unseen.
21:00-21:04	Common pipistrelle	Point F	
21:05-21:09	Common pipistrelle	Walk to point G	Single pass, unseen.
22:35-22:39	Myotis species	Walk to point P	Single pass, unseen.

Survey summary of activity transect on 26/04/2022 - Transect 3.

Time	Species	Location of bat(s)	Activity
20:40-20:44	Common pipistrelle	Point D	One bat observed commuting east to west along hedgerow.
20:45-20:49	Common pipistrelle, soprano pipistrelle	Walk to point E	Unseen. Low activity.

Time	Species	Location of bat(s)	Activity
21:05-21:09	Common pipistrelle	Walk to point G	
21:25-21:29	Common pipistrelle	Walk to point I	
21:35-21:39	Common pipistrelle	Walk to point J	

Survey summary of activity transect on 26/04/2022 - Transect 4.

Time	Species	Location of bat(s)	Activity
20:35-20:39	Common pipistrelle	Walk to point D	Foraging calls recorded. No bat seen.
21:00-21:04	Common pipistrelle	Point F	
21:05-21:09	Common pipistrelle	Walk to point G	Single pass, unseen.
21:50-21:54	Common pipistrelle	Point K	Single pass, unseen.

Survey summary of activity transect on 26/04/2022 - Transect 5.

Time	Species	Location of bat(s)	Activity
20:55-20:59	Common pipistrelle	Walk to point F	Single pass, unseen.
21:25-21:29	Common pipistrelle	Walk to point I	Feeding buzzes and foraging calls recorded. No bats seen.
21:30-21:34	Common pipistrelle, serotine	Point I	
22:50-22:54	Common pipistrelle, Myotis	Point Q	

Survey summary of activity transect on 26/04/2022 - Transect 6.

Time	Species	Location of bat(s)	Activity
21:10-21:14	Common pipistrelle, soprano pipistrelle, brown long-eared	Point G	Foraging, unseen.
21:15-21:19	Common pipistrelle, soprano pipistrelle	Walk to point H	
21:50-21:54	Common pipistrelle	Point K	Unseen. Low activity.
22:00-22:04	Common pipistrelle	Point L	
22:25-22:29	Common pipistrelle	Walk to point O	

Survey summary of activity transect on 26/04/2022 - Transect 7.

Time	Species	Location of bat(s)	Activity
20:35-20:39	Common pipistrelle	Walk to point D	Unseen. Low activity.
20:40-20:44	Common pipistrelle, soprano pipistrelle	Point D	
20:45-20:49	Soprano pipistrelle	Walk to point E	
20:55-20:59	Common pipistrelle, soprano pipistrelle	Walk to point F	Feeding buzzes and foraging calls recorded. No bats seen.
21:09-21:11	Common pipistrelle	Point G	
21:18-21:22	Common pipistrelle	Point H	
21:32	Myotis	Point I	
21:44-21:49	Common pipistrelle	Walk to point K	
21:50-21:54	Common pipistrelle	Point K	
22:01-22:09	Common pipistrelle, Myotis	Walk to point M	Unseen. Low activity.
22:25-22:29	Myotis	Walk to point O	

Survey summary of activity transect on 30/05/2022 - Transect 6.

Time	Species	Location of bat(s)	Activity
21:20-21:24	Common pipistrelle, soprano pipistrelle	Point M	Five bats observed foraging around hedgerow.
21:25-21:29	Common pipistrelle	Walk to point K	Bats observed commuting along the hedgerows.
21:35-21:39	Common pipistrelle	Point K	
21:40-21:44	Common pipistrelle, soprano pipistrelle	Walk to point J	Foraging, unseen.
21:45-21:49	Common pipistrelle, soprano pipistrelle	Point J	
22:00-22:04	Soprano pipistrelle	Point I	Circling, foraging and feeding.
22:10-22:14	Common pipistrelle	Point H	
22:15-22:19	Common pipistrelle, soprano pipistrelle	Walk to point G	Unseen. Low activity.
22:20-22:24	Common pipistrelle	Point G	Bats observed commuting north to south along the tree line.
22:25-22:29	Common pipistrelle	Walk to point F	

Time	Species	Location of bat(s)	Activity
22:30-22:34	Common pipistrelle	Point F	Unseen. Low activity.
22:35-22:39	Common pipistrelle	Walk to point E	Circling, foraging and feeding.
22:40-22:44	Common pipistrelle	Point E	
22:50-22:54	Serotine	Point D	Single pass, unseen.

Survey summary of activity transect on 31/05/2022 - Transect 7.

Time	Species	Route	Location of bat(s)	Activity
21:01-21:05	Common pipistrelle	7	Walk to point A	Unseen. Low activity.
21:06-21:10	Common pipistrelle	7	Point A	One bat observed foraging.
21:11-21:15	Common pipistrelle, soprano pipistrelle	7	Walk to point B	Foraging, unseen.
21:21-21:25	Common pipistrelle	7	Walk to point C	Constant feeding buzzes and foraging calls recorded. No bats seen
21:26-21:30	Common pipistrelle, soprano pipistrelle	7	Point C	
21:31-21:35	Soprano pipistrelle	7	Walk to point D	Unseen. Low activity.
21:41-21:45	Common pipistrelle, soprano pipistrelle	7	Walk to point E	Foraging, unseen.
21:46-21:50	Common pipistrelle, soprano pipistrelle	7	Point E	Feeding buzzes and foraging calls recorded for both species. No bats seen
21:51-21:55	Common pipistrelle, soprano pipistrelle	7	Walk to point F	
21:56-22:00	Common pipistrelle, soprano pipistrelle	7	Point F	
22:01-22:05	Common pipistrelle, soprano pipistrelle	7	Walk to point G	
22:06-22:10	Soprano pipistrelle	7	Point G	
22:11-22:15	Soprano pipistrelle	7	Walk to point H	
22:16-22:20	Soprano pipistrelle	7	Point H	Two bats observed constantly foraging along the river.
22:21-22:25	Common pipistrelle, soprano pipistrelle, UID	7	Walk to point I	
22:26-22:30	Common pipistrelle, soprano pipistrelle	7	Point I	

Time	Species	Route	Location of bat(s)	Activity
22:31-22:35	Common pipistrelle, soprano pipistrelle	7	Walk to point J	
22:36-22:35	Soprano pipistrelle	7	Point J	Foraging, unseen.
22:41-22:40	Common pipistrelle, soprano pipistrelle, UID	7	Walk to point K	Two bats observed constantly foraging along the river.
22:46-22:45	Common pipistrelle, soprano pipistrelle	7	Point K	
22:51-22:55	Common pipistrelle, soprano pipistrelle	7	Walk to point L	Unseen. Low activity.
23:01-23:05	Soprano pipistrelle	7	Walk to point M	Foraging, unseen.

Survey summary of activity transect on 16/06/2022 - Transect 6.

Time	Species	Location of bat(s)	Activity
21:44-21:48	Noctule	Point D	One bat observed flying east to west across the Site boundary, flying out of the Site.
21:49-21:53	Noctule	Walk to point E	Single pass, unseen.
21:54-21:58	Noctule	Point E	Single pass, unseen.
22:04-22:08	Common pipistrelle	Point F	Foraging, unseen.
22:09-22:13	Common pipistrelle	Walk to point G	Foraging along hedgerow.
22:14-22:18	Common pipistrelle	Point G	
22:19-22:23	Common pipistrelle	Walk to point H	Foraging, unseen.
22:24-22:28	Common pipistrelle	Point H	
22:29-22:33	Common pipistrelle	Walk to point I	
22:39-22:43	Soprano pipistrelle	Walk to point J	Unseen. Low activity.
22:44-22:48	Common pipistrelle	Point J	
22:59-23:03	Common pipistrelle	Walk to point L	
23:04-23:08	Common pipistrelle, soprano pipistrelle	Point L	Circling, foraging and feeding.

Survey summary of activity transect on 16/06/2022 - Transect 7.

Time	Species	Location of bat(s)	Activity
21:44-21:48	Soprano pipistrelle, noctule	Point D	Circling and foraging.
21:59-22:03	Soprano pipistrelle	Walk to point F	Unseen. Low activity.
22:04-22:08	Common pipistrelle, *Myotis* species	Point F	
22:09-22:13	Common pipistrelle	Walk to point G	
22:24-22:28	Common pipistrelle	Point H	
22:46-22:50	Common pipistrelle	Point K	
23:09-23:13	Common pipistrelle, soprano pipistrelle, *Myotis* species	Walk to point M	
23:34-23:38	Common pipistrelle, soprano pipistrelle, Brown long-eared	Point O	

Survey summary of activity transect on 25/07/2022 - Transect 6.

Time	Species	Route	Location of bat(s)	Activity
21:29-21:33	Noctule	6	Walk to point J	Unseen. Low activity.
21:44-21:48	Common pipistrelle	6	Point I	
21:49-21:53	Common pipistrelle	6	Walk to point H	
21:54-21:58	Common pipistrelle	6	Point H	
21:59-22:03	Common pipistrelle	6	Walk to point G	Feeding buzzes and foraging calls recorded. No bats seen.
22:04-22:08	Common pipistrelle	6	Point G	
22:09-22:13	Common pipistrelle, soprano pipistrelle	6	Walk to point F	
22:14-22:18	Common pipistrelle	6	Point F	
22:19-22:23	Common pipistrelle	6	Walk to point E	
22:29-22:33	Common pipistrelle	6	Walk to point D	
22:34-22:38	Common pipistrelle	6	Point D	
22:39-22:43	Common pipistrelle	6	Walk to point C	
22:44-22:48	Common pipistrelle, soprano pipistrelle	6	Point C	Unseen. Low activity.

Time	Species	Route	Location of bat(s)	Activity
22:54-22:58	Common pipistrelle	6	Point B	
23:04-23:08	Common pipistrelle	6	Point A	

Survey summary of activity transect on 25/07/2022 - Transect 7.

Time	Species	Route	Location of bat(s)	Activity
21:34-21:38	Common pipistrelle, soprano pipistrelle	7	Point E	Foraging, unseen.
21:39-21:43	Soprano pipistrelle, noctule	7	Walk to point F	
21:44-21:48	Common pipistrelle, soprano pipistrelle	7	Point F	Unseen. Low activity.
21:49-21:53	Common pipistrelle	7	Walk to point G	
21:54-21:58	Common pipistrelle, soprano pipistrelle	7	Point G	Foraging, unseen.
22:04-22:08	Common pipistrelle, soprano pipistrelle	7	Point H	
22:14-22:18	UID	7	Point I	Unseen. Low activity.
22:24-22:28	Soprano pipistrelle	7	Point J	
22:44-22:48	UID	7	Point J	
22:59-23:03	Common pipistrelle	7	Walk to point H	Foraging along tree line.
23:09-23:13	Common pipistrelle	7	Walk to point G	
23:14-23:18	Common pipistrelle	7	Point G	
23:24-23:28	UID	7	Point F	Single pass, unseen.
23:29-23:33	Common pipistrelle, soprano pipistrelle	7	Walk to point E	Foraging, unseen.
23:34-23:38	Soprano pipistrelle	7	Point E	
23:39-23:43	Common pipistrelle	7	Walk to point D	
23:44-23:48	Common pipistrelle, soprano pipistrelle, UID	7	Point D	Constant foraging along hedgerow.
23:49-23:53	Common pipistrelle, soprano pipistrelle	7	Walk to point C	
23:54-23:58	Common pipistrelle	7	Point C	Foraging, unseen.

Time	Species	Route	Location of bat(s)	Activity
00:09-00:13	Common pipistrelle	7	Walk to point A	
00:14-00:18	Common pipistrelle, soprano pipistrelle	7	Point A	

Survey summary of activity transect on 22/08/2022 - Transect 6.

Time	Species	Location of bat(s)	Activity
20:39-20:43	Common pipistrelle	Walk to point E	Feeding buzzes and foraging calls recorded. No bats seen.
20:44-20:48	Common pipistrelle	Point E	
20:49-20:53	Common pipistrelle	Walk to point F	
20:54-20:58	Common pipistrelle, Myotis species	Point F	
20:59-21:03	Common pipistrelle	Walk to point G	
21:04-21:08	Common pipistrelle	Point G	
21:09-21:13	Common pipistrelle, Myotis species	Walk to point H	
21:14-21:18	Common pipistrelle	Point H	
21:19-21:23	Common pipistrelle	Walk to point I	
21:24-21:28	Common pipistrelle	Point I	
21:34-21:38	Common pipistrelle	Point J	
21:49-21:53	Common pipistrelle	Walk to point L	
21:54-21:58	Common pipistrelle, noctule, Myotis species	Point L	Foraging, unseen.
21:59-22:03	Common pipistrelle	Walk to point M	Unseen. Low activity.
22:04-22:08	Common pipistrelle, soprano pipistrelle	Point M	
22:09-22:13	Soprano pipistrelle	Walk to point N	
22:14-22:18	Common pipistrelle	Point N	

Survey summary of activity transect on 22/08/2022 - Transect 7.

Time	Species	Route	Location of bat(s)	Activity
20:34-20:38	Soprano pipistrelle	7	Point I	Single pass, unseen.
20:39-20:43	Common pipistrelle, soprano pipistrelle	7	Walk to point H	Two bats observed commuting west to east and east to west along the river course.
20:44-20:48	Common pipistrelle	7	Point H	Unseen. Low activity.
20:49-20:53	Common pipistrelle	7	Walk to point G	
20:54-20:58	Common pipistrelle, soprano pipistrelle	7	Point G	
20:59-2103	Common pipistrelle	7	Walk to point F	
21:04-21:08	UID	7	Point F	
21:24-21:28	Common pipistrelle	7	Point D	
21:39-21:43	Noctule	7	Walk to point B	

Survey summary of activity transect on 26/09/2022 - Transect 6.

Time	Species	Route	Location of bat(s)	Activity
20:31-20:35	Common pipistrelle	6	Walk to point C	One bat observed commuting along the river course.

Survey summary of activity transect on 26/09/2022 - Transect 7.

Time	Species	Route	Location of bat(s)	Activity
18:46-21:36	n/a	7	Full route walked	No activity.

Survey summary of activity transect on 03/10/2022 - Transect 6.

Time	Species	Route	Location of bat(s)	Activity
19:06-19:10	Common pipistrelle	6	Walk to point E	One bat observed commuting north to south along the tree line.
19:26-19:30	Common pipistrelle, soprano pipistrelle	6	Walk to point G	Feeding buzzes and foraging calls recorded. No bats seen.
19:31-19:35	Common pipistrelle	6	Point G	
19:46-19:50	Common pipistrelle	6	Walk to point I	
19:51-19:22	Common pipistrelle	6	Point I	
19:56-20:00	Common pipistrelle	6	Walk to point J	Unseen. Low activity.
20:16-20:20	Soprano pipistrelle	6	Walk to point L	
20:26-20:30	Soprano pipistrelle	6	Walk to point M	
20:31-20:35	Common pipistrelle, UID	6	Point M	

Survey summary of activity transect on 03/10/2022 - Transect 7.

Time	Species	Route	Location of bat(s)	Activity
18:36-18:40	Noctule	7	Point L	Unseen. Low activity.
18:46-18:50	Soprano pipistrelle	7	Point K	
19:06-19:10	Common pipistrelle	7	Point I	
19:26-19:30	UID	7	Point F	
19:31-19:35	Common pipistrelle	7	Walk to point E	
20:06-20:10	Common pipistrelle, UID	7	Point C	

Stonestreet Green Solar

Appendix 9.5i: Hazel Dormouse Survey Report

CONTENTS

1. EXECUTIVE SUMMARY

S.1 Lloydbore Ltd. were commissioned by EPL 001 Limited (the 'Applicant') to conduct a hazel dormouse presence / likely absence survey to inform the proposed Stonestreet Green Solar scheme ('Project').

S.2 The location of the Project is shown on **ES Volume 3, Figure 1.1: Site Location Plan (Doc Ref. 5.3)**. The Project will be located within the Order limits (the land shown on the **Works Plans (Doc Ref. 2.3)** within which the Project can be carried out). The Order limits plan is provided as **ES Volume 3, Figure 1.2: Order Limits (Doc Ref. 5.3)**. Land within the Order limits is known as the 'Site'.

S.3 The Site area is approximately 192 ha located Aldington to the south-east of Ashford in Kent. The Project lies within the administrative areas of Kent County Council ('KCC') and Ashford Borough Council ('ABC') local authorities. Further information on the Project, including proposed infrastructure and design, is provided in **ES Volume 2, Chapter 3: Project Description (Doc Ref. 5.2)**.

S.4 Following completion of initial habitat assessment surveys during 2020 and 2022 as part of **ES Volume 4, Appendix 9.4: Preliminary Ecological Appraisal (Doc Ref. 5.4)**, suitable habitat for dormouse was identified throughout the Site, primarily boundary hedgerows, tree lines and woodland areas.

S.5 A hazel dormouse presence / likely absence survey of these habitats (the 'Survey Area') was therefore undertaken between July 2020 and November 2022 (inclusive) to better assess whether hazel dormouse is present.

S.6 Evidence of hazel dormouse presence was recorded throughout the Site throughout the hedgerow network, with confirmed presence of hazel dormouse recorded within Parcels A, B and C and possible presence of hazel dormice recorded within Parcels D and E.

S.7 Good practice guidance (the *Dormouse Conservation Handbook*) states that, once hazel presence is recorded on a site, it should be assumed that all suitable habitat is occupied by this species. The Site has been assessed overall as being of Local importance for hazel dormice.

S.8 Appropriate avoidance, mitigation and compensation measures will be devised and implemented for hazel dormice for the Project.

S.9 A hazel dormouse European Protected Species Mitigation ('EPSM') licence will need to be obtained from Natural England to facilitate development. The EPSM licence can only be applied for once consent has been granted for the Project.

S.10 The associated **ES Volume 2, Chapter 9: Biodiversity (Doc Ref. 5.2)** and the **Outline Landscape and Ecological Management Plan (LEMP) (Doc Ref. 7.10)** details avoidance, mitigation, compensation and enhancement measures relating to hazel dormice, and the full detail of such measures will be finalised within an EPSM.

2. INTRODUCTION

2.1 This Hazel Dormouse Survey report has been prepared on behalf of EPL 001 Limited ('the Applicant') to assess the presence/absence of Hazel Dormouse (*Muscardinus avellanarius*) in relation to the Development Consent Order ('DCO') application for Stonestreet Green Solar ('the Project').

2.2 This Hazel Dormouse Survey Report is **Appendix 9.5i** to **ES Volume 2, Chapter 9: Biodiversity (Doc Ref. 5.2)**.

THE PROJECT

2.3 The Project comprises the construction, operation and decommissioning of solar photovoltaic ('PV') arrays and energy storage, together with associated infrastructure and an underground cable connection to the existing National Grid Sellindge Substation.

2.4 The Project will include a generating station (incorporating solar arrays) with a total capacity exceeding 50 megawatts ('MW'). The agreed grid connection for the Project will allow the export and import of up to 99.9 MW of electricity to the grid. The Project will connect to the existing National Grid Sellindge Substation via a new 132 kilovolt ('kV') substation constructed as part of the Project and cable connection under the Network Rail and High Speed 1 ('HS1') railway.

2.5 The location of the Project is shown on **ES Volume 3, Figure 1.1: Site Location Plan (Doc Ref. 5.3)**. The Project will be located within the Order limits (the land shown on the **Works Plans (Doc Ref. 2.3)** within which the Project can be carried out). The Order limits plan is provided as **ES Volume 3, Figure 1.2: Order Limits (Doc Ref. 5.3)**. Land within the Order limits is known as the 'Site'.

SITE DESCRIPTION

2.6 The Site area is approximately 192 ha located Aldington to the south-east of Ashford in Kent. The Project lies within the administrative areas of Kent County Council ('KCC') and Ashford Borough Council ('ABC') local authorities. Further information on the Project, including proposed infrastructure and design, is provided in **ES Volume 2, Chapter 3: Project Description (Doc Ref. 5.2)**.

2.7 The Site comprises agricultural fields delineated by hedgerows and tree belts. It extends to approximately 192 hectares and is currently predominantly used for arable cropping and grazing.

2.8 The Site also supports hedgerow, parcels of woodland, drainage ditches, ponds and arable field margins. The East Stour River flows in an east to west direction within, and adjacent to, the northern part of the Site.

2.9 Fields are described in relation to the Project as follows:

- The South Western Area, Fields 1 to 9.

- The Central Area, Fields 10 to 19 and 23 to 25.
- The South Eastern Area, Fields 20 to 22.
- The Northern Area, Fields 26 to 29.
- Project Substation (location of the Project Substation, in the north western section of Field 26).
- 'Cable Route Corridor' (export of electricity from the Project at 132 kilovolt ('kV') via underground cables (the 'Grid Connection Cable') to the Sellindge Substation). 'Cable Route Crossing' (use of an existing cable duct under the High Speed 1 / Channel Tunnel Rail Link ('HS1') railway or through Horizontal Directional Drilling ('HDD') beneath HS1 for the Cable Route Corridor).
- Sellindge Substation (location of the existing Sellindge Substation).

SCOPE

2.10 The survey was conducted between July 2020 and November 2022 (inclusive).

2.11 The 'Survey Area' consisted of suitable dormouse habitats within the Site which was sub-divided into survey parcels as shown in Annex 3.

SURVEY OBJECTIVES

2.12 The objectives of the survey and report are to: -

- Assess the suitability of on-Site and boundary habitats within the Survey Area for hazel dormouse;
- Identify whether any hazel dormice are present within on-Site and boundary habitats within the Survey Area;
- If hazel dormouse presence is confirmed, assess the importance of on-Site and boundary habitats within the Survey Area for hazel dormouse;
- Determine whether avoidance, mitigation and/or compensation measures are required in relation to hazel dormouse; and
- Confirm whether a hazel dormouse European Protected Species Mitigation ('EPSM') licence will need to be obtained from Natural England (the Statutory Nature Conservation Organisation for England) to facilitate development.

3. METHODOLOGY

DESK STUDY

3.1 A biological records search was undertaken by Kent and Medway Biological Records Centre ('KMBRC') in April 2022 and updated in August 2023. The data set obtained through this search includes records of legally protected species, such as hazel dormouse. A 1km search radius was used.

3.2 Natural England's Multi Agency Geographic Information for the Countryside (MAGIC) interactive mapping software was used to search for granted hazel dormouse EPSM licences located within a 5km radius of the Survey Area boundaries.

3.3 Aerial imagery and mapping software were used to assess the connectivity of on-Site habitats to any wider network of hedgerows, woodland and other habitats that are, or may be, suitable for hazel dormouse.

HABITAT ASSESSMENT

3.4 A Preliminary Ecological Appraisal ('PEA') (**ES Volume 4, Appendix 9.4: Preliminary Ecological Appraisal (Doc Ref. 5.4)**) of the Survey Area was undertaken in April 2020 by a competent expert. An update PEA survey was undertaken in 2022 (during spring and summer) to update the habitat baseline.

3.5 Further updated baseline habitat survey work, including habitat condition assessment, was also conducted in June to July 2023. A habitat assessment of the previously inaccessible Sellindge substation area was carried out on 10th January 2024.

3.6 The PEA survey visits were used to assess the suitability of habitats within the Site for hazel dormouse.

NEST TUBE SURVEY (PRESENCE / LIKELY ABSENCE)

METHODOLOGY

3.7 Hazel dormice are usually active between April and November (inclusive), dependent on the prevailing weather conditions. They will readily use nest tubes for nest building and/or shelter.

3.8 The Dormouse Conservation Handbook (Bright, Morris, & Mitchell-Jones, 2006) recommends that presence / likely absence surveys should utilise a minimum of 50 nest tubes, deployed at a density of one tube per 20m within suitable dormouse habitat (Bright, Morris, & Mitchell-Jones, 2006; Chanin & Woods, Surveying dormice using nest tubes: results and experiences from the South West Dormouse Project. English Nature Research Report 524., 2003). Natural England standing advice states that survey tubes should be deployed at 15-20m intervals (Natural England, Standing advice: Guidance: Hazel or common dormice: surveys and mitigation for development projects., 2015).

Nest tubes were affixed to horizontal or near-horizontal branches of woody vegetation such as hedgerows within all areas of suitable dormouse habitat within the 'Survey Area' (see Annex 3).

3.9 Surveyors searched each tube for signs of hazel dormouse occupancy, which include: -

- Hazel dormouse nests;
- Distinctive feeding remains; and
- Hazel dormice.

3.10 Evidence of use by other small mammals, such as wood mouse (*Apodemus sylvaticus*) or yellow-necked mouse (*A. flavicollis*), shrews and/or birds was also recorded, and any nest tube occupancy by these species was considered when assessing the detectability of hazel dormice.

3.11 The structure of a 'typical' hazel dormouse nest comprises a tightly woven central structure encased within green leaves.

3.12 Wood mouse and yellow-necked mouse (*Apodemus* sp.) nests comprise a loose mass of dead brown leaves that are not woven, lack a 'roof' and become fragmented and untidy over time ((Bright, Morris, & Mitchell-Jones, 2006).

3.13 A point-based scoring system within *The Dormouse Conservation Handbook* is used to assess survey results (Bright, Morris, & Mitchell-Jones, 2006). Each month across the period April to November (inclusive) carries an associated index of probability score based on the likelihood of finding dormice in 50 nest tubes or boxes (see Table 1).

Table 1 Index of probability of finding dormice present in 50 nest tubes in any one month (as taken from (Bright, Morris, & Mitchell-Jones, 2006)).

Month	Index of Probability/Score
April	1
May	4
June	2
July	2
August	5
September	7
October	2
November	2

3.14 A minimum of 20 points are required to indicate a likely absence of hazel dormouse from a survey area.

3.15 Nest tubes or boxes do not need to be checked every month to be awarded the associated monthly points. Instead, they can be checked every other month if needed.

SURVEY AREA, DATES AND PERSONNEL

3.16 712 nest tubes were placed within suitable dormouse habitat (primarily suitable hedgerows throughout the Site connected to nearby woodlands) within Parcels A - D within the Survey Area in May and June 2020 by Lloydbore Ltd surveyors (see Table 2).

An additional 63 nest tubes were installed within Parcel E within the Survey Area in April 2022 due to an extension of the red-line boundary The exact locations in which the nest tubes were placed are included within Annex 3.

3.17 Habitat survey compartments have been used within the survey to indicate tube locations within a given land Parcel (see Appendix 4).

Table 2 Number of tubes installed within Survey Area in 2020 and 2022

Parcel	Land Parcel	No. of Tubes	Year tubes installed
A	Southwestern Area	306	2020
B	Southwestern Area and off-Site fields to east	202	
C	Northern Area	81	
D	Southeastern Area and off-Site field to south	123	
E	Central Area	63	2022

3.18 17 survey visits were conducted between July 2020 and November 2022. The survey visits were organised and led by Victoria Harrison (2017-32572-CLS-CLS) with individual surveys led by other suitably licenced and experienced ecologists. Multiple Lloydbore Ltd surveyors assisted with the survey visits.

3.19 Details of survey visits are shown in Table 3.

Table 3 Survey timing, surveyors, weather and compartment per visit

Date	Surveyors	Time	Weather	Survey compartments
10/07/2020	Victoria Harrison; Emily Thomson; Jason Armstrong; Peter Walker	10:00 / 16:00	Dry, 20 degrees, 10% cloud cover, light breeze	i, ii, iii, iv, v, vi, vii, viii, ix, x, xi, xii, xiii, xxiii, xiv and xxvi
28/07/2020	Victoria Harrison; Louise Gower; Peter Walker; Jason Armstrong	10:00 / 15:30	Dry, 19 degrees, 10% cloud cover, moderate breeze	xiv, xi, xv, xvi, xvii, xviii, xx, xxi, xxii, xxix, xxv, xxvii, xxviii and xxx
23/10/2020	Victoria Harrison; Nichola Stapleton	09:26 / 15:05	11 degrees, dew. Rain at end of survey. 100 cloud cover.	xix, xviii, xx, xxi, xxii, xxiii, xxiv, xxv and xxvi
30/10/2020	Victoria Harrison; Fran Jordan; Emily Cummins; Naomi Cornwell	09:48 / 16:00	15 degrees, wet ground, overcast	i, ii, iii, ix, v, vi, viii, xxix, xxvii, xxviii, xxx, iv, xvi and xvii
20/11/2020	Victoria Harrison; Philip Ames	09:04 / 14:00	2 degrees, overcast, dry	xxii, xxiii xix, xviii, xx, xxi, xvi and xvii
23/11/2020	Emily Cummins; Nina Marie Rygh	09:00 / 14:00	Dry, 10 degrees, 15% cloud cover, gentle breeze	xxiv, xxv, xxvi, xxix, xxvii, xxviii and xxx
25/11/2020	Victoria Harrison; Nina Marie Rygh; Samantha Dawson; Fran Jordan	09:15 / 12:50	Overcast, 10 degrees, damp ground	i, ii, iii, ix, v, vi, vii, viii, x, xi, xii, xiii, xiv, xv and iv
22/10/2021	Victoria Harrison; Samuel Durham; Daisy Kemp; Susanna Clerici	10:30 / 15:40	Sunny, 5 degrees, damp ground	xx, xix, xxi, xxix, xxviii, xxvii, xxx, xxiii, xxvi, xxiv and xxii
04/11/2021	Victoria Harrison; Fran Jordan	09:15 / 14:20	9.5 degrees, dry, gentle breeze	ix, v, vi, vii, viii, x, xi, xii and iv
11/11/2021	Victoria Harrison; Nichola Stapleton	09:28 / 13:38	Dry, 11 degrees, 100% cloud cover	i, ii, iii, xxi, xvi and xvii

Date	Surveyors	Time	Weather	Survey compartments
25/05/2022	Victoria Harrison; Nichola Stapleton	09:30 / 16:00	Dry, 18 degrees, 40% cloud cover, gentle breeze	xxix, xiv, xxxi, xxxii, xxxiii and xxxiv.
15/06/2022	Victoria Harrison; Jaime Turner	09:33 / 16:44	Dry, 20 degrees, 40% cloud cover, calm.	ix, xxiii, xxiv, xxv, xxvi, xxxi, xxxii, xxxiii and xxxiv.
13/07/2022	Victoria Harrison; Jessica Callaghan	06:23 / 10:36	Dry, 19.5 degrees, 0% cloud cover, calm, slightly damp ground.	ix, xxiii, xxiv, xxv, xxvi, xxxi, xxxii, xxxiii and xxxiv.
26/08/2022	Victoria Harrison; Jessica Callaghan	10:35 / 10:49	Dry, 20 degrees, 14% cloud cover, calm	ix, xxiii, xxiv, xxv and xxvi.
06/10/2022	Jason Armstrong; Jaimé Turner	09:30 / 14:35	Slightly damp, 11 degrees, 0% cloud cover, light air	ix, xxiii, xxiv, xxv, xxvi, xxxi, xxxii, xxxiii and xxxiv.
25/10/2022	Jason Armstrong; Jaimé Turner	09:57 / 11:36	Slightly damp, strong intermittent sunlight, 13 degrees, 0% cloud cover, calm	ix, xxiii, xxiv, xxv and xxvi.
22/11/2022	Jason Armstrong; Jaimé Turner	10:32 / 14:06	Wet, clear sun, 8-10 degrees, 15% cloud cover, light air	ix, xxiii, xxiv, xxv, xxvi, xxxi, xxxii, xxxiii and xxxiv.

ASSESSMENT AND EVALUATION

3.20 *The Dormouse Conservation Handbook* (Bright, Morris, & Mitchell-Jones, 2006) and associated guidelines have been used to: -

- Assess the suitability of on-site and adjacent habitats for hazel dormouse; and
- Inform the scope of survey works required to determine presence / likely absence of hazel dormouse.

3.21 Natural England's standing advice which is a material consideration at planning, also provides details on survey methodology and how the implementation of mitigation measures, such as using recognised techniques at the appropriate time of year, can reduce the scope of survey work required (Natural England, Standing advice: Guidance: Hazel or common dormice: surveys and mitigation for development projects., 2015).

3.22 The assessment of the importance of on-site habitats for hazel dormice has been informed by guidance set out in *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine* (CIEEM, Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.2. (Updated April 2022)., 2018) and thresholds for 'county' level importance derived from *Local Wildlife Sites in Kent. Criteria for Selection and Delineation* (Kent Wildlife Trust, Local Wildlife Sites in Kent. Criteria for Selection and Delineation. Version 1.7. June 2022. Tyland Barn, Kent., 2022).

ZONE OF INFLUENCE (ZOI)

3.23 The potential impact(s) of a project are not always limited to the boundaries of the site concerned. A project may also have the potential to result in impacts upon ecologically important sites, habitats or species that are located beyond the site boundaries.

3.24 The area over which a project may impact ecologically important features is known as the Zone of Influence ('ZoI').

3.25 The ZoI is determined by the source / type of impact, the potential pathway(s) for that impact and the location and sensitivity of the ecologically important feature(s) beyond the boundary.

3.26 The potential ZoI of a project in relation to hazel dormice is used to determine the extents of the dormouse survey study area.

3.27 A review of the proposals confirmed that there will be localised loss of suitable on-site and boundary dormouse habitat within the Survey Area. Works may also result in impacts on individual animals (e.g., killing and/or injury during site works).

3.28 These potential impacts could adversely affect the favourable conservation status of the wider local hazel dormouse population, but the most significant potential adverse effects would likely be experienced by any hazel dormice present within the Survey Area.

3.29 Therefore, in the absence of appropriate avoidance, mitigation and compensation measures, the potential ZoI of the Project, in relation to hazel dormouse, is likely to extend to the Survey Area and those areas located just beyond the Survey Area boundary.

3.30 Conversely, the proposed habitat creation measures are likely to result in enhancement of the favourable conservation status of any wider local hazel dormouse population, through provision of substantial new areas of suitable habitat that will be managed to benefit reptiles and other wildlife.

3.31 This ZoI was used to establish the required extents of the hazel dormouse presence / likely absence survey, which included all suitable on-site habitat.

LIMITATIONS

3.32 The dormouse survey was limited to the suitable on-Site and boundary habitats for hazel dormice located within the survey area. Throughout the course of the dormouse survey the red line boundary was amended. To date, the red line boundary no longer includes section of Parcel A and areas which were previously not surveyed during 2020 and 2021 were included within the 2022 survey (Parcel E). Given the above, the areas of suitable habitat included during the hazel dormouse presence / likely absence survey are referenced as the Survey Area throughout this document.

3.33 During the survey work, wooden slats (a constituent part of dormouse survey tubes) were found to be missing or damaged on a number of occasions. In addition, given the significant time between the conclusion of the 2021 surveys and the commencement of the 2022 surveys a large number of dormouse tubes had missing or damaged inserts at the start of the 2022 surveys. However, this is not a material limitation because the survey work established hazel dormouse presence on the Survey Area and within these areas; and:

- Those dates when tubes were recorded as missing, damaged or inaccessible are detailed in Annex 7.
- Where possible, missing or damaged tubes, including those that had missing wooden slats were replaced or repaired.

3.34 A number of habitat sections could not be accessed during survey visits completed in 2020, 2021 and 2022 due to the presence of livestock. Habitat section xxii was excluded from the 2022 survey of Parcel C due to health and safety reasons and access limitations associated with the presence of livestock. However, this is not a material limitation because the survey work established hazel dormouse presence and possible presence within the Survey Area.

3.35 Although survey work for some Parcels A to D was completed in 2020, habitats have remained unchanged, and these survey results remain applicable as the distribution of dormouse is unlikely to have significantly altered in the intervening years.

3.36 Throughout the hazel dormouse presence / likely absence survey a number of nests found within nest tubes were categorised as 'possible' hazel dormouse nests or starter nests. The majority of these nests comprised a shredded material internal structure but either were not fully woven or encased with green leaves like a typical hazel dormouse nest. Given the above, in areas where possible hazel dormouse nests were recorded surveys were extended until additional certainty could be provided to the identification of the nests or until presence of confirmed dormouse nests were recorded. This is not considered to be a material limitation to the survey work undertaken given confirmed presence of hazel dormouse has been confirmed and the Parcels within the Survey Area have direct habitat connectivity to locations where presence of hazel dormice was confirmed.

3.37 An ecological survey represents a 'snapshot' in time of the ecological condition of a site. The ecological character of a site can change substantially throughout both the course of a year, and from year to year impacting on the extent and quality of habitats potential to support protected species.

3.38 None of these limitations either singly or in combination is significant enough to affect the baseline, impact assessment and resulting mitigation or enhancement referenced in this report.

LIFESPAN OF SURVEY DATA

3.39 If commencement of site works is delayed beyond 18 months of November 2022 (the date of completion of the latest hazel dormouse survey of the Survey Area), a suitably experienced ecologist will need to undertake a site visit and review the validity of this report. Note that unless habitats change significantly in future years, the baseline presented in this report is expected to be remain unchanged as dormouse are unlikely to further colonise or vacate the Site between years, compared to more mobile species (i.e. birds and bats).

3.40 Dependent on the results if the initial update site visit, an update hazel dormouse presence / likely absence survey may then be required to provide up-to-date baseline survey and to ensure that the project has a robust understanding of project legal risks with regards to hazel dormice.

4. RESULTS

DESK STUDY

4.1 The biological data search returned seven historic records of hazel dormouse located within 1km of the Survey Area. The most recent record (2001) was located *c.*170m east of the Survey Area at the closest point.

4.2 A search of Natural England's MAGIC website returned six records of granted hazel dormouse EPSM licences. The closest granted hazel dormouse EPSM licence is located *c.*2.7km west of the Survey Area and permits the damage and destruction of a resting place and breeding site between 2020 and 2027.

4.3 An assessment of aerial imagery confirmed that on-site habitats are connected to a wider network of extensive off-site hedgerows, scrub areas, woodland and tree lines, including locations where previous EPSM licences were recorded.

HABITAT ASSESSMENT

4.4 The on-Site and boundary hedgerows, tree lines and combined scrub and woodland areas provide *c.*11.3km, *c.*0.45km and *c.*3.2ha of suitable dormouse habitat, respectively.

4.5 Based on the assessment and comparison with the hazel dormouse Habitat Suitability Criteria set out in Annex, the hedgerow within the Survey Area is assessed overall to be of 'medium' quality to hazel dormice - providing opportunities for foraging, shelter and protection.

4.6 The Survey Area is directly connected to a network of off-Site woodland blocks and hedgerows. Off-Site woodland blocks located within the immediate vicinity of the Site area of sufficient size to support hazel dormouse populations and therefore, the off-Site and on-Site hedgerows will allow for dispersal between these areas whilst also providing suitable habitat for dormice.

NEST TUBE SURVEY (PRESENCE / LIKELY ABSENCE) RESULTS

4.7 The locations in which evidence and indicators of hazel dormouse presence and possible presence of hazel dormouse were recorded during the course of the survey visits are included within Annex 5

4.8 In addition, detailed survey results for the hazel dormouse presence / likely absence survey are provided within Annex 7.

4.9 Given evidence of hazel dormouse presence and possible presence was recorded across the Survey Area, a review of the probability score for each area of the Survey Area was not required for the purpose of this hazel dormouse presence / likely absence survey.

4.10 An overview of survey results recorded during the dormouse survey are detailed below.

10TH JULY 2020

4.11 A single likely starter dormouse nest (unoccupied) was recorded within Tube 231 (Parcel A). This nest comprised all hazel (*Corylus avellana)* leaves however, no hazel trees are present within the immediate vicinity, which indicates that animals have dispersed to the tube in order to create a nest.

4.12 In addition to the above, the nest had no odour (indicating an absence of *Apodemus* species) and the structure of the nest was compacted at the end of the nest tube.

28TH JULY 2020

4.13 No evidence of hazel dormouse presence recorded during the survey visit.

23RD OCTOBER 2020

4.14 Two possible dormouse nests were recorded within Tube 271 and 466 (Parcel B) during the survey visit.

4.15 Tube 271 comprised a mixture of green and brown leaves (predominantly green hazel leaves) with some shredded material present (see Photo 1). This nest had a tight structure however, a single *Apodemus* mouse was recorded within the nest at the time of survey and therefore, the structure was compromised.

4.16 Tube 466 comprised a mixture of green and brown leaves (predominantly hawthorn (*Crataegus monogyna*) leaves) and lacked shredded material. The structure of the nest was tight and compact and a central nesting chamber area was present indicating use of the nest.

30TH OCTOBER 2020

4.17 Two possible dormouse nests were recorded within Tubes 103 and 538 (Parcel B) during this survey visit

4.18 A likely dormouse starter nest was recorded within Tube 103 (Parcel A).

4.19 Both nests exhibited some characteristics of a typical dormouse nest however, given a number of factors, it was concluded that these nests be categorised as possible dormouse nests.

20TH OCTOBER 2020

4.20 No evidence of hazel dormouse presence recorded during the survey visit.

23RD OCTOBER 2020

4.21 Four unoccupied possible dormouse starter nests were recorded within Tubes 517 (Parcel C), 549, 568 and 604 (Parcel D). during the survey visit.

25TH NOVEMBER 2020

4.22 Three unoccupied possible dormouse starter nests were recorded within Tubes 103, 158 and 161 (Parcel A) during the survey visit.

22ND OCTOBER 2021

4.23 Two unoccupied possible dormouse nests were recorded within Tubes 536 and 574 (Parcel D) during the survey visit.

4.24 The nest within Tube 536 was dominated by green hazel leaves with very few brown leaves (see Annex 6). The structure was relatively tightly layered at the rear of the nest tube. However, the structure was quite loose at the front of the tube.

4.25 The nest within Tube 574 comprised primarily shredded material with some green leaves (sections of hawthorn leaves). The structure was similar to that of a 'typical' dormouse nest however, a number of characteristics differed leading to a 'possible' dormouse nest classification.

4TH NOVEMBER 2021

4.26 A single unoccupied dormouse nest was recorded within Tube 150 (Parcel A) and one unoccupied possible dormouse nest was recorded within Tube 81 (Parcel A) during the survey visit.

4.27 The nest recorded within this tube comprises a 'typical' dormouse nest as described in the above sections, although the only difference is the leaves surrounding the shredded material central chamber are brown compared to green (see Photo 5).

11TH NOVEMBER 2021

4.28 Three unoccupied dormouse nests within Tubes 399, 400 and 407 (Parcel B) and one unoccupied possible dormouse nest was recorded within 413 (Parcel B) during the survey visit.

4.29 The dormouse nests recorded within Tubes 399 and 400 were dominated by shredded material and generally lacked a presence of leaves (see Photo 6 and Photo 7).

25TH MAY 2022

4.30 No evidence of hazel dormouse presence recorded during the survey visit.

15TH JUNE 2022

4.31 Two unoccupied possible dormouse nests were recorded within Tubes 502 and 521 (Parcel C) during the survey visit.

4.32 In addition to the above, one unoccupied dormouse nest was recorded within Tube 525 during the visit. This nest comprised a 'typical' dormouse nest with a shredded material woven central chamber, encased in green leaves (see Annex 6). The skeleton of a small mammal was recorded within the nest at the time of survey. Given hazel dormice have a very significant dental structure, an analysis of the skull was undertaken during the survey visit and it was confirmed that the dead small mammal was in fact a dormouse, thus confirming presence of the species within the Survey Area.

13TH JULY 2022

4.33 No evidence of hazel dormouse presence recorded during the survey visit.

26TH AUGUST 2022

4.34 No evidence of hazel dormouse presence recorded during the survey visit.

6TH OCTOBER 2022

4.35 A single unoccupied possible dormouse nest was recorded within Tube 757 (Parcel E) during the survey visit.

25TH OCTOBER 2022

4.36 No evidence of hazel dormouse presence was recorded during the survey visit.

22ND NOVEMBER 2022

4.37 No evidence of hazel dormouse presence was recorded during the survey visit.

5. EVALUATION AND RECOMMENDATIONS

EVALUATION

5.1 Hazel dormice are present within the Survey Area.

5.2 Presence of hazel dormice was confirmed in Parcels A, B and C (see Annex 5).

5.3 Possible presence of hazel dormice was confirmed in all Parcels (see Annex 5).

5.4 *The Dormouse Conservation Handbook* states that, once hazel presence is recorded on a site, it should be assumed that all suitable habitat is occupied by this species. Parcels A, B and E have direct landscape level connectivity through hedgerows and therefore, even though only possible presence of hazel dormouse was recorded within Parcel E during the surveys, the suitable habitat within Parcel E is considered occupied by hazel dormice.

5.5 Similarly, Parcel C and D have direct landscape level connectivity through off-Site hedgerows, tree lines and woodland areas and therefore, habitats within Parcel D will also be considered occupied hazel dormice habitat even though only possible evidence of hazel dormouse was recorded during the survey work.

5.6 Based on the amount of habitat present within the Survey Area at the time of survey, and the fact that habitats within the Survey Area represent a constituent part of a wider network of suitable habitat, the Survey Area is assessed as being of 'local' importance for hazel dormice.

RECOMMENDATIONS

5.7 Given the above, appropriate avoidance, mitigation and compensation measures will need to be adopted and implemented to minimise the risk of the proposed works adversely affecting hazel dormice and/or resulting in a legal offence with regards to this species.

5.8 A hazel dormouse EPSM licence will be required from Natural England to facilitate development.

5.9 The EPSM licence will detail the precise mitigation proposals to prevent harm to hazel dormice during works and will provide full detail of the proposed compensatory habitat creation measures, habitat enhancement measures and habitat management measures.

5.10 The EPSM licence will also detail how the Favourable Conservation Status of the hazel dormouse population within and surrounding the Survey Area will be maintained. Replacement habitat will be provided to compensate for the loss of existing dormouse habitat. The compensatory habitat will be in accordance with the conditions of the approved licence.

5.11 An EPSM licence cannot be obtained until full development consent has been granted with all relevant conditions discharged.

5.12 The associated **ES Volume 2, Chapter 9: Biodiversity (Doc Ref. 5.2)** and the **Outline LEMP (Doc Ref. 7.10)** details avoidance, mitigation, compensation and enhancement measures relating to hazel dormice.

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7. ANNEX 1: LEGISLATION

7.1 The Conservation of Habitats and Species Regulations 2017 and the Wildlife and Countryside Act 1981 (as amended) afford legal protection to hazel dormice.

7.2 The specific legal protection afforded to hazel dormice can be found within the Sections and Schedules of the relevant legislation and relevant case law.

7.3 In general, any person that: -

- Damages or destroys a breeding or resting place of hazel dormice. (This is sometimes referred to as the strict liability or absolute offence);
- Deliberately captures, injures or kills a hazel dormouse / dormice;
- Deliberately disturbs hazel dormice, and in particular disturbance likely to impair animals' ability to survive, breed or nurture young, their ability to hibernate and migrate and disturbance likely to have a significant effect on local distribution and abundance;
- Intentionally or recklessly disturbs a hazel dormouse / dormice while occupying a structure or place used for shelter and / or protection (Wildlife and Countryside Act 1981 (as amended)); and
- Intentionally or recklessly obstructs access to any structure or place that a hazel dormouse / dormice use for shelter or protection (Wildlife and Countryside Act 1981 (as amended)).

…may be guilty of an offence under the Conservation of Habitats and Species Regulations 2017 and/or the Wildlife and Countryside Act 1981 (as amended).

7.4 Actions affecting multiple animals can be construed as separate offences and therefore penalties can be applied per animal impacted.

7.5 Under certain circumstances licences can be granted by the Statutory Nature Conservation Organisation (Natural England in England) to permit actions that would otherwise be unlawful.

7.6 There are some very specific defences associated with the Conservation of Habitats and Species Regulations 2010 (as amended), however these are unlikely to apply to construction related projects. The Sections of the Regulations provide further details of these defences.

7.7 The Wildlife and Countryside Act (1981) includes defence for those aspects of the legislation that apply to hazel dormice. These defences are unlikely to apply to construction related projects and do not apply to those acts included in the Conservation of Habitats and Species Regulations 2010 (as amended). The Schedules of the Act provide further details of defences.

7.8 Local authorities have obligations under sections 40 and 41 of the Natural Environment and Rural Communities Act (NERC) 2006 to have regard to the purpose of conserving biodiversity in carrying out their duties.

8. ANNEX 2: HABITAT SUITABILITY CRITERIA - HAZEL DORMOUSE

8.1 For the purpose of this report, habitat suitability criteria developed by Lloydbore Ltd have been used to assess and categorise on-site habitats for hazel dormouse.

8.2 Table 4 has been taken from the Hazel Dormouse Conservation Handbook and details trees and shrubs of value to dormice (Bright, Morris, & Mitchell-Jones, 2006). The presence and percentage cover of tree and shrub species listed in Table 4 informs the suitability criteria set out in Table 5.

Table 4 Trees and shrubs of value to dormice

Species	Description
Hazel	Where present, this is the principal source of food (nuts) for fattening up prior to hibernation. Hazel also supports many insects, including caterpillars, which are potential dormouse food. Hazel forms a continuous understorey of sprawling poles, easy for arboreal activity and is a very valuable (but not essential) species for the dormouse.
Oak	An important source of insect food (including caterpillars). Dormice also eat oak flowers, but acorns are of little value
Honeysuckle	The plant's finely shredded bark is the preferred nesting material used by dormice. Honeysuckle flowers also provide food at a time when few other things are available, with berries later. The climbing strands also offer convenient routes into the trees and provide dense shelter in which to nest.
Bramble	Its flowers and fruits are very important dormouse foods and tend to be available for a long period (especially where the site has slopes which vary the amounts of sunlight on the shrubs) and the thorns provide good protection for nests. Bramble often flowers late, when many other species are over and dormice also eat the berries and seeds in autumn. Dormice seem to thrive where blackberries are abundant, even in the absence of hazel. Bramble is best if scattered among hazels and trees.
Sycamore	A valuable source of insect food and pollen. A useful tree: dormice can survive in habitats with many sycamores. However, sycamores cast a dense shade which reduces the understorey. Thus sycamores should be kept few and scattered, perhaps coppiced to prevent seeding and to reduce the extent of shading.
Ash	Ripening seeds ('keys') are eaten whilst they are still on the tree, but ash supports few food insects. The canopy does not cast a dense shade, but generally ash woodlands are not good habitat.

Species	Description
Wayfaring tree	Fruits in late summer when little else may be available. Dormice eat the seeds and probably also the flowers.
Yew	The fruits are a favoured food and dormice will make special excursions to reach them, but the seeds are not eaten.
Hornbeam	Seeds are small and hard, but dormice eat them. The advantage is that they are too small to be attractive to squirrels, so they may form an alternative food where squirrels have taken most of the hazel nuts. Fruiting is erratic.
Broom	Flowers are eaten in early summer.
Sallow	Unripe seeds are eaten from the flowers in early summer. Sallow also supports many insects
Birch	The catkins are over too early in the year to be much use to dormice, but they can eat the seeds. These are too small to attract squirrels and may provide support where squirrels compete for hazel nuts.
Sweet chestnut	Chestnuts are an excellent food source and dormice may also eat the flowers.
Blackthorn	Fruits (kernels) are eaten but the flowers come too early in the year. Dense blackthorn thickets tend to be avoided where alternative shrubs are available.
Hawthorn	Flowers are an important food in the spring. The fruits are eaten occasionally.
Conifers	Little is known about the use made of these trees by dormice, but they often support many aphids and caterpillars – potential dormouse food. The trees may also provide shelter from the wind and rain in exposed sites.
Other species such as cherry, crab apple, holly, ivy.	Little is known about the value of these trees to dormice, but it is likely that they will eat the pollen (stamens) and perhaps fruits. Ivy is a useful source of food insects and its evergreen tangles among tree branches are often used for summer nesting sites.

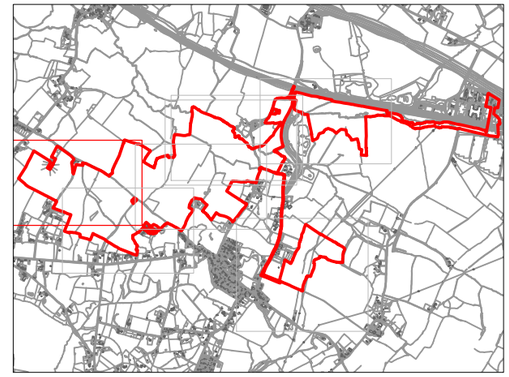
8.3 The below habitat suitability criteria have been adapted based on the ecology and specific ecological requirements of this hazel dormice.

Table 5 Habitat suitability criteria for hazel dormouse

Habitat suitability	Description	Criteria (Habitat suitability based on meeting at least 3 of the criteria stated within the below sections)
High	Provides opportunities for foraging, shelter, protection and hibernation.	5 or more native tree and/or shrub species of value to dormice present (as per list provided in Annex 2. Dense canopy, understorey and/or shrub layer (as present) with good aerial connectivity. Abundant 'summer' nesting opportunities - e.g. dense bushes/shrubs, hollow tree branches, squirrel dreys and old bird nests. Abundant hibernation opportunities - e.g. log piles, hollow tree stumps, coppice stools and debris piles.
Medium	Provides opportunities for foraging, shelter and protection.	Between 2 and 4 native tree and/or shrub species of value to dormice present. Sub-optimal aerial connectivity (non-continuous / 'gappy' canopy, understorey and/or shrub layer (as present)). Frequent nesting opportunities - e.g. dense bushes/shrubs, hollow tree branches, squirrel dreys and old bird nests. Occasional or rare hibernation opportunities - e.g. log piles, hollow tree stumps, coppice stools and debris piles.
Low	Provides opportunities for foraging only.	0 or 1 native tree or shrub species of value to dormice present. Canopy, understorey and/or shrub layer (as present) are 'sparse,' with poor / infrequent aerial connectivity. No nesting opportunities. No hibernation opportunities.
Negligible	Does not provide any opportunities for hazel dormouse.	Un-vegetated areas, includes bare ground and buildings.

9. ANNEX 3: NEST TUBE LOCATIONS

[SEE OVERLEAF]



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LEGEND:

- Location of hazel dormouse nest tube
- Section of dormouse habitat surveyed
- h2 - Hedgerow
  Total length approx: 11301.1 m.
- w1d - Wet woodland
  Total area approx: 0.790 ha.
- w1f - Lowland mixed deciduous woodland
  Total area approx: 1.230 ha.
- w1g6 - Line of trees
  Total length approx: 449.2 m.
- h3h - Mixed scrub
  Total area approx: 1.176 ha.
- Order limits
  Total area approx: 191.538 ha.

0 30 60 m

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rev.	rev. date	auth.	rev. note
C01	15/05/24	MW	Cleint approved for submission.

rev.	rev. date	auth.	rev. note

client. **EPL 001 Limited**

project.
Stonestreet Green Solar
Land North And West Of Aldington
Kent

drawing no. **5535-LLB-XX-XX-DR-Ec-0041** rev. **C01**

drawing title.
Dormouse Survey Plan

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Parcel A1

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drawn. **NA**
checked. **MW**

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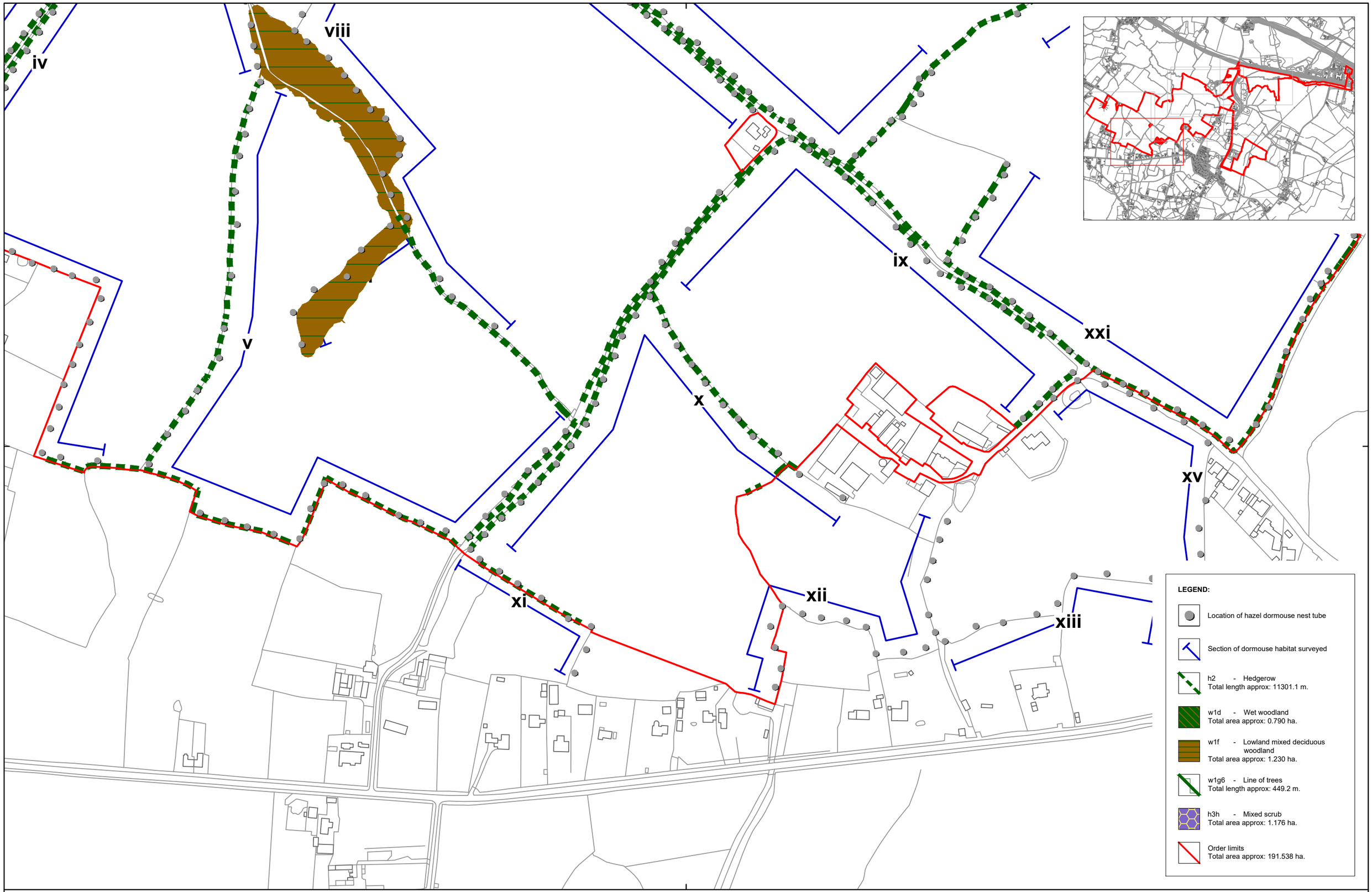

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checked. MW

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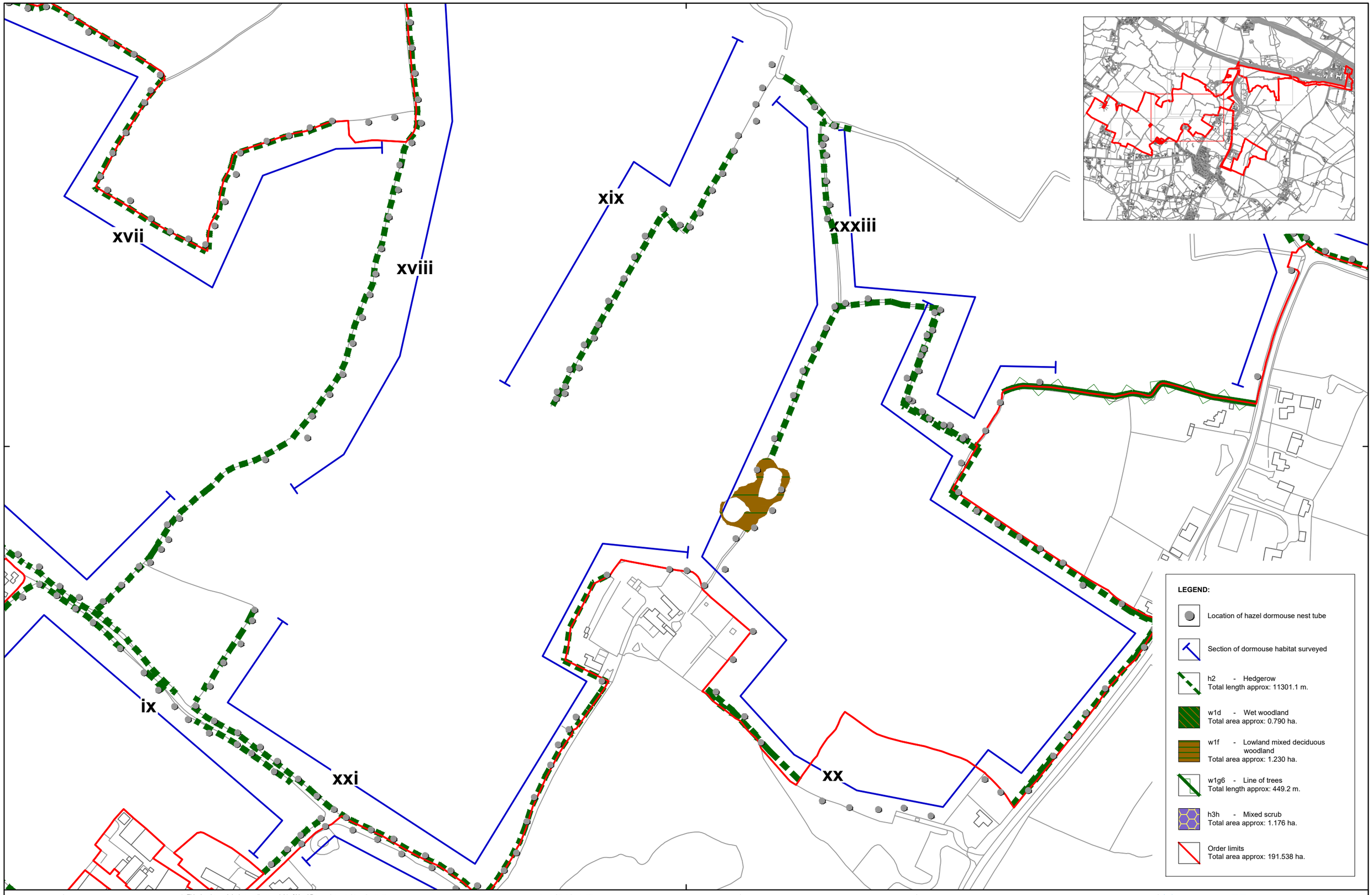

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rev. rev. date auth. rev. note

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project. *Stonestreet Green Solar*
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drawing no. *5535-LLB-XX-XX-DR-Ec-0043* rev. *C01*
drawing title. *Dormouse Survey Plan* suit. *A4*
APFP *5(2)(i)(ii)*
Parcel A3

rev date. *15/05/24*
scale. *1:3000*
sheet. *A3*
drawn. *NA*
checked. *MW*

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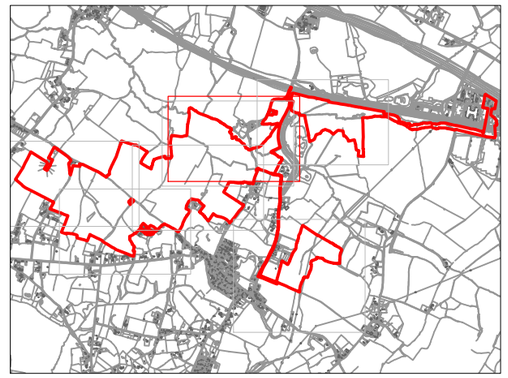

xxxi

xxii

xviii

xix

xxxiii

xxxi

xxxiv

LEGEND:

- Location of hazel dormouse nest tube
- Section of dormouse habitat surveyed
- h2 - Hedgerow
  Total length approx: 11301.1 m.
- w1d - Wet woodland
  Total area approx: 0.790 ha.
- w1f - Lowland mixed deciduous woodland
  Total area approx: 1.230 ha.
- w1g6 - Line of trees
  Total length approx: 449.2 m.
- h3h - Mixed scrub
  Total area approx: 1.176 ha.
- Order limits
  Total area approx: 191.538 ha.

N

0 30 60 m

1:3000

rev.	rev. date	auth.	rev. note
C01	15/05/24	MW	Cleint approved for submission.

rev. rev. date auth. rev. note

client. **EPL 001 Limited**

project. **Stonestreet Green Solar**
Land North And West Of Aldington
Kent

drawing no. **5535-LLB-XX-XX-DR-Ec-0044** rev. **C01**

drawing title. **Dormouse Survey Plan** suit. **A4**

APFP **5(2)(l)(ii)**

Parcel B

rev date. **15/05/24**
scale. **1:3000**
sheet. **A3**
drawn. **NA**
checked. **MW**

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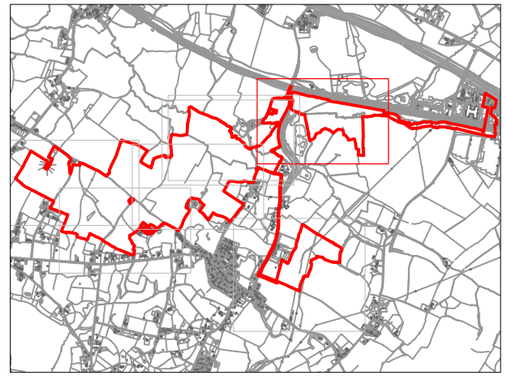

xxiii

xxiv

xxv

xxvi

xxii

LEGEND:

- Location of hazel dormouse nest tube
- Section of dormouse habitat surveyed
- h2 - Hedgerow
  Total length approx: 11301.1 m.
- w1d - Wet woodland
  Total area approx: 0.790 ha.
- w1f - Lowland mixed deciduous woodland
  Total area approx: 1.230 ha.
- w1g6 - Line of trees
  Total length approx: 449.2 m.
- h3h - Mixed scrub
  Total area approx: 1.176 ha.
- Order limits
  Total area approx: 191.538 ha.

0 30 60 m

1:3000

rev.	rev. date	auth.	rev. note
C01	15/05/24	MW	Cleint approved for submission.

rev.	rev. date	auth.	rev. note

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drawing no. **5535-LLB-XX-XX-DR-Ec-0045** rev. **C01**

drawing title. **Dormouse Survey Plan** suit. **A4**

APFP **5(2)(l)(ii)**

Parcel C

rev date. **15/05/24**
scale. **1:3000**
sheet. **A3**
drawn. **NA**
checked. **MW**

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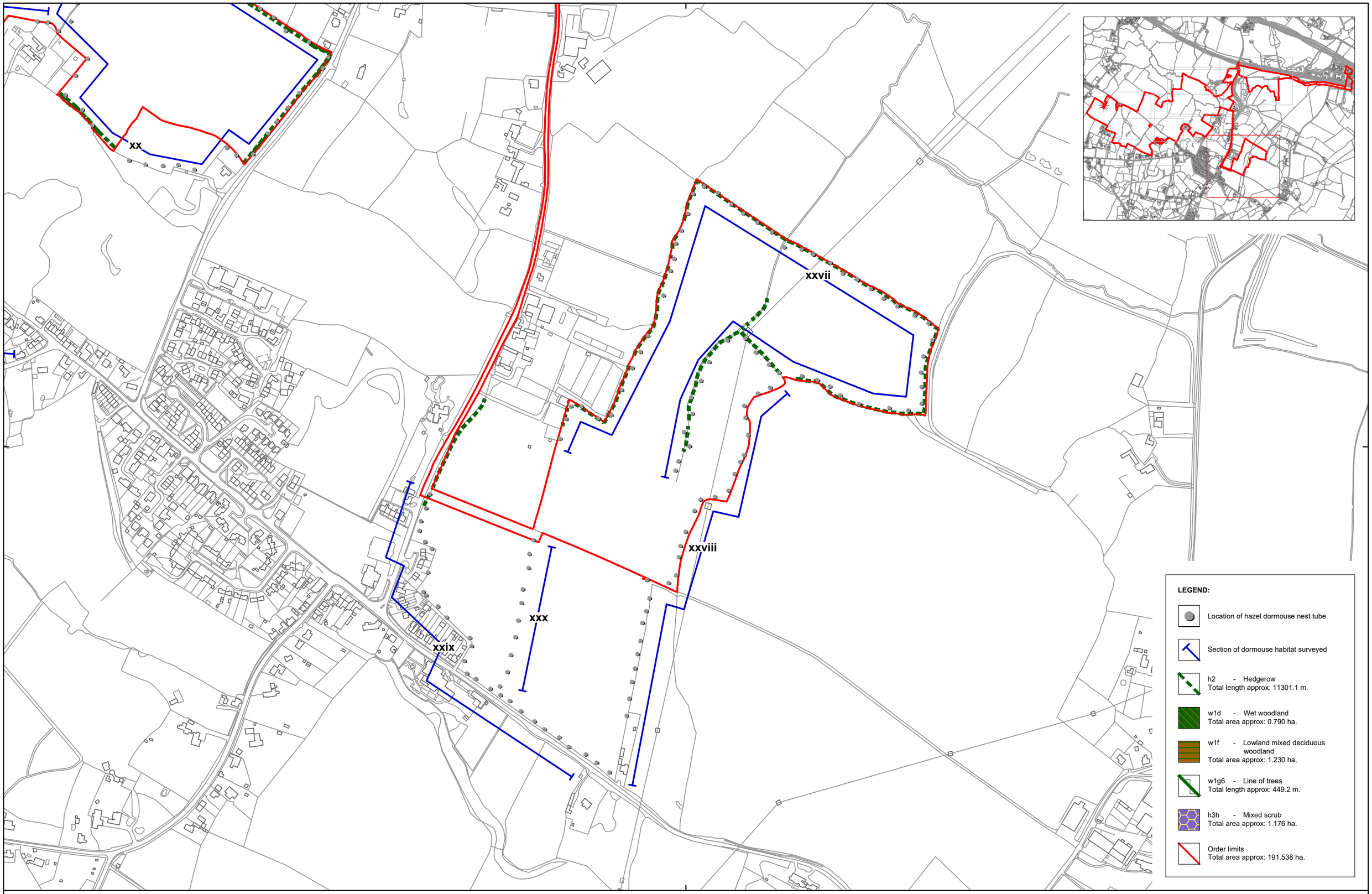

LEGEND:

- Location of hazel dormouse nest tube
- Section of dormouse habitat surveyed
- h2 - Hedgerow
  Total length approx: 11301.1 m.
- w1d - Wet woodland
  Total area approx: 0.790 ha.
- w1f - Lowland mixed deciduous woodland
  Total area approx: 1.230 ha.
- w1g6 - Line of trees
  Total length approx: 449.2 m.
- h3h - Mixed scrub
  Total area approx: 1.176 ha.
- Order limits
  Total area approx: 191.538 ha.

0 50 100 m
1:5000

rev.	rev. date	auth.	rev. note
C01	15/05/24	MW	Cleint approved for submission.

client. **EPL 001 Limited**
project. **Stonestreet Green Solar**
Land North And West Of Aldington
Kent

drawing no. **5535-LLB-XX-XX-DR-Ec-0046** rev. **C01**
drawing title. **Dormouse Survey Plan** suit. **A4**
APFP **5(2)(I)(ii)**
Parcel D

rev date. **15/05/24**
scale. **1:5000**
sheet. **A3**
drawn. **NA**
checked. **MW**

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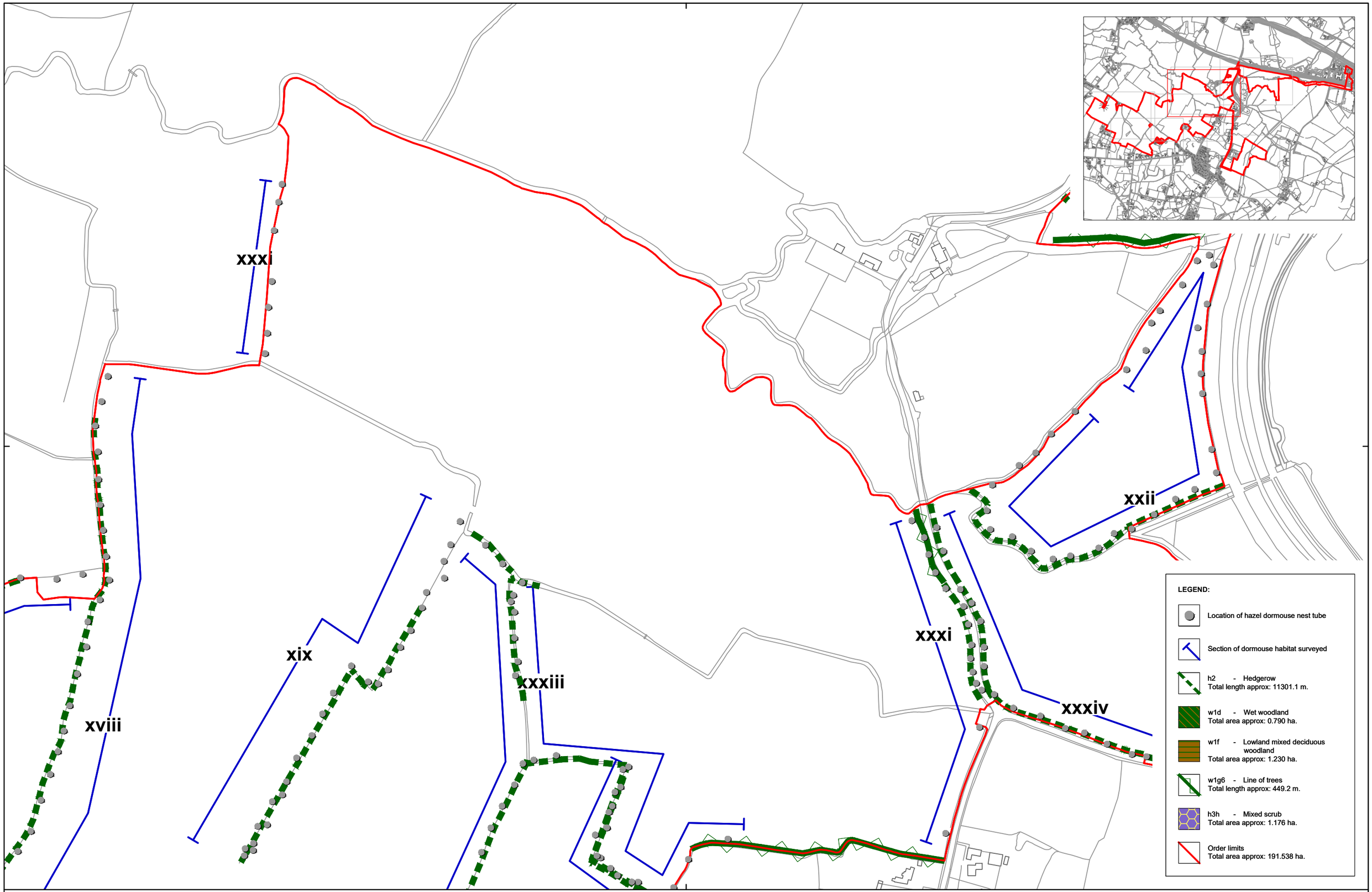

LEGEND:

- Location of hazel dormouse nest tube
- Section of dormouse habitat surveyed
- h2 - Hedgerow
  Total length approx: 11301.1 m.
- w1d - Wet woodland
  Total area approx: 0.790 ha.
- w1f - Lowland mixed deciduous woodland
  Total area approx: 1.230 ha.
- w1g6 - Line of trees
  Total length approx: 449.2 m.
- h3h - Mixed scrub
  Total area approx: 1.176 ha.
- Order limits
  Total area approx: 191.538 ha.

0 30 60 m

1:3000

rev.	rev. date	auth.	rev. note
C01	15/05/24	MW	Cleint approved for submission.

rev.	rev. date	auth.	rev. note

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Stonestreet Green Solar
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drawing no. *5535-LLB-XX-XX-DR-Ec-0047* rev. *C01*
drawing title. *Dormouse Survey Plan* suit. *A4*
APFP *5(2)(l)(ii)*
Parcel E

rev date. *15/05/24*
scale. *1:3000*
sheet. *A3*
drawn. *NA*
checked. *MW*

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10. ANNEX 4: SITE AND NEST TUBE INFORMATION

10.1 Detail of land parcels, survey compartments and nest tubes are detailed in the tables within this annex.

Table 6 Parcel A: tube and survey compartment information

Parcel	Survey compartment	Nest tube no.
A	i	1, 2, 3, 4, 5, 6, 7, 8, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63
	ii	23, 24, 25, 26, 27, 28, 29, 30, 31, 32
	iii	9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22
	ix	668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690
	v	89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119
	vi	83, 84, 85, 86, 87, 88
	viiI	64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 129, 130, 131, 132, 133, 134, 135, 136
	viii	120, 121, 122, 123, 124, 125, 126, 127, 128, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667
	iv	137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189
	x	246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268
	xi	230, 231, 232, 233, 234, 235, 236, 237, 245
	xii	217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 238, 239, 240, 241, 242, 243, 244
	xiii	206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216
	xiv	202, 203, 204, 205
	xv	190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201

Table 7 Parcel B: tube and survey compartment information

Parcel	Survey compartment	Nest tube no.
B	xix	340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364
	xviii	365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454
	xx	287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339
	xxi	269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470
	xvi	408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 455, 456, 457
	xvii	378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407

Table 8 Parcel C: tube and survey compartment information

Parcel	Survey compartment	Nest tube no.
C	ix	691, 692, 693, 694,
	xxii	471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502
	xxiii	523, 524, 525, 526, 527, 528, 529
	xxiv	515, 516, 517, 518, 519, 520, 521, 522
	xxv	695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712

Parcel	Survey compartment	Nest tube no.
	xxvi	503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514

Table 9 Parcel D: tube and survey compartment information

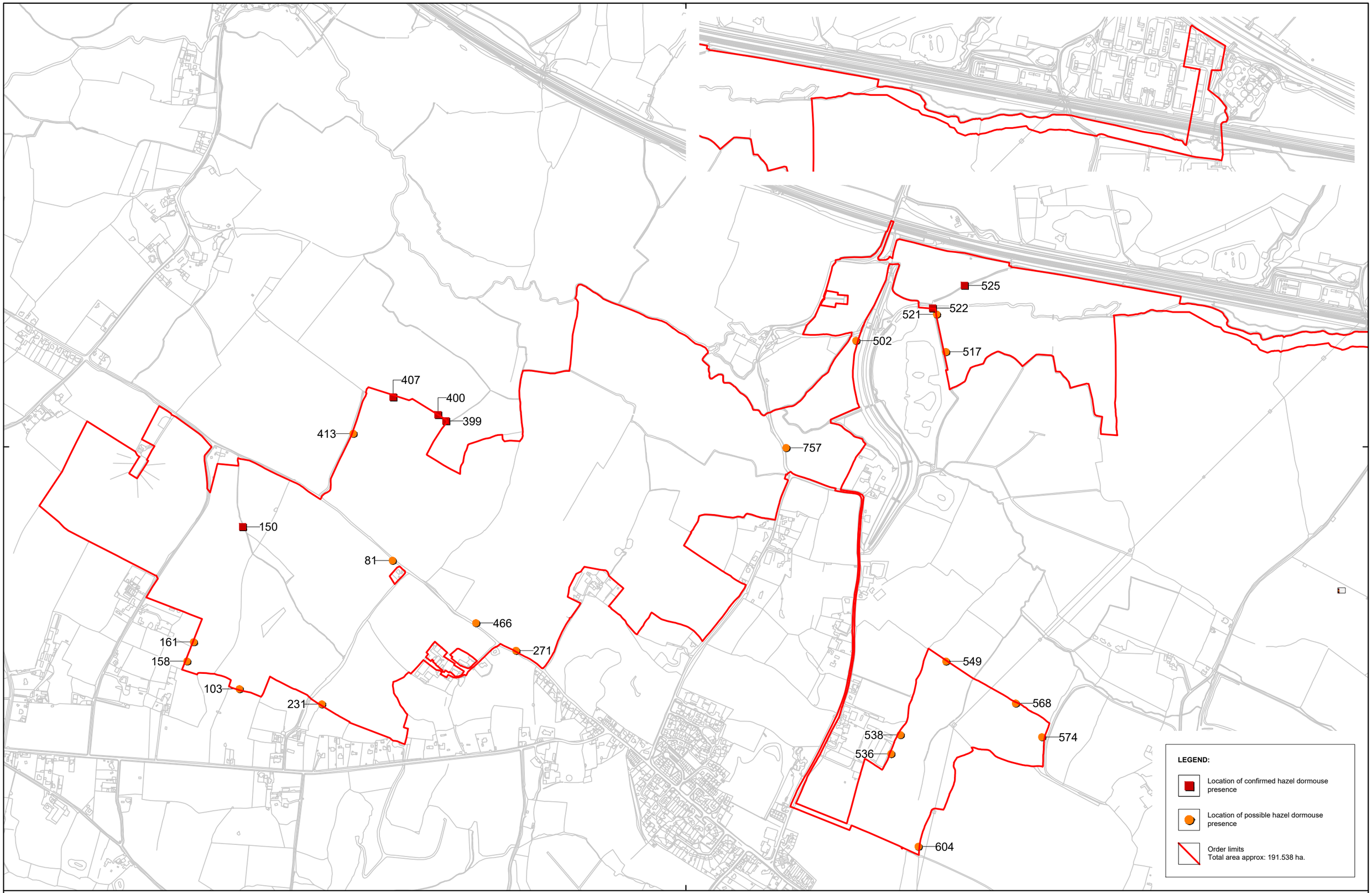
Parcel	Survey compartment	Nest tube no.
D	xxix	616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652
	xxvii	530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588
	xxviii	589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615
	xxx	626, 627, 628, 629, 630, 631, 632, 633, 634, 635

Table 10 Parcel E: tube and survey compartment information

Parcel	Survey compartment	Nest tube no.
E	xxxi	713, 714, 715, 716, 717, 718, 719, 720,
	xxxii	721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738,
	xxxiii	739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752
	xxxiv	753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775

11. ANNEX 5: DORMOUSE HABITAT SUITABILITY AND DISTRIBUTION PLANS

[SEE OVERLEAF]



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0 100 200 m

1:10000

rev.	rev. date	auth.	rev. note
C01	15/05/24	MW	Cleint approved for submission.

rev.	rev. date	auth.	rev. note

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drawing title.
Dormouse Survey Results Plan suit. **A4**

APFP **5(2)(i)(ii)**

rev date. **15/05/24**
scale. **1:10000**
sheet. **A3**
drawn. **NA**
checked. **MW**

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12. ANNEX 6: HAZEL DORMOUSE PHOTOS

Photo 1 Possible dormouse nest recorded within Tube 271 on 23rd October 2020.

Photo 2 Possible dormouse started nest recorded within Tube 466 on 23rd October 2020.

Photo 3 Unoccupied possible dormouse nest present within Tube 536 on 22nd October 2021.

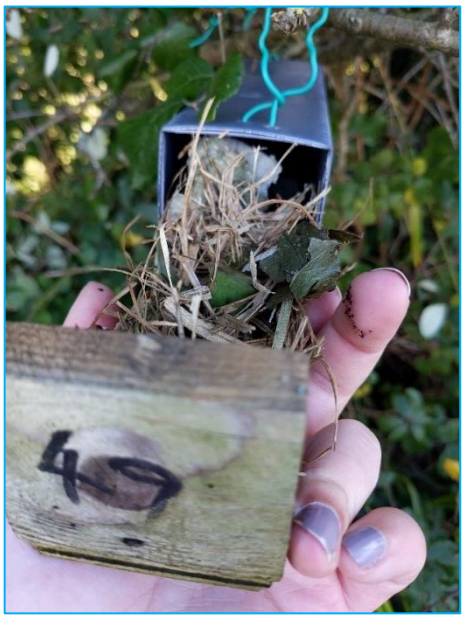

Photo 4 Unoccupied possible dormouse nest tube present within Tube 574 on 22nd October 2021.

Photo 5 Unoccupied dormouse nest present within Tube 150 on 4th November 2021.

Photo 6 Unoccupied dormouse nest present within Tube 399 on 11th November 2021.

Photo 7 Unoccupied dormouse nest present within Tube 400 on 11th November 2021.

Photo 8 Unoccupied dormouse nest with remains of a dormouse present within Tube 525 on 15th June 2022.

13. ANNEX 7: DETAILED HAZEL DORMOUSE SURVEY RESULTS

13.1 For the purpose of these detailed hazel dormouse survey results, tubes which were empty at the time of survey have not been listed within the results table.

13.2 In addition, tubes with presence or possible presence of hazel dormouse have been highlighted with bold text.

Table 11 Detailed hazel dormouse survey results 2020.

Date	Parcel	Tube number	Comments
10/07/2020	A	63, 66, 67, 68, 69, 71, 75, 76, 77, 80, 81, 82, 84, 85, 86, 87, 88, 89, 90, 91, 94, 98, 99, 100, 102, 105, 106, 114, 116, 117, 118, 119, 122, 123, 124, 126, 127, 128, 129, 131, 132, 133, 238, 243, 248, 252, 260, 263, 264, 660, 662, 667, 668, 669, 673, 676, 678, 679, 680, 681, 685, 686, 688, 689	Missing Insert
		231	**Unoccupied dormouse nest. Likely starter nest, all hazel leaves however, no hazel nearby. No odour, compacted structure at end of nest tube.**
		Unknown tube numbers	29 Tube missing inserts
28/07/2020	A	192, 267	Missing Insert
	B	274, 275, 276, 278, 281, 282, 283, 284, 285, 286, 290, 293, 298, 302, 303, 311, 315, 317, 319, 322, 326, 330, 332, 333, 334, 336, 344, 347, 349, 352, 353, 354, 357, 359, 360, 362, 375, 405, 458	Missing Insert
	C	471, 474, 490, 494, 694, 700	Missing Insert
	D	532, 533, 534, 537, 539	Missing Insert

Date	Parcel	Tube number	Comments
23/10/2020	B	273, 276, 277, 279, 283, 284, 287, 292, 303, 309, 310, 312, 316, 318, 329, 333, 334, 340, 341, 342, 345, 346, 348, 350, 353, 354, 358, 360, 373, 456, 462, 464	Missing Insert
		269	Unoccupied *Apodemus* nest
		271	**Possible dormouse nest based on nest structure, however, nest occupied by one Apodemus mouse at the time of survey.**
		466	**Possible dormouse starter nest**
	C	475, 489, 493, 498, 506, 508, 526, 695, 697, 699, 701, 705, 708, 711	Missing Insert
		478	Occupied *Apodemus* nest
		482, 484, 487, 488, 492, 495, 496, 501, 509	Unoccupied *Apodemus* nest
		507, 515	*Apodemus* nut cache
30/10/2020	A	2, 5, 31, 35, 36, 45, 84, 85, 86, 88, 89, 91, 92, 95, 97, 99, 104, 106, 107, 109, 115, 126, 130, 144, 146, 148, 156, 176, 181, 187, 661, 663, 665, 677, 679, 680, 681, 682, 683, 686, 687, 689, 690	Missing Insert
		103	**Unoccupied possible dormouse starter nest**
		100, 157	Unoccupied *Apodemus* nest
	B	378, 417, 439	Missing Insert
		412, 436	Unoccupied *Apodemus* nest
		413, 437	Occupied *Apodemus* nest
	C	692, 693	Missing Insert

Date	Parcel	Tube number	Comments
		529	Unoccupied *Apodemus* nest
	D	530, 547, 548, 562, 569, 571, 573, 577, 606, 608, 613, 614, 624, 625, 626, 628, 633, 639, 640, 641, 645, 646, 651	Missing Insert
		538	**Unoccupied possible dormouse nest (Photo 2305)**
		544, 564, 587, 588, 594, 599	Unoccupied *Apodemus* nest
		550, 551, 553, 556, 580	Occupied *Apodemus* nest
		612	*Apodemus* nut cache
20/11/2020	B	277, 305, 310, 320, 331, 335, 345, 347, 348, 350, 374, 440	Missing Insert
		269, 395, 413, 427, 438	Unoccupied *Apodemus* nest
		437	Occupied *Apodemus* nest
	C	475, 476, 483, 496, 527	Unoccupied *Apodemus* nest
		485, 494	Occupied *Apodemus* nest
23/11/2020	C	503, 518, 520, 700, 701, 702	Missing Insert
		517	**Unoccupied possible dormouse starter nest**
	D	548, 552, 575, 583, 597, 603, 644, 646	Missing Insert
		549, 568, 604	**Unoccupied possible dormouse starter nest**
25/11/2020	A	29, 36, 64, 68, 74, 77, 79, 91, 92, 100, 128, 129, 132, 134, 173, 189, 193, 195, 197, 199, 200, 203, 204, 205, 206, 211, 213, 236, 247, 253, 254, 255, 257, 259, 261, 265, 677, 686, 688, 690	Missing Insert
		3, 165, 220, 222, 239, 250	*Apodemus* nut cache
		7, 21, 41, 51, 110, 154, 185, 233, 256	Occupied *Apodemus* nest

Date	Parcel	Tube number	Comments
		9, 11, 34, 38, 42, 46, 50, 52, 70, 72, 76, 96, 101, 157, 174, 177, 191, 229, 232, 234, 237, 245, 249, 251	Unoccupied *Apodemus* nest
		103, 158, 161	**Unoccupied possible dormouse starter nest**
		215	Berry cache (likely *Apodemus*)

Table 12 Detailed hazel dormouse survey results 2021.

Date	Parcel	Tube number	Comments
22/10/2021	B	284, 285, 286, 287, 288, 289, 291, 293, 294, 295, 296, 297, 301, 303, 304, 307, 310, 311, 313, 318, 321, 324, 325, 327, 328, 330, 331, 332, 333, 334, 337, 338, 339, 341, 342, 343, 346, 347, 348, 349, 350, 351, 353, 354, 355, 356, 358, 360, 361, 363	Missing Insert
		299	Unoccupied old rotted mammal nest
		306	Unoccupied well rotted mammal nest with food cache
		323, 345	Unoccupied *Apodemus* nest
		308, 312, 316, 320 335	*Small mammal* nut cache
	C	471, 472, 473, 475, 476, 477, 479, 480, 481, 483, 484, 485, 486, 488, 489, 490, 491, 493, 494, 495, 496, 497, 499, 500, 502, 504, 505, 507, 508, 509, 510, 511, 512, 513, 514, 516, 518, 519, 521, 524, 528	Missing Insert
		522	*Apodemus* nut cache
		527	Unoccupied *Apodemus* nest
	D	530, 531, 533, 535, 540, 541, 542, 545, 546, 548, 549, 550, 551, 552, 553, 554, 555, 557, 558, 559, 567, 569, 572, 576, 578, 579, 581, 585, 588, 592, 593, 595, 601, 604, 605, 607, 609, 610, 611, 613, 615, 616, 617, 618, 619, 620, 621, 622, 623, 625, 626, 628, 630, 635, 636, 637, 638, 640, 641, 643, 645, 648, 649, 650	Missing Insert
		534, 539, 570, 586, 631, 632, 634	*Apodemus* nut cache

Date	Parcel	Tube number	Comments
		536, 574	**Unoccupied possible dormouse nest**
		582, 598, 600	Unoccupied *Apodemus* nest
04/11/2021	A	64, 68, 70, 72, 74, 76, 78, 80, 82, 85, 86, 87, 88, 90, 92, 95, 96, 97, 98, 99, 100, 113, 115, 116, 117, 118, 119, 124, 126, 127, 129, 130, 132, 133, 134, 135, 138, 139, 143, 145, 147, 151, 155, 157, 158, 159, 160, 164, 166, 167, 168, 169, 170, 171, 174, 175, 177, 178, 179, 180, 183, 184, 186, 188, 222, 223, 224, 226, 238, 239, 240, 245, 246, 251, 252, 257, 259, 260, 261, 264, 265, 266, 659, 661, 665, 667, 668, 669, 671, 675, 677, 679	Missing Insert
		101, 103, 104, 105, 106, 107, 108, 110, 111, 112, 230, 232, 233, 234, 235, 237	No Access to tubes
		77, 93, 120, 121, 136, 149, 162, 163, 248, 670, 674	Unoccupied *Apodemus* nest
		81	**Unoccupied possible dormouse nest**
		150	**Unoccupied dormouse nest**
		253, 256	*Apodemus* nut cache
11/11/2021	A	1, 3, 4, 6, 8, 10, 12, 13, 14, 18, 19, 20, 22, 24, 25, 26, 27, 28, 32, 33, 35, 36, 37, 40, 42, 43, 44, 46, 47, 48, 49, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62	Missing Insert

Date	Parcel	Tube number	Comments
		275, 276, 277, 279, 280, 283, 364, 365, 366, 370, 376, 379, 380, 381, 382, 383, 384, 385, 386, 387, 389, 390, 391, 392, 394, 397, 398, 401, 403, 406, 414, 421, 422, 424, 425, 426, 428, 429, 433, 434, 435, 437, 438, 442, 444, 456, 450, 460, 464	Missing Insert
	B	447, 448, 465	Unoccupied *Apodemus* nest
		459	Unoccupied *Apodemus* nest with nut cache
		399, 400, 407	**Unoccupied dormouse nest**
		413	**Unoccupied possible dormouse nest**
		415, 443, 455	*Apodemus* nut cache

Table 13 Detailed hazel dormouse survey results 2022.

Date	Parcel	Tube number	Comments
15/06/2022	C	512, 513, 514, 517, 523, 527, 528, 529, 695, 696, 698, 701, 706, 710	Missing Insert
		502, 521	**Unoccupied possible dormouse nest**
		511	Other nest
		525	**Unoccupied dormouse nest. Dead dormouse present within tube.**
		707	*Apodemus* nut cache
	E	715, 716, 748, 752, 753, 754, 755, 756, 757, 764, 766 ,767, 770, 772	Missing Insert
13/07/2022	C	503, 504, 511, 512, 517, 521, 523, 695, 699, 703, 705, 706, 707, 708, 710, 711	Missing Insert
		505	Unoccupied *Apodemus* nest
		522	**Unoccupied dormouse nest**
	E	717, 750	Missing Insert
		Unknown tube numbers	60 tubes Missing Inserts
		718, 726, 727, 740, 745, 753, 769, 771, 772, 773, 774	Missing Tube
		719, 755	Unoccupied *Apodemus* nest
26/08/2022	E	744, 745, 750, 752	Missing Insert
06/10/2022	C	503, 511, 703	Missing Insert
		518	*Apodemus* nut cache
		510, 516, 696, 705, 707, 708	Unoccupied *Apodemus* nest
	E	730, 733, 736, 749, 756, 761, 762, 773, 774	Unoccupied *Apodemus* nest
		757	**Unoccupied possible dormouse nest**

Date	Parcel	Tube number	Comments
		729	Occupied *Apodemus* nest
25/10/2022	E	Unknown tube numbers	2 tubes Missing Inserts
		729, 731, 733, 734, 742, 749, 753, 754, 756, 757, 761, 769, 775	Unoccupied *Apodemus* nest
		773	Unoccupied *Apodemus* nest with nut cache
		736	Occupied *Apodemus* nest
		774	*Apodemus* nut cache
22/11/2022	C	509, 706	*Apodemus* nut cache
		702	Dead *Apodemus* present within tube. No nest or bedding present within tube.
		522, 698	Unoccupied *Apodemus* nest
	E	725, 730, 731, 734, 736, 742, 743, 745, 749, 753, 754, 757, 760, 762, 763, 770, 775	Unoccupied *Apodemus* nest
		761, 765	Occupied *Apodemus* nest
		723	Unoccupied *Apodemus* nest. Rosehip food cache present within tube.

Stonestreet Green Solar

Appendix 9.5j: Hedgehog Survey Report

CONTENTS

1. EXECUTIVE SUMMARY

1.1 Lloydbore Ltd was commissioned by EPL 001 Limited (the 'Applicant') to conduct a hedgehog survey to inform the proposed Stonestreet Green Solar scheme ('the Project'). This included a desk study, a habitat suitability survey and presence / likely absence survey in 2020 and 2022.

1.2 On-site hedgerows may provide some foraging habitat, but due to their condition are unlikely to provide opportunities for hibernation. Small groups of deciduous trees and woodland parcels provide some suitable foraging habitat and nesting materials required for hibernation.

1.3 No hedgehogs, or hedgehog field signs, were recorded during the survey visits.

1.4 Hedgehogs may be absent or occur in very small numbers within the Site, based on the field survey results and the lack of nearby desk study records. Extensive arable fields acting as a barrier and a high population of badgers present on-site likely reduce the suitability of the Site for hedgehogs.

1.5 The survey data is considered valid for a period of 24 months from the conclusion of the survey period (i.e., until October 2024), after which an updated site walkover and review of this report should be carried out by a suitably experienced ecologist to provide up to date baseline survey data.

1.6 Following the update walkover, the ecologist will need to determine whether there have been any material changes to the ecological baseline, the potential impacts of the 'Project' and/or the ecology-related legal risks associated with the 'Project' to inform detailed mitigation.

1.7 The associated **ES Volume 2, Chapter 9: Biodiversity (Doc Ref. 5.2)** and **Outline Landscape and Ecological Management Plan ('LEMP') (Doc. Ref. 7.10)** provides detail of avoidance, mitigation and compensation measures relating to hedgehogs. As such, this survey report should be read in tandem with these two strategic documents.

2. INTRODUCTION

INTRODUCTION

2.1 This Hedgehog Survey Report has been prepared on behalf of EPL 001 Limited ('the Applicant') to assess the presence of Hedgehogs (*Erinaceinae*) in relation to the Development Consent Order ('DCO') application for Stonestreet Green Solar ('the Project').

2.2 This Hedgehog Survey Report is **Appendix 9.5j** to **ES Volume 2, Chapter 9: Biodiversity (Doc Ref. 5.2)**.

THE PROJECT

2.3 The Project comprises the construction, operation and decommissioning of solar photovoltaic ('PV') arrays and energy storage, together with associated infrastructure and an underground cable connection to the existing National Grid Sellindge Substation.

2.4 The Project will include a generating station (incorporating solar arrays) with a total capacity exceeding 50 megawatts ('MW'). The agreed grid connection for the Project will allow the export and import of up to 99.9 MW of electricity to the grid. The Project will connect to the existing National Grid Sellindge Substation via a new 132 kilovolt ('kV') substation constructed as part of the Project and cable connection under the Network Rail and High Speed 1 ('HS1') railway.

2.5 The location of the Project is shown on **ES Volume 3, Figure 1.1: Site Location Plan (Doc Ref. 5.3)**. The Project will be located within the Order limits (the land shown on the **Works Plans (Doc Ref. 2.3)** within which the Project can be carried out). The Order limits plan is provided as **ES Volume 3, Figure 1.2: Order Limits (Doc Ref. 5.3)**. Land within the Order limits is known as the 'Site'.

SITE DESCRIPTION

2.6 The Site area is approximately 192 ha, located to the north and west of the village of Aldington to the south-east of Ashford in Kent. The Project lies within the administrative areas of Kent County Council ('KCC') and Ashford Borough Council ('ABC') local authorities. Further information on the Project, including proposed infrastructure and design, is provided in **ES Volume 2, Chapter 3: Project Description (Doc Ref. 5.2)**.

2.7 The Site comprises agricultural fields delineated by hedgerows and tree belts. It extends to approximately 192 hectares and is currently predominantly used for arable cropping and grazing.

2.8 The Site also supports hedgerow, parcels of woodland, drainage ditches, ponds and arable field margins. The East Stour River flows in an east to west direction within, and adjacent to, the northern part of the Site.

2.9 Fields are described in relation to the Project as follows:

- The South Western Area, Fields 1 to 9.
- The Central Area, Fields 10 to 19 and 23 to 25.
- The South Eastern Area, Fields 20 to 22.
- The Northern Area, Fields 26 to 29.
- Project Substation (location of the Project Substation, in the north western section of Field 26).
- 'Cable Route Corridor' (export of electricity from the Project at 132 kilovolt ('kV') via underground cables (the 'Grid Connection Cable') to the Sellindge Substation). 'Cable Route Crossing' (use of an existing cable duct under the High Speed 1 / Channel Tunnel Rail Link ('HS1') railway or through Horizontal Directional Drilling ('HDD') beneath HS1 for the Cable Route Corridor).
- Sellindge Substation (location of the existing Sellindge Substation).

SCOPE

2.10 The survey was commissioned in light of recommendations provided following the initial site walkover assessment in 2020 and detailed within **ES Volume 4, Appendix 9.5: Preliminary Ecological Appraisal (PEA) (Doc Ref. 5.4)** which identified the presence of suitable habitat for hedgehogs.

SURVEY OBJECTIVES

2.11 The objectives of the survey and report are to: -

- Assess the suitability of on-Site and boundary habitats within the Survey Area for hedgehogs;
- Identify whether any hedgehogs are present within on-Site and boundary habitats within the Survey Area;
- If hedgehog presence is confirmed, assess the importance of on-Site and boundary habitats within the Survey Area for hedgehogs; and
- Determine whether avoidance, mitigation and/or compensation measures are required in relation to hedgehogs.

3. METHODOLOGY

DESK STUDY

3.1 Data was obtained from the Kent and Medway Biological Records Centre ('KMBRC') in 2020, 2022 and August 2023 to inform the Ecological Impact Assessment. A 1km search radius was used and the data obtained through this search includes records of hedgehogs.

3.2 Records obtained within the ten-year period prior to the date of the record search are considered 'recent'. Records older than this are considered 'historical'.

HABITAT ASSESSMENT

3.3 A Site visit was undertaken on 21st April 2020 and again on various dates in 2020, to update the habitat baseline.

3.4 An update Preliminary Ecological Appraisal ('PEA') (**ES Volume 4, Appendix 9.5: Preliminary Ecological Appraisal (Doc Ref. 5.4)**) was undertaken in 2022 (during spring and summer) to update the habitat baseline.

3.5 Updated baseline habitat survey work, including habitat condition assessment, was also conducted in June to July 2023. A survey of the previously inaccessible Sellindge Substation area was carried out on 10th January 2024.

3.6 Habitat data collected during the PEA was used to assess the suitability of on-Site habitats for hedgehogs. This assessment followed criteria provided in Cresswell *et al* (2012), as follows: -

- Likely availability of invertebrates and other prey items based on habitat types and prevailing weather conditions;
- Extent of suitable summer nesting opportunities, such as nesting materials and places of shelter (e.g., within long grass, rank vegetation, burrows); and
- Availability of suitable hibernation material in the form of deciduous tree leaf litter and supporting structures for these nests to be built under - such as brushwood or dense scrub, or opportunities to use suitable sites already formed such as rabbit (*Oryctolagus cuniculus*) burrows, tree stumps or natural cavities.

3.7 Full details of the Cresswell *et al* (2012) criteria can be found in Annex 2.

3.8 The habitat suitability assessment was used to select habitats for presence / likely absence survey.

HEDGEHOG PRESENCE / LIKELY ABSENCE SURVEY

3.9 A hedgehog presence / likely absence survey, comprising dusk spotlighting transects of suitable habitats, was carried out by a competent expert. The survey was undertaken to establish whether hedgehogs occurred within the Site, and if

presence was confirmed to assess population abundance and the importance of on-site habitats.

3.10 Spotlighting is a proven, effective technique recommended for assessing hedgehog abundance (Haigh and Butler, 2012) and the methodology follows the People's Trust for Endangered Animals (PTES) recommended spotlighting approach in *Guidance for Surveying Hedgehogs* (PTES, 2022).

3.11 Hedgehogs are usually active between May and November (PTES, undated), dependent on the prevailing weather conditions.

3.12 Four transects were established across the Site adjacent to habitat assessed as being suitable for hedgehogs - to determine presence/likely absence and, if present, hedgehog usage of the Site.

3.13 Two surveyors conducted the transects (see Annex 3 for routes) at dusk using 1,000,000 candle-powered torches to illuminate suitable habitat such as the field margin undergrowth, grassland, hedgerow understory, scrub and woodland (PTES, Undated; and Riber, 2006) - searching for presence, including eyeshine indicative of hedgehog. The transects included pauses every 20m to listen for audible sounds of hedgehogs such as rustling, calls and snuffling.

3.14 Spotlighting works best in short grass habitats where animals are more easily seen, or along linear features such as woodland rides or the bases of hedgerows (PTES, undated).

3.15 Any field signs along the transect route such as footprints and scat were recorded.

Table 1: Survey details of hedgehog presence / likely absence surveys in 2020 and 2022.

Date of survey	Start time	Finish time	Surveyors	Transect Surveyed	Weather
28/10/2020	18:00	19:35	Nikki Stapleton & Nina Rygh.	Transect 3	10°C. Cloud cover not recorded. Dry, no wind.
18/10/2022	18:00	20:05	Nikki Stapleton, Jess Callaghan, Jason Armstrong & Jonathan Fletcher.	Transect 2 & 3	13°C - 14°C. 30% - 10% cloud cover. Light air.
19/10/2022	18:00	13:30	Nikki Stapleton and Jess Callaghan.	Transect 1	13°C - 12°C. 15% - 30% cloud cover. Light breeze.

Date of survey	Start time	Finish time	Surveyors	Transect Surveyed	Weather
25/10/2022	17:45	19:10	Nikki Stapleton and Jess Callaghan.	Transect 4.	13°C - 10°C. 100% cloud cover Light breeze.

ZONE OF INFLUENCE (ZOI)

3.16 The potential impact of a project is not always limited to the boundaries of the Site concerned. The project may also have the potential to impact on ecologically valuable sites, habitats or species beyond the Site boundaries.

3.17 The area over which a project may impact ecologically valuable receptors is known as the Zone of Influence ('ZoI').

3.18 The ZoI is determined by the source/type of impact, a potential pathway for that impact and the location and sensitivity of the ecologically valuable receptor beyond the boundary.

3.19 A review of the Project confirmed that they will result in partial loss of suitable on-site hedgehog habitat. Works may also result in impacts on individual animals (e.g., killing and/or injury during site works).

3.20 These potential impacts could adversely affect the conservation status of the wider local hedgehog population, but the most significant potential adverse effects would likely be experienced by any hedgehogs present on Site.

3.21 Hedgehog home range size varies throughout the year and by sex, but are a minimum of 1 hectare (Cresswell *et al,* 2012).

3.22 Therefore, in the absence of appropriate avoidance, mitigation, and compensation measures, the potential ZoI of the 'Project', in relation to hedgehog, is likely to extend to the Site and those areas located just beyond the Site boundary.

3.23 This potential ZoI was used to establish the required extents of the hedgehog survey, which included all suitable on-site habitat.

SURVEY LIMITATIONS

3.24 An ecological survey represents a 'snapshot' in time of the ecological condition of a site. The ecological character of a site can change substantially throughout both the course of a year, and from year to year impacting on the extent and quality of habitats potential to support a species.

3.25 Due to a bat activity survey visit also taking place on the 28th October 2020, the first hedgehog survey visit was started 24 minutes early and therefore before dusk. This was to avoid the higher levels of disturbance from other surveyors undertaking

transects in the same area that may cause hedgehogs to hide or be quiet. However, this is not considered a significant limitation as the surveyors undertaking the bat transect route were additionally able to record any incidental sightings of hedgehogs along a similar transect during the predetermined appropriate time.

3.26 When using the spotlight technique, it is recommended that transects are repeated several times.

3.27 Only one survey was carried out within 2020 along one transect route (Transect 3), and the remaining 2020 survey effort was instead focussed on nest searches. However, this is unlikely to be a significant limitation as surveyors undertaking other nocturnal surveys with similar recommended timing (bat activity and great crested new presence / absence surveys) presented opportunities for incidental sightings. Additionally, no evidence of hedgehog field signs such as prints or scat have been found on the Site through two seasons of survey (2020 and 2022).

3.28 The hedgehog presence / likely absence survey did not include the entire Site and was limited to areas of suitable habitat. This is not considered a limitation due to the lack of suitable habitat in the fields that were not included. Additionally, these fields were repeatedly surveyed for other species in which incidental sightings of hedgehogs could have been recorded.

3.29 There is some debate over the effectiveness of spotlighting surveys to determine hedgehog presence. As the encounter rate for this technique is low, transects need to be of sufficient length, which is a minimum of 1km (PTES, undated). All four transect routes were in excess for 1km, and previous studies have found spotlighting to be the most effective technique for hedgehog detection (Haigh & Butler, 2012).

LIFESPAN OF SURVEY DATA

3.30 The lifespan of this report and the ecological survey information contained herein has been determined based on CIEEM's *Advice Note: On the Lifespan of Ecological Reports and Surveys* (CIEEM, 2019) and an assessment of how the presence, distribution and abundance of hedgehogs may change over time.

3.31 If the commencement of site works is delayed beyond two years from the latest baseline survey (October 2022), an update site walkover should be undertaken by a suitably experienced ecologist and review this report, noting that the survey season for hedgehogs runs July and October (inclusive).

3.32 Following the update walkover, the ecologist will need to determine whether there have been any material changes to the ecological baseline, the potential impacts of the 'Project' and/or the ecology-related legal risks associated with the 'Project'. An update hedgehog presence / likely absence may then be needed to provide up-to-date data.

4. RESULTS

DESK STUDY

4.1 The biological data search returned three recent and 13 historic records of hedgehog located within 1km of the Site.

4.2 The most recent record (2012) was located *c*.810m north of the Field 26 at the closest point.

HABITAT ASSESSMENT

4.3 Suitable habitat is limited throughout the Site due to the presence of large areas of arable fields, which are of negligible suitability for hedgehog nesting and hibernation and offer a limited foraging opportunities.

4.4 Hedgerows present on Site provide some suitable foraging habitat, and mammal burrows present in the understory may be used for summer nests. Due to the condition of the hedgerows present on Site, many of which have very limited ground cover, it is unlikely that these hedgerows provide suitable shelter for hibernation areas or material.

4.5 Small groups of deciduous trees and parcels of woodland (predominantly the woodland present between Fields 5, 6 and 7) provide suitable nesting material and a small areas suitable for hibernation nesting. Hedgehogs will primarily build their nest underneath a structure that gives aerial support such as brushwood and scrub, of which there is a small amount in this area.

4.6 Studies suggest hedgehog prefer forested areas and edge habitats to open areas (Riber, 2006). Therefore, field margins and woodland boundaries in fields that have a wider margin and provide more foraging habitat with higher opportunities for nesting materials (leaflitter, debris, mammal burrows) were chosen for the subsequent transect routes.

HEDGEHOG SURVEY

4.7 Four transect routes were created to target the most suitable habitat, informed by the results of the habitat assessment and shown in Annex 3.

4.8 During the survey, spotlighting was not limited to boundary habitat as the second surveyor repeatedly shone their torch out into the wider fields to check for hedgehog eyeshine.

4.9 No hedgehogs, or hedgehog field signs, were recorded during the survey visits.

5. EVALUATION AND RECOMMENDATIONS

EVALUATION

5.1 No evidence of hedgehog presence was found during the survey.

5.2 Hedgehogs may be absent or occur in very small numbers within the Site, based on the field survey results and the lack of nearby desk study records.

5.3 An established population of badgers (*Meles meles*) within the Site boundary may also negatively affect the presence of hedgehogs due to predation (Hof & Bright, 2012) and food competition (Cresswell 2012).

5.4 Expansive arable fields are likely to restrict hedgehog movement (Cresswell, 2012). The Site is largely made up of arable fields which may severely restrict the amount of suitable habitat and the ability of hedgehogs to disperse through the landscape.

RECOMMENDATIONS

5.5 Detailed, precautionary avoidance, mitigation and enhancement measures relating to hedgehog are included within the associated **ES Volume 2, Chapter 9: Biodiversity (Doc Ref. 5.2)** and the **Outline LEMP (Doc Ref 7.10)**.

5.6 The below key principles are provided for context only and expanded upon further in these reports.

5.7 Any hedgehogs found during construction works should be carefully moved out of harm's way (with thick gloves) into suitable vegetation cover away from roads and vehicle access. This will be discussed with workers during toolbox talks. Toolbox talks form part of the construction phase ecological supervision and mitigation as part of **Outline CEMP (Doc Ref. 7.11)**.

5.8 No trenches or pits should be left open overnight unless they are fitted with a means of escape for mammals (e.g. a scaffold plank positioned to form a ramp). This follows general best practice for mammals (e.g. badger and brown hare).

5.9 On-Site habitats can be improved for hedgehogs by installing piles of logs and/or brushwood for shelter, which can be left in place to gradually decompose and thus provide invertebrate prey and nesting opportunities.

5.10 Expected habitat creation as part of the 'Project' such as conversion of arable fields to grassland will greatly increase the quantity and connectivity of foraging habitat for species such as hedgehog.

5.11 Permeability should be maintained within any compartmentalised fencing through provision of suitably sizes access points (at least 13x13cm or 5 inches square potentially as a two-way gate) to ensure hedgehog (and other small animals) can access these newly created habitats.

6. REFERENCE

Hof, A., R. and Bright, P., W. (2012*) Factors affecting hedgehog presence on farmland as assessed by a questionnaire survey*. Acta Theriological, 57. 79-88.

CIEEM (2019). *Advice Note: On the Lifespan of Ecological Reports and Surveys.* Chartered Institute of Ecology and Environmental Management, Winchester.

Cresswell W.J, Birks J, Dean M, Pacheco M, Trewhella W.J, Wells D and Wray S (2012). *UK BAP Mammals: Interim Guidelines for Survey Methodologies, Impact Assessment and Mitigation*. The Mammal Society, Southampton.

Riber, A., B. (2006) *Habitat use and behaviour of European hedgehog (Erinaceus europaeus) in a Danish Rural Area*. Acta Theriological. 51, 4. 363-371

Haigh, A. and Butler, F. (2012) *A review of techniques for detecting hedgehogs (Erinaceus euripaeus) in rural landscape*. Journal of Negative Results in BioMedicine. 9. 15-26

Lloydbore Ltd (2022). Preliminary Ecological Appraisal. Stonestreet Green Solar. 5535-LLB-RP-EC-0001-P02. Lloydbore Ltd, Canterbury.

Peoples Trust for Endangered Animals (Undated) *Guidance for Surveying Hedgehogs*. Accessed via: [redacted] ast Accessed: 13/12/2022].

Peoples Trust for Endangered Species (undated). Factfile Hedgehogs. Available [redacted]

7. ANNEX 1 SUMMARY OF LEGISLATION

LEGISLATION

7.1 The level of protection afforded to protected species varies dependent on the associated legislation. A full list of protected species and their specific legal protection is provided within the Schedules and/or Sections of the associated legislation. Case law may further clarify the nature of the legal protection afforded to species.

7.2 The legal protection afforded to protected species overrides all planning decisions.

THE NATURAL ENVIRONMENT AND RURAL COMMUNITIES ACT 2006 (AS AMENDED)

7.3 Section 41 (S41) of the Natural Environment and Rural Communities (NERC) Act (2006) requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. The S41 list is used to guide decision-makers, including local and regional authorities, in implementing their duty under Section 40 of the act to have regard to the conservation of biodiversity in England when carrying out their normal functions.

7.4 Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 has been used to identify habitats and species considered to be a conservation priority at a national scale. These are also called Habitats or Species of Principal Importance. The importance of these habitats and species are recognised in the National Planning Policy Framework (NPPF) (Ministry of Housing, Communities & Local Government, 2021).

PROTECTION OF MAMMALS ACT 1996 (AS AMENDED)

7.5 This Act provides protection for all wild mammals against certain cruel acts with the intention of causing unnecessary suffering, including crushing and asphyxiation. With regards to development, this may have implications for site clearance works.

ANIMAL WELFARE ACT 2006

7.6 This Act imposes a duty of care on anyone responsible for an animal to take reasonable steps to ensure that the animal's needs are met. With regards to development, this may have implications when capture and translocations of animals are proposed.

8. ANNEX 2 HABITAT SUITABILITY ASSESSMENT

8.1 Summary of Creswell *et al* (2012) criteria for assessing habitat suitability for hedgehogs.

PREY AVAILABILITY

- Habitats that are likely to provide less opportunities for invertebrate foraging include dry, sandy soils, cold upland areas and acidic soils.
- A larger invertebrate assemblage is likely to be found among moist, rich soils especially where grass is grazed short which makes access easier. Additionally, the presence of livestock adds manure which will attract potential prey species.
- Weather additionally effects foraging ability, with dry weather limiting the availability of worms which may seriously affect females raising young.
- Ideal habitat provides good feeding opportunities juxtaposed with suitability nesting areas and sources of nesting materials. Examples include pastureland with small fields separated by hedges and copses with good hedgehog habitat.

SUMMER NESTING OPPORTUNTIES

- Summer nesting opportunities are frequently located in long grass or rank vegetation within field margins or road verges.
- Females are likely to use nesting materials, such as leaflitter, to build a nest in which to raise their young. Males are more likely to find a suitable place at the end of the night e.g dense vegetation, rabbit burrows.
- Less critical than hibernation opportunities.

HIBERNATION OPPORTUNITIES

- Winter nests are made with naturally fallen leaves of deciduous trees, for example maple (*Acer* sp.) and Oak (*Quercus* sp.) to create a laminated heap. This will surround the individual with at least 5cm of tightly packed leaves and are weatherproof.
- Leaves that are too large, such as horse chestnut (*Aesculus hippocastanum*), or too small, such as birch (*Betula sp*.) are unsuitable.
- Pinnate leaves like those found on ferns (*Polypodiopsida sp*.) are also unsuitable as they cannot be packed flat and tight enough to resist perforation by rain.
- Nests are normally built under structures that lend support from above such as garden sheds, piles of brushwood or brambles.

- Winter nesting opportunities are a crucial factor in hedgehog distribution and habitat use, leading to absence from certain habitats as they require suitable leaves and physical support.
- Some individuals may hibernate opportunistically in rabbit burrows, tree stumps or natural cavities.

9. ANNEX 3 SURVEY TRANSECTS

[SEE OVERLEAF]

LEGEND:

- Transect 1
- Transect 2
- Transect 3
- Transect 4
- Order limits
  Total area approx: 191.538 ha.

0 100 200 m

1:10000

rev.	rev. date	auth.	rev. note
C01	14/05/24	MW	Cleint approved for submission.

rev.	rev. date	auth.	rev. note

client. **EPL 001 Limited**

project. **Stonestreet Green Solar**
Land North And West Of Aldington
Kent

drawing no. **5535-LLB-XX-XX-DR-Ec-0052** rev. **C01**

drawing title. **Survey Transects** suit. **A4**

APFP **5(2)(i)(ii)**

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sheet. **A3**
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checked. **MW**

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Stonestreet Green Solar

Appendix 9.5k: Riparian Mammal Survey Report

CONTENTS

EXECUTIVE SUMMARY

S.1 Lloydbore Ltd was commissioned by EPL 001 Limited (the 'Applicant') to conduct a water vole and otter presence / likely absence survey and beaver field sign survey to inform the proposed Stonestreet Green Solar scheme ('Project').

S.2 The survey was undertaken between 1st and 17th June 2022. The East Stour River channel bordering the Site was also surveyed for water vole, otter and beaver in April and October 2020 and no signs of these species were recorded.

S.3 American mink presence was confirmed across the Site. American mink will predate water voles, which have little defence against this non-native invasive species.

S.4 Evidence of water vole on Site was limited to old water vole burrows and a feeding station, with no evidence or indicators of recent use by water voles. Given the lack of current water vole field signs, water voles are considered to be likely absent within the Site.

S.5 It is recommended that the entire Site should be subject to a mink control programme in order to encourage water vole recolonisation of the area.

S.6 Evidence of otter found on Site included both footprints and otter spraint to the west of the fishing lake east of Goldwell Lane, confirming otter presence across the Site.

S.7 Further otter survey prior to construction will therefore be required to better assess whether there is any requirement for a Natural England European Protected Species Mitigation ('EPSM') licence. Based on current evidence, however a licence is not required.

S.8 No evidence of beaver was recorded within the Site during the survey.

S.9 Given the above, no further assessment is required with regard to beavers.

S.10 It is advised that a robust pollution prevention strategy is designed in order to avoid and minimise pollution of the East Stour River (adjacent and downstream) and other off-site riparian habitats primarily through implementation of the **Outline Construction Environmental Management Plan ('CEMP') (Doc Ref 7.8)**.

S.11 The associated **ES Volume 2, Chapter 9: Biodiversity (Doc Ref 5.2)** and the **Outline Landscape and Ecological Management Plan ('LEMP') (Doc Ref 7.10)** that have been produced to inform the DCO application provide details of avoidance, mitigation and compensation measures relating to riparian mammals.

1. INTRODUCTION

1.1 This Riparian Mammal Survey Report has been prepared on behalf of EPL 001 Limited ('the Applicant') to determine presence or likely absence of riparian mammal species along a section of the East Stour River in relation to the Development Consent Order ('DCO') application for Stonestreet Green Solar ('the Project').

1.2 The Riparian Mammal Survey Report is **Appendix 9.5k** to **ES Volume 2, Chapter 9: Biodiversity (Doc Ref. 5.2)**.

DESCRIPTION OF THE PROJECT

1.3 The Project comprises the construction, operation and decommissioning of solar photovoltaic ('PV') arrays and energy storage, together with associated infrastructure and an underground cable connection to the existing National Grid Sellindge Substation.

1.4 The Project will include a generating station (incorporating solar arrays) with a total capacity exceeding 50 megawatts ('MW'). The agreed grid connection for the Project will allow the export and import of up to 99.9 MW of electricity to the grid. The Project will connect to the existing National Grid Sellindge Substation via a new 132 kilovolt ('kV') substation constructed as part of the Project and cable connection under the Network Rail and High Speed 1 ('HS1') railway.

1.5 The location of the Project is shown on **ES Volume 3, Figure 1.1: Site Location Plan (Doc Ref. 5.3)**. The Project will be located within the **Order limits (the land shown on the Works Plans (Doc Ref. 2.3)** within which the Project can be carried out). The Order limits plan is provided as **ES Volume 3, Figure 1.2: Order Limits (Doc Ref. 5.3)**. Land within the Order limits is known as the 'Site'.

SITE DESCRIPTION

1.6 The Site area is approximately 192 ha, located to the north and west of the village of Aldington to the south-east of Ashford in Kent. The Project lies within the administrative areas of Kent County Council ('KCC') and Ashford Borough Council ('ABC') local authorities. Further information on the Project, including proposed infrastructure and design, is provided in **ES Volume 2, Chapter 3: Project Description (Doc Ref. 5.2)**.

1.7 The Site comprises agricultural fields delineated by hedgerows and tree belts. It extends to approximately 192 hectares and is currently predominantly used for arable cropping and grazing.

1.8 The Site also supports hedgerow, parcels of woodland, drainage ditches, ponds and arable field margins. The East Stour River flows in an east to west direction within, and adjacent to, the northern part of the Site.

1.9 Fields are described in relation to the Project as follows:

- The South Western Area Field 1 to 9.
- The Central Area Fields 10 to 19 and 23 to 25.

- The South Eastern Area Fields 20 to 22.
- The Northern Area Fields 26 to 29.
- Project Substation (location of the Project Substation, in the north western section of Field 26).
- 'Cable Route Corridor' (export of electricity from the Project at 132 kilovolt ('kV') via underground cables (the 'Grid Connection Cable') to the Sellindge Substation). 'Cable Route Crossing' (use of an existing cable duct under the High Speed 1 / Channel Tunnel Rail Link ('HS1') railway or through Horizontal Directional Drilling ('HDD') beneath HS1 for the Cable Route Corridor).
- Sellindge Substation (location of the existing Sellindge Substation).

SCOPE

1.10 Lloydbore Ltd was instructed to undertake a water vole (Arvicola amphibius), otter (Lutra lutra) and beaver (*Castor fiber*) survey to determine presence or likely absence of these riparian mammal species along a section of the East Stour River to inform the Project.

1.11 The scope of works included an associated report detailing the results of the survey.

1.12 The riparian mammal survey was commissioned in light of recommendations made by Lloydbore following the completion of an initial site walkover survey in April 2020. This initial walkover highlighted the suitability of the on-site water course sections for water vole and otter and the potential for presence of these species (Lloydbore, 2022). A subsequent review of aquatic and riparian on-site habitats in spring 2022 confirmed their suitability for beaver.

SURVEY OBJECTIVES

1.13 The objectives of the survey and report are to: -

- Determine whether water voles, otters and/or beavers are present within, or likely to be absent from, the habitats surveyed;
- If water voles, otters and/or beavers are present, provide detail regarding the recorded distribution of these species within the survey area;
- Assess the likely importance of the habitats for water voles, otter and beaver; and
- Determine whether a Natural England licence relating to water voles, otter and/or beaver is likely to be required to facilitate works.

2. METHODOLOGY

DESK STUDY

2.1 A biological data set was obtained from the Kent and Medway Biological Records Centre ('KMBRC') in April 2022 and updated in August 2023. The data obtained through this search includes any records of water vole, otter and beaver. The search radius was a 1km buffer of the Site boundary.

2.2 Aerial imagery and mapping software were used to assess the connectivity of on-site and immediately adjacent habitats to any wider network of habitats suitable for water vole, otter and beaver.

2.3 Records obtained within the ten-year period prior to the date of the record search are considered 'recent'. Records older than this are considered 'historical'.

2.4 The Mammals of Kent (Young et al., 2015) was reviewed - to provide background information on the distribution of water vole in Kent, in relation to the location of the survey Site.

SURVEY

2.5 Two riparian mammal surveys were undertaken, to search for signs of water vole, otter and beaver.

2.6 The first survey was conducted in October 2020 over a period of three days, and the second was conducted on 1st, 10th, 16th and 17th June 2022. The survey visits were undertaken by a competent expert.

2.7 The East Stour River and ditches were surveyed from the bankside areas and within the waterbody where safe to do so. Binoculars were used to survey areas inaccessible by foot.

2.8 The survey visit was carried out in daylight hours and outside of any periods of heavy rain. Allowing at least two days prior to the survey visit without heavy rain as heavy rainfall can remove evidence of water vole and otter presence in particular (such as footprints, droppings and spraint).

2.9 The survey was conducted during weather conditions conducive to finding evidence of water vole, otter and beaver field signs (avoiding times of high rainfall that might have removed or obscured field signs as described above).

2.10 Care was taken not to compact or disturb banks and vegetation during the survey.

2.11 During the Site visit, any field signs indicative of presence of American mink (*Neovison vison*) - an invasive non-native species - such as spraints (faeces), prints or feeding remains, were also recorded.

2.12 A habitat assessment survey of the previously inaccessible Sellindge substation area was carried out on 10th January 2024 by a competent expert.

WATER VOLE SURVEY

2.13 The suitability of the East Stour River, ditches, lakes and bankside areas for water vole was assessed using criteria set out within Strachan *et al.*, (2011) and Dean *et al.,* (2016). The following criteria were considered: -

- Depth, width, strength of current, and likely daily water level fluctuations within watercourse;
- Bank substrate;
- Bank profile;
- Vegetation cover (type, extent and species composition);
- Whether the water body is likely to dry seasonally;
- Bordering land use;
- Connectivity to wider suitable habitat; and
- Disturbance levels (e.g. from human recreation).

2.14 The water vole presence / likely absence survey method was based on guidance provided in Strachan *et al.*, (2011) and Dean *et al.*, (2016).

2.15 The survey comprised a search of bankside habitats for diagnostic signs of water vole presence such as latrines, scattered faeces, burrows, feeding stations and ball nests.

OTTER SURVEY

2.16 The otter survey method broadly followed the survey and monitoring guidance detailed within Monitoring the Otter (Chanin, 2003b).

2.17 Otter surveys can be conducted at any time of year, but the spring period is considered optimal as receding water levels allow field signs on exposed wet mud to be identified.

2.18 Otters frequently deposit spraint under or near bridges, where footprints are also frequently found.

2.19 The otter survey comprised a walkover inspection of the accessible bankside habitat, for any diagnostic otter field signs. Binoculars were used where areas were inaccessible.

2.20 During the survey visits, the surveyors looked for field signs of otter including spraints, holts, slides, nest, tracks, prints and feeding signs.

BEAVER FIELD SIGN SURVEY

2.21 The beaver field sign survey followed survey guidance detailed within *Standing Advice for planning consultations for Beavers* (NatureScot, n.d).

2.22 Beaver surveys can be conducted at any time of year, but the winter and spring period is considered optimal as there is less bankside vegetation, which makes beaver field signs, if present, more visible (NatureScot, n.d).

2.23 The beaver survey comprised a walkover inspection of the accessible bankside habitat within 20m of freshwater, for any diagnostic beaver field signs. Binoculars were used where areas were inaccessible.

2.24 During the survey visits, the surveyors searched for field signs of beavers including feeding evidence, food caches, slides / paths, prints, scent mounds, canals, burrows, dams and lodges.

SURVEY LIMITATIONS

2.25 The first survey, in 2020, was undertaken in October, which is just outside of the optimum late-season survey window for water vole.

2.26 This is not considered to be a significant limitation to the survey because the survey was completed during suitable weather conditions (warm and dry) where water voles are still likely to be active. Therefore, evidence of water vole is still likely to have been recorded if the species was present.

2.27 Due to access limitations and dense shrub vegetation, the full length of the waterbodies along survey section 8 (a drainage ditch containing stagnant water), survey section 11 (a shallow section of the East Stour River), survey section 14 (a damp drainage ditch, partially within hedgerow), survey section 15 (a wet drainage ditch within a hedgerow) and survey section 20 (a shallow oxbow lake adjacent to the East Stour River) could not be surveyed thoroughly and was not accessible during the Site visit.

2.28 Where access was not possible, binoculars were used to search for evidence of water vole and otter. The full length of the waterbody along survey sections 8, 11, 14 and 20 was not visible through binoculars, due to dense vegetation obscuring the view. However, the areas that were able to be viewed were in fine-grain detail, and no evidence of water vole or otter was recorded within these areas during the survey.

2.29 Given survey section 8 contained a small amount of stagnant water coupled with frequent mink field signs found in close proximity to this waterbody, it is unlikely that water voles are present within this water body. Given the lack of resting opportunities for otter along this water body (no crevices within stone / tree roots / log piles and no areas of reed or tall grass for laying up), it is unlikely otters are present in this ditch section.

2.30 Similarly, survey section 14 contained very little water and did not provide resting opportunities for otter, so it is unlikely that either otter or water vole are present within this survey section.

2.31 Survey section 20 only contained very shallow water, and given the lack of water vole field signs and prevalence of mink field signs in close proximity to the survey section, it is highly unlikely water vole are present within this survey section. Given that otter footprints and spraint were found in other sections of the East Stour River, there is a possibility of otter presence within this survey section. Therefore, as a precaution otter presence has been assumed within survey section 20.

2.32 As a precaution, given otter field signs were found directly south of survey section 11, it should be assumed that otter are present within this survey section. However, there

is unlikely to be good otter holting or resting opportunities along this survey section due to the pasture land either side of the waterbody and the thin strip of vegetation bordering the waterbody.

2.33 A full riparian mammal survey of the Sellindge Substation area was not undertaken (due to access being granted outside the riparian mammal survey season) but a habitat assessment and search for field signs was undertaken. Works are currently not anticipated to impact the watercourse here or within 5m.

2.34 The access limitations are not considered to be significant limitations to the validity of the survey. The survey and appraisal are considered to provide a robust assessment of presence / likely absence of water vole, otter and beaver from the Site. As such, there are no material limitations to the survey or assessment.

ASSESSMENT AND EVALUATION

2.35 Professional judgement and guidance (e.g., Strachan *et al.,* 2011 and Dean *et al.,* 2016) were used to assess both the suitability of habitats for water vole, otter and beaver and to determine whether the Project will require a licence from Natural England.

ZONE OF INFLUENCE

2.36 The potential impact of a project is not always limited to the boundaries of the Site concerned. The project may also have the potential to impact on ecologically valuable sites, habitats or species beyond the Site boundaries. The area over which a project may impact ecologically valuable receptors is known as the Zone of Influence ('ZoI').

2.37 The ZoI is determined by the source/type of impact, a potential pathway for that impact and the location and sensitivity of the ecologically valuable receptor beyond the boundary.

2.38 The potential ZoI of the Project is used to establish the spatial extent of any baseline ecological surveys that are required to assess the ecological impacts of the scheme.

2.39 Potential sources of impact associated with the Project include downstream pollution during the Site clearance, construction and operational stages, via the East Stour River.

2.40 In the absence of mitigation, if water voles, otter and/or beaver are present in downstream habitats on the East Stour River, the ZoI of the Project in relation to these species could extend to several kilometres downstream, dependent on the severity and nature of any pollution event and the dispersion and dilution effects particular to the pollutant and the hydrological conditions in the river at the time.

2.41 However, these potential impacts can be easily avoided using standard pollution prevention and control measures (which will be detailed within the associated **ES Volume 2, Chapter 9: Biodiversity (Doc Ref. 5.2)** and the **Outline LEMP (Doc Ref. 7.10)**. The likely ZoI of the Project in relation to water vole, otter and beaver is therefore considered to extend to the red line boundary of the Site and those connected habitats located just beyond. For this reason and given that the length of the survey Site is sufficient to support multiple female water vole territories itself, as

well as the fact that otters and beavers are wide-ranging species that would likely leave detectable field signs within the large area surveyed if they are present in the local area, it was not considered necessary to survey downstream habitats for water vole, otter or beaver.

3. RESULTS

DESK STUDY

WATER VOLE

3.1 There are four historic records of water vole located within 1km of the Site boundary (*c*. 50m south of field D3 in 2009; *c*. 150m northeast of field 18 in 1998; and two records *c*. 1km northeast of field 18 in 2011), but no recent records.

3.2 Young *et al.,* (2015) indicates that the Site is located within the known distribution and range of water vole within Kent.

OTTER

3.3 There are four historical records (within the Royal Military Canal in 1976 and Lower Wall in 1972) of otter located within 1km of the Site, but no recent records.

3.4 Young *et al.,* (2015) indicates that the Site is located outside of the know distribution and range of otter within Kent.

3.5 No granted European Protected Species Mitigation ('EPSM') licences for otter were identified within a 30km radius of the Site.

BEAVER

3.6 The biological records search did not return any records of beaver located within 1km of the Site.

HABITAT ASSESSMENT

3.7 The East Stour River and is located in the north of the survey area, an oxbow lake and fishing lake is present in the northeastern section of the survey area. In addition to the larger waterbodies, there are several drainage ditches with varying water levels (dry, damp and wet) across the remainder of the Site.

3.8 The earth banks are generally steep across the Site and so have potential for water vole and beaver burrow creation However, these are of sub-optimal suitability for water vole within survey sections 1-9 due to the bankside habitat and riparian vegetation being fairly sparse across the area, with pockets of dense vegetation that are present providing limited shelter and cover from predators.

3.9 Survey sections 18 and 19 are dry and damp (respectively) and isolated. As they are not connected to further waterbodies and are situated within the middle of arable fields, which does not provide shelter from predators, they are not suitable for water vole or otter. These areas could be colonised by beaver, but more suitable and accessible habitats exist in some sections of the East Stour River and the fishing lake and therefore, whilst the species remains at relatively low population density in Kent, it is considered unlikely that beavers would seek to colonise these more isolated, less suitable areas.

3.10 In addition, survey sections 4 and 17 were also dry, and survey sections 7, 8, 14, 16 and 21 were damp at the time of survey which further reduces their suitability to support water vole. Otter may use these waterbodies for commuting purposes.

3.11 No obvious otter holting (denning) opportunities were found within bankside habitat within the Site due to a noted lack of natural cavities, for example tree roots, stone or log piles. However, the woodland habitat adjacent to survey section 22 and to the east of survey section 9, could provide holting potential and there is a low possibility of holting within woodland habitat central to the oxbow lake, within the northeastern section of the Site, access was not possible to the oxbow lake due to dense vegetation and access was not permitted in to the adjacent woodland at the time of survey.

3.12 A potential otter laying up area, an area of flat earth bankside habitat, was also noted along survey section 12.

3.13 A habitat assessment and search for field signs at Sellindge Substation was undertaken in January 2024. Access was only granted outside the riparian mammal survey season, so a full survey could not be carried oput.. No burrows were recorded along the stream bank, however, only the eastern bank could be viewed from the available access.

3.14 The description of the survey sections below and the water vole and otter survey plan (see Annex 2) provide further details on habitat.

SURVEY

SURVEY SECTIONS

1. Wet, slow flowing ditch section. The water at the time of the survey measured less than 0.5m in depth. The ditch is 2-5m in width and supports steep earth banks, with abundant tall herb and grass and occasional submerged aquatic vegetation. A commercial fishing lake and short grassland with vehicular access borders the survey section. **No evidence of water vole, otter or beaver presence.**
2. The steep earth banks of the ditch widens to 5-10m for a short section. The water at the time of the survey was slow flowing and measured 1-2m in depth. The bankside habitat is dominated by tall herb. A commercial fishing lake and short grassland with vehicular access borders the survey section. **No evidence of water vole, otter or beaver presence.**
3. Survey section 3 comprises a man-made sluice with vertical concrete sides, a width of 5-10m and slow flowing water of depth 0.5-1m. A commercial fishing lake and short grassland with vehicular access borders the survey section. **No evidence of water vole, otter or beaver presence. Evidence of American mink presence.**
4. Wet, slow flowing ditch section. The water at the time of the survey measured 0.5-1m in depth. The ditch is 5-10m in width and supports steep earth banks, with abundant tall herb and grass. A commercial fishing lake and short grassland with vehicular access borders the survey section. **No evidence of water vole, otter or beaver presence.**

5. Survey section 5 comprises a man-made sluice with steep concrete sides, a width of 5-10m and fast flowing shallow water of depth 0.5-1m. A commercial fishing lake and short grassland with vehicular access borders the survey section. **No evidence of water vole, otter or beaver presence.**

6. Wet, slow flowing section of the East Stour River. The water at the time of the survey measured 2-5m in depth. The river is 2-5m in width and supports shallow earth banks, with frequent submerged vegetation and rare patches of reed, abundant tall herb and grass and scattered trees was present on the northern and southern banksides with an additional line of trees on the southern bankside. Arable land surrounds the survey section with a commercial fishing lake and short grassland also bordering the survey section to the south. **No evidence of water vole, otter or beaver presence.**

7. A seasonally wet drainage ditch, water at the time of the survey was static and measuring less than 0.5m in depth, and dry in some areas. The width of the ditch measured 2-5m with shallow earth banks supporting abundant bramble scrub, tall herb and bankside trees. **No evidence of water vole, otter or beaver presence. Evidence of American mink presence.**

8. A drainage ditch with static water of depth less than 0.5m . The width of the ditch measured 1-2m supporting steep earth banks dominated by dense bramble with scattered trees. This ditch section was unable to be accessed due to the dense vegetation and presence of wire fencing, the ditch was assessed using binoculars where vegetation was less dense. Arable land borders this ditch section. **No evidence of water vole, otter or beaver presence.**

9. A fishing lake, over 40m in width with shallow earth banks and deep water measuring 1-2m at edge but deeper than 2m towards the centre. Short grassland borders the lake with woodland present *c*.20m to the southeast of the lake. **No evidence of water vole, otter or beaver presence.**

10. East Stour River, 5-10m in width with a sluggish current, shallow earth banks and deep water. measuring 1-2m. Bankside trees border the river and dense reedbeds are present within the water body. **No evidence of water vole, otter or beaver presence.**

11. East Stour River, 2-5m in width with a slow current, shallow earth banks and shallow water of depth less than 0.5m. Dense bankside trees border the river preventing access to survey this area. **Assumed water vole and otter presence. No evidence of beaver presence.**

12. East Stour River, 10-20m in width with a sluggish current, steep earth banks and shallow water of depth less than 0.5m. Dense herbs and bankside trees border this area. **Confirmed otter presence and water vole field signs. No evidence of beaver presence.**

13. A wet drainage ditch, 2-5m in width with steep earth banks and static water of 0.5-1m in depth. Dense reeds and sedges fill the waterbody section with occasional bankside bushes and trees. **No evidence of otter or beaver, confirmed water vole field signs.**

14. A damp drainage ditch, 2-5m in width with steep earth banks and areas of static water of less than 0.5m in depth. Dense herbs and tall grass border and fill the waterbody with abundant tall grass and herbs present. **No evidence of otter or beaver, confirmed water vole field signs.**
15. A wet drainage ditch within a hedgerow, 1-2m in width with steep earth banks and areas of static water of less than 0.5m in depth. Dense hedgerow borders the waterbody herbs and tall grass border and fill the waterbody in areas with abundant bramble scrub and reeds are also present with occasional bankside trees. **No evidence of otter or beaver, confirmed water vole field signs.**
16. A wet drainage ditch, 1-2m in width with shallow earth banks and areas of sluggish water of less than 0.5m in depth. Tall herbs, tall grass, nettles and bankside trees border and fill the waterbody in areas. **No evidence of otter or beaver, confirmed water vole field signs.**
17. A dry drainage ditch, 1-2m in width with shallow earth banks. Tall herbs, short grass and bankside trees border and fill the waterbody in areas. **No evidence of otter or beaver, confirmed water vole field signs.**
18. An isolated dry drainage ditch, 1-2m in width with steep earth banks. Bramble scrub, nettles and bankside trees border and fill the waterbody in areas. **No evidence of otter or beaver, confirmed water vole field signs.**
19. An isolated damp drainage ditch, 2-5m in width with steep earth banks and sluggish water of depth less than 0.5m. Bankside trees border the waterbody with frequent bramble scrub and abundant nettles, which fill the waterbody in areas. **No evidence of otter or beaver, confirmed water vole field signs.**
20. Oxbow lake adjacent to the East Stour River, 2-5m in width with steep earth banks and areas of static water less than 0.5m in depth. Dense bankside trees are present with abundant and dense tall herb also bordering the waterbody. **No evidence of water vole or beaver, assumed presence of otter.**
21. A dry drainage ditch, 1m in width with steep earth banks. Bramble scrub borders the water body. **No evidence of otter or beaver, water vole field signs.**
22. East Stour River, 5-10m in width with a slow current, shallow earth banks and deep water. measuring 1-2m. Bankside trees and dense tall herb border the river, areas of dense reedbeds are present within the water body. **No evidence of water vole, otter or beaver presence. Evidence of American mink presence.**

WATER VOLE

3.15 Water vole burrows were observed along survey sections 12-15 and 17-19 and assumed present in survey section 11 (due to the presence of suitable and connected habitat but not accessible due to dense vegetation). However, the results are inconclusive as water voles have very volatile populations, a burrow by itself without any additional field signs cannot confirm current presence.

3.16 In addition a pathway in vegetation was observed in survey Section 13, a collapsed water vole burrow was located *c*. 90m from this pathway but did not appear to lead to the burrow.

3.17 A feeding station was observed within survey Section 16, the grass was freshly cut, however no droppings were present and no definitive water vole field signs were identified in close proximity to the Site so these findings were inconclusive and could have been left by another small mammal.

3.18 No other field signs of water voles – such as latrines, scattered faeces or feeding stations were recorded.

3.19 Evidence of American mink, which predate on water vole as part of their diet, was found in the form of footprints identified along the East Stour River, within survey section 11, and mink scat within survey section 3 and survey section 7.

3.20 In addition to the above, the area around survey sections 1-5, 8 and 9 are subject to disturbance by members of the public using the fishing lake.

3.21 A likely absence of water voles has therefore been recorded for the Site.

OTTER

3.22 No otter holts were recorded within the Site. However, a tree identified as suitable for holting (but with no evidence of current use) was identified within survey section 11.

3.23 In addition, opportunities within the woodland habitat, adjacent to survey section 22 and to the east of survey section 9 and within woodland habitat central to the oxbow lake, within the northeastern section of the Site, access was not possible to the oxbow lake due to dense vegetation and access was not permitted into the adjacent woodland at the time of survey.

3.24 A potential otter laying up area, an area of flat earth bankside habitat, was also noted along survey section 12. Otter spraint was found *c*. 15m from this potential resting place and otter footprints found c. 150m upstream of this resting place.

3.25 Otter presence has therefore been confirmed on Site.

BEAVER

3.26 No evidence of beaver presence was recorded within the Site.

3.27 Given the above, beaver are assumed to be likely absent from the Site.

4. PHOTOS

Photo 1 Mink scat located within survey section 3.

Photo 2 Mink scat located within survey section 7.

Photo 3 Otter spraint located within survey section 12.

Photo 4 Otter footprint located within survey section 12.

Photo 5 Suitable holting location (no evidence of current use) in Survey section 12.

Photo 6 Inconclusive water vole feeding station within Survey section 16.

5. EVALUATION

5.1 No current conclusive signs or indicators of water vole or beaver presence was found within the Site boundary during the 2020 or 2022 surveys.

5.2 Mink scat was also found during the 2022 survey within a damp ditch to the north of the East Stour River, a wet ditch running south off the East Stour River and within the East Stour River itself, confirming mink presence within the Site boundary. Fisherman also gave anecdotal evidence during the 2020 survey that mink were frequently seen within the fishing lake and at least a single mink was observed by Lloydbore ecologists on the fishing lake during an amphibian survey at the Site in 2022.

5.3 American mink will predate water voles, which have little defence against this non-native invasive mammal species. Given the lack of further current water vole field signs, water voles are considered to be likely absent within the Site.

5.4 Based on the prevalence of American mink field signs and lack of recent water vole evidence, water voles are assumed to be likely absent from the Site and have therefore been scoped out of further assessment. However, it is recommended that the Site should be subject to a mink control programme in order to assist in allowing water vole recolonisation of the area. Any such mink control programme should be undertaken in close coordination with other landowners along the East Stour River, to maximise the likelihood that mink control efforts are effective.

5.5 Otter footprints and spraint were identified within survey section 12 (the East Stour River). Further otter footprints and two sprainting sites were also identified *c*. 2km east of the Site boundary and a further sprainting site during surveys Lloydbore undertook for other projects in Spring and Summer 2022.

5.6 A potential otter laying up area has been identified within survey section 12, adjacent to evidence of otter presence. Once an update survey has been undertaken closer to the time of Site development, an exclusion zone of at least 30m surrounding any otter holts couches / lying up locations should be set up and maintained throughout construction.

5.7 In addition, an update to the otter survey should be undertaken prior to works to check for any subsequent evidence of otter holting or resting areas. This 'pre-commencement survey' will be used to better assess whether there is any requirement for a Natural England European Protected Species (EPS) mitigation licence to facilitate site works. Based on current evidence, however a licence is not required.

5.8 It is advised that a robust pollution prevention strategy is designed in order to avoid and minimise pollution of the East Stour River (downstream) and other off-site riparian habitats, primarily through implementation of the **Outline CEMP (Doc Ref. 7.8)**.

6. REFERENCES

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7. ANNEX 1: SUMMARY OF LEGISLATION

7.1 The specific legal protection afforded to water vole can be found within the Sections and Schedules of the relevant legislation.

WATER VOLE

7.2 Water vole is listed on the Wildlife and Countryside Act 1981 (as amended), and it receives 'full' legal protection. The Act includes the following offences: -

- Intentional killing, taking (capture) or injury of a water vole;
- Possession or control of any live or dead water vole, or any part or derivative;
- Intentional or reckless damage or destruction of a water vole's place of shelter or protection;
- Intentional or reckless disturbance of a water vole whilst it is occupying a structure or place which it uses for shelter and / or protection; and
- Intentional or reckless obstruction of access to a water vole's place of shelter and / or protection.

7.3 No actions that will impact upon water vole or its habitat can be undertaken unless authorised under a licence issued by Natural England. Such a licence is not usually granted until after planning consent has been granted and relevant ecology-related planning conditions have been discharged, and once Natural England are satisfied that adequate measures are to be put in place to mitigate for the impact of the development. In certain instances, a class displacement licence can be used to cover lower impact works, without the need for planning permission.

OTTER

7.4 Otter is protected as a European Protected Species under the Conservation of Habitats and Species Regulations 2017 (as amended) and the Wildlife and Countryside Act 1981 (as amended). This legislation includes the following offences: -

- Damage or destruction of a breeding or resting place of otter. (This is sometimes referred to as the strict liability or absolute offence).
- Deliberate capture, injury or killing of an otter / otters.
- Deliberate disturbance of an otter / otters, and in particular disturbance likely to impair animals' ability to survive, breed or nurture young, their ability to hibernate and migrate and disturbance likely to have a significant effect on local distribution and abundance.
- Intentional or reckless disturbance of an otter / otters while occupying a structure or place used for shelter and / or protection (Wildlife and Countryside Act 1981 (as amended)).

- Intentional or reckless obstruction of access to any structure or place that an otter / otters use for shelter or protection (Wildlife and Countryside Act 1981 (as amended)).

7.5 No actions that will impact upon a European protected species or its habitat can be undertaken unless authorised by a European Protected Species licence issued by Natural England. Such a licence is not usually granted until after planning consent has been granted and relevant ecology-related planning conditions have been discharged, and once Natural England are satisfied that adequate measures are to be put in place to mitigate for the impact of the development.

BEAVER

7.6 Beaver is protected as a European Protected Species under the Conservation of Habitats and Species Regulations 2017 (as amended). This legislation includes the following offences: -

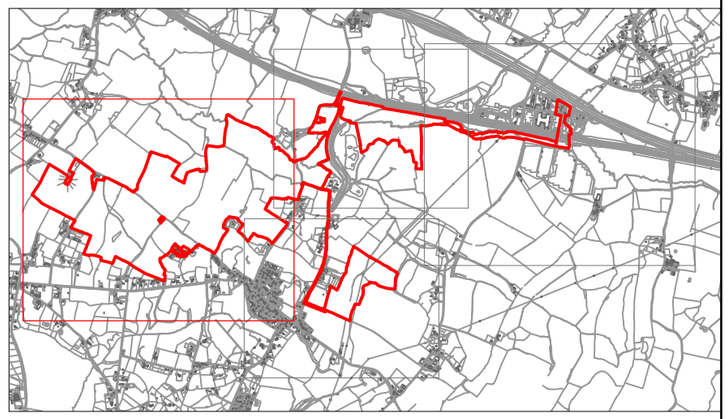
- Damage or destruction of a breeding or resting place of beaver. (This is sometimes referred to as the strict liability or absolute offence).
- Deliberate capture, injury or killing of a beaver / beavers.
- Deliberate disturbance of a beaver / beavers, and in particular disturbance likely to impair animals' ability to survive, breed or nurture young, and disturbance likely to have a significant effect on local distribution and abundance; and
- The release of beaves into the wild except with a licence.

7.7 In addition to the above, wild beavers are protected under The Wild Mammals (Protection) Act 1996 which protects mammals from cruel acts / treatment such as mutilation, beating, impaling or drowning.

7.8 A European Protected Species licence issued by Natural England is typically required for any actions that may constitute an offence under the above legislation. Such a licence is not usually granted until after planning consent has been granted and relevant ecology-related planning conditions have been discharged, and once Natural England are satisfied that adequate measures are to be put in place to mitigate for the impact of the development.

8. ANNEX 2: RIPARIAN MAMMAL SURVEY PLAN

[SEE OVERLEAF]



Arable
Reeds
Arable
Arable
Bankside trees & bramble
Reeds
Reeds
Bankside trees
Arable
Reeds
Reeds
Section 14
Bramble and bankside trees
Bramble
Reeds
Reeds
Section 15
Herb & bramble
Bramble scrub
Arable
Bankside trees
Bramble
Bankside trees
Pasture
Banksi
Sectic
Section 16
Section 17
Arable
Arable
Section 18
Arable
Section 4
Arable
Arable
Bankside trees

LEGEND:

- Waterbodies
- Survey section
- Water Vole Field Sign
- Otter Field Sign
- Mink Field Sign

Vegetation

- Tall grass
- Bramble
- Reeds / sedges
- Bankside trees
- Mixed vegetation
- Order limits
  Total area approx: 191.538 ha.

N

m

N.T.S.

rev.	rev. date	auth.	rev. note
C01	15/05/24	MW	Cleint approved for submission.

client. **EPL 001 Limited**

project. **Stonestreet Green Solar**
Land North And West Of Aldington
Kent

drawing no. **5535-LLB-XX-XX-DR-Ec-0024** rev. **C01**

drawing title. **Riparian Mammal Survey**
Sheet 1 of 4

suit. **A4**

APFP **5(2)(I)(ii)**

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sheet. **A3**
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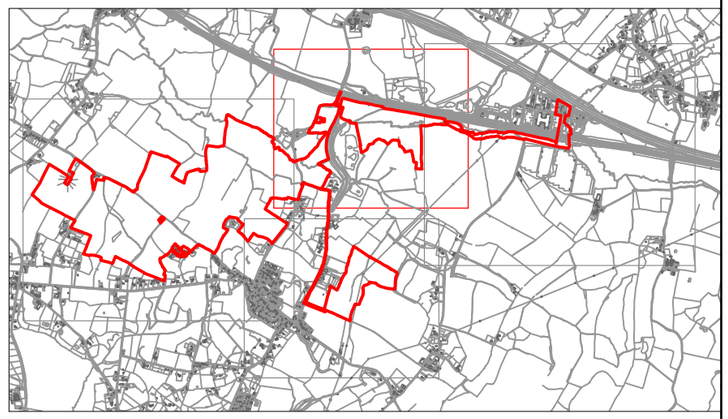

Bankside trees
Arable fields
Section 7
Arable fields
Reeds / sedges
Arable
Arable fields
Bankside trees
Reeds / sedges
Tall grass
Section 20
Bankside trees
Reeds / Sedges
Bankside trees
Bankside trees
Bankside trees
Bankside trees
Tall grass
Section 6
Bankside trees
Bankside trees
Pasture
Arable fields
Reeds / Sedges
Reeds / Sedges
Reeds / Sedges
Reeds & bankside trees
Residential garden
Section 5
Section 22
Section 10
Short grassland
Bankside trees
Section 8
Arable
Tall grass
Residential garden
Short grassland
Section 11
Section 4
Rough grassland
Rough grassland
Pasture
Pasture field
Section 9
Pasture
Pasture
Bankside trees
Bramble
Bankside trees
Bankside trees
Section 2
Section 3
Tall Grass
Broadleaved woodland
Section 1
Section 12
Section 13
Reeds
Tall Grass
Arable
Bramble
Reeds
Section 16
n 17

LEGEND:

- Waterbodies
- Survey section
- Water Vole Field Sign
- Otter Field Sign
- Mink Field Sign

Vegetation

- Tall grass
- Bramble
- Reeds / sedges
- Bankside trees
- Mixed vegetation
- Order limits
  Total area approx: 191.538 ha.

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project.
Stonestreet Green Solar
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drawing title.
Riparian Mammal Survey Plan
Sheet 2 of 4

suit. **A4**

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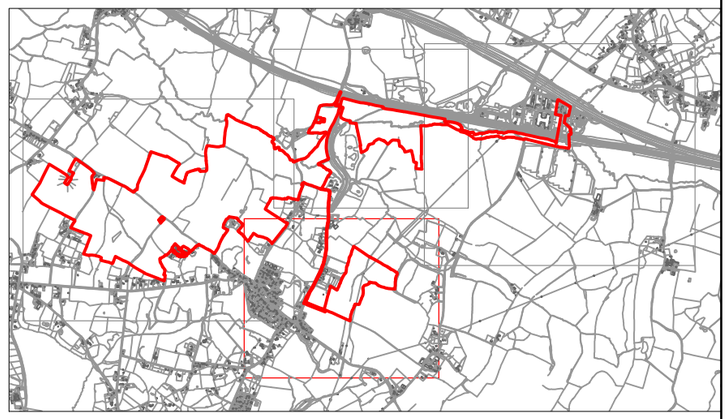

Arable

Arable

Section 19

Bankside trees

Arable

LEGEND:

- Waterbodies
- Survey section
- Water Vole Field Sign
- Otter Field Sign
- Mink Field Sign

Vegetation

- Tall grass
- Bramble
- Reeds / sedges
- Bankside trees
- Mixed vegetation
- Order limits
  Total area approx: 191.538 ha.

N

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rev.	rev. date	auth.	rev. note
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rev. rev. date auth. rev. note

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project.
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drawing title.
Riparian Mammal Survey
Sheet 3 of 4

suit. *A4*

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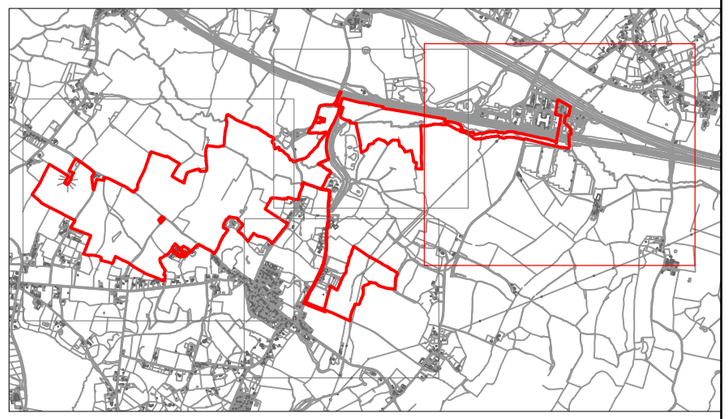

Segment 1

Bankside trees

Bankside trees

Bankside trees

Woodland

Section 22

Arable

Arable

Start of Segment 2

Segment 2

ide trees

Start of Segment 2

Woodland

Section 22

Arable

Section 21

Solar farm, short grass

LEGEND:

- Waterbodies
- Survey section
- Water Vole Field Sign
- Otter Field Sign
- Mink Field Sign

Vegetation

- Tall grass
- Bramble
- Reeds / sedges
- Bankside trees
- Mixed vegetation
- Order limits
  Total area approx: 191.538 ha.

N

m

N.T.S.

rev.	rev. date	auth.	rev. note
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project.
Stonestreet Green Solar
Land North And West Of Aldington
Kent

drawing no. *5535-LLB-XX-XX-DR-Ec-0027* rev. *C01*

drawing title.
Riparian Mammal Survey
Sheet 4 of 4

suit. *A4*

APFP *5(2)(I)(ii)*

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scale. *N.T.S.*

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Stonestreet Green Solar

Appendix 9.5l: Bat Tree Survey Report

CONTENTS

1. EXECUTIVE SUMMARY

S.1 Lloydbore Ltd was commissioned by EPL 001 Limited (the 'Applicant') to undertake bat surveys to inform the proposed Stonestreet Green Solar scheme (the 'Project').

S.2 These surveys comprised a Ground Level Tree Assessment (GLTA) and subsequent bat emergence / re-entry survey of trees to be potentially impacted by development proposals, as identified by previous Arboricultural Impact Assessment (Wardell Armstrong, 2022). Impacts are expected to be limited to works to maintain tree health and where trees require unavoidable works to facilitate the required infrastructure for the Project.

S.3 Following completion of the GLTA in June 2023, three trees (T74, T80 and T81) were identified as assess as having suitability for roosting bats of 'moderate' or higher and requiring presence / likely absence (emergence / re-entry surveys) in accordance with good practice survey guidance.

S.4 A number of trees were also assessed as having 'low' suitability for roosting bats (T14, T148 and T189). The remaining trees potentially subject to works were assessed as having negligible suitability for roosting bats.

S.5 A bat emergence survey of trees assessed as moderate or higher suitability for roosting bats (T74, T80 and T81)) was undertaken during August 2023 (inclusive).

S.6 No evidence of roosting bats was recorded during the survey. At least four species of bat (common pipistrelle, soprano pipistrelle, noctule and brown long-eared) were recorded using The Site for commuting and / or foraging during the emergence survey.

S.7 As works are not scheduled to commence on-site until 2025, it is likely that survey works of trees across the Site, including a ground level tree assessment, will need to be repeated prior to construction related works commencing - ideally within 12 months of works impacting trees. If surveys have recorded roosting bats within a tree to be subject to works, such works can only be carried out under a granted Natural England European Protected Species ('EPS') mitigation licence.

S.8 Low suitability trees or trees with a recorded likely absence of roosting bats do not require further survey in accordance with good practice survey guidance, but future works potentially impacting Potential Roost Features ('PRFs') will need to be carried out a Precautionary Method of Working under ecological supervision by a suitably licenced ecologist (i.e. registered with a minimum of a Class 2 Natural England survey licence) as required by BCT good practice guidelines.

Full details of the survey work completed are provided in this report. The associated **ES Volume 2, Chapter 9: Biodiversity (Doc Ref 5.2)** and the **Outline Landscape and Ecological Management Plan ('LEMP') (Doc Ref. 7.10)** detail avoidance, mitigation, compensation and enhancement measures relating to bats.

2. INTRODUCTION

2.1 This bat tree survey report has been prepared on behalf of EPL 001 Limited ('The Applicant') to provide the results of the ground level tree assessment ('GLTA') and subsequent bat emergence / re-entry survey of trees in relation to the Development Consent Order ('DCO') application for Stonestreet Green Solar ('the Project').

2.2 This bat tree survey report is **Appendix 9.5l** to **ES Volume 2, Chapter 9: Biodiversity (Doc Ref. 5.2)**.

THE PROJECT

2.3 The Project comprises the construction, operation and decommissioning of solar photovoltaic ('PV') arrays and energy storage, together with associated infrastructure and an underground cable connection to the existing National Grid Sellindge Substation.

2.4 The Project will include a generating station (incorporating solar arrays) with a total capacity exceeding 50 megawatts ('MW'). The agreed grid connection for the Project will allow the export and import of up to 99.9 MW of electricity to the grid. The Project will connect to the existing National Grid Sellindge Substation via a new 132 kilovolt ('kV') substation constructed as part of the Project and cable connection under the Network Rail and High Speed 1 ('HS1') railway.

2.5 The location of the Project is shown on **ES Volume 3, Figure 1.1: Site Location Plan (Doc Ref. 5.3)**. The Project will be located within the Order limits (the land shown on the **Works Plans (Doc Ref. 2.3)** within which the Project can be carried out). The Order limits plan is provided as **ES Volume 3, Figure 1.2: Order Limits (Doc Ref. 5.3)**. Land within the Order limits is known as the 'Site'.

SITE DESCRIPTION

2.6 The Site area is approximately 192 ha, located to the north and west of the village of Aldington to the south-east of Ashford in Kent. The Project lies within the administrative areas of Kent County Council ('KCC') and Ashford Borough Council ('ABC') local authorities. Further information on the Project, including proposed infrastructure and design, is provided in **ES Volume 2, Chapter 3: Project Description (Doc Ref. 5.2)**.

2.7 The Site comprises agricultural fields delineated by hedgerows and tree belts. It extends to approximately 192 hectares and is currently predominantly used for arable cropping and grazing.

2.8 The Site also supports hedgerow, parcels of woodland, drainage ditches, ponds and arable field margins. The East Stour River flows in an east to west direction within, and adjacent to, the northern part of the Site.

2.9 Fields are described in relation to the Project as follows:

- The South Western Area, Fields 1 to 9.
- The Central Area, Fields 10 to 19 and 23 to 25.

- The South Eastern Area, Fields 20 to 22.
- The Northern Area, Fields 26 to 29.
- Project Substation (location of the Project Substation, in the north western section of Field 26).
- 'Cable Route Corridor' (export of electricity from the Project at 132 kilovolt ('kV') via underground cables (the 'Grid Connection Cable') to the Sellindge Substation). 'Cable Route Crossing' (use of an existing cable duct under the High Speed 1 / Channel Tunnel Rail Link ('HS1') railway or through Horizontal Directional Drilling ('HDD') beneath HS1 for the Cable Route Corridor).
- Sellindge Substation (location of the existing Sellindge Substation).

SCOPE

2.10 Lloydbore Ltd was instructed to undertake bat surveys at the Site to inform the Project.

2.11 These surveys comprised a GLTA and subsequent bat emergence / re-entry survey of trees to be potentially impacted by the Project, as identified by the Arboricultural Impact Assessment (Wardell Armstrong, 2022). Impacts are expected to be limited to works to maintain tree health and where trees require unavoidable works to facilitate required infrastructure for the Project.

SURVEY OBJECTIVES

2.12 The objectives of the survey and report are to: -

- Identify any trees to be potentially subject to works that are suitable for roosting bats
- Identify the level of further survey or mitigation required for each tree assessed as suitable
- Identify whether bats are roosting within the trees that have been assessed as suitable for roosting bats;
- Determine whether a European Protected Species bat mitigation licence is likely to be required to facilitate the Project; and
- Assess the ecological importance of the application Site for roosting bats and, where appropriate and possible, provide information in relation to site use by foraging and commuting bats (as recorded during the emergence survey).

2.13 Note that site wide activity surveys have been conducted separately during 2020 and 2022 as detailed within the **ES Volume 4, Appendix 9.5h: Bat Activity (Transect and Static) Survey Report (Doc Ref. 5.4)**. As a result, the surveys, assessment and evaluation of foraging and commuting bats in relation to the Project is addressed in that report and is not addressed here.

3. METHODOLOGY

DESK STUDY

3.1 A biological records search was undertaken by Kent and Medway Biological Records Centre ('KMBRC') in August 2023. The data obtained through this search includes records of bats. The search radius was 5km, measured from the Site boundary.

3.2 Records obtained within the ten-year period prior to the date of the record search are considered 'recent.' Records older than this are considered 'historical.'

3.3 Natural England's Multi Agency Geographic Information for the Countryside (MAGIC) interactive mapping software was used to search for granted bat European Protected Species Mitigation ('EPSM') licences located within a 5km radius of the Survey Area boundaries.

3.4 A search was also undertaken using the KMBRC data and 'MAGIC' for internationally designated sites (Special Areas of Conservation (SACs)) designated for bats within 10km; other statutory sites designated for bats within 5km and any relevant non-statutory sites within 1km.

3.5 Aerial imagery and mapping software were used to assess the connectivity of on-Site habitats to any wider network of hedgerows, woodland and other habitats that are, or may be, suitable for bats.

DETERMINING SURVEY EXTENTS

3.6 The potential impacts of a project are not always limited to the boundaries of the Site concerned. The area over which a project may impact ecologically important features is known as the Zone of Influence ('ZoI').

3.7 The ZoI is determined by the source / type of impact, the potential pathway(s) for that impact and the location and sensitivity of the ecologically important feature(s) beyond the Site boundary.

3.8 The Project will result in the removal of a limited number of trees in proportion to the size of the Site and habitat losses are generally restricted to arable fields with the Project providing widespread habitat enhancements in the long term. Impacts upon any roosts located within off-site structures or trees are significantly less likely due to distance from the works footprint and the fact that the habitats being removed are largely of low suitability for foraging bats.

3.9 Assuming that external lighting is minimised on site during the construction and occupation stages of the Project, in line with standard light-related avoidance and mitigation measures for bats as set out in the associated *Ecological Impact Assessment* report, the risk of ecologically significant adverse effects upon any bats that utilise off-site roosts / habitats can be further minimised.

3.10 Given the factors listed above, the survey study area was limited to trees assessed to be potentially subject to arboricultural works and suitable for roosting bats within the red line boundary of the Site.

GROUND LEVEL TREE ASSESSMENTS

3.11 A ground level inspection of trees to be potentially impact was conducted during summer 2023 based upon the Project proposals available at the time, to assess their suitability for roosting bats. This focused on those trees identified in the *Arboricultural Report* (Wardell Armstrong, 2022) that either require removal or arboricultural works to facilitate the Project. The assessment was carried out by a competent expert, of trees to be potentially impacted in all areas of the Site aside from the Sellindge Substation area. A survey of the previously inaccessible Sellindge Substation area was carried out on 10th January 2024.

3.12 A high-powered clulite torch and binoculars were used to identify potential bat roost features ('PRFs') and to search for any evidence of bat roosting.

3.13 PRFs on trees that may be used by bats include, but are not limited to: -

- Woodpecker holes;
- Knot holes;
- Lifted bark; and
- Hazard beams.

3.14 Following the inspection, the trees were categorised according to their suitability for roosting bats. Factors considered in this assessment include: -

- The age, condition and growth of the building;
- The presence of potential bat access points into the tree; and
- The surrounding habitat.

3.15 The categories used to determine bat roost suitability were adapted from guidance provided in *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (BCT, 2016). The following categories were used: -

- 'Confirmed roost';
- 'High suitability' for roosting bats;
- 'Moderate suitability' for roosting bats;
- 'Low suitability' for roosting bats; and
- 'Negligible suitability' for roosting bats.

EMERGENCE SURVEY

3.16 Following the external / internal building inspection, a number of trees were assessed as being of 'low' suitability for roosting bats, not requiring further survey in accordance with *good practice guidelines* (BCT, 2016). A number of trees were however assessed as having high or moderate suitability, therefore requiring further survey.

3.17 A bat emergence / re-entry survey, comprising five total dusk emergence visits, was undertaken in accordance with current good practice guidance (BCT, 2016).

3.18 During the survey, two surveyors were positioned at vantage points around each tree. These vantage points gave adequate visual coverage of the most likely bat access / exit points.

3.19 Surveyors were equipped with an Echo Meter Touch, Anabat Walkabout, Batlogger M2 or a Batlogger M detector, all these devices have a built-in recording device.

3.20 Infra-red cameras were used as a night vision aid (NVA) during all survey visits. An infra-red camera was positioned at every surveyor position during at least one survey visit, in suitable weather.

3.21 NVAs increase precision during survey visits, particularly where there is potential for late-emerging species and in dark conditions and to help provide confirmation of bat emergence points or where 'possible' emergence was recorded.

3.22 Infra-red cameras that were deployed during the survey include Canon XA10, Canon XA11, Canon XF100, Canon XF200, Panasonic HC-VX870 and Sony Handycam DCR-SR52. Additional infra-red (IR specific spotlights or torches) were used during the three survey visits to provide adequate illumination of the potential roost features (PRFs).

3.23 These NVAs were positioned at locations in which potential roost features or aspects of the trees with potential to support PRFs could be recorded throughout the course of the survey visit. The NVAs were deployed at the beginning of the survey and set to record for the duration of the survey. Surveyors would switch to viewing the PRFs through the screen of their NVA once it became too dark to visibly see the features they were observing.

3.24 Where appropriate, NVAs were positioned unmanned. In these instances, the survey footage was subject to a full desk-based review after the survey visit.

3.25 When required, the infra-red footage was also reviewed after the survey identified potential or confirmed emergences, this footage was re-analysed to provide additional information on egress / ingress locations and accurate number of bats present within the tree.

3.26 NVA footage was reviewed using VLC media player at normal review speed or slower, to ensure that any bat emergences within the range of the cameras were recorded.

3.27 The *Interim Guidance Note: Use of night vision aids for bat emergence surveys and further comment on dawn surveys* (BCT, 2022) has been used as the standard survey protocol for use of NVAs and informed the scope of survey works undertaken using NVAs.

3.28 Within this report, the term 'peak count' represents the total number of individual bats recorded at a specific location during a single survey visit.

3.29 The 'max count' represents the largest count of individual bats recorded within the survey period at any location.

3.30 Table 1 provides details of the timings and weather conditions recorded during the surveys.

Table 1: Survey date, time, surveyor and weather details

Date of survey	Survey type	Tree	Start time	Finish time	Sunset	Surveyors	Weather at start	Weather at end
09/08/2023	Dusk	T74, T80 and T81.	20:14	22:14	20:29	Jack Bage, Davey Monk, Susanna Clerici and Jason Armstrong	19°C, 10% cloud, Beaufort wind 1, dry.	17°C, 0% cloud, Beaufort wind 1, dry.
17/08/2023	Dusk	T74, T80 and T81.	19:58	21:43	20:13	Nikki Stapleton, Davey Monk, Mark Horsted, Sarah Putnam	18°C, 30% cloud, Beaufort wind 1, dry.	19°C, 0% cloud, Beaufort wind 1, dry.
29/08/2023	Dusk	T81	19:34	21:19	19:49	Jack Bage and Davey Monk	15°C, 25% cloud, Beaufort wind 0, dry.	16°C, 100% cloud, Beaufort wind 1, dry.

SURVEYOR EXPERIENCE

3.31 The survey was carried out by a competent expert.

ASSESSMENT AND EVALUATION

3.32 BCT (2016), the Bat Habitat Tree Key and the *Bat Workers Manual* (JNCC, 2004) have been used to:

- Assess the suitability of the trees for roosting bats;
- Inform the scope of survey works required to assess whether bats are using the trees to roost.

3.33 Natural England standing advice (undated), which is a material consideration in planning, also provides details on standard survey methodology and factors that can influence survey effort.

3.34 The *Guidelines for Ecological Impact Assessment* (CIEEM, 2018) were used as guidance to determine the ecological importance of the Site for bats.

SURVEY LIMITATIONS

3.35 Three dusk survey visits were conducted which is not in accordance with current good practice guidance (BCT, 2016), as at least on survey is recommended to comprise a pre-dawn re-entry survey. However, the recent interim guidance note (BCT, 2022) states that guidelines will be transitioning away from the use of dawn surveys as standard practice as long as appropriate NVAs (such as infra-red cameras) have been used. Studies show that dawn return times are significantly variable between species (Andrews & Pearson, 2022) and Froidevaux *et al.* (2020) found that bat detection probability was not affected by whether a survey was carried out at dusk or dawn. By using NVAs, the detection of bats as they emerge from their roosts can be vastly improved, therefore, the need for dawn re-entry survey visits can be reduced. Images were taken at the end of the survey to show the end illumination of the PRFs using infra-red cameras, which was sufficient to allow comprehensive and reliable views of all PRFs recorded. These images are shown in Annex 2. Note also that the most recent good practice survey guidelines (BCT, 2023) discourage the routine use of pre-dawn surveys, though these guidelines were not published at the time of survey.

3.36 It is difficult to assess the suitability of trees for hibernating bats - because bats can hibernate within features that cannot be accessed or seen during an external or internal inspection. Therefore, even an inspection during the hibernation period carries a large degree of uncertainty.

3.37 Precautionary measures will need to be adopted during tree works to ensure any risks to roosting bats (including hibernating bats) are minimised.

3.38 It is noted that the surveys were compressed to a 3-week window. However, the surveys were conducted during a peak survey month and in optimal survey conditions. It is additionally likely that the surveys will need to be repeated as the construction works are not scheduled until 2026.

3.39 Note that Project proposals within the Sellindge Substation area were not finalised during the 2023 emergence / re-entry season (May to September) ,no details of any arboricultural impacts in this area were available and the area was not accessible at this time.

3.40 When bat calls could not be accurately identified to species level, the word 'likely' has been used in front of the species name to recognise the degree of uncertainty.

3.41 Brown long-eared bat (*Plecoutus auritus*) can be difficult to record in the field. The calls of this species can be quiet and hard to detect. This species can also forage without calling. It is also a 'later emerging' species (BCT, 2016), which means that it may not emerge until it is too dark for a surveyor to identify the species visually.

In order to partially counter this limitation, infra-red cameras were used to cover key positions, allowing the surveyors to review and/or watch the footage on site when features become too dark for a surveyor to record later emerging species.

3.42 Myotis calls are difficult to identify to species level and have therefore been identified as 'myotis species' which can include alcathoe bat (*Myotis alcathoe*), Bechstein's bat (*M. bechsteinii*), Brandt's bat (*M. brandtii*), Daubenton's bat (*M. daubentonii*), Natterer's bat (*M. nattereri*) and whiskered bat (*M. mystacinus*).

3.43 Occasionally, bats were observed but were not recorded echolocating. In these instances, the species cannot be verified using bat sound analysis software and identification was based on visual characteristics, such as the size and flight pattern.

3.44 Bat use of individual trees can vary significantly across short periods of time. Whilst the completed survey work is considered robust, there is always the residual risk that bats have used or will use a tree outside of the period in which the survey work was undertaken. This is a standard limitation of bat roost surveys of trees. To account for this standard limitation, precautionary measures will need to be adopted during tree felling works, or any works which directly impacts the trees, to ensure any risks to roosting bats (including hibernating bats) are minimised.

3.45 In spite of these minor limitations, this report provides a robust assessment of the Site's importance for bats, the objectives of the report have been fulfilled and there are no ecologically significant limitations to the effectiveness of the survey conducted.

LIFESPAN OF SURVEY DATA

The lifespan of the survey data contained in this report has been assessed as 12 months from the completion of the emergence survey (in late August 2023). This lifespan is based on applicable CIEEM guidance on the lifespan of ecological survey data (CIEEM, 2019). After 12 months, a suitably experienced ecologist will need to review whether any update survey work is required to inform planning, licensing and/or construction.

4. RESULTS

DESK STUDY

4.1 Note that a desk study was conducted as part of the bat activity report **ES Volume 4, Appendix 9.5h: Bat Activity (Transect and Static) Survey Report (Doc Ref.5.4)** but is provided below for completeness.

> *'The KMBRC data search returned recent records of eight bat species within 5km of the Site, including serotine, Daubenton's bat, whiskered bat, Natterer's bat, soprano pipistrelle, common pipistrelle, brown long-eared bat and noctule.*
>
> *The closest recorded maternity roost was a soprano pipistrelle maternity roost of 396 bats in June 2012, located c.2.1 km south of the Site at the closest point. The most recent maternity roost was a brown long-eared maternity roost of 20 bats in July 2018, located c.3.8 km north of the Site.*
>
> *The closest hibernation record was a hibernating serotine bat in 1992, located c.5.4 km northwest of the Site at the closest point.*
>
> *A search of Natural England's MAGIC website returned eight records of granted EPS bat mitigation licences within 5km of the Site. Species listed on these licences included common pipistrelle, soprano pipistrelle, brown long-eared bat and serotine. These records relate to five non-breeding roosts and three maternity roosts. No records of hibernation roosts were identified through the MAGIC search.*
>
> *No internationally designated sites (SACs) for bats were identified within 10km of the Site and no other statutory designated sites (i.e. SSSIs) designated for bats were identified within 5km. No detail of the reasons for designation of LWSs was provided through the KMBRC data search*.'

EXTERNAL (GROUND LEVEL TREE ASSESSMENT) ASSESSMENT

4.2 The results of the GLTA are provided within the table below. Tree reference numbers match those with the arboricultural report (Wardell Armstrong, 2022) and field references for the Project as listed in paragraph 2.9.

Table 2: Summary of data obtained during the GLTA survey visit on 23/06/23.

Tree	Nearest field reference	Location of PRF	Description	Bat Roost Suitability Assessment
T2, T4, T5, G3, G4	Field 1 and 2	N/A	N/A	Negligible

Tree	Nearest field reference	Location of PRF	Description	Bat Roost Suitability Assessment
T14	Field 2	Throughout canopy	Minor deadwood and lifted bark on small diameter dead branches, Photo 1.	Low
		Approx 3m height, southeast	Minor crevice, potentially leading into stem but appears to not lead back from torch inspection	
G75	Field 22	N/A	N/A	Negligible
T74	Field 18	Approx 12-14m heigh, west	Four large knot holes with apparent cavities comprise main PRFs, Photo 2.	Moderate
T80	Field 17 (adjacent to T81)	Approx 2-4m height, north	Two large fallen limbs on north side and not directly visible or accessible and appear to have fallen across site boundary. Break / tear out points at low level. Dense vegetation around fallen limbs appears to limit opportunities for clear flight paths into any non-visible individual PRFs that may be present on the limbs.	Moderate
		N/A	Rest of tree appears intact without deadwood present aside from lack of full visibility of north side of tree	
T81	Field 17 (adjacent to T81)	Approx 8-10m height, north	Vertical fissure present on standing dead upright limbs	High
		Approx 8m height, north	Large horizontal 'hazard beam' split on north collapsing branch	
		Approx 8m height, south east	Knot hole appearing to lead to stem cavity on upright stem	

Tree	Nearest field reference	Location of PRF	Description	Bat Roost Suitability Assessment
		N/A	Rest of tree appears intact without deadwood present aside from lack of full visibility of north side of tree	
T109, T115	Field 19	N/A	N/A	Negligible
G116, G117	Field 24	N/A	N/A	Negligible
T148	Field 24	N/A	No visible PRFs but could not fully inspect due to dense vegetation	Low
T189	Field 29	Approx 10m heigh, west	Possible minor cavity associated with knot hole but tree otherwise intact despite appearing to succumb to ash dieback. Photo 5	Low

EMERGENCE SURVEY

4.3 No evidence of roosting bats was recorded during the survey. NVAs were used to confirm surveyor results from the field, by analysing video recordings post survey.

4.4 At least four species of bat (common pipistrelle, soprano pipistrelle, noctule and brown long-eared) were recorded using the Site for commuting and / or foraging during the emergence survey.

4.5 A summary of the activity recorded during each survey is provided below.

09/08/2023

4.6 The first bat was recorded on-site at 20:45 close to T81. Four species of bat (common pipistrelle, soprano pipistrelle, brown long eared and Noctule) were recorded during the survey visit. Activity was overall assessed as low, based on the limited number of passes recorded. Individual bats were observed passing nearby during the survey, with the majority of activity recorded close to T74 and T81.

Table 3: Summary of data obtained during the emergence survey visit on 09/08/2023.

Time	Species and number	Location of bat(s)	Activity	Emergence confirmed on NVA(s)?
20:45	Soprano pipistrelle	T81 / T80	In flight	No
20:52	Common pipistrelle	T74	Pass	No
21:02	Common pipistrelle	T74	Pass	No
21:02	Common pipistrelle	T81 / T80	In flight	No
21:09	Unknown (likely pipistrelle)	T74	Pass	No
21:14	Soprano pipistrelle	T74	Pass	No
21:26	Brown long eared	T81 / T80	In flight	No
21:39	Noctule	T74	Pass	No

17/08/2023

4.7 The first bat was recorded on-site at 20:34 close to T81. Four species of bat (common pipistrelle, soprano pipistrelle, brown long eared and Noctule) were recorded during the survey visit. Activity was low. Individual bats were observed flying during the survey.

Table 4: Summary of data obtained during the emergence survey visit on 17/08/2023.

Time	Species and number	Location of bat(s)	Activity	Emergence confirmed on NVA(s)?
20:34	Soprano pipistrelle	T81 / T80	In flight	No

Time	Species and number	Location of bat(s)	Activity	Emergence confirmed on NVA(s)?
20:45	Common pipistrelle	T81 / T80	In flight	No
20:49	Common pipistrelle	T74	Unseen	No
20:56	Common pipistrelle	T81 / T80	In flight	No
21:02	Common pipistrelle	T81/ T80	In flight	No
21:09	Soprano pipistrelle	T74	Unseen	No
21:10	Brown long eared	T80	In flight	No
21:12	Soprano pipistrelle	T74	In flight	No
21:27	Noctule	T81	In flight	No
21:36	Brown long eared	T81	Unseen	No

29/08/2023

4.8 The first bat was recorded on-site at 20:06 close to T81. Three species of bat (soprano pipistrelle, brown long eared and Noctule) were recorded during the survey visit. Activity was very low (i.e., consisting of three recorded passes only).

Table 5: Summary of data obtained during the emergence survey visit on 29/08/2023.

Time	Species and number	Location of bat(s)	Activity	Emergence confirmed on NVA(s)?
20:06	Noctule	T81	Unseen	No
20:12	Soprano pipistrelle	T81	In flight	No

Time	Species and number	Location of bat(s)	Activity	Emergence confirmed on NVA(s)?
21:10	Brown long eared	T81	Unseen	No

5. PHOTOGRAPHS

Photo 1 *T14, small semi-mature oak with minor ivy cover and minor dead wood branches*

Photo 2 *T74, knot holes and cavities on upright stems*

Photo 3 *T81 showing dead branches, woodpecker holes and vertical fissures in upright stem*

Photo 4 *T80 showing dead large branch with splits*

Photo 5 *T189, knot hole present on upright stem. Unlikely to lead back to cavity but recommended ecological supervision if arboricultural works are required*

6. EVALUATION AND RECOMMENDATIONS

EVALUATION

ROOSTING BATS

6.1 No bats were recorded emerging from the trees.

6.2 The trees assessed as suitable for roosting bats are likely to remain suitable prior to construction. Additional trees may also increase or decrease in suitability as a result of natural tree growth or damage during the intervening time period of several years.

6.3 Bats may also colonise additional trees as new roosts within the intervening time period.

FORAGING AND COMMUTING BATS

6.4 Please refer to **ES Volume 2, Chapter 9: Biodiversity (Doc Ref. 5.2)** and **ES Volume 4, Appendix 9.5h: Bat Activity (Transect and Static) Survey Report (Doc Ref. 5.4)** for evaluation in respect of commuting and foraging bats.

RECOMMENDATIONS

6.5 As roosting bats were not recorded within T74, T80 or T81 during the completed survey work, an EPS mitigation licence is not expected to be required to facilitate the Project relating to trees.

6.6 As works are not scheduled to commence on-site until 2025/2026, it is likely that survey works of trees across the Site, including a ground level tree assessment, will need to be repeated prior to construction related works commencing - ideally within 12 months of works impacting trees If surveys record presence of roosting bats within a tree that is to be subject to works, such works can only be carried out under a granted Natural England EPS mitigation licence.

6.7 The main principles of mitigation will relate to supervised felling of trees with suitability for roosting bats. As a precautionary measure, works to all trees with suitability for roosting bats T74, T80, T81 (and any trees assessed as having low suitability) should be undertaken outside of the period May to mid-September (inclusive). This avoids the sensitive bat maternity period. Ideally works will commence in the period mid-September to October or in April which also avoids the hibernation period.

6.8 If a likely absence of bats has been recorded such trees should be felled subject to a Precautionary Method of Working under ecological supervision by a suitably licenced ecologist (i.e. registered with a minimum of a Class 2 Natural England survey licence) as required by BCT good practice guidelines. This is applicable where existing survey data (tree assessment or pre-commencement surveys) is assessed as valid (i.e., is less than 12 months old) and the Project ecologist has confirmed that felling can proceed under an ecological watching brief.

6.9 The associated **ES Volume 2, Chapter 9 'Biodiversity' (Doc Ref 5.2)** and the **Outline LEMP (Doc Ref. 7.10)** detail avoidance, mitigation, compensation and enhancement measures relating to bats.

7. REFERENCES

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Mitchell-Jones, A.J. (2004) *Bat Mitigation Guidelines.* English Nature, Peterborough.

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8. ANNEX 1: SUMMARY OF LEGISLATION

8.1 The Conservation of Habitats and Species Regulations 2017 (as amended) and the Wildlife and Countryside Act 1981 (as amended) afford legal protection to bats.

8.2 The specific legal protection afforded to bats can be found within the Sections and Schedules of the relevant legislation and relevant case law.

8.3 In general, any person and/or activity that: -

- Damages or destroys a breeding or resting place of bats. (This is sometimes referred to as the strict liability or absolute offence);
- Deliberately captures, injures or kills a bat/s;
- Deliberately disturbs bats in a way likely to impair animals' ability to survive, breed or nurture young, their ability to hibernate and migrate and disturbance likely to have a significant effect on local distribution and abundance;
- Intentionally or recklessly disturbs a bat/s while occupying a structure or place used for shelter and/or protection (Wildlife and Countryside Act 1981 (as amended)); and
- Intentionally or recklessly obstructs access to any structure or place that bat / bats use for shelter or protection (Wildlife and Countryside Act 1981 (as amended)).

…may be guilty of an offence.

8.4 The legislation applies to bat roosts even when they are not occupied.

8.5 Actions affecting multiple animals can be construed as separate offences and therefore penalties can be applied per animal impacted.

8.6 Under certain circumstances licences can be granted by the Statutory Nature Conservation Organisation (Natural England in England) to permit actions that would otherwise be unlawful.

8.7 There are some very specific defences associated with the Conservation of Habitats and Species Regulations 2017 (as amended), however these are unlikely to apply to construction related projects. The Sections of the Regulations provide further details of these defences.

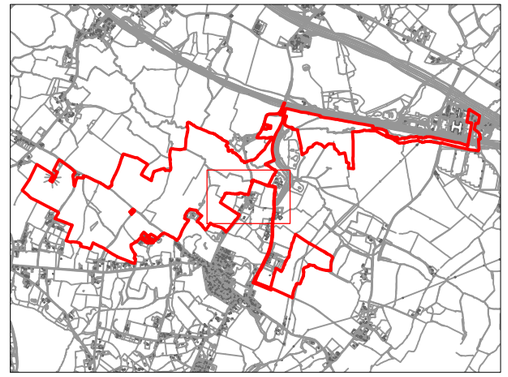
8.8 The Wildlife and Countryside Act (1981) includes defence for those aspects of the legislation that apply to bats. These defences are unlikely to apply to construction related projects and do not apply to those acts included in the Conservation of Habitats and Species Regulations 2017 (as amended). The Schedules of the Act provide further details of defences.

8.9 Local authorities have obligations under sections 40 and 41 of the Natural Environment and Rural Communities Act (NERC) 2006 to have regard to the purpose of conserving biodiversity in carrying out their duties. Seven species of bat species are listed on Section 41 the NERC Act.

9. ANNEX 2: BAT EMERGENCE SURVEY PLAN

LOCATION PLAN OF T74, T80 AND T81

[SEE OVERLEAF]



T74

T81

T80

LEGEND:

- Location of existing tree
- Location of existing tree surveyed
- Order limits

0 20 40 m

1:2000

rev.	rev. date	auth.	rev. note
C01	14/05/24	MW	Cleint approved for submission.

rev.	rev. date	auth.	rev. note

client. ***EPL 001 Limited***

project. ***Stonestreet Green Solar***
Land North And West Of Aldington
Kent

drawing no. ***5535-LLB-XX-XX-DR-Ec-0065*** rev. ***C01***

drawing title. ***Bat Emergence Survey Plan*** suit. ***A4*** APFP ***5(2)(I)(ii)***

rev date. ***14/05/24***
scale. ***1:2000***
sheet. ***A3***
drawn. ***NA***
checked. ***MW***

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10. ANNEX 3: INFRA-RED ILLUMINATION

Photo 6 *Position 1 - start of the survey IR photo. T80*

Photo 7 *Position 1 - end of survey showing IR illumination of the PRFs. T80*

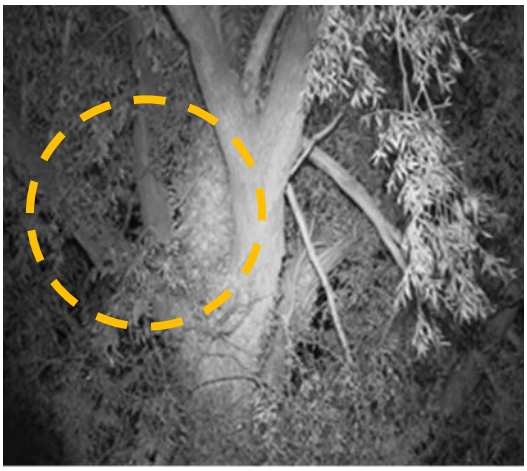

Photo 8 *Position 2 - start of the survey IR photo. Dotted orange circles indicate the locations of PRFs identified on T81.*

Photo 9 *Position 2 - end of survey photo showing IR illumination of the PRFs.*

Stonestreet Green Solar

Appendix 9.5m: Badger Report
(CONFIDENTIAL)

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Appendix 9.5n: Schedule 1 Bird Species Report (CONFIDENTIAL)