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Bramford to Twinstead Reinforcement

Volume 6: Environmental Information

Document 6.3.7.2: ES Appendix 7.2 – Species Baseline Report

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1. Introduction

1.1 Overview

1.1.1 This document accompanies National Grid Electricity Transmission plc's (here on referred to as National Grid) application for development consent to reinforce the transmission network between Bramford Substation in Suffolk, and Twinstead Tee in Essex. The Bramford to Twinstead Reinforcement ('the project') would be achieved by the construction and operation of a new electricity transmission line over a distance of approximately 29km comprising of overhead lines, underground cables and grid supply point substation. It also includes the removal of 25km of the existing distribution network and various ancillary works.

1.1.2 This Species Baseline Report has been produced to support the application for development consent and the accompanying ES under the Planning Act 2008.

1.2 Structure of this Report

1.2.1 The report comprises the baseline for the following species:

- Desk study and field survey for otter (*Lutra lutra*) and water vole (*Arvicola amphibius*);
- Desk study and field survey for breeding birds at Hintlesham Woods; and
- Desk based habitat suitability assessment for notable bird species, reptiles, other notable species, and terrestrial invertebrates.

1.2.2 Chapter 2 describes the methodology used for the desk study, field survey and habitat suitability assessments. Field survey limitations are also detailed. Chapter 3 presents the results of the desk study, field survey and habitat suitability assessments.

1.2.3 Separate factual reports have been produced for: bats (**application document 6.3.7.7**); hazel dormouse (*Muscardinus avellanarius*) (**application document 6.3.7.8**); and badger (*Meles meles*) (**application document 6.3.7.9**).

1.2.4 The approach to great crested newt (*Triturus cristatus*) is discussed in ES Appendix 7.6: Protected and Controlled Species Legislation Compliance Report (**application document 6.3.7.6).** National Grid has agreed with Natural England to apply the District Level Licence approach on the project which does not require field survey.

1.3 Legislation and Policy

Otter

1.3.1 The otter is protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended) which makes it a European Protected Species (EPS). The combined effect of this legislation makes it an offence to: intentionally or deliberately kill, injure or capture an otter; to possess an otter (whether alive or dead), or any part of an otter; or sell or offer for sale without a licence.

1.3.2 It is also an offence to damage or destroy any place used by an otter, for shelter, whether present or not, and to intentionally or recklessly disturb an otter, in its place of rest or shelter in such way that is likely to impair their ability to survive, to breed or reproduce, wild. Licences can be granted by Natural England to allow otherwise illegal activities, including development, to take place if carried out in accordance with the provisions of the licence.

1.3.3 Otter is a Species of Principal Importance (SPI) in England, as required by Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006, which helps public bodies meet their biodiversity duty to be aware of biodiversity conservation in their decision making.

Water Vole

1.3.4 The water vole is fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). It is an offence to intentionally kill, injure or capture a water vole or to possess or sell one (whether live or dead). It is also an offence to intentionally or recklessly damage, destroy or obstruct access to any structure or place a water vole uses for shelter or to disturb water voles whilst occupying any such place.

1.3.5 From December 2022, it has been possible to apply for a mitigation licence for water vole from Natural England.

1.3.6 Water vole is also a SPI in England.

Birds

1.3.7 All wild bird species, their eggs and nests receive protection under the Wildlife and Countryside Act, 1981 (as amended). Those bird species listed on Schedule 1 receive additional protection during the breeding season as do their nests, eggs and dependent young against intentional or reckless disturbance at or near and active nest.

1.3.8 Forty-nine bird species are also SPI in England.

Reptiles

1.3.9 All British reptile species receive protection under the Wildlife and Countryside Act 1981 (as amended) making it illegal to intentionally injure or kill these animals. Smooth snake (*Coronella austriaca*) and sand lizard (*Lacerta agilis*) are also protected under the Conservation of Habitats and Species Regulations 2017 (as amended) but are restricted to well-known sites in England and are not considered present in Essex or Suffolk.

1.3.10 All six native British reptiles are SPI in England.

Terrestrial Invertebrates

1.3.11 Some terrestrial invertebrate species have legal protection while a larger range of terrestrial invertebrate species comprising bees, butterflies, ants, beetles, caddisflies, crickets, damselflies, dragonflies, flies, grasshoppers, millipedes and spiders are SPI in England.

Other Notable Species

1.3.12 Other Notable Species in this report are defined by their classification as a SPI in England, which are not covered by separate reporting elsewhere in the application for development consent.

2. Methodology

2.1 Otter and Water Vole

Desk Study

2.1.1 A desk study was undertaken to identify records for otter and water vole within 1km of the Order Limits. Requests for data were sent to the Essex Wildlife Trust (EWT), Essex Field Club (EFC) and the Suffolk Biodiversity Information Service (SBIS).

2.1.2 The data search also included a review of citations for statutory and non-statutory designated sites within 1km of the Order Limits where otter and/or water vole were mentioned. The identification of Sites of Special Scientific Interest (SSSI) with otter and water vole was based on Natural England's Impact Risk Zones which were viewed on The Government's Multi-Agency Geographic Information for the Countryside (MAGIC) website to identify any overlap with the Order Limits. The Impact Risk Zones define zones around each SSSI which reflect the sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

2.1.3 The MAGIC website was also used to identify historic records of approved EPS licences and returns for otter within 1km of the Order Limits.

2.1.4 The results of otter and water vole surveys undertaken in 2012/2013 before the project was put on hold are incorporated into the desk study.

Field Survey

Habitat Suitability Assessment

2.1.5 Ordnance Survey mapping and aerial imagery were used to identify all waterbodies crossed by/within the Order Limits. An assessment of relative suitability of habitats for otter and water vole was completed in 2021 and 2022 for waterbodies (rivers, streams, ditches, ponds, quarries, and reservoirs) crossed by/within the Order Limits, where access allowed. This was used to categorise waterbodies as 'unsuitable', 'sub-optimal' or 'optimal' for otter and/or water vole. This qualitative assessment used professional judgement on consideration of the following factors:

- Bank profile;
- Bank substrate;
- Water depth;
- Shading;
- Potential for habitat changes throughout the year;
- Height of water level and fluctuations relative to bank height;
- Bankside vegetation; and
- Channel vegetation.

2.1.6 The entire length of waterbodies within the Order Limits were surveyed with an additional 200m upstream and 200m downstream where the waterbody extended outside the Order

Limits. Where this was not practicable i.e. due to land access constraints or health and safety factors, desk based assessments were made.

2.1.7 A 500m survey area was not deemed necessary as the potential impacts on watercourses from the project would be temporary. This approach was agreed with Natural England, as documented in the Statement of Common Ground (**application document 7.3.2**). For non-linear waterbodies such as ponds, quarries and reservoirs the entire waterbody edge was surveyed, where possible.

Field Sign Surveys

2.1.8 Waterbodies identified as optimal and sub-optimal during the habitat suitability assessment were subject to field sign surveys to confirm the presence or likely absence of otter and water vole. Where evidence of other riparian mammals were observed, these were also recorded. Field surveys were undertaken between June and October 2021 and between April and July 2022. Surveys were undertaken in accordance with methods described in the Water Vole Conservation Handbook (Strachan *et al.,* 2011; and Dean *et al.,* 2016) and Monitoring the Otter (Chanin *et al.*, 2003).

2.1.9 Waterbodies were generally surveyed twice. In cases where the habitat was of very low suitability and there was little to no likelihood that otter or water vole were present in the surrounding area, and no field evidence was recorded, a second survey was not undertaken. If the habitat was thought to have changed significantly since the first visit, a second survey was conducted.

2.1.10 The field signs indicative of the presence of otter and recorded where present included:

- Holts (e.g. beneath the roots of bankside trees) and above ground ‘couches’ or ‘hovers’;
- Spraints;
- Footprints;
- Feeding remains e.g. fish carcasses;
- Slides or other well-used access points to watercourses (additional evidence would be required to positively confirm otter presence); and
- Direct observation of otter and other sightings, such as otter road kills.

2.1.11 The field signs indicative of the presence of water vole and recorded where present included:

- Burrows;
- Faeces and latrines;
- Feeding stations;
- Paths (additional evidence would be required to positively confirm water vole presence);
- Footprints;
- Direct observation of water voles; and
- Sounds – characteristic ‘plop’ when water voles enter water to warn other water voles of possible danger.

2.1.12 Surveys were conducted by wading in-channel where water depth and flow was safe to do so. Where water exceeded 0.2m, surveys were conducted by walking along the banks.

2.1.13 Any field signs, incidental sightings, or anecdotal evidence given by landowners regarding riparian mammals were also recorded and mapped.

2.1.14 All field surveys were undertaken by suitably experienced ecologists, and where possible, timed to avoid periods of high water levels or immediately following habitat management activities, as these can wash away or destroy field signs.

Camera Trapping Survey

2.1.15 Where potential otter holts were recorded within the Order Limits, camera trapping surveys were undertaken of the potential holts to determine their use by otter. Cameras were deployed for at least four consecutive nights on three occasions between April and August 2022.

Limitations

2.1.16 Some minor field drains have been omitted from the habitat suitability assessment and field survey as they were not shown on Ordnance Survey mapping and not visible on aerial imagery but this is not considered a constraint to the results.

2.1.17 Field surveys were not able to be completed at all waterbodies due to land access restrictions. However, 95% of waterbodies within the Order Limits were subject to at least one survey. In addition, most surveys were conducted between mid-April and the end of June, and between July and the end of September, i.e. at optimal times. All field sign surveys were undertaken between April and October. Therefore, the timing of field sign surveys is not considered to be a particular constraint.

2.1.18 Some waterbodies subject to field sign surveys had areas of bank which were unable to be surveyed, for example, due to unstable ground or dense vegetation. In these cases, the survey area was extended beyond the 200m study area (where land access permitted) to enable the surveys to cover 200m in total albeit not a continuous stretch. Adequate bank coverage, of at least 50%, was obtained at all waterbodies subject to survey. Therefore, this is not considered to be a particular constraint.

2.1.19 Otter are known to occupy territories over extensive areas, in which they follow a semi-nomadic existence moving from one holt to another to exploit seasonally available food sources (Chanin *et al.,* 2003). Therefore, it is difficult to establish if otter do not frequent a site, as they may only be absent in the short term or be present only very infrequently. As a programme of pre-construction surveys will take place at a later date, this is not considered to be particular constraint.

2.1.20 The part of the project that involves the Grid Supply Point (GSP) substation and associated works was not subject to otter and water vole surveys as waterbodies would not be directly impacted by the works. However, whilst ecologists were on site undertaking other species surveys they made a note of any otter and water vole signs.

2.2 Breeding Birds - Hintlesham Woods SSSI

Introduction

2.2.1 Hintlesham Woods SSSI is approximately 118ha in size and is located approximately 3km east of Hadleigh. The SSSI is designated on the basis that it supports one of the largest remaining areas of ancient coppice-with-standards woodland in Suffolk and for its

breeding bird assemblage. Notable bird species mentioned within the SSSI citation include common whitethroat (*Curruca communis)*, nightingale (*Luscinia megarhynchos)*, tawny owl (*Strix aluco)*, and woodcock (*Scolopax rusticola)*.

2.2.2 The aim of the survey was to provide an evaluation of the breeding bird assemblage across the survey area based on a desk based review of records and up to date field surveys to assess the following:

- The assemblage of bird species using the survey area during the breeding season;
- The conservation value of the bird assemblage using the survey area;
- The spatial and temporal distribution of bird activity; and
- The breeding status of birds using the survey area with a focus on priority species.

Survey Area

2.2.3 Although designated as a single site, the SSSI is formed from five distinct woodland stands: Hintlesham Great Wood, Hintlesham Little Wood, Ramsey Wood, Keeble's Grove, and Wolves Wood. A survey of the entire SSSI was not considered necessary to inform the project ornithological impact assessment. Survey extents were focussed on Ramsey Wood, Hintlesham Little Wood and the adjacent boundary edge of Hintlesham Great Wood as locations where potential direct or indirect impacts from the project could occur.

Bird Conservation Status

2.2.4 There are two mechanisms by which the relative conservation status of birds are categorised in the UK. These are the Birds of Conservation Concern (BOCC) 5 classification (Stanbury, *et al.,* 2021), and the UK Biodiversity Framework.

2.2.5 Each bird species is categorised into one of three alert lists: red; amber; or green, according to set criteria. There are now 70 BoCC 5 red-list species with evidence of critical declines of breeding, migratory and wintering species that has almost doubled since the first BoCC publication in 1996.

2.2.6 Thirty-six bird species are specified on the SBIS website as being 'priority species' in Suffolk (SBIS, 2022c), and are subject to targeted conservation due to their declining or sensitive breeding status within the county. Species on the priority Suffolk list that favour woodland habitats include bullfinch (*Pyrrhula pyrrhula)*, marsh tit (*Poecile palustris)*, song thrush (*Turdus philomelos)*, turtle dove (*Streptopelia turtur)* and willow tit (*Poecile montanus)*.

Priority Species

2.2.7 Although the term 'priority species' does not commonly include those species protected by legislation (protected and priority species are normally considered independently of one another in ecological assessments), for the purpose of this report the term is used in accordance with the Bird Survey Guidelines (Bird Survey and Assessment Steering Group (2022) which defines the following criteria for priority species:

- Species listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended);
- Species of Principal Importance in England;

- Red and Amber listed by the Birds of Conservation Concern (Stanbury *et al.,* 2021); and
- Priority species listed by SBIS.

Desk Study

2.2.8 A desk study was undertaken to review records held by SBIS of priority species from within Hintlesham Woods SSSI. The Suffolk Bird Report (Suffolk Bird Group, 2020) (an annual publication of bird records that have occurred within the county, providing the breeding status and historic trends of resident and migratory species) was used as a reference to consider any additional priority species which had the potential to be present within the SSSI.

Field Survey

Bird Survey Guidelines

2.2.9 In order to effectively observe resident and migratory species within lowland deciduous woodland during the breeding season, the Bird Survey Guidelines recommends a minimum of six survey visits as being sufficient to capture a robust dataset that targets a range of species with different activity behaviours.

2.2.10 Seven surveys (five dawn and two dusk) in total were undertaken which was considered necessary to determine the value of the woodland for breeding birds and account for the possible occurrence of crepuscular (active during twilight) species. The survey schedule is shown in Table 2.1.

2.2.11 The surveys commenced at the end of March continuing to the end of July to improve the possibility of encountering woodland species that breed later in the season such as hobby (*Falco Subbuteo*) and spotted flycatcher (*Muscicapa striata)*. The breeding bird season generally starts from mid-March continuing until early July although certain species such as corvids (*Corvidae*), barn owl (*Tyto alba)*, tawny owl and woodpigeon (*Columba palumbus)* can commence breeding activity earlier in the season.

2.2.12 In accordance with the Bird Survey Guidelines (2022), dawn surveys commenced half an hour before sunrise concluding by around 10am when activity levels of many species have abated. Dusk surveys commenced two hours before sunset concluding an hour after sunset or when bird activity within the woodland had ceased.

2.2.13 The survey area comprised three pre-defined transects; the location of these is shown on Figure 7.2.2 (**application document 6.4)**. These were initially designed using desk-based tools (Google Earth Pro© aerial imagery and Streetmap©) although were later modified following the first survey with details given in the transect description later in this section.

2.2.14 Each transect followed existing footpaths or rides to avoid areas of damp ground and also to allow the same transect to be repeated on multiple occasions. The transects were walked at a constant pace whilst identifying bird species by song/calls and sight within a lateral distance of 10m either side of the transect. High-definition binoculars were used that are particularly effective within a woodland environment when light levels can be variable. All sightings, including activity and behaviour were recorded using an Apple iPad® installed with ESRi ArcGIS Field Maps to note down all observations using precise Global Positioning System locations. A species list was compiled for observations made within the woodland and surrounding areas of arable farmland within 100m of the woodland edge.

2.2.15 During each of the survey visits the following details were recorded:

- Bird numbers, species, age (e.g. adult, juvenile) and sex; and
- Bird behaviour (e.g. in flight, singing, or feeding), paying particular attention to evidence of breeding.

2.2.16 The behaviour, sex, age and location of individual birds was recorded using the field survey template, allowing conclusions to be drawn about the breeding status for each species. The breeding status of each species was classified into four categories: 'confirmed breeder' (CB), 'probable breeder' (PB), 'possible' breeder (PS), or as 'non-breeding' (NB) following Balmer *et al.* (2013).

2.2.17 Species names and taxonomic order used in this report adhere to the British List produced by the British Ornithologists' Union (2021).

Transect 1

2.2.18 Transect 1 was accessed from a small parking area along the A1071 north of the woodland. A public access track routes approximately 750m south into a habitat mosaic comprising an open canopy of mature trees, scrub and herbaceous plants. A westward route was then taken into dense woodland for a further 750m that connected to additional rides (identified after Visit 1), aligned north to south within Ramsey Wood. Continuing westward, the route bordered the western periphery of the woodland within the dense tree canopy, heading approximately 650m along the northern woodland edge along the arable field margin and back to the start of the transect.

Transect 2

2.2.19 Transect 2 was accessed south of the woodland from Hintlesham village taking a northerly route approximately 260m along a public footpath before heading east along the interface of the field margin and southern edge of the woodland. The route then continued north along the eastward side that offered views across the arable field to the east for a further approximate 600m.

2.2.20 The route then led into the woodland in a westerly direction that formed a 2km loop. This provided an opportunity to survey Hintlesham Great Wood for breeding woodland species. An open area to the north of Transect 2 dominated by scrub and neutral grassland provided an opportunity to survey an area of the transect with an open canopy and exposure to the sky for species flying over the woodland.

Transect 3

2.2.21 Transect 3 was accessed from the same location as Transect 1, the parking area north of the woodland. A large proportion of the walking route tracked 1km along the periphery of the woodland, routed along the eastern edge where birds flying over the woodland could be observed. The route then passed through the central block of Ramsey Wood joining the track around the southern and western perimeter of the woodland for a further approximate 1.7km where the expanse of arable land and open skies could be viewed, making note of any species occupying areas adjacent to the woodland.

Weather

2.2.22 Surveys were scheduled to avoid adverse weather such as heavy rain and strong wind as these conditions can reduce bird activity and detectability. Weather conditions during the surveys were documented making note of start and end temperature, cloud cover (okta scale), wind speed (Beaufort scale), and levels of precipitation (see Table 2.1).

Limitations

2.2.23 Not all woodland tracks were visible when defining the transects during the online mapping searches. The initial site surveys revealed additional rides that were then incorporated into a redesign of each transect after the first round of surveys in March 2022. This provided greater coverage to the woodland and the distances of each transect slightly increased. However, the additional distances for each transect did not impact upon the timings for each survey, which were completed within three to four hours, and within the suggested completion time of between 10:00 to 11:00am.

2.2.24 Detectability of birds within dense woodland can be challenging especially when foliage develops during spring. Vocalisations then become an important factor in bird identification. A range of common species, such as chiffchaff (*Phylloscopus collybita*) and wren (*Troglodytes troglodytes),* can sing throughout the spring season. However, scarcer species such as marsh tit and nightingale will sing for a relatively shorter period therefore limiting the success of positive identification throughout the course of the surveys. Observations of all species were recorded by sight, song or call to provide an accurate representation of the breeding bird assemblage within the woodland.

Table 2.1 – Weather Data for Breeding Bird Surveys at Hintlesham Woods SSSI

Visit Number	Date	Sunrise / Sunset	Start Time	End Time	Temperature (ºC)		Cloud (%)		Wind Speed		Precipitation		Notes
			Start	End	Start	End	Start	End	Start	End	Start	End	
Transect 1													
1	29/03/2022	06:40	06:04	09:54	6	7	100	100	2	2	0	0	
2	12/04/2022	06:06	05:36	09:24	9	11	50	60	0	1	0	0	
3	03/05/2022	20:24	18:00	21:15	13	9	20	50	1	1	0	0	
4	24/05/2022	04:49	04:30	07:31	10	11	100	80	2	2	0	0	
5	13/06/2022	21:16	19:01	22:06	19	14	10	30	3	1	0	0	
6	05/07/2022	04:43	04:40	07:45	10	14	10	70	1	1	0	0	
7	26/07/2022	05:08	04:59	08:00	14	16	90	80	3	3	0	0	
Transect 2													
1	30/03/2022	06:37	06:25	09:40	7	8	100	100	2	1	2	0	
2	13/04/2022	06:04	05:41	09:24	8	12	10	50	1	1	0	0	
3	04/05/2022	20:26	18:49	21:13	13	10	100	80	2	1	0	2	Start delayed - heavy rain
4	25/05/2022	04:48	04:32	07:58	8	11	50	90	1	3	0	0	
5	14/06/2022	21:17	19:01	22:06	19	14	10	10	3	1	0	0	
6	06/07/2022	04:45	04:42	07:45	9	12	10	90	1	1	0	0	

Visit Number	Date	Sunrise / Sunset	Start Time	End Time	Temperature (ºC)		Cloud (%)		Wind Speed		Precipitation		Notes
			Start	End	Start	End	Start	End	Start	End	Start	End	
7	27/07/2022	05:10	04:58	08:03	12	16	30	60	1	2	0	0	
Transect 3													
1	31/03/2022	06:33	06:10	08:41	0	2	10	50	2	3	0	4	
2	14/04/2022	06:02	05:42	08:49	7	11	10	10	1	1	0	0	
3	05/05/2022	20:27	18:15	21:17	18	13	50	80	1	1	0	0	
4	26/05/2022	04:47	04:27	08:01	10	12	10	20	1	1	0	0	
5	15/06/2022	21:18	19:10	22:01	20	17	70	20	3	1	0	0	
6	07/07/2022	04:46	04:41	07:43	16	17	100	100	3	3	0	0	
7	28/07/2022	05:11	04:57	08:17	13	18	100	90	1	2	0	0	

2.3 Habitat Suitability Assessments

2.3.1 A desk-based assessment was undertaken to determine habitat suitability within the Order Limits for the following:

- Notable bird species (those with an increased level of protection in the UK and listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), are SPI are listed as red or amber on the BoCC or are considered priority species in Suffolk);
- Reptiles;
- Terrestrial invertebrates; and
- Other notable species (species listed as Species of Principal Importance in England which are not covered in any other section within this report or other species survey reports which support the application for development consent).

2.3.2 Figure 7.1.4 and Figure 7.1.5 (**application document 6.4**) show the UK Habitat Classification (UKHab) survey results for areas and linear features respectively, that were used along with protected and notable species records within 1km of the project from the following local record sources (June 2022):

- Essex Wildlife Trust;
- Essex Field Club;
- Suffolk Biodiversity Information Service; and
- British Trust for Ornithology (BTO):
  - Bird Atlas: surveyed in both summer and winter seasons between 2007–2011;
  - Breeding Bird Survey – Most recent: TL8736 – counted in 2019 and 2007; TL8435 – counted annually 2006–2019;
  - BirdTrack data up to February 2021; and
  - English Winter Bird Survey squares just outside the 1km study area, surveyed in 2018–2019.

2.3.3 The data search also included review of citations for statutory and non-statutory designated sites within 1km of the Order Limits for mention of notable bird species, reptiles, other notable species and terrestrial invertebrates. A review of Natural England's SSSI Impact Risk Zones was also undertaken (Defra, 2022b).

2.3.4 The results of previous site surveys which were undertaken between 2009 and 2013 prior to the project pause were also considered in the habitat suitability assessment:

- Breeding bird surveys, wintering bird surveys and raptor vantage point surveys undertaken between 2009 and 2012;
- Artificial refuge surveys for reptiles undertaken in 2013 at five locations; and
- Field surveys for invertebrates undertaken in 2013 at five locations selected by presence of suitable habitat.

2.3.5 Any other incidental and anecdotal evidence of species collected across the suite of desk or field surveys undertaken in 2021 and 2022 were also included.

Notable Bird Species

2.3.6 No additional information other than that listed above was used to inform the habitat assessment for other notable species.

Reptiles

2.3.7 The habitat suitability assessment for reptiles also included a review of habitat information collected during field surveys in 2021 and 2022 to determine habitat suitability for common reptiles comprising adder (*Vipera berus*), grass snake (*Natrix natrix*), slow worm (*Anguis fragilis*) and common lizard (*Zootoca vivipara*) within the Order Limits. Suitable habitats for reptiles are those that contain all or some of the following features (Edgar *et al*., 2010):

- Mosaic habitats with variable vegetation structure and height;
- Sunny, sheltered locations, unshaded, south-facing;
- Open areas for basking;
- Cover in the form of thatched or tussocky swards; and/or
- Connectivity to other suitable habitats.

2.3.8 The habitat features were divided into habitat attributes including:

- Available habitat;
- Habitat structure;
- Habitat connectivity;
- Topography;
- Warmth;
- Breeding habitat; and
- Hibernation habitat.

2.3.9 The habitat attributes were qualitatively classed as having low, moderate or high suitability for reptiles based on the variety of attributes the habitats possessed, the value of each habitat for reptiles and any past habitat or species results. These are detailed in Table 2.2.

2.3.10 Habitats were defined as having negligible suitability for reptiles if they consisted of one or more of the below features and are not discussed further in the report:

- Bare ground only;
- Built up areas including buildings, tarmacked areas;
- Dense plantation woodland; and
- Heavily grazed/managed habitats with no connectivity or spatial and structural complexity.

Table 2.2 - Reptile Habitat Suitability Criteria

Reptile Habitat Attribute	Habitat Attribute Description		
	Low	Moderate	High
Available habitat	Few areas of suitable habitat	Several areas of suitable habitat	Multiple areas of suitable habitat
Habitat structure	Generally short vegetation and lacks variability	Medium to high vegetation (>50mm) with variability in height and structure. Contains dense grass tussocks, patches of dead vegetation, open basking areas and a variety of vegetation species including bramble scrub, bracken and mosses in limited areas. Provides shelter from predators.	Medium to high vegetation, structurally diverse and/or mosaic of habitats at differing heights, types and ages. Contains numerous dense grass tussocks, dead vegetation, open basking areas and variety of vegetation species including bramble scrub, bracken and mosses. Provides ample shelter from predators.
Habitat connectivity	Suitable habitat surrounded by areas with negligible suitability; or less than a quarter of suitable habitat boundary is directly connected with adjacent suitable habitat. Limited habitat interface between suitable habitats.	Less than half of suitable habitat boundary is connected to adjacent suitable habitat, with suitable habitat interface between connected habitats.	At least half of suitable habitat boundary directly connected with adjacent suitable habitat, with suitable interfaces between connected habitats.
Topography	Mostly flat or low	Moderately variable	Highly variable – may include some steep slopes
Warmth	Mostly north facing	Mostly east or west facing	Mostly south facing
Breeding habitat	Limited features suitable for breeding present	Moderate number of features suitable for breeding	Large number of features suitable for breeding
Hibernation habitat	Limited features suitable for hibernating present	Moderate number of features suitable for hibernating present	Large number of features suitable for hibernating present

Terrestrial Invertebrates

2.3.11 Habitats in the Order Limits with potentially suitable features to support a range of notable terrestrial invertebrates or assemblages were identified using the general assemblage features (Natural England, 2007 and Kirby, 2001). These are shown in Table 2.3 as a guide. This was then cross referenced with the desk study on invertebrate species to identify important habitats for terrestrial invertebrate assemblages and/or notable terrestrial invertebrate species.

Other Notable Species

2.3.12 No additional information other than that listed above was used to inform the habitat assessment for other notable species.

Limitations

2.3.13 Desk study records are a form of 'citizen science' and relies on submission of records from members of the public and environmental and ecological professionals. There can, therefore, be some bias towards recording of 'rare' and conspicuous species and typically common species (which may be locally rare) can be under recorded.

2.3.14 The majority of the habitat suitability assessment was undertaken using desk-based information, including aerial photography. Field based observations may differ, and it is assumed that the species are present in any suitable habitat found within the Order Limits. The limitations with this approach are therefore not considered significant.

Table 2.3 - Assemblage Type Classification and Associated Invertebrate Families

Assemblage Type	Type of Habitats	Common Invertebrate Assemblages Found in These Habitats
Field layer assemblage	Lowland habitats where disturbance removes vegetation to create areas of bare or sparsely vegetated ground.	Large groups, beetles, aculeates (i.e. bees, wasps and ants) and flies dominate the fauna but this assemblage type is particularly important for aculeates, grasshoppers, heteropteran bugs and spiders.
Grassland and scrub matrix assemblage	All types of grasslands, scattered scrub and woodland edge including those grasslands that vary in moisture content and base-richness.	The five big groups (beetles, flies, bugs, aculeates, butterflies and moths) and bugs (Heteroptera and Auchenorrhyncha).
Scrub heath and moorland assemblage	The assemblage is dominant on nutrient-poor, acid soils where exposure, grazing, or mowing limits the development of trees. Herbaceous or dwarf shrub vegetation is dominant but trees and shrubs can be an important component of the overall habitat. Lowland heaths, moorland, montane biotopes, and upland pastures support the assemblage. The habitats are naturally species-poor, and no major taxon is particularly well represented in comparison with grassland habitats.	Spiders, homopteran bugs and moths are relatively more important, although beetles and flies will dominate the catches.
Shaded field layer assemblage	Leaf litter Brash piles	Dominated by flies and beetles, although the habitat is important for several non-insect groups (millipedes, centipedes, woodlice, harvestmen, and molluscs).
Arboreal canopy	Trees and shrubs create complex habitats supporting several very distinct invertebrate assemblages associated with the canopy foliage, decaying wood or bark and wood surfaces. Open wood-pasture and individual trees.	Phytophagous species dominate the assemblage, although it also includes their predators and parasites. Tree blossom and fruit associates are included, as are species that feed on the surfaces of the leaves, such as certain mildew-feeding ladybirds and specialist barkflies (Psocoptera). Moths are the dominant group, and the tree canopy is the habitat that supports the greatest numbers of species. Beetles and bugs are also species-rich.

Assemblage Type	Type of Habitats	Common Invertebrate Assemblages Found in These Habitats
Wood decay assemblages	Species of wood decay and wood surface assemblages are found wherever trees and shrubs grow and are not confined to 'woodland' – the most species-rich examples have been shown to occur with large, old and open-grown trees. The majority of species are associated with wood decay and the fungi causing decay (the saproxylic species), but there is a significant number of species grazing on algae, lichens and mosses on the surface of trunks and branches. Predators and parasites may use both saproxylic and epiphyte invertebrates indiscriminately although many appear to have a particular emphasis on one of the other. Most of the rare species are found on ancient and veteran trees, but common saproxylic species live on small pieces of dead wood and its associated fungi, derived from trees and shrubs of all ages.	Range of beetles, flies and aculeates that are the key groups in this habitat. The saproxylic fauna is dominated by beetles and flies. Many aculeates feed on other saproxylic invertebrates and use dead timber as nesting sites – particularly large dead timbers in open sunny situations – but this niche is much less prominent amongst beetles and flies. Decaying timber and its fungi are important for other groups, such as snake flies and pseudoscorpions.

3. Results

3.1 Otter and Water Vole

Desk Study

3.1.1 Ordnance Survey mapping and aerial imagery were used to identify all waterbodies crossed by/within the Order Limits. This resulted in the identification of 41 waterbodies, the location of these is shown on Figure 7.2.1 (**application document 6.4)**.

3.1.2 Table 3.1 summarises the otter and water vole records provided by the biological records centres and results from previous surveys undertaken in 2012/2013. These results are also shown on Figure 7.2.1 (**application document 6.4)**. Together, these indicate the presence of otter and water vole on/near the Rivers Box, Brett and Stour. Otter were also recorded along Belstead Brook and Assington Mill Pond. In addition, the following designated sites have otter and water vole specifically described in their citations:

- Sproughton Park County Wildlife Site (CWS) (otter and water vole); and
- Assington Meadows CWS (water vole).

3.1.3 No EPS licence returns for otter were found within 1km of the Order Limits.

3.1.4 The 2012/2013 surveys found sporadic evidence of otter and water vole along waterbodies that cross the Order Limits with both species recorded on the River Brett. Otter were also recorded on the River Box, and a waterbody at Sprott's Farm (east of Whitestreet Green and north-east of the River Box). Water vole were recorded alongside a watercourse east of Pond Hall, and Belstead Brook.

Table 3.1 – Otter and Water Vole Desk Study Results

Species	Number of Records	Most Recent Record	Comments	Nearest Waterbody (see Figure 7.2.1)
Local Record Centres				
Otter	15	2014	Multiple records on/near the River Stour, River Box, River Brett and Belstead Brook and one record at Assington Mill Pond	W-G-5, W-E-10, W-C-1, W-AB-30, W-F-6
Water vole	12	2018	Records on/near the River Stour, River Box, and multiple records on the River Brett.	W-G-5, W-E-10, W-C-1
American mink	2	2014	Records near the River Stour and River Box.	W-G-5, W-E-10
Previous Field Survey				
Otter	2	2013	Field signs found along the River Brett, near Pond Hall and Belstead Brook.	W-C-1, W-AB-46, W-AB-30.
Water vole	3	2013	Field signs found along the River Box, Sprott's Farm and River Brett	W-E-10, W-E-1, W-C-1

3.1.5 The desk study also confirmed the presence of American mink (*Neovison vison*) on watercourses crossed by the project, most recently in 2014 on the River Box and River Stour. American mink are known to be a voracious predator of water vole and have been a major contributory factor to the decline of this species throughout the UK. The presence of an active population of mink on the watercourses within and adjacent to the project drastically reduces the likelihood of water vole being present despite habitats being suitable.

Field Survey

Habitat Suitability Assessment

3.1.6 A summary of the suitable waterbodies, for otter and water vole, identified along the project is shown on Figure 7.2.1 (**application document 6.4**) with detail provided in Annex: A: Otter and Water Vole Habitat Suitability Assessment.

3.1.7 The results in summary identified 37 waterbodies that were scoped into field assessment, of these, three were identified as optimal for both otter and water vole. Three waterbodies were identified as sub-optimal for otter and 15 for water vole. Thirty-one waterbodies were identified as unsuitable for otter and 19 for water vole. Twenty waterbodies were scoped out for field sign survey after their first site visit due to the unsuitability of habitat for otter and water vole.

3.1.8 Three waterbodies (W-G-6, W-G-3/W-G-4 and W-H-20) had land access denied and were unable to be surveyed. These watercourses were considered to be suitable habitat as a precaution.

3.1.9 Dense vegetation was present throughout all waterbodies within the Order Limits which restricted access in limited areas. Steep banks and fencing (including barbed wire) were present at W-G-17 / W-G-18, W-G-16, waterbody east of Appletree Wood, waterbody south-west of Assington Thicks, W-E-10, W-D-5/W-D-7, W-C-1, W-AB-47, W-AB-46, between W-AB-32 and 33 and around ponds at the quarry site. These waterbodies were not fully surveyed due to health and safety concerns. These constraints were not considered to impact the survey results due to the majority of the waterbody and surrounding area being surveyed.

Field Sign Surveys – Otter

3.1.10 During the field surveys, evidence of otter was recorded on four waterbodies. A summary of the results is provided in Table 3.2 and shown in Figure 7.2.1 (**application document 6.4**).

Table 3.2 – Summary of Otter Field Sign Survey Results

Waterbody Number	Signs
W-AB-30	Otter spraint identified on stream bank. Otter exclusion fencing surrounding fishing lakes to the north.
W-AB-4	Two potential holt locations within the adjacent woodland. Otter footprint recorded and a dead otter recorded on the road close to W77.
W-C-1 - River Brett	Potential hovers around mature trees on the bankside. Old otter spraint identified under mature tree on the riverbank.

Waterbody Number	Signs
W-G-5 - River Stour	Potential hovers and holt with slides providing egress into the river.

Field Sign Surveys – Water Vole

3.1.11 During the field surveys, evidence of water vole presence was found on six waterbodies. A summary of the results is provided in Table 3.3 and shown in Figure 7.2.1 (**application document 6.4)**.

Table 3.3 – Summary of Water Vole Field Sign Survey Results

Waterbody Number	Signs
W-AB-30 – Belstead Brook	Live sighting of water vole by surveyor. Droppings and feeding signs recorded.
W-AB-46	Water vole burrow with potential droppings at the entrance.
W-C-1 - River Brett	Water vole droppings identified at water's edge.
W-F-6 / W-F-7	Water vole feeding signs recorded.
W-G-5 - River Stour	Water vole burrows and multiple feeding signs, including food piles and cropped vegetation, recorded along the river.
W-G-12	Disused water vole burrows, occupied by brown rat (*Rattus norvegicus*) at time of survey.

3.1.12 The part of the project that involves the GSP Substation and associated works was not subject to otter and water vole surveys as waterbodies would not be directly impacted by the works. However, whilst ecologists were on site undertaking other species surveys they observed a water vole in a wet ditch at Park Farm (south of Wickham St Paul) and this sighting is shown on Figure 7.2.1 (**application document 6.4**).

3.1.13 During the field surveys, no evidence of American mink presence was found. Although anecdotal evidence, suggested the presence of American mink at two waterbodies, namely waterbody W-G-12 and waterbody W-G-5 (the River Stour).

Camera Trapping Survey

3.1.14 Camera traps were deployed at W-AB-4 where a potential otter holt was identified within the Order Limits. After a thorough examination of the footage, no evidence of otter presence was recorded.

3.2 Breeding Birds - Hintlesham Woods SSSI

Desk Study

3.2.1 Twenty-nine priority bird species have been previously recorded within Hintlesham Woods. Birds recorded also include those that are not woodland species and will include those that have been flying over the woodland (i.e. gull species) or farmland birds that may have perched up on the woodland edge e.g. yellowhammer (*Emberiza citrinella*).

3.2.2 The priority species recorded are shown in Annex B: Hintlesham Woods – Bird Desk Study and Field Survey Results (noting that a species can be assigned more than one

category of legal/conservation status – for example, song thrush, which is a BoCC Amber-list, SPI and SBIS Priority Species). Key woodland species recorded were lesser spotted woodpecker (*Dryobates minor*), marsh tit, dunnock (*Prunella modularis*) and fieldfare (Turdus pilaris) with species such as barn owl, redwing (*Turdus iliacus*), linnet (*Linaria cannabina*) and skylark (*Alauda arvensis*) primarily found in arable habitats within the vicinity of Hintlesham Woods.

Field Survey

3.2.3 Fifty-nine bird species were recorded in total during field surveys, 32 of which were classified as priority species in accordance with the Bird Survey Guidelines criteria. The full survey results are listed in Annex B with priority species shown in Figure 7.2.2 (**application document 6.4**).

Schedule 1 Bird Species

3.2.4 Six Schedule 1 species were recorded, as described in Table 3.4 and shown in Figure 7.2.2 (**application document 6.4**). These were all non-breeding (NB) species and are considered to be wintering passerines (brambling, firecrest, redwing) or commuting/ foraging raptors (hobby, peregrine and red kite).

Table 3.4 - Breeding Status of Schedule 1 Species Recorded

Species	Scientific Name	Notes	Breeding Status
Brambling	*Fringilla montifringilla*	A single female bird feeding in trees on Transect 2 on the 13 April was a presumed late departing winter visitor.	NB
Firecrest	*Regulus ignicapilla*	A single bird noted within the interior of the woodland along Transect 1 on the 29 March.	NB
Hobby	*Falco subbuteo*	One feeding over the woodland observed from the clearing along Transect 2 on the 27 July. Possible breeder nearby.	NB
Peregrine	*Falco peregrinus*	One flew strongly east over the woodland on the 28 July seen from Transect 3.	NB
Red kite	*Milvus milvus*	One drifting west to the north of the woodland along Transect 1 on the 26 July.	NB
Redwing	*Turdus iliacus*	Small groups observed during the late March surveys transitioning through the woodland for their northward migration.	NB

Species of Principal Importance

3.2.5 Two of the eight SPI recorded during the surveys were confirmed breeders; dunnock and marsh tit. Despite numerous observations of singing male song thrush throughout the survey period, no breeding evidence was recorded and was therefore classified as a probable breeder.

BoCC Red-list

3.2.6 Ten red-list species were recorded of which, marsh tit was a confirmed breeder (CB) with mistle thrush, nightingale and spotted flycatcher exhibiting behaviour or showing signs of

possible breeding (PS) or probable breeding (PB) activity within the woodland. The full list of red-listed species observed during the surveys are presented in Table 3.5 and shown in Figure 7.2.2.

3.2.7 The BoCC four red-list species observed within the woodland that showed evidence of breeding activity are discussed in more detail below. The greenfinch and linnet recorded as possible breeding (PB) are not described as they were recorded outside of the woodland itself.

Table 3.5 – Breeding Status of Red-listed Species Recorded Within the Woodland

Species	Scientific Name	Notes	Breeding Status
Greenfinch	*Chloris chloris*	A single singing male heard north of the woodland on the 26 July.	PS
House martin	*Delichon urbicum*	A post-breeding group of 12 birds over arable land adjacent to Transect 3. Bred in Hintlesham village.	NB
Linnet	*Linaria cannabina*	Small groups within arable land adjacent to Transect 3.	PS
Marsh tit	*Poecile palustris*	Adults and young observed within woodland.	CB
Mistle thrush	*Turdus viscivorus*	A young bird was seen along Transect 2 on the 15 June.	PS
Nightingale	*Luscinia megarhynchos*	Two singing males along Transect 3 from the 14 and throughout May with at least one bird/pair still present into June.	PB
Skylark	*Alauda arvensis*	Present within arable fields adjacent to Transect 3.	NB
Spotted flycatcher	*Muscicapa striata*	An adult and juvenile observed along the woodland edge of Transect 3 on the 28 July may have bred within the woodland.	PS
Swift	*Apus apus*	Two migrating birds flying over woodland on the 26 May.	NB
Yellowhammer	Emberiza citrinella	Present throughout the surveys within areas of hedgerow and farmland to the east of the woodland.	NB

Marsh Tit

3.2.8 At least five singing male marsh tit were observed along Transect 1 on the 12 April, with territorial males continuing to vocalise throughout the month. Breeding success was confirmed during June and July where multiple observations of juveniles were widely recorded throughout the woodland. A family group of two adults and three juveniles along Transect 2 on the 6 July provided further evidence of breeding success. Juvenile sightings were observed on five separate occasions during the June and July surveys. Figure 7.2.3 (**application document 6.4**) shows the locations and ageing of each marsh tit recorded.

3.2.9 Marsh tit were generally observed along woodland edges and within clearings. They were also relatively vocal, calling frequently whilst feeding. Many of the post-breeding observations were recorded within larger groups of their congeners such as blue tit (*Cyanistes caeruleus*), great tit (*Parus major*), and coal tit.

Mistle Thrush

3.2.10 A single adult male mistle thrush was noted twice during the first two surveys (21 March and 12 April) with a subsequent observation of a single juvenile bird along Transect 2 on the 5 May. Breeding success for mistle thrush is categorised as 'possible' as no singing birds or evidence of courtship were noted during spring.

Nightingale

3.2.11 Nightingale were first noted along Transect 3 on the 14 April (also heard from Transect 1), a singing male holding territory within a line of dense scrub largely comprising hawthorn and blackthorn along the eastern woodland edge (see Figure 7.2.4, **application document 6.4**). The singing male was then joined by a second bird on the 3 May. Both males continued to sing throughout May but due to the cryptic nature of this species, neither birds were seen.

3.2.12 Singing birds were recorded on both dawn and dusk surveys in May. A singing male during the dusk survey on the 5 May continued to vocalise 45 mins after sunset.

3.2.13 During June, the nightingale had fallen silent with no further singing birds heard beyond the survey on the 26 May. Evidence of breeding along the woodland edge was strengthened by a distinct alarm calling male during a dusk survey on the 15 June along Transect 3 from deep within the scrub where the singing males had been previously recorded. With observations made on five previous surveys, the alarm call may suggest that nightingale were attending to a nest. However, whether the pair were incubating or sustaining young remained undetermined. No further observations of nightingale were recorded beyond this date.

Spotted Flycatcher

3.2.14 An adult and juvenile bird was recorded from Transect 3 on the 28 July along the southern fringe of the woodland associating with an assemblage of common passerines. This single observation does not provide enough conclusive evidence of breeding success within the woodland. Post-breeding adult and juvenile birds are known to migrate together from natal sites. It is possible that the birds were transitioning through the woodland and therefore the breeding status has been categorised as 'possible'.

BoCC Amber-list

3.2.15 Seventeen Amber list species were observed during the surveys which are summarised in Table 3.6 and shown in Figure 7.2.2 (**application document 6.4**).

Table 3.6 – Breeding Status of Amber-listed Species Recorded Within the Woodland

Species	Scientific name	Notes	Breeding Status
Black-headed gull	*Chroicocephalus ridibundus*	Four flying over the woodland were presumed post/non-breeders.	NB
Bullfinch	*Pyrrhula pyrrhula*	A pair flying along hedgerow along Transect 3 on the 7 and 28 July.	NB
Common gull	*Larus canus*	Fourteen wintering in fields adjacent to Transect 3 on the 31 March.	NB

Species	Scientific name	Notes	Breeding Status
Common whitethroat	*Sylvia communis*	Two singing along field margin on Transect 3 and young birds seen on the 28 July.	CB
Dunnock	*Prunella modularis*	Regular singing males around woodland.	CB
Kestrel	*Falco tinnunculus*	Resident and regularly seen from Transect 2 and Transect 3 that may have bred nearby.	NB
Lesser black-backed gull	*Larus fuscus*	Small groups regularly seen flying over the woodland.	NB
Mallard	*Anas platyrhynchos*	Three flying over the woodland on the 13 April.	NB
Redwing	*Turdus iliacus*	Wintering groups within the woodland throughout March.	NB
Rook	*Corvus frugilegus*	Groups seen in fields east of woodland throughout the survey period.	NB
Song thrush	*Turdus philomelos*	Seven singing males on the 29 March with observations throughout the surveys.	PB
Sparrowhawk	*Accipiter nisus*	A single bird seen hunting north of the woodland from Transect 1 on the 5 July.	NB
Stock dove	*Columba oenas*	At least one pair seen within the woodland throughout the surveys.	PB
Tawny owl	*Strix aluco*	One calling along Transect 1 on the 29 March and two on the 5 May that may have bred within the woodland.	PB
Willow warbler	*Phylloscopus trochilus*	Heard singing on two separate occasions in early May along Transect 2 and Transect 3.	PS
Woodpigeon	*Columba palumbus*	Seen throughout the surveys in small groups.	CB
Wren	*Troglodytes troglodytes*	Up to 12 singing males in April with young seen throughout July.	CB

Non-priority Species

3.2.16 Half of the species recorded within the woodland and adjacent areas were common, widespread, and did not meet the criteria of 'priority species' detailed above.

3.2.17 Common green-list passerines such as blue tit, great tit, long-tailed tit and robin (*Erithacus rubecula)* were present throughout the survey period. These species are also widely distributed throughout the region.

3.2.18 Migratory breeding species were evident within the woodland: blackcap (*Sylvia atricapilla*) and chiffchaff (*Phylloscopus collybita*). Numbers increased through the spring with each species peaking at 14 singing males around the woodland in April.

3.2.19 Migratory passerines continued to arrive in May that were largely observed within clearings and along the woodland edge and rides. Two singing garden warbler (*Sylvia borin*) and two pairs of common whitethroat along Transect 3, and singles of willow warbler along Transects 2 and 3, are sub-saharan migrants using the woodland during the breeding season.

Summary

3.2.20 In total, 59 species were identified during the surveys comprising 32 priority species of which four were confirmed breeders.

3.2.21 The most bird activity was found along woodland edges and rides where the open tree canopy promoted the growth of a scrubby understory that are of high value to breeding birds.

3.2.22 Conversely, it was evident that dense areas of woodland with limited natural light significantly reduced the presence of bird activity, although some trees appeared to provide suitable nesting opportunities for more common species such as treecreeper (*Certhia familiaris)* and nuthatch (*Sitta europaea*).

3.3 Habitat Suitability Assessments

Notable Bird Species

3.3.1 The records of notable bird species held by the local record centres (LRC): EWT, EFC, and SBIS; and BTO within a 1km study area of the Order Limits are summarised in Annex C: Notable Bird Species Desk Study. The combined data identified 90 notable bird species recorded within 1km of the Order Limits. Of these:

- 23 species are listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended);
- 26 species are SPI;
- 33 species are BoCC – red listed;
- 46 species are BoCC – amber listed; and
- 26 species were Suffolk Priority species.

3.3.2 Some bird species were present on multiple conservation schedules/lists.

3.3.3 Table 3.7 provides a summary of the statutory designated sites with notable bird species in their citations whose SSSI Impact Risk Zones overlap with the project.

Table 3.7 – Statutory Designated Sites with Bird Species Cited as Qualifying Species or Mentioned in the Citation Summary

Site	Name	Citation Summary/ Qualifying Bird Species	Distance and Direction from Order Limits
Special Protection Area (SPA)	Stour and Orwell Estuaries	Dark-bellied brent goose (*Branta bernicla*), Northern pintail (*Anas acuta*) Pied avocet (*Recurvirostra avosetta*) (Breeding) Grey plover (*Pluvialis squatarola*)	5.72km south-east and hydrologically linked to the Order Limits

Site	Name	Citation Summary/ Qualifying Bird Species	Distance and Direction from Order Limits
		Red knot (*Calidris canutus*) Dunlin (*Calidris alpina*) Black-tailed godwit (*Limosa limosa islandica*) Common redshank (*Tringa tetanus*) Waterbird assemblage* of over 20,000 individuals.	
Ramsar	Stour and Orwell Estuaries	Ramsar criterion 5: assemblages of international importance (63,017 waterfowl – five-year peak mean 1998/9-2002/2003).	5.72km south-east and hydrologically linked to the Order Limits
SSSI	Hintlesham Woods	Ancient semi-natural woodland habitat. The designation includes Wolves Wood, Keeble's Grove, Ramsey Wood and Hintlesham Great Wood. Also, a Royal Society for the Protection of Birds Reserve. A variety of birds breed in these woods, encouraged by the recent resumption of coppicing in Wolves Wood. Species include woodcock, nightingale, tawny owl, nuthatch and whitethroat.	Within Order Limits – Section AB: Bramford Substation/Hintlesham
SSSI	Cornard Mere, Little Cornard	A seasonally flooded area of fen, species-rich ruderal herb vegetation, woodland, scrub and neutral grassland. Cornard Mere attracts considerable numbers of over-wintering snipe and provides a habitat for a variety of insects, including an uncommon sawfly.	2km north

*Species include great crested grebe (*Podiceps cristatus*); great cormorant (*Phalacrocorax carbo*); dark-bellied brent goose; common shelduck (*Tadorna tadorna*); Eurasian wigeon (*Mareca penelope*gadwall (*Anas strepera*); northern pintail; goldeneye (*Bucephala clangula*); common ringed plover (*Charadrius hiaticula*); grey plover; northern lapwing (*Vanellus vanellus*); red knot; dunlin; black-tailed godwit; Eurasian curlew (*Numenius arquata*); common redshank; and ruddy turnstone (*Arenaria interpres*).

3.3.4 Non-statutory designated sites, present within 1km of the Order Limits, with notable bird species in the citations are listed in Table 3.8.

Table 3.8 – Non-statutory Designated Sites with Bird Species Mentioned in the Citation Summary

Site	Name	Citation Summary – Bird Species	Distance and Direction from Order Limits
County Wildlife Site (CWS)	Sproughton Park	A range of habitats including wet grassland, alder carr, veteran trees, hedgerows, ponds, and springs. Fauna associated includes birds.	100m south-east
CWS	Bullen Wood	Ancient woodland with diverse plant species and valuable habitats for woodpeckers.	130m south
CWS	Round Wood and Elms Grove	Ancient woodland site noted for supporting a wide range of woodland birds, particularly warblers.	320m south
CWS	Tom's/Broadoak Wood	Where there is sufficient light a dense shrub layer of hawthorn, hazel, spindle and field maple is present, providing suitable habitat for a range of bird species, including nightingale (*Luscinia megarhynchos*).	Immediately adjacent (south)

Site	Name	Citation Summary – Bird Species	Distance and Direction from Order Limits
CWS	Raydon Great Wood	Ancient woodland. The large size, habitat variation and structural diversity of this site provide habitat opportunities for a wide range of wildlife including birds. Several notable species are recorded here with birds including nightingale, cuckoo, song thrush and dunnock.	205m south
CWS	Valley Farm Wood	Mixed wet and ancient woodland and hedges which support several bird species.	Within
CWS	Layham Pit Woodland and Meadow	An active quarry with an undisturbed area of wet woodland and unimproved wet meadow. It supports bird communities including chiff chaff, black cap, willow warbler and nightingale.	Within
CWS	Layham Grove	Ancient woodland with tree diversity providing opportunities for birds including the notable species nightingale.	115m north
CWS	River Box Meadows	Floodplain meadows on the River Box also an important habitat for waders such as snipe (*Gallinago gallinago*).	765m north
Local Wildlife Site (LoWS) and Essex WT Reserve	Loshes Meadows Complex	Grassland, woodland, young plantation, hedgerows, and marsh habitats. It supports a variety of breeding birds.	Within

3.3.5 A range of bird surveys were undertaken between 2009 and 2012, covering the preferred route corridor (congruent with the study area for this report) and surrounding habitats. Breeding bird surveys, including transects and point counts were conducted in 2010 and 2012. Raptor vantage point surveys were conducted in 2010. Wintering bird surveys were undertaken during winter 2009/2010 and 2010/2011.

3.3.6 Seventy-eight bird species were recorded during these surveys. Thirty-eight of these bird species were BoCC. Barn owl and hobby were the only Schedule 1 species identified during the previous field surveys, the notable species identified are presented in Annex C: Notable Bird Species Desk Study with the desk study.

3.3.7 Five species of notable bird were recorded incidentally by surveyors carrying out the programme of ecological surveys in 2021/2022 throughout the Order Limits. The species were:

- Barn owl;
- Cuckoo;
- Nightingale;
- Skylark; and

- Snipe.

3.3.8 The habitats within the study area and the relevant notable bird species that they could potentially support (identified from the desk study) are presented in Annex D: Notable Bird Habitat Assessment. Habitat classification is shown in Figure 7.1.4 for habitat areas and Figure 7.1.5 for linear features (**application document 6.4**) as part of the UKHab mapping for the full project. This shows that notable bird species could be present in almost any of the semi-natural habitats within the Order Limits, including cropland, wetland, grassland, heathland, hedgerows, rivers and lakes, woodland and in urban areas. Due to this, the Order Limits are likely to support a range of notable bird species.

3.3.9 Cropland (including arable farmland and margins) was the most common habitat present throughout the Order Limits, which provides habitat and feeding opportunities for farmland birds, in particular Section AB: Bramford Substation/Hintlesham, near Hintlesham Village and Section F: Leavenheath/Assington, near Assington. These species include but are not limited to tree sparrow, grey partridge, lapwing and yellowhammer. Schedule 1 listed species barn owl also relies on open farmland and managed margins for hunting prey and farm buildings to build nests. Brambling use open farmland margins when close to areas of dense woodland and fieldfare also use arable farmland during the winter.

3.3.10 Hedgerows border the majority of the arable farmland and are likely to support a range of notable bird species for nesting and as a food resource. Many of these are passerine species and include bullfinch, song thrush and Schedule 1 species redwing. The grey partridge also uses grass cover at the bottom of hedgerows to nest. Areas of scrub also support passerine species and is important for cover for birds such as nightingale.

3.3.11 Small areas of wetland, for example in Section F: Leavenheath/Assington, located south of Assington, and waterbodies, for example in Section D: Polstead at the disused Layham Quarry, are present within the Order Limits and although are important, generally, for overwintering waders, waterfowl and wetland birds, the presence of these habitats is restricted to that in association with the major watercourses e.g. River Stour. The multiple data sources and the review of habitats present within the Order Limits combine to suggest that the habitats within the Order Limits and their surroundings are of limited importance to the waders, waterfowl and wetland birds (including the qualifying bird species of the Stour and Orwell Estuaries SPA and Ramsar).

3.3.12 Areas of woodland were also present along the length of the Order Limits, for example Hintlesham Woods, Chestnut Grove and Alder Carr. These support a number of notable species including woodcock, nightingale and tawny owl.

3.3.13 Urban areas are defined as constructed, industrial and other artificial habitats. Urban areas were rare within the Order Limits but where present consisted of residential buildings and gardens located to the east of the study area near Hintlesham Fisheries, and built-up areas such as Bramford Substation, to the east of the project. Constructed habitats can support a number of notable species such as house martin and house sparrow that nest in the eaves of buildings and peregrine falcons have been known to nest in stone buildings.

3.3.14 Figure 7.2.5 (**application document 6.4**) shows the location of the Schedule 1 bird records. Examples include several records of fieldfare and redwing within section AB to the north of Hintlesham village and barn owl records within Section D: Polstead, near Polstead. Kingfisher were recorded in association with the River Brett. A number of barn

owl boxes were also noted within the Order Limits, one an active barn owl roost. These are also shown on Figure 7.2.5 (**application document 6.4**).

3.3.15 A review of combined bird records for BoCC red listed, amber listed, SPI species and Suffolk Priority species (using GIS mapping to identify areas where there were concentrations of records) identified that notable bird species have been recorded across the Order Limits but with specific areas of increased presence. The areas with the highest density of records were: open fields in Burstall Hill and adjacent to Wolves Wood in Section AB: Bramford Substation/Hintlesham adjacent the Order Limits; at Raydon Great Wood to the south of the Order Limits in Section C: Brett Valley; within the Order Limits at Layham Quarry in Section D: Polstead and across arable fields near Dollops Wood in Section E: Dedham Vale Area of Outstanding Natural Beauty (AONB); in association with Arger Fen SSSI to the south of the Order Limits in Section F: Leavenheath/Assington and across the Culverdown area in Section G: Stour Valley, extending along the River Stour north towards Cornard Mere SSSI and north of Loshes Meadows.

3.3.16 A review of wintering bird records based on the English Winter Bird Survey squares just outside the 1km study area surveyed in 2018–2019 and field survey between 2009-2012 (using GIS mapping to identify areas where there were concentrations of records) showed that records are generally sparse with large areas of the Order Limits having no records. The highest density of records within the Order Limits were located adjacent to Hintlesham Woods in Section AB: Bramford Substation/Hintlesham, and to the west of the River Stour in Section G: Stour Valley. Section G: Stour Valley has the largest overall coverage of records. The highest density of records within the 1km study area were located to the south of the Order Limits adjacent to Arger Fen SSSI in Section F: Leavenheath/Assington.

Reptiles

3.3.17 Table 3.9 shows a summary of the reptile species records up to 2022 as held by EFC, EWT, and SBIS within the last 15 years.

Table 3.9 – Reptile Species Records within 1km of the Order Limits

Common Name	Scientific Name	Number of Records	Most Recent Record
Slow worm	*Anguis fragilis*	23	2020
Grass snake	*Natrix helvetica*	14	2019
Adder	*Vipera berus*	none	n/a
Common lizard	*Zootoca vivipara*	21	2019

3.3.18 Designated sites within the study area were reviewed for mention of reptile presence. The following sites have presence of reptiles in their citation and are shown on Figure 7.2.6 (**application document 6.4)**:

- Layham Pit Woodland and Meadows CWS; and
- Raydon Great Wood CWS.

3.3.19 Previous field survey for reptiles undertaken in 2013 focused on five locations (Table 3.10). Low populations of grass snake, slow worm and common lizard were recorded in

habitats that were identified as potentially suitable for reptiles (see Figure 7.2.6 **application document 6.4**). No evidence of adder presence was found.

Table 3.10 – 2013 Reptile Survey Results

Survey ID (Fig 7.2.6) and Easting Northing	Description	Species Recorded and Peak Count
1 587050, 235540	Small (single farm-scale) mineral extraction site with light scrub and surrounding unimproved grassland. Improved and semi-improved grassland to the wider part of site. Good structural diversity with tall and short areas of grassland and marginal habitats to tracks, woodland edge and scrub. Reptiles present throughout grassland areas.	Slow worm (17); and common lizard (18).
2 587330, 236130	Improved grassland, appeared horse grazed although none present during survey. Woodland and mature hedges to margins, and small area of dense bracken to NW corner. Poor grassland structure away from the edges although improving during the season. Survey also found common lizard to adjoining grassland margin and debris immediately south of site.	Slow worm (6); and common lizard (2).
3 587730, 236130	Extensive area of semi-improved grassland with excellent structural diversity including tussocks, vegetative litter layer and marginal habitats to tracks, hedge lines and light scrub. Woodland and some mature hedgerows to boundaries but internal hedgerows generally species poor and sparse. Adjoins further good reptile habitats: to south-east (grassland and wet meadows) and NW (rough grass/scrub/heath mix). Widespread reptile presence throughout.	Slow worm (26); and common lizard (28).
4 601130, 240000	Extensive mineral extraction site with areas of low disturbance established grassland and scrub habitats to the marginal areas. Good structural diversity and habitat connectivity. Low-intensity extraction and landfill works ongoing.	Slow worm (23); common lizard (9); and grass snake (4).
5 593729, 237145	Mixed habitat site with rough grassland, hedgerows, banks, wet meadows / fen and woodland. Low common lizard presence to open areas of grassland to entrance track and central bracken /grassland habitat. Grass snake also reported at the site although not recorded during survey.	Common lizard (2).

3.3.20 The incidental and anecdotal records of reptiles and specific mentions of suitable reptile habitats are given in Table 3.11 and shown in Figure 7.2.6 (**application document 6.4**).

Table 3.11 – Incidental and Anecdotal Evidence of Reptiles Within the Order Limits

Location	Incidental Reptile Records	Notes
610593, 243375	Hibernacula	Store of wood chip, logs and chopped wood, used my small mammals (burrows seen). User of site said that these stores are not permanent, they rot down and are removed and replaced.
610601, 243386	Hibernacula	Earth mound of rubble and logs at the top, covered in places by ruderal vegetation – buddleia, winter cress, nettle, prickly sow thistle, docks, bristly ox-tongue, mallow, spotted medick, taraxacum sp. Lots of exposed ground.
601574, 240135	Common lizard	Basking
587056, 235443	Slow worm	Live sighting
587375, 235475	Grass snake	Sighting by wet sedge habitat
587856, 235916	Common lizard	Live sighting
587879, 235970	Grass snake	Live sighting
601660, 240227	Two common lizards	Basking at field edge
609092, 242893	Grass snake	Anecdotal evidence of grass snake following chat with landowner
587328, 235811	Slow worm	Anecdotal evidence of slow worm at Little Ansell Farm
598835, 239824	Common lizard	Juvenile common lizard basking in dark vegetation

3.3.21 Using the results of the UKHab surveys from 2021 and 2022 and information from Edgar *et al*. (2010), a list of suitable reptile habitats found within the Order Limits was determined. These comprised:

- Bracken;
- Cereal cropland (generally around the perimeter where there are rough borders and hedgerows for cover);
- Wet woodland;
- Fen;
- Lowland dry acid grassland;
- Lowland meadows;
- Lowland mixed deciduous/other woodland;
- Mixed scrub;

- Modified grassland (generally around the perimeter where there are rough borders and hedgerows for cover);
- Other coniferous woodland (where there are open sunny glades for basking);
- Other neutral grassland;
- Other woodland; broadleaved (where there are open sunny glades for basking); and
- Other woodland; mixed (where there are open sunny glades for basking).

3.3.22 The results of the habitat suitability surveys of borehole locations are shown in Table 3.12 and contributed to the reptile habitat assessment results.

Table 3.12 – Habitat Suitable for Reptiles Identified During Walkover Survey at Borehole Locations

Reptile Area (Fig 7.2.6)	Location (Easting, Northing)	Description of Reptile Habitat
RH10	606957, 243191	Suitable – Arable barley field with large field margin approximately 20m wide. Field margin comprises mosaic of tussocky semi-improved and marshy grassland. Woodland adjacent to field margin.
RH17	604995, 241259	Suitable – Field as a whole is very suitable with variable sward height and structure, areas of scattered scrub and sloping banks. Area where borehole is located has shorted sward but still suitable for basking and adjacent to scrub.
RH22	601216, 240068	Suitable – Within scrub adjacent to quarry track. Scrub habitat provides some shaded and some open canopy areas. Sloped earth bank along track provides good basking opportunities
RH22	600957, 239966	Suitable – Sunny sloped earth bank with vegetation and adjacent patches of scrub
RH30	593541, 237109	Suitable – Borehole location is within marshy grassland dominated by sedge species and horsetail with abundant nettle. Adjacent habitat comprises bracken dominated sloped bank and scrub and woodland along fence line

3.3.23 Habitats within the Order Limits were classed as having low, moderate or high suitability for reptiles (Table 2.2). Any habitats that were well connected and formed a mosaic of habitats were grouped together into one area. All habitats within the mosaic are treated as the highest assigned value.

3.3.24 The results of the desk-based reptile habitat assessment are shown on Figure 7.2.6 (**application document 6.4**) and full data is given in Annex E: Full Reptile Habitat Suitability Data.

3.3.25 The majority of the land within the Order Limits was found to support habitat with a low potential suitability for reptiles. The dominant habitat was arable farmland used for grazing or cropland. Where the Order Limits passed through the centre of these fields, habitats were generally classed as having low suitability to support reptiles, due to ongoing disturbance, short sward and lack of suitable cover. Connection to a variety of habitats in the wider landscape was limited and availability of areas suitable for hibernation or

breeding was low. However, marginal habitats around the field boundary can provide more suitable reptile habitat and therefore arable fields have been classed as having low suitability rather than negligible suitability. Although the footprint of the Order Limits may only affect a small section of arable marginal habitat, these areas are generally well connected to suitable habitat in the wider landscape.

3.3.26 Habitats assessed as having high suitability for reptiles, typically comprise a mosaic of habitats including areas of wet woodland, rough grassland, scrub and large areas of marginal habitat alongside fields or roadsides, for example in Section G: Stour Valley to the south of Great Henny. These were often connected to ponds, ditches or more open grassland, gravel track or train track ballast providing suitable areas for basking, breeding and hibernation. Incidental or anecdotal records of slow worm, grass snake or common lizard were noted in some of the areas assessed as providing high suitability habitat, or the area was present within, or adjacent to, a CWS with reptiles specifically mentioned in the citation, for example Layham Woodland and Meadow CWS, located in Section D: Polstead.

3.3.27 Habitats assessed as having moderate suitability to support reptiles typically comprise less complex mosaic habitats in smaller or narrower areas of the Order Limits, such as in Section H: GSP Substation to the west of Butler's Wood. Habitats included woodland and forest, connected to areas of occasionally grazed arable farmland, ditches and dense or scattered scrub that were often more isolated or connected to larger areas of cropland compared to the habitats assessed as having high suitability for reptiles. No incidental or anecdotal records of reptiles were found within the areas assessed as having moderate suitability for reptiles.

Terrestrial Invertebrates

3.3.28 Although not designated for its invertebrate interest, Hintlesham Woods SSSI (within the Order Limits), Arger Fen SSSI (located approximately 10m south of the Order Limits) and Cornard Mere, Little Cornard SSSI (located approximately 2km north of the Order Limits) are statutory sites that have been noted as being valuable habitats for invertebrates. Hintlesham Woods SSSI and Arger Fen SSSI are mainly woodland habitats with a of range of species and life stages of trees, including dead and decaying wood that provide a range of habitats for a number of invertebrates. Both the stag beetle and the nationally notable oak pinhole borer beetle are associated with the wood decay terrestrial invertebrate assemblage which is highly likely to be present in these habitats. Cornard Mere, Little Cornard SSSI is *Glyceria maxima* swamp habitat supporting a variety of insects including an uncommon sawfly.

3.3.29 The Stour and Orwell Estuaries Ramsar located 5.72km south-east of the project is designated, in part, for supporting five British Red Data Book invertebrates (a muscid fly (*Phaonia fusca*), a horsefly (*Haematopota grandis*), spiders (*Arctosa fulvolineata* and *Baryphema duffeyi*)) and swollen spire snail (*Mercuria confusa*).

3.3.30 Non-statutory designated sites (see Figure 7.2.7 (**application document 6.4**)) that have suitable invertebrate habitat or invertebrate species/assemblages mentioned in their citations are described below in Table 3.13.

Table 3.13 – Non-statutory Designated Sites with Invertebrate Species in their Citations

Non-Statutory Designated Site	Citation description	Distance and Direction from Order Limits
Sproughton Park CWS	The mosaic of grassland and hedges is also ideal feeding habitat for bats; alder carr is a biodiversity Priority habitat (Wet Woodland) and known to be of great importance for invertebrates.	100m south-east
Burstall Long Wood CWS	Areas of dead and diseased elm and aspen provide a source of decaying timber for invertebrates	680m south
Bullen Wood CWS	Ancient woodland with diverse plant species and valuable habitats for dead wood invertebrates	130m south
Brimlin Woods CWS	A pond situated on the edge of the central ride supports a fair diversity of water plants and provides important habitat for dragonfly larvae and other invertebrates	650m south
Squires Wood CWS	There is a considerable amount of dead wood providing an important habitat for invertebrates in areas which have not been managed recently.	550m south
Tom's/Broadoak Wood CWS	The presence of fallen and standing deadwood provides further opportunities for invertebrates including stag beetle.	Immediately adjacent (south)
Raydon Great Wood CWS	The large size, habitat variation and structural diversity of this site provide habitat opportunities for a wide range of wildlife including invertebrates such as dragonflies and butterflies.	205m south
Valley Farm Wood CWS	The structural diversity within the site provides habitat opportunities for a range of species, particularly invertebrates.	Within
Layham Grove CWS	The site provides habitat opportunities for a range of wildlife, particularly invertebrates.	115m north
Layham Pit Woodland and Meadows CWS	Historically, it is likely that the wet grassland would have been cattle grazed. Whilst re-introduction of grazing/cutting may be desirable to prevent scrub encroachment, the extremely wet nature of the site means it is likely that the habitat will remain stable and the rate of change is slow. In addition, the current tall herb structure is of wildlife value in its own right. There is evidence of badgers feeding and it is important for a wide range of invertebrate.	Within
Stack Wood CWS	Brushwood and fallen trees provide an important habitat for a range of woodland invertebrates which are restricted to dead wood.	780m north
High Trees Farm Wood CWS	The woodland provides habitat opportunities for a range of wildlife, including invertebrates and birds	445m north

Non-Statutory Designated Site	Citation description	Distance and Direction from Order Limits
Bushy Park Wood CWS	To the north is a small area colonised by oak pollards with an understorey of holly. It is thought that this compartment was originally parkland. Old oak pollards are immensely valuable as a habitat for invertebrates	Immediately adjacent (south)
Assington Thicks CWS	Ponds present on the eastern margin of the woods provide additional habitat for woodland invertebrates	215m north

3.3.31 The B-Lines network is a strategically mapped nationwide network of potential and existing wildflower habitat, designed to identify where creating a new habitat will provide the greatest benefit for pollinators (Buglife, 2022). It aims to coordinate the delivery of 3km wide corridors, of wildflower-rich habitats, to aid pollinator movement across the landscape. The B-Line network crosses the Order Limits at various locations including Alphamstone and Leavenheath (see Figure 7.2.7 (**application document 6.4**)).

3.3.32 The terrestrial invertebrate species records within 1km of the Order Limits up to June 2022 as held by EFC, EWT, and SBIS are shown in Annex F: Notable Terrestrial Invertebrate Records Within 1km of the Order Limits. The majority of the records provided by local records centres were confined to designated sites and found mostly in woodland habitats (Figure 7.2.7 (**application document 6.4**)). Approximately seventy notable invertebrate species have been recorded within 1km of the Order Limits within the last 15 years. Three of these species are protected from sale by being listed on the Wildlife and Countryside Act 1981 (as amended): stag beetle (*Lucanus cervus*), purple emperor butterfly (*Apatura iris*) and white-letter hairstreak butterfly (*Satyrium w-album*).

3.3.33 Twenty-one notable terrestrial invertebrate species were identified during the field surveys undertaken in 2013 (Table 3.14). Most of these species were located within designated sites along the Order Limits.

Table 3.14 – Notable Invertebrate Species Recorded in the 2013 Field Surveys

Location (see Figure 7.2.7)	Description	Results
Hintlesham Wood (SSSI), 606700, 243000	A woodland ride which is botanically diverse. Lots of insects on the wing. Little deadwood.	59 different terrestrial invertebrate species, of these three were of local or national importance: *Agonum emarginatum*, *Notiophilus palustris* and *Bembidion dentellum*, all species of Coleoptera of local importance.
Fruit Farm, 604400, 241100	Found adjacent and to the south-west of Valley Farm Meadow CWS characterised by marshy grassland and semi-improved horse grazed grassland with good connectivity to other habitats. The area is next to a stream with a species-rich meadow. Stream was species poor.	39 terrestrial invertebrate species identified, one of which was *Coenosia atra*, a nationally notable species of Diptera.

Location (see Figure 7.2.7)	Description	Results
Layham Quarry pond (Layham Pit Woodland and Meadow CWS), 601300, 240100	Open ground with many disturbed areas. Few plants in places. Where the quarry had been left undisturbed vegetation was establishing.	36 species of terrestrial invertebrates identified, with only *Bembidion dentellum*, a species of Coleoptera, identified as locally important.
Assington Fen and Woodland (to the south-east of Assington Thicks CWS but not connected) 593500, 237100	Fen species-rich with boggy ground conditions in May and drier conditions in August. Rivulets and streams flowing throughout.	62 species of terrestrial invertebrates identified, eight of which were of local or national importance. These were *Agonum emarginatum, Bembidion articulatum, Dyschirius luedersi, Poecilus cupreus, Pterostichus nigrita, Cassida flaveola* and *Tytthaspis sedecimpunctata*, all Coleoptera of local importance and *Hydrotaea parva*, a Diptera of national importance. 25 species were identified at Assington Woods; a single species was identified as important: *Neoascia meticulosa*, a Diptera of local importance.
Quarry (to the north-west of Alphamstone Complex LWS) 587000, 235500	Quarry that had been left undisturbed for many years. Good botanical diversity and good structural diversity. Open ground.	36 species were recorded. Of these, two species were found to be important: *Bruchidius villosus*, a locally important species of Coleoptera and *Thereva plebeja*, a nationally notable species of Diptera.

3.3.34 Incidental records of butterfly species recorded from Hintlesham Great Wood, Hintlesham Little Wood and Wolves Woods comprised: white admiral, a SPI; silver-washed fritillary (*Argynnis paphia*); purple hairstreak (*Favonius quercus*); large white (*Pieris brassicae*); small white (*Pieris rapae*); gatekeeper (*Pyronia tithonus*); ringlet (*Aphantopus hyperantus*); meadow brown (*Maniola jurtina*); comma (*Polygonia c-album*); and speckled wood (*Pararge aegeria*).

3.3.35 Table 3.15 lists the types of habitats recorded during the UKHab surveys that may correlate to assemblage types as described in Table 2.3. The habitats have been mapped and are shown in Figure 7.2.7 (**application document 6.4)**.

Table 3.15 – Habitats and Related Invertebrate Assemblage Type and Feature.

Assemblage Type	Habitats (UKHab) in the Order Limits Where Assemblages May Occur	Examples of Features Valuable to Invertebrates
Field layer	u1a – Open Mosaic Habitats on Previously Developed Land c1 – Arable and horticulture c1a – Arable field margin c1b – Temporary grass and clover leys	Sparsely vegetated ground provides special conditions for warmth loving and ground nesting species. Limited scattered trees and scrub can provide useful foraging areas and habitat such as dead wood.

Assemblage Type	Habitats (UKHab) in the Order Limits Where Assemblages May Occur	Examples of Features Valuable to Invertebrates
	u1d – Suburban/ mosaic of developed/ natural surface	Scrub plants such as broom and gorse can be an important source of nectar and pollen and can support their own fauna. Tall, flower-rich vegetation is a valuable nectar resource. Piles of rubble and loose rocks provide habitat and shelter. Bare cliffs and slopes provide valuable nesting sites for burrowing bees and wasps. (Whitehouse A.T., 2008)
Grassland and scrub matrix	g1a – Lowland dry acid grassland g3c – Other neutral grassland h3h – Mixed scrub h3d – Bramble scrub h3e – Gorse scrub	Range of successional stages and vegetation structures in grassland. Wide range of floral species provide nectar sources. Tussocky grassland can provide microclimates and varied vegetation structure. Scattered scrub and hedgerows can provide shelter, areas for hunting, resting and hibernation. Scrub can act as landmark features for swarming species (Suffolk Wildlife Trust, 2022).
Shaded field layer	w1 – Broadleaved mixed and yew woodland w1f – Lowland mixed deciduous woodland w1g – Other woodland; broadleaved w1g6 – Line of trees w1h – Other woodland; mixed h2a – hedgerows	Brash piles and leaf litter provide cover and food sources along with overwintering opportunities.
Arboreal canopy	w1 – Broadleaved mixed and yew woodland w1f – Lowland mixed deciduous woodland w1g – Other woodland; broadleaved w1g6 – Line of trees w1h – Other woodland; mixed	Range of tree species provide opportunities for a wide array of invertebrates Range of ages and structures beneficial for species Bramble, climbers such as ivy and honeysuckle provide cover and nectar sources. Shelter along with sunny glades are vital to many woodland invertebrates Open spaces can provide opportunities for other plant species providing habitat for a wider range of invertebrates. Presence of fungi can support invertebrates.

Assemblage Type	Habitats (UKHab) in the Order Limits Where Assemblages May Occur	Examples of Features Valuable to Invertebrates
Wood decay	w1 – Broadleaved mixed and yew woodland w1f – Lowland mixed deciduous woodland w1g – Other woodland; broadleaved w1g6 – Line of trees w1h – Other woodland; mixed h2a – hedgerows	Range of age, size and species of dead wood component is important along with slow and rapid decay as these requirements vary between invertebrate species.
Other habitats suitable or terrestrial invertebrates not covered in assemblage types above		
Wetland	f2 – Fen marsh and swamp f2b – Purple moor grass and rush pastures f2f – Other swamps w1d5 – Alder woodland on floodplains (H91E0) w1d – Wet woodland r1 – Standing open water and canals r2 – Rivers and streams	Fen marsh and standing water are associated with many invertebrates but particularly dragonflies, damselflies, caddis flies and diving beetles. In wet woodland tree species such as willow and alder dominate and support a number of invertebrate species and their larvae. Other species rely on fungi and lichen that may also be present. Dead wood is often frequent providing nesting sites and overwintering opportunities.
Urban	u1a – Open mosaic habitats on previously developed land u1c – Artificial unvegetated, unsealed surface u1d – Suburban/ mosaic of developed/ natural surface u1e – Built Linear Features	Hedgerows found along roadsides, amenity grasslands and garden plants that provide good nectar sources and areas of cover year-round. Warm areas of rubble or concrete, holes in walls and brickwork of houses.

3.3.36 When considering the combined desk study and field survey results from 2013, understanding the habitat requirements of notable species and assemblages then comparing them to the presence and distribution of certain habitats cross the Order Limits recorded in 2021/22, it is possible to make some assumptions about the terrestrial invertebrate species and assemblages likely present.

3.3.37 A number of notable moth species recorded within the study area prefer open grassland habitat including the cinnabar (*Tyria jacobaeae*), latticed heath (*Chiasmia clathrata*) and beaded chestnut moth (*Agrochola lychnidis*). Areas of scrub, woodland edges and hedgerow are likely to provide cover and hibernating opportunities for such open grassland species where these habitats are present.

3.3.38 Open mosaic habitats including areas of disturbance that create bare and sandy ground are important for heat loving terrestrial invertebrate species. Example habitats of this type found within the Order Limits include quarries, lowland dry acid grassland and railway embankments. Notable species found within the study area that are associated with these habitats include the notable species small heath butterfly (*Coenonympha pamphilus*), the painted nomad bee (*Nomada fucata*) and the lobe-spurred furrow bee (*Lasioglossum pauxillum*).

3.3.39 Cropland is the dominant habitat within the Order Limits and this habitat likely to support a range of invertebrates. Pollinators such as bees, moths and butterflies are vital for plant and crop productivity and beetles and spiders are important predators of crop pests. Arable field margins within the Order Limits could also support notable invertebrate species such as the Nationally Notable B ridge-cheeked furrow bee (*Lasioglossum puncticolle*), especially if sewn with wildflower seed, especially when surrounded with hedgerows for extra cover.

Other Notable Species

3.3.40 Five species that are considered 'other notable species' have been recorded within 1km of the Order Limits within the last 15 years. Table 3.16 summarises the results which are also shown in Figure 7.2.8 (**application document 6.4**). Polecat (*Mustela putorius*) and brown hare (*Lepus europaeus*) were also recorded during deployment of camera traps in Section E: Dedham Vale AONB.

Table 3.16 – Other Notable Species Within 1km of the Order Limits

Common Name	Taxon Name	Number of Records	Most Recent Record
Brown hare	*Lepus europaeus*	59	2022
Hedgehog	*Erinaceus europaeus*	62	2021
Polecat	*Mustela putorius*	14	2020
Common toad	*Bufo bufo*	6	2021
Harvest mouse	*Micromys minutus*	14	2010

3.3.41 Brown hare require a mosaic of habitats including arable fields, rough grasslands, and woodland edges. This species tends to live in exposed habitats where it makes its forms in small depressions within open fields, long grass, and hedgerows which are present across the Order Limits. Figure 7.2.8 (**application document 6.4**) shows the locations of these habitats and therefore the likely distribution of the species across the Order Limits. Table 3.17 cross references each notable species against the habitat where they could be found.

3.3.42 Hedgerows are an important feature for hedgehog as they provide key foraging habitat as well as acting as corridors for dispersal. Many hedgerows are located within the Order Limits that link records of hedgehog to the north of the project to those in the south, particularly in the Layham and Assington areas. This also concurs with the increasing use of urban and semi-urban habitats where amenity grassland is often used as a foraging resource.

3.3.43 A large variety of lowland habitats are suitable in supporting polecat. These habitats include marshes, woodlands, riverbanks, arable fields, and grasslands, amongst others which are present across the Order Limits. Polecat often use existing features to make their dens which may include rabbit burrows, fox dens, or log piles. Farm buildings can often support polecats and hedgerows are used for foraging or dispersal.

3.3.44 The common toad requires both aquatic and terrestrial habitat throughout its life stages. In the mating season, toads require deep, permanent bodies of water, with sufficient emergent and sub-emergent vegetation for breeding purposes. Few ponds are located within the Order Limits but many are located in the surrounding area. Suitable terrestrial

habitats include woodland, grassland, heathland, and hedgerows; all found within the Order Limits.

3.3.45 Numerous different habitats have the potential to support harvest mouse. Habitats include tussocky grassland, reedbeds, hedgerows, scrub, crops including oats and wheat and woodland edges. Harvest mice construct their nests by weaving together grass and stems, therefore vegetation needs to be abundant. Arable fields are dominant across the Order Limits, particularly to the east.

3.3.46 In summary the Order Limits support a range of habitats that have the potential to support these 'other notable species' and with the desk study records provide an indication of the extent and distribution of these species.

Table 3.17 – Other Notable Species Habitat Assessment

Habitat (UKHab) within the Order Limits	Species	Description
W – Woodland and forest including: w1f – Lowland mixed deciduous woodland w1g – Other woodland; broadleaved w1h – Other woodland; mixed w2c – Other coniferous woodland w1d – Wet woodland	Brown hare	Woodland edges may support forms, foraging, and commuting.
	Hedgehog	Woodland may support burrowing and provide hibernacula (log piles and leaf litter), along with foraging and commuting.
	Polecat	Woodland may support dens along with foraging and commuting.
	Common toad	Woodland may support burrowing and provide hibernacula (leaf litter and log piles), along with foraging and commuting.
	Harvest mouse	Woodland edges may support nesting, foraging, and commuting.
H – Heathland and shrub including h3a – Blackthorn scrub h3b – Hazel scrub h3d – Bramble scrub h3e – Gorse scrub h3h – Mixed scrub	Hedgehog	Scrub may support nesting, foraging, and commuting.
	Polecat	Scrub may support foraging and commuting.
	Common toad	Scrub may support burrowing opportunities.
	Harvest mouse	Scrub may support nesting opportunities.
H2a – hedgerow h2b – other hedgerow w1g6 – line of trees	Hedgehog	Habitat may support foraging and commuting.
	Polecat	Habitat may support foraging and commuting.
	Common toad	Habitat may support foraging and commuting.
	Harvest mouse	Habitat may support foraging and commuting.
G – grassland including g1a – Lowland dry acid grassland g3c – Other neutral grassland	Brown hare	Unimproved and semi-improved grassland may support forms and foraging.
	Hedgehog	Semi-improved grassland may support foraging.
	Polecat	Semi-improved grassland may support foraging.
	Common toad	Unimproved and semi-improved grasslands may support foraging.

Habitat (UKHab) within the Order Limits	Species	Description
	Harvest mouse	Unimproved and semi-improved grasslands may support nesting and foraging.
G4 – Modified grassland	Brown hare	Improved grasslands may support foraging where longer sward height may encourage the creation of forms.
	Hedgehog	Improved grasslands may support foraging.
	Polecat	Improved grasslands may support foraging.
	Common toad	Improved grasslands may support foraging.
F2 – Fen marsh and swamp f2f – Other swamps	Polecat	Marshland may support dens and foraging.
	Common toad	Marshland may support burrows and foraging.
G1c – Bracken u1a – Open Mosaic Habitats on Previously Developed Land	Brown hare	Tall ruderal may support foraging and commuting.
	Hedgehog	Bracken and tall ruderal may support foraging and commuting.
	Polecat	Bracken and tall ruderal may support foraging and commuting.
	Common toad	Bracken and tall ruderal may support burrowing, foraging, and commuting.
	Harvest mouse	Bracken and tall ruderal may support nesting, foraging, and commuting.
R1 – Standing open water and canals r1a – Eutrophic standing waters r2 – Rivers and streams r2a – Rivers (priority habitat)	Polecat	Riverbanks and riparian vegetation may support dens, foraging, and commuting.
	Common toad	Standing water may provide somewhere to lay eggs. Swampland may support burrows and foraging. Running water may support foraging and commuting.
C1 – Arable and horticulture including c1a – Arable field margins c1b – Temporary grass and clover leys c1c – Cereal Crops	Brown hare	Arable field may support forms and offer foraging resource in spring, fall and winter.
	Polecat	Arable field may support dens in winter months and offer foraging.
	Common toad	Arable field may support foraging.
	Harvest mouse	Cereal crops and long grasses provide a place to build nests and support foraging.
U1 – Built-up areas and gardens	Hedgehog	May support burrows and foraging in gardens and farmyards.
	Polecat	May support dens and foraging in farmyards.
	Common toad	May support burrows and foraging in gardens and farmyards.

Annex A: Otter and Water Vole Habitat Suitability Assessment

Waterbody Number	Habitat Description	Habitat Suitability: Otter	Habitat Suitability: Water Vole
W-AB-4	A 2m wide stream within a broadleaved woodland with a slow flow and bordered by grazing fields. A steep bank structure provided good burrowing opportunities. A lack of adequate vegetation limited food sources and cover available to water vole. The sparse woodland provided potential holt and hover locations for otter. Good connectivity to suitable waterbodies, particularly Spring Brook, within the surrounding area.	Sub-optimal	Sub-optimal
W-AB-5-1	A dry 1m wide drainage ditch bordered by arable fields. Overly exposed ditch with limited suitable bankside vegetation and steep banks offered limited foraging and some burrowing opportunities. Limited connectivity to suitable waterbodies within the area.	Unsuitable	Unsuitable
W-AB-6-1 / W-AB-8-1	A dry 1m wide drainage ditch bordered by arable fields. Overly exposed ditch with limited suitable bankside vegetation and shallow banks offered limited foraging and burrowing opportunities. Limited connectivity to suitable waterbodies within the area.	Unsuitable	Unsuitable
W-AB-12-1	A 1m wide ditch running through a broadleaved woodland. Very shallow banks with no water present and very dry at the time of survey. Unlikely to hold water for more than four months of the year. Limited connectivity to suitable waterbodies within the area.	Unsuitable	Unsuitable
W-AB-13-1	A dry 1m wide drainage ditch bordered by arable fields. Overly exposed ditch with limited suitable bankside vegetation and shallow banks offered limited foraging and burrowing opportunities. Limited connectivity to suitable waterbodies within the area.	Unsuitable	Unsuitable
W-AB-19-1	A dry 1m wide drainage dich bordered by arable fields. Overly exposed ditch with limited suitable bankside vegetation and shallow banks offered limited foraging and burrowing opportunities. Limited connectivity to suitable waterbodies within the area.	Unsuitable	Unsuitable

Waterbody Number	Habitat Description	Habitat Suitability: Otter	Habitat Suitability: Water Vole
W-AB-30 (Belstead Brook)	A 2m wide river within a broadleaved woodland with a slow flow, bordered by grazing fields and recreational fishing ponds. A varied bank structure provided good burrowing opportunities. A lack of vegetation limited food sources and cover available to water vole. Depth, lack of disturbance and connectivity, particularly to Spring Brook may increase the likelihood of use by commuting otter. Anecdotal evidence of otter presence from local resident.	Sub-optimal	Sub-optimal
W-AB-32	A 3m wide stream running through a broadleaved woodland and bordered by arable fields. Varied bank structure which could provide burrowing opportunities but a lack of adequate vegetation limited food sources and cover available to water vole. Limited connectivity to suitable waterbodies within the surrounding area.	Unsuitable	Sub-optimal
W-AB-32 to 33	A 2m wide drainage ditch bordered by plantation woodland to the north. Overly exposed ditch with limited bankside vegetation and shallow banks offered limited foraging and burrowing opportunities. Limited connectivity to suitable waterbodies within the area.	Unsuitable	Unsuitable
W-AB-33	A dry 1m wide drainage ditch bordered by arable fields. Overly exposed ditch with limited bankside vegetation and shallow banks offered limited foraging and burrowing opportunities. Limited connectivity to suitable waterbodies within the area.	Unsuitable	Unsuitable
W-AB-28-1	A dry 1m wide drainage ditch bordered by arable fields. Overly exposed ditch with limited bankside vegetation and shallow banks offered limited foraging and burrowing opportunities. Limited connectivity to suitable waterbodies within the area.	Unsuitable	Unsuitable
W-AB-46	A 2m wide stream within a broadleaved woodland with a static flow and little water. Varied bank structure offered some suitable burrowing opportunities in some areas. Lack of in channel vegetation. Limited connectivity to suitable waterbodies within the area.	Unsuitable	Sub-optimal
W-AB-46	A 1m wide stream, within a broadleaved woodland and adjacent to a grazing field, with a slow flow and minimal water at the time of survey. Overgrown with tall grasses and herbs in some areas. Shallow bank structure offered limited burrowing opportunities. Limited connectivity to suitable waterbodies within the area.	Unsuitable	Sub-optimal

Waterbody Number	Habitat Description	Habitat Suitability: Otter	Habitat Suitability: Water Vole
W-C-1 (River Brett)	A slow flowing river with a width of 10m to 20m with a depth of more than 2m. Varied structure of bankside vegetation with local residents stating that fish were present. Scattered mature trees on bankside could provide ample hovers or holts for otter. Some places for strategic spraint opportunities. Abundance of sedges along bankside provided a staple food source for water vole and steeper banks offered burrowing opportunities. Local resident provided anecdotal evidence of otter and water vole within the last year.	Optimal	Optimal
W-D-1 / W-D-2 / W-D-3 / W-D-4	A 1m wide stream with a depth of <0.5m, located within mixed woodland. Heavily shaded with tall vegetation on either side of the waterbody providing limited potential for otter hovers or holts. Shallow bank structure offered limited burrowing opportunities. Limited connectivity to suitable waterbodies within the area.	Sub-optimal	Sub-optimal
W-D-5 / W-D-7	A ditch running south of the quarry through a mixed broadleaved woodland, tall grasses, and shrubs. Water levels were very low, banks were shallow and dense shrub surrounded sections of the waterbody. Lack of food sources and burrowing opportunities. Connected to two reservoirs north of the waterbody which could provide more suitable habitat.	Unsuitable	Unsuitable
Waterbody between W-D5 and W-D-7 (HL_66)	An old quarry which was filled with water, more than 2m deep and 40m wide. Surrounded by a disused quarry workings. Dense reeds and sedges present which could provide adequate food sources for water vole. A steep bank structure in some areas provides good burrowing opportunities.	Unsuitable	Sub-optimal
W-D-8 / W-E-1/ W-E-2	Heavily shaded ditch running through a mixed broadleaved woodland. Static water within the almost dry ditch which is 1m in width. Shallow bank profile with a lack of in channel vegetation. Lack of burrowing or foraging opportunities. Limited connectivity to suitable waterbodies within the area.	Unsuitable	Unsuitable
W-E-6 / W-E-7	A dry 1m wide drainage ditch running adjacent to an arable field and partly within a broadleaved woodland. Overly exposed ditch with limited bankside vegetation and shallow banks. Limited connectivity to suitable waterbodies within the area.	Unsuitable	Unsuitable
W-E-3 / -E-5	A dry 1m wide drainage ditch bordered by grazing fields and partly running through a broadleaved woodland. Overgrown with scrub, with mature willow trees scattered along the banks. Connected to the River Box to the south but unlikely that otter and water vole would occur along this watercourse.	Unsuitable	Unsuitable

Waterbody Number	Habitat Description	Habitat Suitability: Otter	Habitat Suitability: Water Vole
W-E-8 / W-E-9	A 2m wide ditch running north and well connected to the River Box to the south and pond to the south-west. Bordered by grazing fields and mixed broadleaf woodland to the north. Banksides are shallow and have exposed banks thereby not providing vegetative cover for water voles or suitable habitat for otter. Could be used occasionally by foraging water vole due to connectivity to River Box.	Unsuitable	Sub-optimal
W-E-11	A 1m wide drainage ditch bordered by grazing fields. Banksides are shallow and dominated by tall grasses thereby providing limited burrowing opportunities and cover. Evidence of poaching by cattle recorded. Well connected to the River Box to the north and a large pond to the north-west which could provide suitable habitat for water vole. Watercourse could be used occasionally by foraging water vole.	Unsuitable	Sub-optimal
W-E-10 (River Box)	A fast-flowing river with a width of approximately 3m and a depth of between 1m and 2m. Varied bankside structure and vegetation providing ample foraging and burrowing opportunities for water vole. Well connected to large pond to the north which could provide suitable water vole habitat. Unable to see whether fish were present in the river but scattered mature trees, with root systems intertwined with the bankside, providing potential hovers or holts for otter. Some places for strategic spraint opportunities.	Optimal	Optimal
W-E-12 / W-E-13 / W-E-14	A 2m wide drainage ditch bordered by grazing fields. Banksides were shallow and dominated by tall grasses thereby providing limited burrowing opportunities and cover. Evidence of poaching by cattle. Well connected to the River Box to the east and a large pond to the north which could provide suitable habitat for water vole. Watercourse could be used occasionally by foraging water vole.	Unsuitable	Sub-optimal
Upstream of W-F-3	A dry 1m wide drainage ditch, partly running through a dense hedgerow, bordered by arable fields. Limited bankside vegetation and shallow banks. Limited connectivity to suitable waterbodies within the area.	Unsuitable	Unsuitable
W-F-3	A dry 1m wide drainage ditch, partly running through a dense hedgerow, bordered by arable fields. Overly exposed in some areas with limited bankside vegetation and shallow banks. Limited connectivity to suitable waterbodies within the area.	Unsuitable	Unsuitable

Waterbody Number	Habitat Description	Habitat Suitability: Otter	Habitat Suitability: Water Vole
W-F-6 / W-F-7	A 1m wide fast flowing stream running through a predominantly wooded area. Heavily shaded in some areas with fallen trees along the stream. Shallow banks with limited vegetation provided limited burrowing and feeding opportunities. Connected to a pond north of the stream where water vole had been consistently sighted and recorded by residents. Water vole also sighted by resident to the south. Anecdotal evidence via recent video footage shown to surveyors. Evidence of water pollution. Limited connectivity to suitable waterbodies within the area.	Unsuitable	Sub-optimal
Waterbody south-west of Assington Thicks	Two reservoirs located adjacent to arable crops. Steep banks dominated by scrub with little suitable vegetation for water vole. Signs of pollution within the waterbodies. The steep banks observed could provide ample burrowing potential for water vole but connectivity to suitable waterbodies within the area was limited.	Unsuitable	Unsuitable
W-F-8 / W-F-10 / W-F-12	A shallow drainage ditch, approximately 1m wide, with a static flow through a plantation woodland. Banksides were shallow, heavily shaded and unvegetated for most of the watercourse. Limited connectivity to suitable waterbodies within the area.	Unsuitable	Unsuitable
W-F-13	A dry 1m wide drainage ditch running adjacent to an arable field. Overly exposed ditch with limited bankside vegetation and shallow banks. Limited connectivity to suitable waterbodies within the area.	Unsuitable	Unsuitable
Waterbody east of Appletree Wood	A reservoir located adjacent to arable crops and a small woodland. Steep banks dominated by scrub with little suitable vegetation for water vole, although sedges were locally dominant in the north-west corner of the reservoir. The steep banks could provide ample burrowing potential for water vole. Limited connectivity to suitable waterbodies within the area.	Unsuitable	Sub-optimal
W-G-1 downstream	A 1m to 2m wide ditch flowing at a sluggish pace through a heavily shaded woodland. The ditch held less than 0.5m of water, with the northern section clearly drying up. Flat banksides with little vegetative cover, offered very little burrowing potential and food sources for water vole. River Stour located to the south-east but connectivity was limited.	Unsuitable	Unsuitable
W-G-3 / W-G-4	N/A	N/A	N/A

Waterbody Number	Habitat Description	Habitat Suitability: Otter	Habitat Suitability: Water Vole
W-G-5 (River Stour)	A slow flowing River with a width of 5m to 10m and depth of more than 2m. Good bankside vegetation, presence of fishing sites along the river indicating a good fish stock within the river. Scattered mature trees on bankside could provide ample hovers or holt potential for otter. Places for strategic spraint opportunities. Abundance of reeds along bankside could provide a staple food source for water vole. Anecdotal evidence from local resident of water vole presence.	Optimal	Optimal
W-G-6	N/A	N/A	N/A
W-G-16 downstream (east of road)	A small stream, with less than 0.5m of water, with a sluggish flow which extended east of W21.Trees were prevalent along the banks with limited suitable bankside vegetation. Could be used by foraging and commuting water vole due to the connectivity to suitable watercourses.	Unsuitable	Sub-optimal
W-G-16 (Henny Meadow Fleet)	A 1m to 2m wide fast flowing stream within a woodland. Between 0.5m and 1m of water with a fast flow. Part of the watercourse was culverted under a road. Lack of vegetative cover on the banksides. Connected to large waterbodies to the west and waterbody could be used by commuting water vole.	Unsuitable	Sub-optimal
W-G-17 / W-G-18	A 1m to 2m wide fast flowing stream with an earthy substrate. Heavily shaded, shallow banks with limited bankside vegetation. Limited connectivity to suitable waterbodies within the area.	Unsuitable	Unsuitable
W-G-12	A 2m to 5m wide ditch containing less than 0.5m of water with a sluggish flow. Predominantly within a woodland and therefore heavily shaded in some areas. Varied bank profile with lack of in channel vegetation. Limited connectivity to suitable waterbodies within the area.	Unsuitable	Sub-optimal
W-H-20	N/A	N/A	N/A

Annex B: Hintlesham Woods – Bird Desk Study and Field Survey Results

Bird Species	Desk Study Record	Conservation / Legal Status				Transect / Max Count			Observations Across All Surveys (%)	Breeding Status
		BoCC	Schedule 1	SPI	SBIS Priority Species	1	2	3		
Barn owl	Y	Green	■	-	■	-	-	-	-	**-**
Blackbird	N	Green	-	-	-	2	3	1	66.7%	**PB**
Blackcap	N	Green	-	-	-	4	14	9	81.0%	**CB**
Black-headed gull	Y	Amber	-	-	-	8	5	-	14.3%	**NB**
Blue tit	N	Green	-	-	-	18	22	19	81.0%	**CB**
Brambling	N	Green	■	-	-	-	1	-	4.8%	**NB**
Bullfinch	N	Amber	-	■	■	-	-	2	9.5%	**PS**
Carrion crow	N	Green	-	-	-	-	3	1	14.3%	**NB**
Chaffinch	N	Green	-	-	-	-	1	-	9.5%	**NB**
Chiffchaff	N	Green	-	-	-	8	14	15	95.2%	**CB**
Coal tit	N	Green	-	-	-	3	7	2	61.9%	**CB**
Collared dove	N	Green	-	-	-	2		-	4.8%	**NB**
Common buzzard	Y	Green	-	-	-	4	5	-	66.7%	**CB**
Common gull	Y	Amber	-	-	-	-	-	2	4.8%	**NB**

Bird Species	Desk Study Record	Conservation / Legal Status				Transect / Max Count			Observations Across All Surveys (%)	Breeding Status
		BoCC	Schedule 1	SPI	SBIS Priority Species	1	2	3		
Common whitethroat	Y	Amber	-	-	-	-	-	4	14.3%	**CB**
Dunnock	Y	Amber	-	■	■	4	3	2	52.4%	**CB**
Fieldfare	Y	Red	■	-	-	-	-	-	-	**-**
Firecrest	Y	Green	■	-	-	1	-	-	4.8%	**NB**
Garden warbler	N	Green	-	-	-	-	-	2	9.5%	**PB**
Goldcrest	N	Green	-	-	-	2	1	2	61.9%	**PB**
Golden oriole	Y	Red	■	-	-	-	-	-	-	**-**
Goldfinch	Y	Green	-	-	-	3	-	3	9.5%	**NB**
Great spotted woodpecker	N	Green	-	-	-	3	2	1	61.9%	**CB**
Great tit	N	Green	-	-	-	6	10	19	71.4%	**CB**
Green woodpecker	N	Green	-	-	-	-	4	1	19.0%	**PB**
Greenfinch	Y	Red	-	-	-	1	-	-	4.8%	**PS**
Grey heron	N	Green	-	-	-	-	-	1	9.5%	**NB**
Herring gull	Y	Red	-	■	■	-	-	-	-	**-**
Hobby	Y	Green	■	-	-	-	1	-	4.8%	**NB**
House martin	N	Red	-	-	-	-	-	-	4.8%	**NB**
House sparrow	Y	Red	-	■	■	-	-	-	-	**-**

Bird Species	Desk Study Record	Conservation / Legal Status				Transect / Max Count			Observations Across All Surveys (%)	Breeding Status
		BoCC	Schedule 1	SPI	SBIS Priority Species	1	2	3		
Jay	N	Green	-	-	-	3	-	5	52.4%	**CB**
Kestrel	Y	Amber	-	-	-	1	1	1	23.8%	**NB**
Lesser black-backed gull	Y	Amber	-	-	-	1	10	2	19.0%	**NB**
Lesser spotted woodpecker	Y	Red	-	■	■	-	-	-	-	**-**
Lesser whitethroat	N	Green	-	-	-	-	-	2	9.5%	**PS**
Linnet	Y	Red	-	■	■	-	-	10	9.5%	**PS**
Little egret	N	Green	-	-	-	-	-	2	4.8%	**NB**
Long-tailed tit	N	Green	-	-	-	10	8	17	66.7%	**CB**
Magpie	N	Green	-	-	-	-	-	1	4.8%	**NB**
Mallard	N	Amber	-	-	-	-	3	-	4.8%	**NB**
Marsh tit	Y	Red	-	■	■	7	9	5	81.0%	**CB**
Mistle thrush	Y	Red	-	-	-	1	1	2	19.0%	**PS**
Moorhen	Y	Amber	-	-	-	-	-	-	-	**-**
Nightingale	N	Red	-	-	-	2	-	3	28.6%	**PB**
Nuthatch	N	Green	-	-	-	6	4	3	61.9%	**CB**
Peregrine	N	Green	■	-	-	-	-	1	4.8%	**NB**
Pheasant	N	Green	-	-	-	2	1	3	28.6%	**PS**

Bird Species	Desk Study Record	Conservation / Legal Status				Transect / Max Count			Observations Across All Surveys (%)	Breeding Status
		BoCC	Schedule 1	SPI	SBIS Priority Species	1	2	3		
Pied wagtail	N	Green	-	-	-	-	-	1	4.8%	**NB**
Red kite	N	Green	■	-	-	1	-	-	4.8%	**NB**
Redwing	Y	Amber	■	-	-	-	17	20	9.5%	**NB**
Robin	N	Green	-	-	-	8	5	3	81.0%	**CB**
Rook	Y	Amber	-	-	-	-	28		14.3%	**NB**
Skylark	Y	Red	-	■	■	-	-	4	28.6%	**NB**
Song thrush	Y	Amber	-	■	■	7	3	3	66.7%	**PB**
Sparrowhawk	Y	Amber	-	-	-	1	-	-	4.8%	**NB**
Spotted flycatcher	N	Red	-	■	■	-	-	2	4.8%	**PS**
Stock dove	N	Amber	-	-	-	2	1	2	42.9%	**PB**
Swallow	N	Green	-	-	-	-	8	5	23.8%	**NB**
Swift	N	Red	-	-	■	-	-	2	4.8%	**NB**
Tawny owl	Y	Amber	-	-	-	1	-	2	9.5%	**PB**
Treecreeper	N	Green	-	-	-	6	8	3	85.7%	**CB**
Willow warbler	N	Amber	-	-	-	-	1	1	9.5%	**PB**
Woodcock	Y	Red	-	-	-	-	-	-	-	**-**
Woodpigeon	N	Amber	-	-	-	18	56	15	47.6%	**PB**

Bird Species	Desk Study Record	Conservation / Legal Status				Transect / Max Count			Observations Across All Surveys (%)	Breeding Status
		BoCC	Schedule 1	SPI	SBIS Priority Species	1	2	3		
Wren	Y	Amber	-	-	-	13	12	8	85.7%	**CB**
Yellowhammer	Y	Red	-	■	■	-	-	3	4.8%	**NB**

Annex C: Notable Bird Species Desk Study

Bird Species	Conservation / Legal Status				Desk Study Records					Field Survey 2009 – 2012				
	BoCC	Schedule 1	SPI	SBIS Priority Species	LRC	Bird Atlas	EWBS	BBS	Bird Track	Winter 2009/10	Winter 2010/11	Breeding 2012	Raptor 2010	Breeding Status
Barnacle Goose	Amber	-	-	-	2	0	0	0	0	-	-	-	-	-
Barn owl	Green	■	-	■	12	13	0	2	0	-	■	■	-	PB
Bearded tit	Green	■	-	-	1	0	0	0	1	-	-	-	-	-
Bittern	Amber	■	■	■	1	0	0	0	0	-	-	-	-	-
Black redstart	Amber	■	-	-	0	1	0	0	0	-	-	-	-	-
Black-headed gull	Amber	-	-	-	56	19	0	1	0	-	-	-	-	-
Brambling	Green	■	-	-	4	7	0	0	0	-	-	-	-	-
Bullfinch	Amber	-	■	■	43	35	1	14	0	-	-	■	-	PB
Cetti's warbler	Green	■	-	-	2	0	0	0	0	-	-	-	-	-
Common gull	Amber	-	-	-	34	0	1	0	0	-	-	■	-	NB
Common redpoll	Red	-	-	-	1	0	0	0	1	-	-	-	-	-
Common ringed plover	Red	-	-	-	1	0	0	0	1	-	-	-	-	-
Common tern	Amber	-	-	-	1	0	0	0	0	-	-	-	-	-
Common whitethroat	Amber	-	-	-	0	0	0	0	0	-	-	■	-	CB
Crane	Amber	-	-	-	2	0	0	0	0	-	-	-	-	-
Cuckoo	Red	-	■	■	52	0	5	105	0	-	-	■	-	PB
Curlew	Red	-	■	■	4	0	0	0	0	-	-	■	-	PS

Bird Species	Conservation / Legal Status				Desk Study Records					Field Survey 2009 – 2012				
	BoCC	Schedule 1	SPI	SBIS Priority Species	LRC	Bird Atlas	EWBS	BBS	Bird Track	Winter 2009/10	Winter 2010/11	Breeding 2012	Raptor 2010	Breeding Status
Dunnock	Amber	-	■ subsp. *pileata*	■	111	45	1	30	0	-	-	■	-	CB
Fieldfare	Red	■	-	-	22	0	1	0	0	-	-	-	-	-
Firecrest	Green	■	-	-	2	0	0	0	4					
Gadwall	Amber	-	-	-	8	5	0	0	0	-	-	-	-	-
Goldeneye	Red	-	-	-	2	0	0	0	1	-	-	-	-	-
Grasshopper warbler	Red	-	-	■	0	2	0	0	0	-	-	■	-	PS
Great black-backed gull	Amber	-	-	-	0	1	0	0	0	-	-	-	-	-
Green sandpiper	Amber	■	-	-	0	2	0	0	0	-	-	-	-	-
Greenshank	Amber	■	-	-	1	0	0	0	0	-	-	-	-	-
Greenfinch	Red	-	-	-	42	0	1	26	0	-	-	-	-	-
Grey partridge	Red	-	■	■	12	6	0	0	4	-	-	■	-	PB
Grey wagtail	Amber	-	-	-	23	10	0	0	0	-	-	-	-	-
Greylag goose	Amber	-	-	-	27	6	0	0	39	-	-	-	-	-
Hawfinch	Red	-	■	-	1	4	0	1	0	-	-	-	-	-
Hen harrier	Red	-	■	-	1	0	0	0	1	-	-	-	-	-
Herring gull	Red	-	■	■	5	0	0	2	0	-	-	-	-	-
Hobby	Green	■	-	-	16	14	0	11	0	-	-	■	■	PS

Bird Species	Conservation / Legal Status				Desk Study Records					Field Survey 2009 – 2012				
	BoCC	Schedule 1	SPI	SBIS Priority Species	LRC	Bird Atlas	EWBS	BBS	Bird Track	Winter 2009/10	Winter 2010/11	Breeding 2012	Raptor 2010	Breeding Status
Honey buzzard	Amber	■	-	-	1	0	0	0	0	-	-	-	-	-
House martin	Red	-	-	-	26	38	0	28	0	-	-	■	-	PB
House sparrow	Red	-	■	■	106	37	1	13	0	-	-	■	-	CB
Kestrel	Amber	-	-	-	60	8	0	0	0	■	■	■	■	CB
Kingfisher	Green	■	-	-	18	4	0	1	0	-	-	-	-	-
Lapwing	Red	-	■	■	38	13	0	0	0	■	■	■	-	PS
Lesser black-backed gull	Amber	-	-	-	18	2	0	9	0	-	-	■	-	NB
Lesser redpoll	Red	-	■	■	11	4	0	1	0	-	-	-	-	-
Lesser-spotted woodpecker	Red	-	■	■	4	0	0	0	0	-	-	-	-	-
Linnet	Red	-	■	■	52	26	0	19	0	■	-	■	-	CB
Little ringed plover	Green	■	-	-	1	1	0	0	0	-	-	-	-	-
Mallard	Amber	-	-	-	46	36	0	18	243	■	■	■	-	PB
Marsh harrier	Amber	■	-	-	1	0	0	0	0	-	-	-	-	-
Marsh tit	Red	-	■	■	38	22	0	1	0	-	-	■	-	CB
Meadow pipit	Amber	-	-	-	17	13	1	0	0	-	-	■	-	PS
Mediterranean gull	Amber	■	-	-	1	0	0	0	0	-	-	-	-	-
Merlin	Red	■	-	-	3	0	0	0	0	-	-	-	-	-

Bird Species	Conservation / Legal Status				Desk Study Records					Field Survey 2009 – 2012				
	BoCC	Schedule 1	SPI	SBIS Priority Species	LRC	Bird Atlas	EWBS	BBS	Bird Track	Winter 2009/10	Winter 2010/11	Breeding 2012	Raptor 2010	Breeding Status
Mistle thrush	Red	-	-	-	19	32	0	18	0	-	-	■	-	PB
Moorhen	Amber	-	-	-	40	38	2	14	0	-	-	-	-	-
Nightingale	Red	-	-	-	27	10	0	4	0	-	-	■	-	PB
Osprey	Amber	■	-	-	0	1	0	0	0	-	-	-	-	-
Oystercatcher	Amber	-	-	-	3	2	0	0	0	-	-	-	-	-
Peregrine falcon	Green	■	-	-	5	0	0	0	0	-	-	-	-	-
Pied flycatcher	Amber	-	-	-	1	0	0	0	0	-	-	-	-	-
Red crossbill	Green	■	-	-	2	0	0	0	0	-	-	-	-	-
Red kite	Green	■	-	-	12	0	0	0	17	-	-	-	-	-
Redstart	Amber	-	-	-	0	0	0	0	0	-	-	■	-	PS
Redwing	Amber	■	-	-	21	16	0	0	0	-	-	-	-	-
Reed bunting	Amber	-	■	■	18	7	0	0	0	-	-	■	-	PB
Rook	Amber	-	-	-	44	41	0	31	92	-	-	-	-	-
Scaup	Red	■	■	-	0	1	0	0	0	-	-	-	-	-
Sedge warbler	Amber	-	-	-	4	41	1	31	0	-	-	-	-	-
Shelduck	Amber	-	-	-	7	2	0	0	0	-	-	-	-	-
Short-eared owl	Amber	-	-	-	1	0	0	0	1	-	-	-	-	-
Skylark	Red	-	■	■	63	4	0	0	0	-	-	■	-	PB

Bird Species	Conservation / Legal Status				Desk Study Records					Field Survey 2009 – 2012				
	BoCC	Schedule 1	SPI	SBIS Priority Species	LRC	Bird Atlas	EWBS	BBS	Bird Track	Winter 2009/10	Winter 2010/11	Breeding 2012	Raptor 2010	Breeding Status
Snipe	Amber	-	-	-	11	0	0	0	0	-	-	-	-	-
Song thrush	Amber	-	■	■	36	0	26	0	0	■	-	■	-	PB
Sparrowhawk	Amber	-	-	-	35	0	7	0	0	-	-	-	-	-
Spotted flycatcher	Red	-	■	■	29	0	4	0	0	-	-	■	-	CB
Starling	Red	-	■	■	95	1	12	0	1	-	-	■	-	CB
Stock dove	Amber	-	-	-	65	0	29	163	0	-	-	■	-	PS
Swift	Red	-	-	■	56	8	0	6	47	-	-	■	-	PS
Tawny owl	Amber	-	-	-	35	18	0	0	0	-	-	-	-	-
Teal	Amber	-	-	-	4	5	0	0	2	-	-	-	-	-
Tree sparrow	Red	-	■	■	1	0	0	0	0	-	-	-	-	-
Turtle dove	Red	-	■	■	16	15	0	6	0	-	-	■	-	PS
Wheatear	Amber	-	-	-	2	0	0	0	1	-	-	-	-	-
Whitethroat	Amber	-	-	-	34	22	0	31	27	-	-	-	-	-
Wigeon	Amber	-	-	-	3	2	0	0	2	-	-	-	-	-
Willow tit	Red	-	■ subsp. *kleinsc himdti*	■	0	0	0	0	0	-	-	■	-	PB
Willow warbler	Amber	-	-	-	23	17	0	8	0	-	-	■	-	PB

Bird Species	Conservation / Legal Status				Desk Study Records					Field Survey 2009 – 2012				
	BoCC	Schedule 1	SPI	SBIS Priority Species	LRC	Bird Atlas	EWBS	BBS	Bird Track	Winter 2009/10	Winter 2010/11	Breeding 2012	Raptor 2010	Breeding Status
Woodcock	Red	-	-	-	14	0	0	0	0	-	-	-	-	-
Wood pigeon	Amber	-	-	-	73	46	3	32	980	-	-	-	-	-
Wren	Amber	-	-	-	50	46	1	32	0	-	-	-	-	-
Yellowhammer	Red	-	■	■	67	42	1	30	0	■	■	■	-	PB
Yellow wagtail	Red	-	■	■		2	0	0	0	-	-	■	-	PS

Annex D: Notable Bird Habitat Assessment

Habitat (UKHab codes see Fig 7.1.2)	Recorded Notable Species Potentially Supported by Habitat	Project Sections
Cropland (c1a-c1e)	Common gull, house sparrow, tree sparrow, grey partridge, yellow wagtail, turtle dove, linnet, skylark, yellowhammer, reed bunting, barn owl, starling, lapwing, kestrel, stock dove, wood pigeon, kestrel, barn owl.	AB, C, D, E, F, G, H
Wetland (f2, f2b & f2f)	Black-headed gull, common gull, lesser black-backed gull, Mediterranean gull, common starling, skylark, grey wagtail, Eurasian curlew, Eurasian wigeon, yellow wagtail, lapwing, turtle dove, nightingale, sparrowhawk, barn owl, reed bunting, snipe, moorhen, sedge warbler, willow warbler, grasshopper warbler, mallard, gadwall, teal, hobby, common crane, greylag goose, merlin, peregrine falcon, shelduck, swift, northern pintail, turtle dove.	AB, C, D, E, F, G
Grassland (g, g1a, g1a6, g1c, g3c, g3c5, g3c6, g3c8, g4)	Eurasian curlew, grey partridge, yellow wagtail, lapwing, skylark, yellowhammer, barn owl, hobby, kestrel.	AB, C, D, E, F, G, H
Heathland and Shrub (h, h3, h3a, h3b, h3d, h3e & h3h)	Dunnock, grasshopper warbler, cuckoo, lesser redpoll, linnet, skylark, yellowhammer, meadow pipit, nightingale, kestrel, merlin, wren.	AB, C, D, E, F, G
Hedgerows (h2a & h2b)	Bullfinch, song thrush, dunnock, house sparrow, marsh tit, willow tit, redwing, tree sparrow, grey partridge, turtle dove, linnet, yellowhammer, nightingale, fieldfare, mistle thrush, wren.	AB, C, D, E, F, G, H
Rivers and Lakes (r1, r1a, r1a6, r1b, r2 & r2a)	Moorhen, grasshopper warbler, cuckoo, reed bunting, sedge warbler, mallard, lapwing, curlew, snipe, herring gull, common tern, grey wagtail, kingfisher, lesser black-backed gull, oystercatcher, shelduck, goldeneye	AB, C, D G
Woodland and Forest (w1, w1d, w1d5, w1f, w1f7, w1g, w1g6, w1g7, w1h, w1h5 & w2c)	Brambling, hobby, dunnock, tree sparrow, woodcock, common starling, cuckoo, song thrush, grasshopper warbler, hawfinch, bullfinch, lesser redpoll, lesser-spotted woodpecker, marsh tit, willow tit, spotted flycatcher, pied flycatcher, yellowhammer, turtle dove, nightingale, barn owl, fieldfare, mistle thrush, tawny owl.	AB, C, D, E, F, G, H
Urban (u1, u1b, u1b5, u1c, u1d & u1e)	Brambling, common starling, common gull, grey wagtail, house martin, house sparrow, kestrel, mistle thrush, peregrine falcon, swift.	AB, C, D, E, F, G, H

Annex E: Full Reptile Habitat Suitability Data

Reptile Habitat Area ID	Habitat Description	Available Habitat	Habitat Structure	Habitat Connectivity	Topography	Warmth	Breeding Habitat	Hibernation Habitat	Overall habitat Suitability Score	Other notes
RH1	A mix of mown grass track, gravel bridleway and an area of planted shrubs surrounding a built-up area 'Bullen Lane substation'. Connected to some more suitable habitat to the south, gravel track could aid basking	Low	Low	Mod	Low	Mod	Low	Low	Low	N/A
RH2	Areas of cropland surrounded by hedges with trees	Low	Low	Mod	Low	Mod	Low	Low	Low	N/A
RH3	A mix of cropland and unmanaged field margin and an area of broadleaved woodland to the south.	Mod	Mod	Mod	Low	Mod	Mod	Mod	Mod	N/A
RH4	Species poor, rough grassland connected to farmland with suitable hibernacula.	High	Mod	High	Mod	Mod	High	High	High	N/A
RH5	Cropland with some areas of amenity grassland and small patches of other neutral grassland.	Low	Low	Low	Low	Low	Low	Low	Low	N/A

Reptile Habitat Area ID	Habitat Description	Available Habitat	Habitat Structure	Habitat Connectivity	Topography	Warmth	Breeding Habitat	Hibernation Habitat	Overall habitat Suitability Score	Other notes
RH6	A river surrounded by a lowland deciduous woodland strip and a wide field boundary of ruderal species. In the wider habitat an area of ruderal grassland and further dense woodland.	High	High	Mod	Low	Low	Mod	Mod	Mod	N/A
RH7	An area through the centre of arable fields and cropland	Low	Low	Low	Low	Low	Low	Low	Low	Some connection to woodland and golf course but still less than ¼
RH8	A mixed area of lowland deciduous woodland and a ditch, connected to arable field margins with connections through an arable field to a pond.	Mod	High	Mod	Low	Low	Mod	Mod	Mod	N/A
RH9	An area through a number of arable and cropland fields. Boundary of field is 2m of uncut grassland which may be suitable for reptiles. Some connection to woodland with reptile potential.	Low	Low	Mod	Low	Low	Low	Low	Low	Areas connected to Hintlesham wood SSSI may have higher potential to support reptiles, however less than half of this area is connected to the SSSI. Borehole GI results show boundary is suitable for reptiles but majority of field is not.

Reptile Habitat Area ID	Habitat Description	Available Habitat	Habitat Structure	Habitat Connectivity	Topography	Warmth	Breeding Habitat	Hibernation Habitat	Overall habitat Suitability Score	Other notes
RH10	Area including a section of Hintlesham Wood SSSI and connecting arable field margins and areas of scrub. Investigation of proposed borehole location within the field boundary found suitable habitat for reptiles including tussocky, marshy grassland. A grass snake record from the data search conducted in 2021, was also present in Hintlesham Wood.	High	High	High	Low	Low	High	High	High	N/A
RH11	Cropland and arable farmland used by grazing cows, with field margins used for vehicle access connected to further cropland in the wider area.	Low	Low	Low	Low	Low	Low	Low	Low	If field margins are allowed to grow and left undisturbed could have higher value for reptiles.
RH11B	Large narrow stretch through a number of cropland and arable fields. This area does cross a number of field boundaries that may provide a higher level of habitat suitability, but the majority is low potential to support reptiles, with lack of connection to other suitable habitat.	Low	Low	Low	Low	Low	Low	Low	Low	Two borehole ground investigation sites identify that the fields are not suitable for reptiles.

Reptile Habitat Area ID	Habitat Description	Available Habitat	Habitat Structure	Habitat Connectivity	Topography	Warmth	Breeding Habitat	Hibernation Habitat	Overall habitat Suitability Score	Other notes
RH11C	Rough grassland which may be occasionally grazed by animals. Dense hedgerows line the field boundaries, which connects to wider landscape	Mod	Mod	Mod	Mod	Low	Low	Low	Mod	N/A
RH12	A combination of rough field margins and a wider patch of neutral grassland. Close to ponds in the wider habitat and hibernacula (an earth mound, rubble, stored wood chips and logs) noted during UKHab survey.	Mod	High	Mod	Low	Low	Mod	High	Mod	N/A
RH13	An area of cropland and a horse grazed field with a short sward.	Low	Low	Low	Low	Low	Low	Low	Low	N/A
RH14	A mixed area of woodland and open grassland suitable for basking and shelter. Connected to further suitable habitat in the wider area.	Mod	Mod	Mod	Low	Low	High	Mod	Mod	N/A
RH15	Narrow stretch through a large arable field, does not encompass field boundaries.	Low	Low	Low	Low	Low	Low	Low	Low	N/A

Reptile Habitat Area ID	Habitat Description	Available Habitat	Habitat Structure	Habitat Connectivity	Topography	Warmth	Breeding Habitat	Hibernation Habitat	Overall habitat Suitability Score	Other notes
RH16	A good mosaic of suitable habitat including areas of woodland, including wet woodland edge habitat, areas of heathland and scrub including rush sp., areas of open grassland and an area of exposed gravel which could be used for basking.	Mod	High	High	Mod	Low	High	High	High	Connected to wider woodland habitat surrounding some ponds. The landowner provided anecdotal evidence of grass snake in the area.
RH17	A mosaic of habitats including a strip of oak dominated woodland present alongside an old railway line, open grassland with mixed sward height, broadleaved woodland and a pond. A small area of marshy habitat is also present. The 2021 desk study identified a slow worm record to the south of this area and it is connected to Raydon Great Wood which has multiple reptile records present.	High	High	Mod	Low	Low	High	High – areas of woodland and areas of scrub within field	High	Borehole ground investigations identified suitable habitat including areas of scrub in the field to the east.
RH18	An area through the centre of arable land encompassing a road and a secured dog-walking area to the west.	Low	Low	Low	Low	Low	Low	Low	Low	N/A
RH19	An area of grassland with occasional Juncus species, with an east facing slope down towards the river. Identified as floodplain grazing marsh. Connected to further marsh habitat in the wider area.	Mod	Mod	Mod	Mod	Mod	Mod	Low	Mod	N/A

Reptile Habitat Area ID	Habitat Description	Available Habitat	Habitat Structure	Habitat Connectivity	Topography	Warmth	Breeding Habitat	Hibernation Habitat	Overall habitat Suitability Score	Other notes
RH20	An area of cropland with minimal rough boundary and well-kept hedgerows surrounding.	Low	Low	Low	Low	Low	Low	Low	Low	N/A
RH21	A mosaic of habitats including an area of grassland and connected woodland, field boundary along modified grassland and a gravel track through an area of sparse woodland that could be beneficial as basking habitat	Mod	Mod	Mod	Low	Low	Mod	Low	Mod	N/A
RH22	An area encompassing some of Layham Pit Woodland and Meadow CWS, a designated site with reptile in the citation. A large mosaic of well-connected habitats such as broadleaved woodland, grassland, scrub and areas of open quarry providing hibernating and basking habitat. Two common lizards were seen basking in a field to the east of the quarry and another was found to the south in connected woodland during the 2021 species surveys.	High	High	High	Mod -Sunny slope mentioned borehole ground investigation habitat survey	Mod	High	High	High	Grass snake records were identified in the 2021 data request and the 2013 reptile survey found, common lizard, grass snake and slow worm here.
RH23	An area through the centre of arable fields and cereal crops, not connected to more suitable habitat in the wider area.	Low	Low	Low	Low	Low	Low	Low	Low	Field boundaries may provide more suitable habitat.

Reptile Habitat Area ID	Habitat Description	Available Habitat	Habitat Structure	Habitat Connectivity	Topography	Warmth	Breeding Habitat	Hibernation Habitat	Overall habitat Suitability Score	Other notes
RH24	A 2.5m buffer strip surrounding cropland, with a tall sward height provides suitable breeding habitat and this is connected to woodland in the wider habitat.	Mod	Mod	Mod	Low	Low	Mod	Mod	Mod	A grass snake record was identified in the 2021 desk study in connected woodland to the south.
RH25	An area of majority grassland and cropland, however the boundaries of each field are specifically mentioned for lack of disturbance and having high sward height and ruderal species present. A common lizard was seen to the north of the area within a field boundary during other species surveys in 2021. The area also encompasses an area of woodland and gorse scrub.	High	High	High	Low	Low	High	High	High	Grass snake records identified in 2021 desk study in connected woodland habitat to the south.
RH26	Small areas of cropland, with limited connections to wider more suitable habitat.	Low	Low	Low	Low	Low	Low	Low	Low	N/A
RH27	Large area of cropland but with more than half its borders connected to more suitable habitat in the wider area. Also encompassing an area of floodplain grassland and areas of woodland on the banks of the River Box.	Mod	Mod	Mod	Low	Low	Mod	Low	Mod	N/A

Reptile Habitat Area ID	Habitat Description	Available Habitat	Habitat Structure	Habitat Connectivity	Topography	Warmth	Breeding Habitat	Hibernation Habitat	Overall habitat Suitability Score	Other notes
RH28	A large area of intensively used farmland including arable farmland, cereal crops, winter 'stubble' land, horse grazed land, intensive apple orchards and grassland used for hay cut. Limited connections to suitable habitat in the wider area.	Low	Low	Low	Mod	Low	Low	Low	Low	N/A
RH29	Woodland and forest encompassing a brook, leading to wetland to the west of this area. A common lizard was found here in the 2013 reptile surveys and grass snake records were identified in connected habitat to the north.	High	High	High	Mod	Mod – east facing slope	High	High	High	A common lizard was found here in the 2013 reptile surveys and grass snake records were identified in connected habitat to the north.
RH30	Short sward grassland and cereal cropland with limited connectivity to more suitable habitat.	Low	Low	Low	Low	Low	Low	Low	Low	N/A
RH31	An area of alder woodland on floodplains and connected to a wide 15m strip of tussocky border of an arable field.	Mod	High	High	Mod	Mod	Mod	Mod	Mod	In Tiger Wood, to the south a high number of reptile records were identified in the 2021 data request.
RH32	An area of cereal crops and arable farmland with no mention of suitable field boundaries.	Low	Low	Low	Low	Low	Low	Low	Low	

Reptile Habitat Area ID	Habitat Description	Available Habitat	Habitat Structure	Habitat Connectivity	Topography	Warmth	Breeding Habitat	Hibernation Habitat	Overall habitat Suitability Score	Other notes
RH33	A large area of maize growth for game bird cover, game birds are reptile predators. Proposed borehole location survey suggests field is not suitable for reptiles however field boundaries may provide more suitable habitat.	Low	Low	Mod	Mod	Mod	Low	Low	Low	Borehole ground investigation habitat survey mentions improved grassland with a uniform sward, field margins are more variable so may provide more suitable reptile habitat.
RH34	Woodland with nettle understory present between two areas of grassland to the east of the River Stour. Also includes the field boundary to the west of the River stour.	Mod	Mod	Mod	Mod	Mod	Low	Mod	Mod	N/A
RH35	An area of cropland not including the field boundary classed as moderate in RH34.	Low	Low	Low	Low	Low	Low	Low	Low	N/A
RH36	Strips of woodland and grassland boundaries alongside the railway track, which are considered good habitat for basking reptiles and woodland provides good hibernating habitat.	High	High	Mod	Mod	Mod	High	High	High	N/A
RH37	An area of cereal cropland separated from good habitat to the west by a small road.	Low	Low	Low	Low	Low	Low	Low	Low	N/A

Reptile Habitat Area ID	Habitat Description	Available Habitat	Habitat Structure	Habitat Connectivity	Topography	Warmth	Breeding Habitat	Hibernation Habitat	Overall habitat Suitability Score	Other notes
RH38	Areas of arable field that have been left alone. Common lizard have been seen by landowner in this area.	High	High	High	Mod	Mod	High	Low	High	N/A
RH39	An area of grassland with scattered scrub, connected to wet woodland, with open grassland and scattered bracken. South facing hill.	High	High	High	High	High	High	High	High	An incidental record of a slow worm is present in connected habitat at Little Ansell farm to the south. Incidental sightings of grass snake and common lizard were also recorded in connected woodland to the south of this area.
RH40	A mosaic of grassland, with some high sward and some grazed grassland, also encompassing areas of mixed scrub and wet woodland to the west. All habitats included as good connection between them all.	Mod	Mod	High	High	High	Mod	Mod	Mod	N/A
RH41	A mixture of grazed and cut grassland field and a strip of dense woodland with bare earth on the ground, with limited cover for reptiles.	Low	Low	Low	Low	Low	Mod	Low	Low	N/A

Reptile Habitat Area ID	Habitat Description	Available Habitat	Habitat Structure	Habitat Connectivity	Topography	Warmth	Breeding Habitat	Hibernation Habitat	Overall habitat Suitability Score	Other notes
RH42	Overgrown field boundary, now made up of areas of woodland and blackthorn scrub, connected to more open woodland in the wider habitat.	Mod	High	Mod	Low	Low	Mod	Mod	Mod	N/A
RH43	An area of tall herb community, adjacent to an area of gravel substrate with some herb growth and areas of broadleaved woodland and wetter grassland.	High	High	High	High -south facing slope	High	How	Mod	High	N/A
RH44	Car park and plantation woodland with bare ground flora.	Low	Low	Mod	Low	Low	Low	Low	Low	N/A
RH45	Arable land and dry ditch, very open field.	Low	Low	Low	Low	Low	Low	Low	Low	N/A
RH46	Access track through arable land and around garden. One small section of scrub present.	Low	Low	Low	Low	Low	Low	Low	Low	N/A
RH47	Horse pasture with cocks foot present connected to woodland field edges and ponds, along with a gravel access track.	Low	Mod	Mod	Low	Low	Mod	Low	Mod	N/A

Reptile Habitat Area ID	Habitat Description	Available Habitat	Habitat Structure	Habitat Connectivity	Topography	Warmth	Breeding Habitat	Hibernation Habitat	Overall habitat Suitability Score	Other notes
RH48	An area through scrub and dense woodland adjacent to a pond and cropland field. Connected to woodland habitat and wide wooded field boundaries and other ponds in the wider area.	Mod	Mod	Mod	Low	Low	Mod	Mod	Mod	N/A
RH49	A large area of arable farmland and some wooded field boundaries, with limited connection to more suitable habitat in the wider landscape.	Low	Low	Low	Low	Low	Low	Low	Low	N/A
RH50	A wide section of grassland field boundary with long grasses and connection to further wooded areas in the wider landscape.	Mod	Low	Mod	Low	Low	Mod	Mod	Mod	N/A
RH51	Arable land with short sward field boundaries.	Low	Low	Low	Low	Low	Low	Low	Low	N/A
RH52	A mosaic of habitats including long sward grassland, oak woodland with a bramble understorey and areas of open grassland.	Mod	Mod	Mod	Low	Low	Mod	Mod	Mod	N/A
RH53	Intensive apple orchards and cropland present with limited connection to the wider area.	Low	Low	Low	Low	Low	Low	Low	Low	N/A

Reptile Habitat Area ID	Habitat Description	Available Habitat	Habitat Structure	Habitat Connectivity	Topography	Warmth	Breeding Habitat	Hibernation Habitat	Overall habitat Suitability Score	Other notes
RH54	Areas of cropland to be used for proposed temporary access route through arable farms and cropland. No connection to the wider habitat.	Low	Low	Low	Low	Low	Low	Low	Low	N/A
RH55	An area of rough grassland field boundary, with some scrub adjacent to a small patch of woodland.	Mod	Mod	Mod	Low	Low	Mod	Mod	Mod	N/A
RH56	An area of scrub and stretch of open grassland with some ruderal species leading to an area of wet mixed woodland.	Mod	Mod	Mod	Low	Low	Mod	Mod	Mod	N/A
RH57	An area of cattle pasture and modified grassland along with an area of bare ground.	Low	Low	Low	Low	Low	Low	Low	Low	N/A
RH58	An area of grassland with ant hills present connected to woodland to the south and a thinner section of open mosaic habitat to the north and open areas of bare ground.	Mod	Mod	Mod	Low	Low	Mod	Mod	Mod	N/A

Reptile Habitat Area ID	Habitat Description	Available Habitat	Habitat Structure	Habitat Connectivity	Topography	Warmth	Breeding Habitat	Hibernation Habitat	Overall habitat Suitability Score	Other notes
RH59	An area of scrub beneath cut woodland and mixed woodland adjacent to wide strips of arable field margins.	High	High	High	Low	Low	High	High – areas of cut woodland providing plenty of ground cover	High	An incidental record of a slow worm was recorded in this area on 22.04.2022
RH59B	A wide arable margin connected to areas of woodland which border a grassland field with sedge species present.	High	High	High	Low	Low	High	High – areas of cut woodland providing plenty of ground cover	High	An incidental record of a grass snake was found within sedge habitat to the east of this area.
RH60	Areas of cropland and winter stubble with limited connection to more suitable habitat in the wider landscape.	Low	Low	Low	Low	Low	Low	Low	Low	N/A

Reptile Habitat Area ID	Habitat Description	Available Habitat	Habitat Structure	Habitat Connectivity	Topography	Warmth	Breeding Habitat	Hibernation Habitat	Overall habitat Suitability Score	Other notes
RH61	A narrow section through cropland and arable farmland passing over some field boundaries and roads to reach the main site. Limited suitable habitat and connection to habitat in the wider landscape.	Low	Low	Low	Low	Low	Low	Low	Low	N/A
RH62	A 10m wide field margin of a ploughed field with some connection to areas of woodland and a pond.	Mod	Mod	Mod	Low	Low	Mod	Low	Mod	N/A
RH63	Modified grassland heavily grazed by horses with little to no field boundary.	Low	Low	Low	Low	Low	Low	Low	Low	N/A
RH64	Area of arable land.	Low	Low	Mod	Low	Low	Low	Low	Low	N/A
RH65	Marginal grassland approximately 6m wide adjacent to ancient woodland and dry ditch.	Mod	Mod	Mod	Low	Low	Mod	Mod	Mod	N/A
RH66	Arable land adjacent to areas of woodland	Low	Low	Low	Low	Low	Low			N/A
RH67	Road verge with some tussocky areas of grassland with docks, spear thistle and cow parsley present.	Mod	Low	Mod	Low	Low	Mod	Low	Mod	N/A

Annex F: Notable Terrestrial Invertebrate Records Within 1km of the Order Limits

Common Name	Scientific Name	Group	Schedules
Four-dimpled springtail-stalker	*Notiophilus quadripunctatus*	Beetle (Coleoptera)	Nationally Scarce, Nationally Notable B
-	*Orsodacne cerasi*	Beetle (Coleoptera)	Nationally Scarce
Stag beetle	*Lucanus cervus*	Beetle (Coleoptera)	WCA Schedule 5, SPI, Essex Priority Species
-	*Nebrioporus depressus*	Beetle (Coleoptera)	Nationally Notable B
Oak pinhole borer	*Platypus cylindrus*	Beetle (Coleoptera)	Nationally Notable B
Cramp-Ball Fungus Weevil	*Platyrhinus resinosus*	Beetle (Coleoptera)	Nationally Notable B
-	*Rhantus frontalis*	Beetle (Coleoptera)	Nationally Scarce
Purple emperor	*Apatura iris*	Butterfly (Lepidoptera)	WCA Schedule 5
Small heath	*Coenonympha pamphilus*	Butterfly (Lepidoptera)	SPI
White admiral	*Limenitis camilla*	Butterfly (Lepidoptera)	SPI
White-letter hairstreak	*Satyrium w-album*	Butterfly (Lepidoptera)	WCA Schedule 5, SPI
-	*Tinodes unicolor*	Caddisfly (Trichoptera)	Nationally Notable
Scarce chaser	*Libellula fulva*	Dragonfly (Anisoptera)	Red listing (2001) Lower risk – near threatened
Lobe-spurred furrow bee	*Lasioglossum pauxillum*	Bee (Hymenoptera)	Nationally Notable A
Bee Wolf	*Philanthus triangulum*	Wasp (Hymenoptera)	RDB Vulnerable

Common Name	Scientific Name	Group	Schedules
Brown tree ant	*Lasius brunneus*	Ant (Hymenoptera)	Nationally Notable A
-	*Chrysis illigeri*	-	Nationally Notable B
Dark Blood Bee	*Sphecodes niger*		RDB Rare
False margined blood bee	*Sphecodes miniatus*	Bee (Hymenoptera)	Nationally Notable B
Lathbury's nomad bee	*Nomada lathburiana*	Bee (Hymenoptera)	Red listing (pre-1994) Rare
-	*Myrmica schencki*	Ant (Hymenoptera)	Nationally Notable B
-	*Nysson trimaculatus*	Sand wasp (Hymenopteran)	Nationally Notable B
Ridge-cheeked Furrow Bee	*Lasioglossum puncticolle*	Bee (Hymenoptera)	Nationally Notable B
Sharp-collared Furrow Bee	*Lasioglossum malachurum*	Bee (Hymenoptera)	Nationally Notable B
Small Velvet Ant	*Smicromyrme rufipes*	Ant (Hymenoptera)	Nationally Notable B
Swollen-thighed Blood Bee	*Sphecodes crassus*	Bee (Hymenoptera)	Nationally Notable B
Spider-hunter wasp	*Auplopus carbonarius*	Wasp (Hymenoptera)	Nationally Notable B
Painted nomad bee	*Nomada fucata*	Bee (Hymenoptera)	Nationally Notable A
Autumnal rustic	*Eugnorisma glareosa*	Moth (Lepidoptera)	SPI
Beaded chestnut	*Agrochola lychnidis*	Moth (Lepidoptera)	SPI
Blood-vein	*Timandra comae*	Moth (Lepidoptera)	SPI
Brindled beauty	*Lycia hirtaria*	Moth (Lepidoptera)	SPI
Brown-spot pinion	*Agrochola litura*	Moth (Lepidoptera)	SPI

Common Name	Scientific Name	Group	Schedules
Buff ermine	*Spilosoma lutea*	Moth (Lepidoptera)	SPI
Centre-barred sallow	*Atethmia centrago*	Moth (Lepidoptera)	SPI
Cinnabar	*Tyria jacobaeae*	Moth (Lepidoptera)	SPI
Deep-brown dart	*Aporophyla lutulenta*	Moth (Lepidoptera)	SPI
Dot moth	*Melanchra persicariae*	Moth (Lepidoptera)	SPI
Dusky brocade	*Apamea remissa*	Moth (Lepidoptera)	SPI
Dusky thorn	*Ennomos fuscantaria*	Moth (Lepidoptera)	SPI
Ear moth	*Amphipoea oculea*	Moth (Lepidoptera)	SPI
Feathered gothic	*Tholera decimalis*	Moth (Lepidoptera)	SPI
Green-brindled crescent	*Allophyes oxyacanthae*	Moth (Lepidoptera)	SPI
Grey dagger	*Acronicta psi*	Moth (Lepidoptera)	SPI
Hedge rustic	*Tholera cespitis*	Moth (Lepidoptera)	SPI
Knot grass	*Acronicta rumicis*	Moth (Lepidoptera)	SPI
Lackey	*Malacosoma neustria*	Moth (Lepidoptera)	SPI
Large nutmeg	*Apamea anceps*	Moth (Lepidoptera)	SPI
Large Wainscot	*Rhizedra lutosa*	Moth (Lepidoptera)	SPI
Latticed heath	*Chiasmia clathrata*	Moth (Lepidoptera)	SPI
Lunar yellow underwing	*Noctua orbona*	Moth (Lepidoptera)	SPI

Common Name	Scientific Name	Group	Schedules
Minor shoulder-knot	*Brachylomia viminalis*	Moth (Lepidoptera)	SPI
Mottled rustic	*Caradrina morpheus*	Moth (Lepidoptera)	SPI
Mouse moth	*Amphipyra tragopoginis*	Moth (Lepidoptera)	SPI
Oak hook-tip	*Watsonalla binaria*	Moth (Lepidoptera)	SPI
Rosy rustic	*Hydraecia micacea*	Moth (Lepidoptera)	SPI
Rustic	*Hoplodrina blanda*	Moth (Lepidoptera)	SPI
September thorn	*Ennomos erosaria*	Moth (Lepidoptera)	SPI
Shaded broad-bar	*Scotopteryx chenopodiata*	Moth (Lepidoptera)	SPI
Shaded fan-foot	*Herminia tarsicrinalis*	Moth (Lepidoptera)	Red listing (pre-1994) - Rare
Small phoenix	*Ecliptopera silaceata*	Moth (Lepidoptera)	SPI
Small square-spot	*Diarsia rubi*	Moth (Lepidoptera)	SPI
Sprawler	*Asteroscopus sphinx*	Moth (Lepidoptera)	SPI
Toadflax brocade	*Calophasia lunula*	Moth (Lepidoptera)	SPI
White ermine	*Spilosoma lubricipeda*	Moth (Lepidoptera)	SPI
-	*Hybomitra bimaculata*	True fly (Diptera)	Nationally Scarce
Lister's river snail	*Viviparus contectus*	A mollusc	Nationally Scarce

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