aspect ecology

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Officers' Meadow, Shenfield

Ecological Appraisal

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Contents

Text:

Plans:

Photographs:

Appendices:

Executive Summary

i) **Introduction.** Aspect Ecology was commissioned by Croudace Homes Ltd in March 2022 to undertake an Ecological Appraisal in respect of proposed development of land at Officer's Meadow, Shenfield, Essex.

ii) **Proposals.** The proposals are for the development of the site to provide up to 344 new residential units and safeguarded land for an educational facility with associated open space, landscaping, drainage and highways infrastructure.

iii) **Survey.** The site was originally surveyed in August 2016, with update survey work conducted in 2018 and 2021-2023 in order to ascertain the general ecological value of the land contained within the boundaries of the site and to identify the main habitats and ecological features present. In addition, a general appraisal of faunal species was undertaken to record the potential presence of any protected, rare or notable species, with specific surveys conducted in respect of bats, reptiles, Dormice, Water Vole, Otter, Great Crested Newt, breeding birds and Badger.

iv) **Ecological Designations.** The site itself is not subject to any statutory ecological designations. The nearest statutory designation is Hutton Country Park Local Nature Reserve located approximately 1.1km east of the site. A section of Arnold's Wood Complex Local Wildlife Site (LWS) and Priority Habitat ancient woodland is present within the site. Arnold's Wood Complex LWS will be fully retained and protected from development. All other non-statutory designations in the surroundings are well separated from the site and are therefore unlikely to be affected.

v) **Habitats.** The site predominantly comprises vacant arable land, with areas of scrub, semi-improved grassland and tall ruderal present throughout. Woodland parcels are present within and adjacent to the site, including Priority Habitat ancient woodland (irreplaceable habitat) at the east of the site. Hedgerows, wooded belts, a watercourse and ditches are also present at the site and arable field boundaries. A single veteran Oak tree is present within the site (irreplaceable habitat). Small areas of hardstanding are present within the site, along with three ponds. Features of ecological importance within the site include the ancient woodland, veteran trees and a number of the hedgerows, the majority of which are retained and will be protected under the proposals.

vi) **Protected Species.** The site offers opportunities for a number of protected species and evidence of such species was recorded during the survey work undertaken, including a number of Priority Species. Outline mitigation strategies have therefore been presented for these species within this report.

vii) **Enhancements.** The proposals present the opportunity to secure a number of biodiversity net gains, including additional native tree, shrub, woodland and hedgerow planting, new roosting opportunities for bats, more diverse nesting habitats for birds and new foraging, commuting and sheltering opportunities for a number of species.

viii) **Summary.** In summary, the proposals have sought to minimise impacts on biodiversity and subject to the implementation of appropriate avoidance, mitigation and compensation measures, it is unlikely that the proposals will result in significant harm.

1 Introduction

Background and Proposals

1.1.1 Aspect Ecology was originally commissioned by Croudace Homes Ltd in 2016 to undertake an ecological constraints and opportunities report, followed by a Preliminary Ecological Appraisal in 2019, in relation to land at Officer's Meadow, Shenfield, centred at grid reference TQ 61881 96146 (see Plan 5014/ECO1), hereafter referred to as 'the site'. Aspect Ecology was subsequently commissioned in March 2022 to undertake an Ecological Appraisal in respect of the proposed development.

1.1.2 The site forms part of a wider allocation for development within the adopted Brentwood Borough Local Plan under Policy R03: Land North of Shenfield. The proposals are for the development of the site to provide up to 344 new residential units and safeguarded land for an educational facility (primary school and early years facility), with associated public open space, landscaping, drainage and highways infrastructure. The proposals will also incorporate a number of attenuation basins.

Site Overview

1.1.3 The site is located within the suburb of Shenfield in the Borough of Brentwood, which is located in the south of the county of Essex. The site is located within an urban-edge context, and is bound to the north by a number of residential dwellings and Chelmsford Road (A1023), beyond which lies the A12 (dual carriageway) and arable land. Alexander Lane, Alexander Lane Recreation Ground and Shenfield High School bound the site to the south beyond which lies residential development. To the east the site is bound by a railway line and Arnold's Wood ancient and semi-natural woodland, with residential development and arable land beyond. To the west the site is bound by Chelmsford Road (A1023) with grassland, woodland and arable land beyond.

1.1.4 The site itself comprises a number of arable fields with small areas of semi-improved grassland, which are separated and bound by hedgerows, wooded belts and scrub. Areas of woodland are present within the site, including an area of ancient woodland (Arnold's Wood), as well as a number of ponds and ditches. A watercourse is also present, running along the site's southern boundary and through the site.

Purpose of the Report

1.1.5 This report documents the methods and findings of the baseline ecology surveys and desktop study carried out in order to establish the existing ecological interest of the site, and subsequently provides an appraisal of the likely ecological effects of the proposals. The importance of the habitats and species present is evaluated. Where necessary, avoidance, mitigation and compensation measures are proposed so as to safeguard any significant existing ecological interest within the site and where appropriate, opportunities for ecological enhancement are identified with reference to national conservation priorities and local Biodiversity Action Plans (BAPs).

2 Methodology

Desktop Study

2.1.1 In order to compile background information on the site and its immediate surroundings the Essex Wildlife Trust was contacted in 2016 and 2018, with the Essex Field Club contacted in April 2022, with updated data requested on the basis of a search radius of 2km. Where information has been received from the above organisation(s) this is reproduced on Plan 5014/ECO2, where appropriate.

2.1.2 Information on statutory designations was obtained from the online Multi-Agency Geographic Information for the Countryside (MAGIC) database, which utilises data provided by Natural England, with an extended search radius (25km). In addition, the MAGIC database was searched to identify the known presence of any Priority Habitats within or adjacent the site. Relevant information is reproduced on Plan 5014/ECO2, where appropriate.

2.1.3 In addition, the Woodland Trust database was searched for any records of ancient, veteran or notable trees within or adjacent to the site.

Habitat Survey

2.1.4 The site was originally surveyed in August 2016, with update survey work conducted in September and October 2018, as well as December 2021 and most recently in April and July 2023 in order to ascertain the general ecological value of the land contained within the boundaries of the site and to identify the main habitats and ecological features present.

2.1.5 The site was surveyed based on standard Phase 1 Habitat Survey methodology[1], whereby the habitat types present are identified and mapped, together with an assessment of the species composition of each habitat. This technique provides an inventory of the basic habitat types present and allows identification of areas of greater potential which require further survey. Any such areas identified can then be examined in more detail through Phase 2 surveys. This method was extended, in line with the Guidelines for Preliminary Ecological Appraisal[2] to record details on the actual or potential presence of any notable or protected species or habitats.

2.1.6 Using the above method, the site was classified into areas of similar botanical community types, with a representative species list compiled for each habitat identified. The nomenclature used for plant species is based on the Botanical Society for the British Isles (BSBI) Checklist.

Faunal Surveys

2.1.7 General faunal activity, such as mammals or birds observed visually or by call during the course of the surveys was recorded. Specific attention was also paid to the potential presence of any protected, rare or notable species, and specific consideration was given to bats, Badger, Dormouse, Great Crested Newt, Otter, reptiles and Water Vole, as described below.

1 Joint Nature Conservation Committee (2010, as amended) *'Handbook for Phase 1 habitat survey: A technique for environmental audit.'*

2 Chartered Institute for Ecology and Environmental Management (CIEEM) (2013) '*Guidelines for Preliminary Ecological Appraisal.*'

Bats[3]

Visual Inspection Surveys

2.1.8 **Trees**. Trees were assessed for their suitability to support roosting bats based on the presence of features such as holes, cracks, splits or loose bark. Suitability for roosting bats was rated based on relevant guidance[4] as:

- Negligible;
- Low;
- Moderate; or
- High.

2.1.9 Any potential roost features identified were also inspected for any signs indicating possible use by bats, e.g. staining, scratch marks, bat droppings, etc.

Activity Surveys

2.1.10 Walked transect surveys were undertaken in June, August and September 2022 to ascertain the level of usage of the site by foraging or commuting bats. This survey method involves walking planned transect routes with key listening points, specifically covering habitats/features with particular potential for commuting or foraging bats. Anabat Scout handheld bat detectors was employed to aid identification of any bats observed. Each transect was walked from sunset, for approximately 2 hours, with a minimum 5 minute stop at each listening point. This methodology was repeated from 2 hours prior to sunrise to complete the dawn survey.

2.1.11 This survey work was carried out during suitable weather conditions, as set out in Tables 2.1 and 2.2 below.

Table 2.1. Dusk walked transect survey details.

Date	Start & end times & time of sunset	Transect / location	Equipment used	Weather
15/06/2022	Start time: 21.18 End time: 23.18 Sunset: 21.18	Chelmsford Road	Anabat Scout	Dry, 5% cloud, BF1, 16°C
Comments: The survey was undertaken by 2 surveyors under direction of licence holder CLS01711.				
08/08/2022	Start time: 20.36 End time: 22.36 Sunset: 20.36	Chelmsford Road	Anabat Scout	Dry, 0% cloud, BF2, 18°C
Comments: The survey was undertaken by 2 surveyors under direction of licence holder CLS01711.				
20/09/2022	Start time: 19.02 End time: 21.02 Sunset: 19.02	Chelmsford Road	Anabat Scout	Dry, 70% cloud, BF1, 15°C
Comments: The survey was undertaken by 2 surveyors under direction of licence holder CLS01711.				

BF0 = calm, BF12 = hurricane force

[3] Surveys based on: English Nature (2004) '*Bat Mitigation Guidelines'* and Collins, J. (ed.) (2016) '*Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn).' Bat Conservation Trust

[4] Collins, J. (ed.) (2016) '*Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn).' Bat Conservation Trust

Table 2.2. Dawn walked transect survey details.

Date	Start & end times & time of sunrise	Transect / location	Equipment used	Weather
21/09/2022	Start time: 04.42 End time: 06.42 Sunrise: 06.42	Chelmsford Road	Anabat Scout	Dry, 95% cloud, BF0, 10°C
Comments: The survey was undertaken by 2 surveyors under direction of licence holder CLS01711.				

BF0 = calm, BF12 = hurricane force

2.1.12 Automated static detector surveys were also carried out during which Song Meter 4 (SM4) detectors were positioned at two locations within the site from the 15th to 22nd June, 8th to 15th August and 13th to 20th September 2022 to record any bat activity. One detector was situated within the centre of the site and the second detector was located in the east of the site. The detectors were set to switch on approximately 30 minutes before sunset and switch off approximately 30 minutes after sunrise. The weather conditions during the static detector surveys are provided in Table 2.3 below.

Table 2.3. Automated detector survey details.

Survey Date	Weather Conditions			
	Wind (BF)	Temp(°C)	Cloud Cover (%)	Precipitation
15/06/2022	1	15	20	Dry
16/06/2022	2	17	10	Dry
17/06/2022	2	20	5	Dry
18/06/2022	3	13	60	Occasional light rain
19/06/2022	2	11	0	Dry
20/06/2022	1	12	15	Dry
21/06/2022	2	14	10	Dry
22/06/2022	2	13	5	Dry
08/08/2022	2	18	25	Dry
09/08/2022	2	17	0	Dry
10/08/2022	2	18	0	Dry
11/08/2022	2	20	0	Dry
12/08/2022	2	20	0	Dry
13/08/2022	3	21	5	Dry
14/08/2022	1	22	15	Dry
15/08/2022	2	20	15	Dry
13/09/2022	3	17	100	Light rain
14/09/2022	2	15	100	Occasional light rain
15/09/2022	3	12	80	Dry
16/09/2022	3	12	50	Dry
17/09/2022	3	8	25	Dry
18/09/2022	3	10	95	Dry
19/09/2022	2	9	10	Dry
20/09/2022	2	13	100	Dry

BF0 = calm, BF12 = hurricane force

Dusk Emergence/ Dawn Re-entry Surveys

2.1.13 Dusk emergence and dawn re-entry surveys were carried out on 22nd/23rd June, 11th/12th July and 7th/8th August 2023 to identify any bats roosting in the trees highlighted to have potential to support roosting bats to be removed under the proposals. Surveyors employed Anabat Scout handheld bat detectors to aid identification of any bats observed. Infrared (IR) camera set-ups, comprising a 1080p IR sensitive camera and two Evolva T38 IR lights, were deployed at a number of locations as shown on Plan 5014/ECO4.

2.1.14 IR cameras were utilised to aid in the identification of precise roosting locations and confirm the number of any emerging / re-entering bats recorded. At dusk, surveyors were in position 15-30 minutes prior to sunset, remaining in place for approximately 2 hours. At dawn, surveyors were in place approximately 1 hour 30 minutes to 2 hours before sunrise and remained in place until 15 minutes after sunrise. This survey method aims to identify any roosting bats emerging from or returning to potential roost sites.

2.1.15 This survey work was carried out during suitable weather conditions, as set out in Tables 2.4 and 2.5 below.

Table 2.4. Dusk survey details.

Date	Start & end times & time of sunset	Structure reference / location	Equipment used	Weather
22/06/2023	Start time: 21.05 End time: 23.20 Sunset: 21.20	T168, T172 and T30	Anabat Scout	Dry, 60% cloud, BF2, 17°C
Comments: The survey was undertaken by 6 surveyors under direction of licence holder 2015-14046-CLS-CLS.				
11/07/2023	Start time: 20.59 End time: 23.14 Sunset: 21.14	T30 and T172	Anabat Scout	Dry, 70% cloud, BF4, 16°C
Comments: The survey was undertaken by 6 surveyors under direction of licence holder 2015-14046-CLS-CLS.				
07/08/2023	Start time: 20.23 End time: 22.38 Sunset: 20.38	T266 and T155	Anabat Scout	Dry, 30% cloud, BF3, 15°C
Comments: The survey was undertaken by 6 surveyors under direction of licence holder 2015-14046-CLS-CLS.				

BF0 = calm, BF12 = hurricane force.

Table 2.5. Dawn survey details.

Date	Start & end times & time of sunrise	Structure reference / location	Equipment used	Weather
23/06/2023	Start time: 02.41 End time: 04.56 Sunrise: 04.41	T266	Anabat Scout	Dry, 85% cloud, BF1, 14°C
Comments: The survey was undertaken by 6 surveyors under direction of licence holder 2015-14046-CLS-CLS.				
12/07/2023	Start time: 02.54 End time: 05.09 Sunrise: 04.54	T266, T155 and T168	Anabat Scout	Dry, 50% cloud, BF3, 14°C
Comments: The survey was undertaken by 6 surveyors under direction of licence holder 2015-14046-CLS-CLS.				
08/08/2023	Start time: 03.32 End time: 06.12 Sunrise: 05.47	T30	Anabat Scout	Dry, 50% cloud, BF1, 12°C
Comments: The survey was undertaken by 6 surveyors under direction of licence holder 2015-14046-CLS-CLS.				

BF0 = calm, BF12 = hurricane force.

Analysis of Bat Survey Recordings

2.1.16 All bat calls were analysed using Anabat Insight v2.0.1 to verify the species recorded during the survey work. Where recordings could not be reliably attributed to species (such as for *Myotis* species) calls were identified to genus level; in the case of calls which could not be distinguished between *Nyctalus* sp. and Serotine, these have been labelled as 'unidentified big bat' species.

Badger (*Meles meles*)[5]

2.1.17 A detailed Badger survey was carried out in July 2022, with general attention paid to any evidence of Badgers during the subsequent numerous site visits in 2023. The survey comprised two main elements. The first element involved searching for evidence of Badger setts. For any setts that were encountered, each sett entrance was noted and mapped. The following information was recorded:

- Number and location of well used/active entrances; these are clear from any debris or vegetation and are obviously in regular use and may, or may not, have been excavated recently;
- Number and location of inactive entrances; these are not in regular use and have debris such as leaves and twigs in the entrance or have plants growing in or around the edge of the entrance; and
- Number of disused entrances; these have not been in use for some time, are partly or completely blocked and cannot be used without considerable clearance. If the entrance has been disused for some time all that may be visible is a depression in the ground where the hole used to be and the remains of the spoil heap.

2.1.18 The second element involved searching for signs of Badger activity such as well-worn paths and push-throughs, snagged hair, footprints, latrines and foraging signs, so as to build up a picture of any use of the site by Badger.

Dormouse *(Muscardinus avellanarius)*[6]

2.1.19 Surveys were undertaken to establish the presence/absence of Dormouse within the site between May and November 2022, with an additional final check carried out in December 2022. Survey work followed the methodology set out within best practice guidance[6], whereby nesting tubes are attached to branches of trees and shrubs and checked on a regular basis for signs of use by Dormouse.

2.1.20 The guidance employs an indexation system to define survey effort, based on the number of tubes deployed and months over which these are in place and are checked for signs of use. Months in which use of nest tubes by Dormouse is more likely afford a higher number of points than months when there is a lower likelihood of use. The guidance recommends that determination of absence of Dormouse from a site should be based on a survey effort score of at least 20 points.

2.1.21 Accordingly, a total of 106 Dormouse nest tubes were deployed within the site, with tubes placed within suitable vegetation including hedgerows and woodland (see Plan 5014/ECO5). Nest tubes were checked bi-monthly from July to November 2022, giving a total survey effort score of 40 points across the entire survey area.

Otter (*Lutra lutra)*[7]

2.1.22 The watercourses within the site were thoroughly searched for signs of Otter in September 2022. Such signs include holts (underground chambers used for lying up), spraints, prints,

5 Based on: Mammal Society (1989) '*Occasional Publication No. 9 – Surveying Badgers*'

6 Based on: English Nature (2003) '*Surveying dormice using nest tubes: Results and experiences from the South West Dormouse Project',* English Nature (2006) '*The Dormouse Conservation Handbook*', 2nd Edition;, English Nature Research Report No. 524; and Natural England (2011) '*Interim Natural England Advice Note – Dormouse surveys for mitigation licensing – best practice and common misconceptions*', WML-537 (12/11)

7 Surveys based on: Life in UK Rivers (2003) *'Monitoring the Otter - Conserving Natura 2000 Rivers*'. Monitoring Series No. 10

paths and slides. The banks of the watercourse were examined thoroughly from both sides (where accessible) and from the watercourse itself where scrub and water depth allowed.

Water Vole (*Arvicola amphibious)*[8]

2.1.23 The watercourses within the site were thoroughly searched for signs of Water Vole in September 2022. Such signs include latrines, tunnels, lawns (small areas of vegetation grazed by Water Vole) and footprints. The banks of the watercourse were examined thoroughly from both sides (where accessible) and from the watercourse itself where scrub and water depth allowed.

Reptiles[9]

2.1.24 Given the presence of potentially suitable reptile habitat within the site, a specific survey was undertaken to establish the presence/absence of common reptile species in May and June 2022.

2.1.25 A total of 214 50x50cm sheets of thick roofing felt were placed within suitable areas across the site to act as artificial refugia, which represents a density of ~10 refugia per hectare. The refugia, or 'tins', provide shelter and heat up more quickly than their surroundings in the morning and can remain warmer than their surroundings in the late afternoon. Being ectothermic (cold blooded), reptiles use them to bask under and raise their body temperature, which allows them to forage earlier and later in the day. Therefore, checking the refugia at appropriate times of the day (morning and evening) enables the presence/absence of common reptiles to be determined.

2.1.26 The refugia remained undisturbed for approximately 1-2 weeks to allow reptiles to find and start using them. Following this initial bedding-in period, refugia were checked at appropriate times of the day on seven occasions during suitable weather conditions, as set out below in Table 2.6.

Table 2.6. Reptile survey dates and weather conditions.

Survey Date	Weather Conditions			
	Wind (BF)	Temp(°)	Cloud Cover (%)	Precipitation
13/05/2022	3	13	100	Dry
18/05/2022	2	16	10	Dry
21/05/2022	3	9	90	Dry
24/05/2022	3	12	60	Occasional light rain
27/05/2022	1	13	80	Dry
30/05/2022	2	9	85	Dry
01/06/2022	1	16	60	Dry

BF0 = calm, BF12 = hurricane force

2.1.27 In addition, reptiles basking in the open or partial cover were actively searched for in suitable locations across the site through direct observation. Existing natural objects (e.g. logs and rocks) and artificial refugia (e.g. debris, tyres, etc.) were also searched, where present, for reptiles or evidence of reptiles (e.g. sloughed skin).

8 Surveys based on: Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016) '*Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.*

9 Surveys based on: Froglife Advice Sheet 10 (1999) '*Reptile Survey - an introduction to planning, conducting and interpreting surveys for snake and lizard conservation.*'

Great Crested Newt (*Triturus cristatus)*

Habitat Suitability Index (HSI)

2.1.28 As a first step in identifying the potential presence of Great Crested Newt at the site, a Habitat Suitability Index (HSI) study was undertaken of all relevant water bodies within 500m[10] of the site boundary (based on a review of Ordnance Survey mapping and satellite imagery). Guidance set out within Natural England's Method Statement template, to be used when applying for a Great Crested Newt development licence, states that surveys of ponds within 500m of the site boundary are only required when '(a) data indicates that the pond(s) has potential to support a large Great Crested Newt population, (b) the footprint contains particularly favourable habitat, (c) the development would have a substantial negative effect on that habitat and (d) there is an absence of dispersal barriers.' Given that in this instance, majority of the points listed above are applicable to the site, it is considered that survey of ponds within 500m of the site boundary is required.

2.1.29 An HSI study is used to assess the potential of water bodies to support Great Crested Newt. It is undertaken by attributing a score to a number of factors that can affect the presence or absence of this species. Ten factors are utilised in an HSI assessment, as described below:

- *SI1 Location.* The location of the water body within Great Britain;
- *SI2 Pond area.* The size of the water body;
- *SI3 Permanence.* How often the water body dries out;
- *SI4 Water Quality.* The water quality, based primarily on invertebrate diversity;
- *SI5 Shade.* The percentage of the perimeter of the water body that is shaded;
- *SI6 Fowl.* The presence or absence of water fowl;
- *SI7 Fish.* The presence or absence of fish;
- *SI8 Pond Count.* The number of water bodies within 1km of the surveyed water body (not counting those on the far side of major barriers such as roads);
- *SI9 Terrestrial.* The quality of terrestrial habitat surrounding the water body; and
- *SI10 Macrophytes.* The percentage cover of the surface area of the water body covered by macrophytes (aquatic plants).

2.1.30 The overall suitability of the water body is then determined by entering these figures into an equation devised by Oldham *et al*. (2000)[11]. The suitability of water bodies is classed into one of five categories, either 'poor', 'below average', 'average', 'good' or 'excellent'.

2.1.31 This HSI study was undertaken in line with the guidelines developed by Oldham *et al.* and subsequently adapted by ARG UK (2010)[12]. A suitably experienced ecologist undertook the assessment in line with these guidelines, with the study also supplemented by desktop research where appropriate.

[10] 250m is the typical maximum migratory range of this species, see English Nature (2004) '*An assessment of the efficiency of capture techniques and the value of different habitats for the great crested newt* Triturus cristatus'. English Nature Research Report 576

[11] Oldham RS, Keeble J, Swan MJS & Jeffcote M (2000) '*Evaluating the suitability of habitat for the Great Crested Newt (Triturus cristatus)*'. Herpetological Journal 10 (4), 143-155

[12] Amphibian & Reptile Groups of the UK (2010) '*ARG UK Advice Note 5: Great Crested Newt Habitat Suitability Index*'

Environmental DNA (eDNA)

2.1.32 An eDNA survey was carried out to determine the presence/absence of Great Crested Newt within two on-site (P2 and P3) and two off-site ponds (P4 and P8 - see Plan 5014/ECO6). Water samples were collected on the 26/04/2022 following the procedure outlined in the methods manual prepared for DEFRA by Biggs *et al*. (2014)[13]. The survey fell within the acceptable seasonal window set out by Natural England (15th April to 30th June)[14]. Samples were collected by suitably licensed Aspect Ecology staff. The water samples were sent for laboratory analysis which was conducted by 'Cellmark' and also followed the procedure set out by Biggs *et al.* (2014)[14].

Breeding Birds[15]

2.1.33 The use of the site by breeding birds was assessed over three survey visits, (on separate days) in April, May and June 2022. Birds present within the site were recorded using a method modified from the British Trust for Ornithology's (BTO's) Common Bird Census technique. This involved walking a route over the site and recording all 'registrations' of birds either seen or heard. The sightings or 'registrations' were recorded on a site plan using standard BTO codes for each bird species and appropriate abbreviations.

2.1.34 This survey methodology has the advantage over other survey methods of mapping each registration to a specific point within the site and this therefore illustrates those areas containing the highest density and diversity of bird species. The dates of each survey, together with a summary of the weather conditions are given in Table 2.7 below.

Table 2.7. Breeding bird survey dates and weather conditions.

Survey Date	Weather Conditions			
	Wind (BF)	Temp(c)	Cloud Cover (%)	Precipitation (0-5)
10/04/2022	2	9	20	Dry
15/05/2022	2	16	100	Dry
19/06/2022	3	10	100	Dry

Survey Constraints and Limitations

2.1.35 All of the species that occur in each habitat would not necessarily be detectable during survey work carried out at any given time of the year, since different species are apparent during different seasons. The Phase 1 habitat surveys in 2018 and 2021 were undertaken outside the optimal season, however the subsequent visits in 2023 fell within the optimal period, allowing for a robust assessment of the ecological interest of the site to be made.

2.1.36 Attention was paid to the presence of any invasive species listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). However, the detectability of such species varies due to a number of factors, e.g. time of year, site management, etc., and hence the absence of invasive species should not be assumed even if no such species were detected during the Phase 1 survey.

[13] Biggs J., Ewald N., Valentini A., Gaboriaud C., Griffiths R.A., Foster J., Wilkinson J., Arnett A., Williams P. and Dunn F. (2014). '*Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA*'. Freshwater Habitats Trust, Oxford.

[14] Natural England (2015) '*Great crested newts: surveys and mitigation for development projects. Standing advice for local planning authorities who need to assess the impacts of development on great crested newts*'. Last updated at www.gov.uk on 24/12/2015.

[15] Surveys based on methodology within: Baille *et al.* RA (2010) '*Breeding Birds in the Wider Countryside: their conservation status*', BTO Research Report No. 385, BTO, Thetford.

2.1.37 Densely vegetated habitats within the site have the potential to reduce the detectability of field signs for faunal species such as Badger. A detailed survey was able to be completed and, whilst dense scrub vegetation is present within the site, it is considered that the survey results do provide an accurate baseline to assess the potential for impacts on Badger under the development proposals.

2.1.38 A recognised limitation of the bat activity surveys is that bat detectors can only provide an index of activity rather than absolute numbers of bats. Therefore, the results of the bat activity surveys should only be considered indicative of the amount of use bats make of an area rather than the abundance of bats. In addition, some bat species, e.g. Brown Long-eared Bat, are difficult to detect due to their quiet echolocation calls.

2.1.39 Letters requesting access to survey ponds P6 and P7, within 500m of the site, were sent to the relevant landowners prior to the HSI and eDNA surveys. However, access to P6 and P7 was refused, and access to P5 was not possible given its location within proximity of two railway lines. As such, eDNA surveys of these ponds were not able to be undertaken. Nevertheless, an eDNA survey of two on-site and two off-site ponds was undertaken in April 2022, providing useful data on likely presence / absence of GCN within the local area.

Ecological Evaluation Methodology

2.1.40 The evaluation of ecological features and resources is based on professional judgement whilst also drawing on the latest available industry guidance and research. The approach taken in this report is based on that described by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018)[16], which involves identifying 'important ecological features' within a defined geographical context (i.e. international, national, regional, county, district, local or site importance). For full details refer to Appendix 5014/1.

National Policy Approach to Biodiversity in the Planning System

2.1.41 The National Planning Policy Framework (NPPF)[17] describes the Government's national policies on 'conserving and enhancing the natural environment' (Chapter 15). NPPF is accompanied by Planning Practice Guidance on 'Biodiversity, ecosystems and green infrastructure' and ODPM Circular 06/2005[18].

2.1.42 NPPF takes forward the Government's strategic objective to halt overall biodiversity loss[19], as set out at Paragraph 174, which states that planning policies and decisions should contribute to and enhance the natural and local environment by:

'*minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures*'

2.1.43 The approach to dealing with biodiversity in the context of planning applications is set out at Paragraph 180:

'When determining planning applications, local planning authorities should apply the following principles:

[16] CIEEM (2018) '*Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine*', ver. 1.2, Chartered Institute of Ecology and Environmental Management, Winchester
[17] Ministry of Housing, Communities & Local Government (2021) '*National Planning Policy Framework*'
[18] ODPM (2006) '*Circular 06/2005: Planning for Biodiversity and Geological Conservation – A Guide to Good Practice*'
[19] DEFRA (2011) '*Biodiversity 2020: A strategy for England's wildlife and ecosystem services*'

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

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

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

d) *development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate.'*

2.1.44 The above approach encapsulates the 'mitigation hierarchy' described in British Standard BS 42020:2019[20], which involves the following step-wise process:

- **Avoidance –** avoiding adverse effects through good design;
- **Mitigation –** where it is unavoidable, mitigation measures should be employed to minimise adverse effects;
- **Compensation –** where residual effects remain after mitigation it may be necessary to provide compensation to offset any harm; and
- **Enhancement –** planning decisions often present the opportunity to deliver benefits for biodiversity, which can also be explored alongside the above measures to resolve potential adverse effects.

2.1.45 The measures for avoidance, mitigation, compensation and enhancement should be proportionate to the predicted degree of risk to biodiversity and to the nature and scale of the proposed development (BS 42020:2019, section 5.5).

Local Policy

2.1.46 Local Planning Policy for the Brentwood Borough is set out within the Brentwood Local Plan, adopted March 2022[21]. Of the policies within the adopted Local Plan the following are of relevance to ecology and nature conservation.

2.1.47 **Strategic Policy NE01 – Protecting and Enhancing the Natural Environment**:

'The Council will require development proposals to use natural resources prudently and protect and enhance the quality of the natural environment. All proposals should, wherever

[20] British Standards Institution (2013) '*Biodiversity – Code of practice for planning and development*', BS 42020:2019
[21] Brentwood Borough Council (2022) *'Brentwood Local Plan 2016-2033'*

possible, incorporate measures to secure a net gain in biodiversity, protect and enhance the network of habitats, species and sites (both statutory and non-statutory) and avoid negative impacts on biodiversity and geodiversity. Compensatory measures will only be considered if it is not possible fully to mitigate any impacts.

When determining planning applications, the council will apply the principles relevant to habitats and biodiversity as set out in National Planning Policy.

International Designated Sites

Where a proposed development is likely to have an adverse impact on European Designated Site (whether individually or in combination with other plans or proposals) permission will not be granted unless there is due compliance with the requirements of the Habitats Regulations.

New residential development within the Essex RAMS and Epping Forest SAC Zones of Influence will be required to provide appropriate on-site measures for the avoidance of, and/or reduction in, recreational disturbance on European Designated Sites through the incorporation of recreational opportunities, including the provision of green space and footpaths in the proposals. Proposals will be required to follow the mitigation hierarchy by seeking to avoid creating recreational impacts first and foremost, with mitigation measures considered separately to avoidance.

Nationally Designated Sites

Development proposals within or outside a SSSI, likely to have an adverse effect on a SSSI (either individually or in combination with other developments), will not be permitted unless, exceptionally, the benefits of the proposed development clearly outweigh both the adverse impacts on the features of the site that make it of national importance and any impacts on the wider network of SSSIs.

Sites of Local Importance

Development proposals that are likely adversely to affect locally designated sites, including their functional status within any identified ecological network, will only be permitted where the applicant can demonstrate that: a. the ecological coherence of the site and any local ecological network is maintained; and b. it can be demonstrated that the benefits of the development clearly outweigh the loss.'

2.1.48 **Strategic Policy NE02 – Green and Blue Infrastructure:**

'Brentwood's network of green and blue infrastructure (GBI) will be protected, enhanced and managed to provide a multi-functional, high quality open space resource, capable of delivering opportunities for recreation, health and wellbeing, ecological connectivity, biodiversity net-gain as well as wider ecosystem services for climate change adaptation.

New development is expected, where possible and appropriate, to maximise opportunities to enhance or restore existing GBI provision and/or create new provision on site that connects to the wider GBI network. Its design and management should also respect and enhance the character and distinctiveness of the local area.

Developments on sites containing or are adjacent to a water course or water body (Blue Infrastructure) are required to ensure there is no adverse impact on the functioning or water quality of the Blue Infrastructure. Proposals that maximise opportunities to enhance or restore Blue Infrastructure and incorporate these features into the public realm of the

development will be supported. An adequate undeveloped buffer zone should be applied as necessary to mitigate flood risk, in line with Policy NE09 and/or support sustainable drainage, in line with Policy BE05.

Proposals should provide appropriate specification and maintenance plans for the proposed green and blue infrastructure throughout the life of the development.'

2.1.49 **Policy NE03 – Trees, Woodlands, Hedgerows:**

'Development proposals that would result in the deterioration or loss of irreplaceable ancient woodland and ancient and veteran trees will not be permitted other than in wholly exceptional circumstances and only if the proposals include a suitable compensation strategy . Applicants will need to demonstrate the efficacy of the strategy by reference to the value of the habitats that will be lost or harmed and provide an appropriate implementation and maintenance programme to underpin the strategy the performance of which will be subject of a condition and/or planning obligation, as appropriate.

In all other cases, proposals should, so far as possible and practicable, seek to retain existing trees, woodlands and hedgerows where they make a positive contribution to the local landscape and/or biodiversity or which have significant amenity value. Wherever possible and appropriate, landscaping schemes should take account of and incorporate these existing features in the scheme and where any loss is unavoidable, incorporate measures to compensate for their loss.'

2.1.50 **Policy NE05 – Open Space and Recreational Facilities:**

'...2. New development is required to maximise opportunities to incorporate new publicly accessible, high quality and multi-functional open space and/or, where appropriate, enhance existing provision that will serve the new and existing community, through improved connections, biodiversity net-gain and high quality sport, play and recreational amenities....'

2.1.51 **Policy NE07 – Protecting Land for Gardens:**

'Proposals for development on sites that form part of an existing garden or group of gardens will only be permitted where:

a. sufficient garden space and space around existing dwellings is retained, especially where these spaces and any trees are worthy of retention due to their contribution to the character of the area and their importance for biodiversity;...'

2.1.52 **Policy BE02 – Water Efficiency and Management:**

'*...Water Quality*

4. All development proposals should have regard to the Water Cycle Study and:

a. seek to improve water quality;

b. not cause deterioration in the quality of a water course or groundwater;

c. not lead to adverse impacts on the natural functioning of the watercourse, including quantity, flow, river continuity, groundwater connectivity, or biodiversity impacts;

d. where development is likely to have an impact, proposals must set out how impacts will be mitigated.'

2.1.53 **Policy BE05 – Sustainable Drainage:**

'... 5. SuDs will be required to meet the following design criteria:

a. the design must follow an index-based approach when managing water quality. Implementation in line with the updated CIRIA SuDS Manual18 is required. Source control techniques such as green roofs, permeable paving and swales should be used so that rainfall runoff in events up to 5mm does not leave the site; b. SuDS should be sensitively designed and integrated into the Green and Blue infrastructure to create high quality public open space and landscaped public realm, in line with Strategic Policy NE02: Green and Blue Infrastructure; c. maximise opportunities to enhance biodiversity net-gain;...'

2.1.54 **Policy BE14 – Creating Successful Places:**

' 1. Proposals will be required to meet high design standards and deliver safe, inclusive, attractive and accessible places. Proposals should:...

e. respond positively and sympathetically to their context and build upon existing strengths and characteristics, and where appropriate, retain or enhance existing features which make a positive contribution to the character, appearance or significance of the local area (including natural and heritage assets);

f. integrate and enhance the natural environment by the inclusion of features which will endure for the life of the development, such as planting to enhance biodiversity, the provision of green roofs, green walls and nature based sustainable drainage;

g. where applicable, ensure that new streets are tree-lined and opportunities are taken to incorporate trees elsewhere in developments;...

3. Development proposals should be supported by a statement setting out the sustainable long-term governance and stewardship arrangements for the maintenance of supporting infrastructure including community assets, and open spaces; the statement should be proportionate to the scale of the scheme and quantum of infrastructure being delivered.'

2.1.55 As mentioned previously, the site forms part of a wider allocation for development within the adopted Brentwood Borough Local Plan under **Policy R03**: Land North of Shenfield (aka Officer's Meadow). Of relevance to ecology matters, part 2 (i) of the policy includes the requirement to:

'. . . protect and where appropriate enhance the Local Wildlife Site (Arnold's Wood)'.

3 Ecological Designations

Statutory Designations

Description

3.1.1 The statutory designations of ecological importance that occur within the local area are shown on Plan 5014/ECO2. The nearest statutory designation is Hutton Country Park Local Nature Reserve (LNR) located approximately 1.1km to the east of the site. Hutton Country Park LNR is designated for the areas of natural grassland, ancient woodland, wetland, a section of the River Wild and ponds which support a diverse array of native flora and fauna. The next nearest statutory designation is Thorndon Park Site of Special Scientific Interest (SSSI) located approximately 3.4km to the south of the site. Thorndon Park SSSI is designated for its semi-natural broad-leaved woodland and ancient parkland which supports a varied assemblage of Beetles.

3.1.2 A number of statutory designations of international importance are located within 25km of the site, the closest of which is Crouch and Roach Estuaries (Mid-Essex Coast Phase 3) Ramsar site, Special Area of Conservation (SAC), SSSI and Special Protection Area (SPA) located approximately 16.7km to the east of the site at its closest point. Crouch and Roach Estuaries (Mid-Essex Coast Phase 3) comprises the River Crouch and River Roach, the intertidal zone along these rivers is 'squeezed' between the sea walks along the banks and river channel, thereby leaving a narrow strip of tidal mud which is used by significant numbers of birds. The designation qualifies under Article 4.2 of the Directive (2009/147/EC) as it regularly supports 1% or more of the biogeographical populations of Dark-bellied Brent Goose *Branta bernicla bernicla* (Ramsar Criterion 3c) and is regularly used by over 20,000 waterbirds (Ramsar Criterion 3a). The designation also supports an assemblage of 13 nationally scarce plant species (Ramsar Criterion 2a). The next nearest designations are Epping Forest SAC and Thames Estuary and Marshes SPA and Ramsar, both of which are located approximately 17km to the west and south-east respectively.

3.1.3 Natural England has developed Impact Risk Zones (IRZs) as an initial tool to help assess the risk of developments adversely affecting SSSIs, taking into account the type and scale of developments. The site sits within an IRZ in relation to Thorndon Park SSSI, however the IRZ does not apply to residential development.

Evaluation

3.1.4 The site itself is not subject to any statutory ecological designations. All statutory ecological designations in the surrounding area are well separated from the site by existing development and given the nature and scale of the proposals, these designations are unlikely to be affected.

Non-statutory Designations

Description

3.1.5 The non-statutory designations of nature conservation interest that occur within the local area are shown on Plan 5014/ECO2. The nearest non-statutory designation is Arnold's Wood Complex Local Wildlife Site (LWS), with a section of this designation located at the east of the site. Arnold's Wood Complex LWS is designated for comprising areas of fragmented ancient woodland. The next nearest non-statutory designation is Long Ridings LWS located approximately 0.4km to the south-west of the site.

Evaluation

3.1.6 A section of Arnold's Wood Complex LWS is located at the east of the site. In the absence of mitigation, the woodland could be adversely affected during site preparation and construction, for example through damage to root protection areas of woodland edge trees, dust deposition, pollution, accidental encroachment, etc. Accordingly, a number of construction safeguards will be implemented (see Chapter 6) in order to mitigate these potential effects, which can be detailed within a Construction Environmental Management Plan (CEMP).

3.1.7 During the operational phase of development there is potential for adverse effects such as recreational damage (trampling of ground flora, collection of wood for fires, eutrophication of soils through dog fouling, etc.) and encroachment from new dwellings, e.g. garden extensions into the woodland, fly-tipping, etc., and an increase in disturbance, such as from noise or lighting. In terms of recreational effects, these will be mitigated through implementation of a suitable Woodland Management Plan, based on the principles set out in the Outline Woodland Management Report (SHA Trees, August 2023) that accompanies the planning application. This includes the following key principles and measures:

- Promotion of public access to the woodland in a controlled and informed manner, accepting that it is already subject to regular access by local residents;
- Use of features such as dead hedges and/or barrier planting to deter access to more sensitive parts of the woodland, and to direct people along the existing footpath, with potential to formalise the path with woodchip to encourage people to keep to its alignment;
- Use of appropriate signage to encourage considerate and responsible use of the woodland, and to provide interpretation of the woodland's ecological and cultural importance;
- Introduction of litter management to keep the woodland clear of rubbish.

3.1.8 In addition to the above, the proposed development includes new areas of public open space, including play-equipped areas, which will be attractive to new and existing local residents alike.

3.1.9 Regarding potential for encroachment, the scheme has been designed to include a minimum 15m buffer from development in accordance with Natural England standing advice[22]. Dense, native thorny planting will be included within the 15m buffer to deter access to the woodland by people and pets. This buffer will also significantly reduce the potential for noise or light disturbance into the woodland. With regard to the latter, the lighting scheme has been specifically designed to ensure no light trespass into the ancient woodland.

3.1.10 In addition to the above, the woodland will be brought under a positive, ecologically and arboriculturally driven management regime in order to enhance its current biodiversity value (refer to Outline Woodland Management Report for details). This will include measures designed to increase the structural and floristic diversity of the woodland, as well as providing new habitat features for wildlife (e.g. deadwood, bat boxes, etc.).

[22] Natural England & Forestry Commission (2022) *'Ancient woodland, ancient trees and veteran trees: advice for making planning decisions'*

3.1.11 In summary, appropriate measures will be implemented to safeguard the LWS during both construction and following occupation of the new development, in addition to the implementation of enhancement measures, in accordance with Policy R03.

Priority Habitats, Ancient Woodland and Ancient/Notable Trees

Description

3.1.12 The site contains an area of woodland that is identified on the MAGIC database as 'Ancient and Semi-natural Woodland' (Arnold's Wood) and an area of the Priority Habitat 'Deciduous Woodland' adjacent to the site. Priority Habitat 'Hedgerows' have been identified within the site during the survey work undertaken. The hedgerows are discussed further within the relevant habitat section in Chapter 4 below.

3.1.13 An Arboricultural Consultant has undertaken a tree survey of the site and identified a single veteran Oak tree within the site (TPO No. T7 27/96 within SJA's 'Preliminary Tree Survey Schedule' – dated December 2022). Furthermore, a record of a single veteran Oak tree was returned from the Woodland Trust database, located approximately 0.1km to the south of the site.

Evaluation

3.1.14 As discussed above, the area of ancient woodland is to be fully retained and protected under the proposals. The area of deciduous woodland to the north of the site was noted to be subject to development during the 2022 survey work (planning application ref: 22/00453/FUL), and is therefore no longer a Priority Habitat. Nevertheless, a section of hedgerow (H6) and a number of trees will be retained along the site boundary adjacent to this development. In addition, the veteran Oak tree within the site will be retained, buffered and protected from development in accordance with the advice of the arboricultural consultant (see Outline Veteran Tree Strategy by SJA Trees, 2023).

3.1.15 Therefore, subject to the implementation of appropriate mitigation measures (as discussed in Section 3.2 above and below at Chapter 6) it is unlikely that any Priority Habitat or any notable/veteran trees will be significantly affected by the proposals.

National Habitat Network

Description and Evaluation

3.1.16 Natural England has produced a series of habitat network maps[23] which are designed to provide a useful baseline for development of a Nature Recovery Network, as required within the 25 Year Environment Plan (Defra, 2018). The habitat network maps are intended to help identify areas for future habitat creation and restoration at a landscape scale, considered alongside local datasets and knowledge. The maps are not intended to provide specific advice on where habitat should be created, but as a guide for local consideration. The network habitats highlight areas of existing Priority Habitat and associated habitat, and areas of creation and restoration. Outside of this are areas of network 'enhancement and expansion'.

3.1.17 Areas of the site, located at the east and south, are located within an area identified as 'Network Enhancement Zone 2', with Arnold's Wood Complex LWS identified as either 'Ancient Woodland' or 'PHI_Other'. Network Enhancement Zone 2 comprise areas of land connecting existing patches of primary and associated habitats which is less likely to be

[23] Natural England (2020) *National Habitat Network Maps User Guidance v.2 May 2020.*

suitable for creation of the primary habitat, and where action to improve biodiversity value through land management changes and/or green infrastructure provision can be targeted. This classification likely relates to the ancient woodland at the east of the site. As such, opportunities to improve the biodiversity value of the site through green infrastructure provision, which should be implemented throughout the site and at the eastern extent within the Zone 2 areas, have been incorporated within the scheme design, for example with additional native woodland, tree, hedgerow and shrub planting.

Summary

3.1.18 In summary, a proportion of Arnold's Wood Complex LWS and Priority Habitat 'Ancient and Semi-natural Woodland' is present on-site, which will be fully retained and protected under the proposals, with a minimum 15m buffer between the woodland edge and the development footprint. Furthermore, a single veteran Oak is present within the site which is to be retained, protected and buffered from development. Otherwise, the site itself is not subject to any statutory ecological designations and, subject to the implementation of appropriate mitigation measures (as described above), it is unlikely that any such designations in the surrounding area will be significantly affected by the proposals.

4 Habitats and Ecological Features

Background Records

4.1.1 The 2018 desktop study returned records of Bluebell *Hyacinthoides non-scripta* from within the on-site area of Arnold's Wood Complex LWS. Bluebell are protected from intentional picking, uprooting or destruction under Schedule 8 of the Wildlife and Countryside Act 1981 (as amended). The 2022 desktop study returned records of Bluebell and Black Poplar *Populus nigra* from within the 1km x 1km OS grid squares containing the site, albeit more specific information was not available that would allow the precise location of these records to be determined in relation to the site.

Overview

4.1.2 The habitats and ecological features present within the site are described below and evaluated in terms of whether they constitute an important ecological feature and their level of importance, taking into account the status of habitat types and the presence of rare plant communities or individual plant species of elevated interest. The likely effects of the proposals on the habitats and ecological features are then assessed. The value of habitats for the fauna they may support is considered separately in Chapter 5 below.

4.1.3 The following habitats/ecological features were identified within/adjacent to the site:

- Arable;
- Semi-improved Grassland;
- Hedgerows;
- Trees;
- Ponds;
- Watercourse;
- Ditches;
- Dense and Scattered Scrub;
- Tall Ruderal;
- Invasive Species;
- Woodland and Wooded Belts; and
- Hardstanding.

4.1.4 The locations of these habitat types and features are illustrated on Plan 5014/ECO3 and described in detail below.

Priority Habitats

4.1.5 Section 40 of the Natural Environment and Rural Communities (NERC) Act 2006 places duties on public bodies to have regard to the conservation of biodiversity in the exercise of their normal functions. In particular, Section 41 of the NERC Act requires the Secretary of State to publish a list of habitats which are of principal importance for conservation in England. This list is largely derived from the 'Priority Habitats' listed under the former UK Biodiversity Action Plan (BAP), which continue to be regarded as priority habitats under the subsequent country-level biodiversity strategies.

4.1.6 Of the habitats within the site the woodland **W2 (Arnold's Wood)**, hedgerows **H1-H3** and **H5** qualify as Priority Habitats. This is discussed further in the relevant habitat sections below.

Arable [Cropland – Non-cereal Crops]

Description

4.1.7 The site primarily comprises arable fields (see Photograph 1) and a review of historic aerial images shows the site appears to have had a varied agricultural management regime since 2000. The fields within the site have had altered management between grassland and arable on numerous occasions. The 2016 survey recorded a number of the fields as semi-improved grassland and the 2018 site visit found the majority of the site to be under arable cultivation and recently ploughed.

4.1.8 The arable field at the south-west of the site was noted to be longer-sward grassland of up to 1m during the September 2018 survey. The field was noted to be dominated by Yorkshire-fog *Holcus lanatus*, with Rough Meadow-grass *Poa trivialis*, Timothy *Phleum pratense*, Bent *Agrostis* sp., Nettle *Urtica dioica*, Cock's-foot *Dactylis glomerata*, Creeping Thistle *Cirsium arvense*, White Clover *Trifolium repens*, Broad-leaved Dock *Rumex obtusifolius*, False Oat-grass *Arrhenatherum elatius*, Vetch *Vicia* sp., Ribwort Plantain *Plantago lanceolata*, Meadow Buttercup *Ranunculus acris*, Greater Plantain *Plantago major* and Scentless Mayweed *Tripleurospermum inodorum*. During the 2021 update survey it was recorded that this field had been ploughed. The grassland is bound by hedgerows and areas of Bramble scrub *Rubus fruticosus agg.*, with the watercourse **WC1** running along the northern edge. Small areas of scattered scrub were recorded encroaching at the field edges, consisting of Willow *Salix* sp. and Oak *Quercus* sp. saplings.

4.1.9 At the time of the update Phase 1 survey in 2021, the arable land was noted to be ploughed. Furthermore, the field at the south-west of the site was noted to have been subject to mowing and grassland had established within the field at its western extent. The field at the south-west was noted to be herb-poor with a uniform sward height of approximately 15cm and dominated by Perennial Rye-grass *Lolium perenne*, with additional species including Yorkshire-fog, Cock's-foot, Creeping Cinquefoil *Potentilla reptans*, Sorrel *Rumex acetosa*, Creeping Buttercup *Ranunculus repens*, Hogweed *Heracleum sphondylium*, Dandelion *Taraxacum officinale* agg., Broad-leaved Dock and Creeping Thistle. Tall ruderal vegetation was noted within the grassland at the western extent, and it was very waterlogged in places. Species present include Yorkshire-fog, Annual Meadow-grass *Poa annua*, Bittercress *Cardamine* sp., Willowherb *Epilobium* sp., Hard Rush *Juncus inflexus*, Soft Rush *Juncus effusus*, Crane's-bill *Geranium* sp., Creeping Buttercup, Curled Dock *Rumex crispus* and Pendulous Sedge *Carex pendula*.

4.1.10 During the 2023 survey of the site, some areas of the arable land were noted to be re-colonising, which likely coincides with the period between ploughing and spraying. Species recorded include Red Fescue *Festuca rubra*, Smooth Meadow-grass *Poa pratensis*, Perennial Rye-grass, Yorkshire-fog, Annual Meadow-grass and False Oat-grass, with herb including Willowherb sp., Medick sp., Ragwort *Senecio sp*, Spear Thistle, Bramble, Cut-leaved Crane's-bill *Geranium dissectum*, Lesser Stitchwort *Stellaria graminea*, Cleavers *Galium aparine*, Broad-leaved Dock, Hogweed, Groundsel *Senecio vulgaris*, Common Vetch, White Clover, Field Pansy *Viola arvensis*, Lesser Trefoil *Trifolium dubium*, Ribwort Plantain, Prickly Sow-thistle *Sonchus asper*, Scentless Mayweed, Prickly Lettuce *Lactuca serriola*, Chickweed *Stellaria media*, Bittercress, Forget-me-not *Myosotis* sp., Shepherd's-purse *Capsella bursa-pastoris*, Dove's-foot Crane's-bill *Geranium molle*, Bristly Oxtongue *Helminthotheca echioides*, Common Mouse-ear *Cerastium fontanum*, Creeping Thistle, Creeping Buttercup,

Dock sp., Long-stalked Crane's-bill *Geranium columbinum*, Red Dead-nettle *Lamium purpureum* and Speedwell *Veronica* sp.

4.1.11 Associated with the arable land are grass margins, the majority of which are narrow and measure approximately 0.5-2m in width. The arable field margins are largely bordered by areas of Bramble *Rubus fruticosus* agg. Species present within the field margins include Yorkshire-fog *Holcus lanatus*, Smooth Meadow-grass *Poa pratensis*, Common Bent *Agrostis capillaris*, Perennial Rye-grass Lolium perenne, Timothy *Phleum pratense*, Dock *Rumex* sp., Willowherb *Epilobium* sp., Ragwort *Senecio* sp., Creeping Thistle *Cirsium arvense,* Nettle *Urtica dioica*, Hogweed *Heracleum sphondylium*, Meadow Crane's-bill *Geranium pratense*, Creeping Buttercup *Ranunculus repens*, Selfheal *Prunella vulgaris* and White Clover *Trifolium repens*.

Evaluation

4.1.12 Although not currently under crop cover, the arable fields are subject to intensive agricultural management, including herbicide spraying and ploughing twice a year, resulting in large areas of bare ground. The field margins are relatively narrow and are not managed for the benefit of biodiversity. Species within the field margins are common and widespread at a local and national level. As such, the arable fields and their grassland margins do not constitute an important ecological feature and their loss to the proposals is of minor ecological significance.

Semi-improved Grassland [Grassland – Modified Grassland]

Description

4.1.13 Small areas of semi-improved grassland are present within the site. A small area of semi-improved grassland is present towards the north-east of the site. The grassland was noted to have a tussocky sward of approximately 10-15cm, comprising Creeping Bent *Agrostis stolonifera*, Yorkshire-fog, Tufted Hair-grass *Deschamsia cespitosa*, Red Fescue, Meadow-grass *Poa* sp., Couch-grass *Elymus* sp., Perennial Rye-grass, Timothy, Red Clover *Trifolium pratense*, Hedge Bindweed *Calystegia sepium*, Creeping Buttercup, Common Mouse-ear, Creeping Thistle, Willowherb, Dock and Silver Birch *Betula pendula* saplings. Residents from the adjacent northern properties have also undertaken works within the grassland, with scrub removal, piles of wood chipping and pallets, grass cutting and amenity planting noted.

Evaluation

4.1.14 Overall, the grassland supports a low diversity of common and widespread species and based on the type and abundance of species present it can be classified as semi-improved grassland[24]. As such, the grassland does not constitute an important ecological feature. The loss of grassland to the proposals is therefore of minor ecological significance and new areas of species-rich grassland are included within the proposals, which will be of greater ecological value .

Hedgerows

Description

4.1.15 Six hedgerows are present within the site (see Photographs 2-7), three of which are located along the site boundary. The hedgerows are described in more detail in Table 4.1 below.

[24] Natural England (2010) 'Higher Level Stewardship – Farm Environment Plan (FEP) Manual', 3rd Edition

Table 4.1. Hedgerow descriptions.

No.	H	W	Woody species	Avg. per 30m*	Ground flora & climbers	Associated features	Comments (including structure / management)	Likely to qualify#
H1	6-14m	3-4m	Blackthorn, Field Maple, Hawthorn , Elder, Oak, Ash, Holly	7	Bramble, Nettle, Dog-rose, F. Oat-grass, Ivy, Tiimothy, Bulbous Buttercup	<10% gaps, ditch, standard trees, hedge bank	Not recently managed and outgrown. Dense with semi-mature to mature trees. Some ploughing at the southern extent. Shallow earth bank (~1m wide x 0.5m height).	**Y**
H2	4-6m	3-5m	Blackthorn (D), Oak, Field Maple, Ash, Hawthorn, Hazel, Elder, Goat Willow	6	Dog-rose, Bramble	Ditch, <10% gaps, standard trees	Generally dense, unmanaged. 1x10m gap for gate.	**Y**
H3	10m	3m	Blackthorn, Oak, Ash, Field Maple, Hawthorn, Elder, Elm, Hazel, Dogwood, Cherry Laurel	5	Ivy, Cr. Buttercup, Bramble, Dog-rose, Ground Ivy	<10% gaps, parallel hedge within 15m, standard trees, connects with hedge	No recent management and largely comprising young trees. Adjacent to road.	**Y**
H4	12-14m	3m	Oak, Hawthorn	2	Bramble	Hedge bank, <10% gaps, standard trees, connects with woodland and pond	Line of trees adjacent to Arnold's Wood LWS. Informal footpath to north.	**N**
H5	4-12m	3-4m	Blackthorn, Hawthorn, Elder, Horse-chestnut, Ash, Oak, Poplar, Cherry	6	Butterfly-bush, Bramble, Willowherb, Bristly Oxtongue, Creeping Cinquefoil, Dove's-foot Crane's-bill, Tufted Hair-grass, S. Rush, Clustered Dock, F. Ot-grass, Pendulous Sedge, P. Rye-grass	Ditch, 10% gaps, standard trees, connects to woodland, connects to pond	Line of trees with scrub understorey along the north-western boundary, adjacent to A1023. Gate for access present.	**Y**
H6	4m	2m	Hawthorn, Blackthorn, Silver Birch, Willow, Ash, Oak	5	Bramble	10% gaps, ditch	Defunct hedgerow with scrub and young trees. Hedgerow gappy and somewhat outgrown.	**N**

Woody species (as listed under Schedule 3 of the Hedgerows Regulations 1997) and woodland ground flora species (as listed under Schedule 2 of the Hedgerows Regulations 1997) underlined, y = young, sm = semi-mature, m = mature, pv = possible veteran, B = bank, W = wall, br = bridleway, f/p = footpath, b/w = byway, (D) = dominant species

* estimated average number of woody species (as listed under Schedule 3 of the Hedgerows Regulations 1997) in any one 30m stretch

likely to qualify – as 'important' under the wildlife and landscape criteria of the Hedgerows Regulations 1997

Evaluation

4.1.16 From a preliminary appraisal, **H1-H3, H5** and **H6** are assessed to be species-rich[25] with **H1-H3** and **H5** likely to qualify as ecologically 'important' under the Hedgerows Regulations 1997, based on the number of woody species and associated features. Hedgerow **H4** is unlikely to qualify as important under the Regulations based on the number of woody species, and **H6** is unlikely to qualify as important based on the associated features.

4.1.17 All of the hedgerows within the site are likely to qualify as a Priority Habitat based on the standard definition[26], which includes all hedgerows (>20m long and <5m wide) consisting predominantly (≥80%) of at least one native woody species. It has been estimated that approximately 84% of countryside hedgerows in GB qualify as a Priority Habitat under this definition.[26] On this basis, the hedgerows within the site constitute important ecological features, although given the relatively limited network present, are only of importance at the local level.

4.1.18 The proposals incorporate the full retention of hedgerows **H2** and **H4**. Sections of hedgerows **H1**, **H3** and **H6** will be removed for construction of a pedestrian access, access road and for parking associated with the development respectively. Furthermore, the majority of **H5** will be removed for the construction of the main access and new roundabout for the development. Retained hedgerows will be protected during the construction phase of the proposals as per the recommendations included at Chapter 6 below. Furthermore, the proposals incorporate new planting which will link with and strengthen the existing/retained hedgerows, create new species-rich hedgerows and will aim to enhance the value of these features for biodiversity.

Trees

Description

4.1.19 A number of trees were recorded within the site, primarily associated with the hedgerows and areas of woodland. Trees recorded include Hybrid Poplar *Populus* sp., Ash *Fraxinus excelsior*, Oak *Quercus* sp., Pedunculate Oak *Quercus robur*, Goat Willow *Salix caprea*, Horse-chestnut *Aesculus hippocastanum*, Walnut *Juglans regia* and Sweet Chestnut *Castanea sativa*. Standard trees within the hedgerows were noted to range from semi-mature to mature in age, with a coppiced Hornbeam *Carpinus betulus* and Pedunculate Oak, situated within the on-site section of Arnold's Wood Complex, noted to be of advanced age, albeit not currently identified as ancient/veteran.

4.1.20 A number of additional semi-mature to mature trees located outside the hedgerows were also recorded (largely at the margins of the site and boundaries between arable fields comprising Ash, Oak, Horse Chestnut, Walnut, Sweet Chestnut, Silver Birch, Willow *Salix* sp., Cherry *Prunus avium* , Field Maple *Acer campestre* and Hornbeam. A single veteran Oak tree with extensive deadwood in the crown is present (tree 151 on the arboricultural plans) at the western end of ditch **D5** (see below).

Evaluation

4.1.21 The veteran Oak tree is an irreplaceable habitat and therefore an important ecological feature, albeit likely of no more than local to district level value given the relatively high number of veteran trees present in Brentwood. The more mature trees recorded within the

[25] i.e. five or more native woody species within a 30m length (or four or more in Northern England) – FEP Manual

[26] Based on: Biodiversity Reporting and Information Group (2011) '*UK Biodiversity Action Plan (BAP) Priority Habitat Descriptions',* ed. Ant Maddock

hedgerows are of ecological interest in their own right, albeit at present do not constitute important ecological features. Other trees located outside the hedgerows that are relatively small in size being young to semi-mature in nature are currently of limited ecological interest, and also do not qualify as important ecological features.

Ponds [Lakes – Ponds (Non-priority Habitat)]

Description

4.1.22 Three ponds are located within the site (see Photographs 8-10), along with a total of five ponds located off-site within 500m of the site boundary, labelled **P1** to **P8** on Plan 6591 /ECO6. The ponds present within the site (**P1**-**P3**) are described in Table 4.2 below:

Table 4.2. Pond descriptions.

Pond no.	Brief description	Approx. size	Shading	Aquatic/ emergent & marginal vegetation	Comments
P1	Field pond	4x5m	Not shaded.	Vegetation recorded during 2021 survey includes Hard Rush, Creeping Buttercup, Willowherb and Curled Dock. Floating Sweet-grass *Glyceria fluitans* and green algae also present.	Small ephemeral pond within semi-improved grassland. Pond is a shallow depression, approximately 20cm deep. Pond was noted to be dry during 2022 survey work.
P2	Field pond	80x15m	Some light shading from adjacent scrub, mostly open.	Abundant Floating Sweet-grass but no other aquatic vegetation noted in 2021. Marginal vegetation includes Tufted Hair-grass, Willowherb, Willow and Bramble.	Shallow ephemeral pond located in scrub margin between arable fields. Pond was noted to be dry during September 2018 survey.
P3	Field pond	45x50m	Shaded along margins by adjacent hedgerow and scrub.	*Iris* sp., Bullrush *Typha latifolia*, Redshank *Persicaria maculosa*, Old Man's Beard *Clematis vitalba*, Willowherb and Soft-rush noted in September 2021. Abundant Bulrush at pond edge, and no other aquatic vegetation recorded in 2021. Marginal vegetation includes Willow scrub, Soft Rush, Hard Rush, Bramble and Bristly Oxtongue.	Ephemeral pond located adjacent to boundary between arable fields. Lots of leaf litter noted in pond. Pond noted to be dry during the September 2018 survey.

Evaluation

4.1.23 Ponds **P1** and **P2** are shallow ephemeral waterbodies which support a limited abundance of aquatic vegetation and are likely to be subject to contamination from agricultural runoff. Pond **P3** supports a number of aquatic and marginal species, however it is also likely to be ephemeral and subject to agricultural runoff. As such, the on-site ponds do not represent good quality examples of this habitat type and do not qualify as important ecological features, and the partial loss of the ponds to the proposals is of negligible ecological significance. New pond creation is included within the proposals for the benefit of biodiversity. Potential for the ponds to support faunal species such as amphibians is discussed below in Chapter 5.

Watercourse [Other Rivers and Streams]

Description

4.1.24 A watercourse (**WC1**) is present at the site boundary adjacent to the A1023, and continues along the southern boundary into the area of off-site woodland (**W3 -** see Photograph 11). The watercourse has earth banks of varying steepness along its length which range from steep banks of ~1-1.5m height and more shallow banks measuring <0.5m in places. In places, the stream banks and bed are artificially reinforced with concrete-composite. In other parts, the substrate comprises silt and gravel/pebbles. The water depth was approximately 20-30cm at the time of the update surveys, however there was recent substantial rainfall during the 2021 survey, and a ~5cm depth and slow flow was noted during the September 2018 survey. The watercourse is shaded by the adjacent vegetation, including the off-site hedgerow on the adjacent bank, such that no aquatic vegetation was recorded during the Phase 1 surveys.

4.1.25 The bank tops comprise a mixture of grass, tall ruderal vegetation and localised dense scrub. Species recorded include Pendulous Sedge, Cock's-foot, False Oat-grass, Smooth Meadow-grass, False Brome *Brachypodium sylvaticum*, Yorkshire-fog, Wood Avens *Geum urbanum*, Rosebay Willowherb *Chamaenerion angustifolium*, Hart's-tongue Fern *Asplenium scolopendrium*, Hedge Bindweed, Ragwort, Dock and Nettle. The stream itself is shaded by trees and scrub located along and adjacent to the banks. Tree and scrub species present include dense Bramble, Dog-rose *Rosa canina*, Oak, Field Maple, Willow, Silver Birch, Sycamore *Acer pseudoplatanus*, Ash, Butterfly-bush *Buddleja davidii*, Hazel *Corylus avellana* and Hawthorn *Crataegus monogyna.* Himalayan Balsam *Impatiens glandulifera* was also noted along the watercourse.

Evaluation

4.1.26 The watercourse is somewhat narrow and shallow in places with naturalistic features, and there are localised areas where the bank and bank tops are vegetated. However, numerous stands of the invasive species Himalayan Balsam are also present along its length and within the site. The watercourse is not ecologically-designated and does not qualify as a Priority Habitat, and therefore it does not constitute an important ecological feature. Nevertheless, the watercourse forms a linear wildlife corridor providing connectivity with the local landscape, including hedgerows, woodland, railway corridor and River Wid to the north and is of inherent ecological value.

4.1.27 The watercourse is largely retained under the proposals, with a small section to be culverted in order to construct an access road to the south-western land parcel. It is recommended that the culvert be designed to maintain the natural river bed level, slope and width, with consideration given to the provision of fish resting places and mammal ledges. In addition, no development is proposed along the western boundary, with native scrub and grassland proposed providing a buffer zone. Furthermore, appropriate safeguards will be implemented during development works including pollution control measures such as filter drains or petrol/water interceptors to minimise the risk of polluted surface water run-off entering local watercourses.

4.1.28 Development of the site provides the opportunity to enhance the watercourse through the implementation of an ecologically sensitive management plan, which would include the removal of non-native species such as Himalayan Balsam. A management regime can also be implemented to ensure that the stream is not over-shaded along long sections, enhancing the habitat compared to the current situation. In addition, the existing agricultural management will be removed, potentially resulting in an increase in water

quality in the long-term. Therefore, the temporary impact on habitat quality resulting from the development is expected to be of minor ecological significance.

Ditches

Description

4.1.29 A ditch (**D1**) is present within the scrub margin between the two most westerly arable fields. The ditch is approximately 1-1.5m wide with shallow earth banks up to 1m in height. The ditch is shaded by Willow scrub and there is a small margin between the ditch and adjacent arable land. The ditch is devoid of aquatic vegetation and filled with leaf litter. Water depth was noted to be approximately 10-20cm during the 2018 and 2021 update surveys. It is likely that some of the ditch dries out and the northern extent was noted to be dry during the September 2018 survey. Species recorded during the 2021 survey include an abundance of Bramble, with Yorkshire-fog, Tufted Hair-grass, Sedge *Carex* sp., Bristly Oxtongue, Smooth Sow-thistle *Sonchus oleraceus*, Hogweed, Nettle, Hard-rush, Soft-rush, Willowherb, Mint *Mentha* sp., Creeping Thistle, Teasle *Dipsacus fullonum*, Willow sapling, Bullrush *Typha latifolia*, Redshank *Persicaria maculosa*, Tufted Hair-grass, Gypsywort *Lycopus europaeus*, Creeping Bent, Dock, Rosebay Willowherb and scrub including Dog-rose, Elder *Sambucus nigra*, Bramble and Old Man's Beard recorded in 2018.

4.1.30 A number of dry ditches are present throughout the site, associated with hedgerow **H2** (**D2**), woodland **W1** (**D3**) and **W2** (**D4**), wooded belt **WB2** (**D5**) and within the off-site woodland **W3**. The ditch associated with **H2** was noted to have shallow earth banks measuring approximately 1m wide and 0.5m high. No vegetation was noted in the ditch associated with **H2**. The dry ditch associated with wooded belt (**WB2**) was noted during the 2018 and 2022 update survey work. During the September 2018 survey work, the ditch was recorded to be ~0.5m wide with tall ruderal vegetation including Couch-grass, Creeping Bent, Tufted Hair-grass, Yorkshire-fog, Soft-rush, Creeping Thistle, Ragwort and Gypsywort.

Evaluation

4.1.31 The wet ditch contains only shallow water with very limited aquatic/marginal species recorded, such that **D1** likely dries out annually. Nevertheless, **D1** likely forms a linear wildlife corridor providing connectivity with the local landscape, including the on-site and adjacent woodland, and is partially retained under the proposals. The remaining ditches were noted to be dry at the time of the survey, and therefore did not support any aquatic or emergent vegetation. Therefore, none of the ditches constitute an important ecological feature, and their loss to the proposals would be of negligible ecological significance. Nevertheless, mitigation measures will be implemented to safeguard all of the retained ditches from any potential pollution event during construction (see Chapter 6).

Dense and Scattered Scrub [Heathland and Shrub – Mixed Scrub]

Description

4.1.32 Areas of dense and scattered scrub are present within the site, largely concentrated between arable fields and at the site boundaries. The species present within these areas include Bramble, Hawthorn, Blackthorn *Prunus spinosa*, Dog-rose, Elder, Hazel, Butterfly-bush, Silver Birch, Field Maple, Willow and Oak. An area of dense Bramble scrub was also noted to have extended into the site, ~4-6m, along the watercourse (**WC1**) during the December 2021 survey.

4.1.33 An area of dense scrub with trees was noted to form the majority of the northern boundary during the September 2018 and 2021 survey. The boundary was noted to be 10-15m in height, with infrequent trees and scrub below including Hawthorn, Bramble, Oak saplings, Elder, Cherry Laurel *Prunus laurocerasus*, Firethorn *Pyracantha* sp. and Blackthorn. Tree species recorded include Oak, Willow, Field Maple, Silver Birch, Eucalyptus *Eucalyptus* sp., Hornbeam and Ash.

Evaluation

4.1.34 The scrub comprises a limited number of common and widespread species and this habitat does not qualify as an important ecological feature and its loss to the proposals is not of ecological significance. Nonetheless, due to the location and extent of scrub present on-site this habitat may provide suitable foraging, commuting and refuge habitat to species such as nesting birds, herptiles and Dormouse. As such, appropriate mitigation measures are outlined at Chapter 6 to safeguard any animals which may be affected during the loss of this habitat.

Tall Ruderal [Sparsely Vegetated Land – Ruderal/Ephemeral]

Description

4.1.35 Small areas of tall ruderal were noted at the field margins and adjacent to areas of scrub during the September 2018 and 2021 survey. The tall ruderal was noted to be ~0.5-1.5m in height and comprise a limited diversity of common and widespread species including Nettle, Ragwort, Bristly Oxtongue, Creeping Thistle, Hogweed, Broad-leaved Dock, Curled Dock, Smooth Sow-thistle, Prickly Sow-thistle *Sonchus asper* and Willowherb. Other species recorded during the survey work in September 2018 include Redshank, Mugwort *Artemisia vulgaris*, Smooth Sowthistle, Broad-leaved Dock, Creeping Cinquefoil *Potentilla reptans*, Teasle, Bristly Oxtongue, Pendulous Sedge, Fleabane *Erigeron* sp., Mint, Greater Plantain, Creeping Buttercup, Dandelion *Taraxacum officinale* agg., St John's-wort *Hypericum* sp., Marsh Thistle *Cirsium palustre*, Goose-foot *Chenopodium* sp., Ivy *Hedera helix*, Hard Rush, Soft-rush, Tufted Hair-grass, Deadly Nightshade *Atropa belladonna*, Hedge bindweed and Rosebay Willowherb.

Evaluation

4.1.36 The tall ruderal habitat does not qualify as an important ecological feature and its loss to the proposals is of negligible ecological significance. Nonetheless, due to the location and extent of tall ruderal present on-site this habitat may provide suitable foraging, commuting and refuge habitat for herptiles. As such, appropriate mitigation measures are outlined at Chapter 6 to safeguard any animals which may be affected during the loss of this habitat.

Woodland and Wooded Belts [Woodland and Forest]

Description

4.1.37 Two areas of woodland are present within the site, as well as an adjacent off-site area of woodland (**W3**). The areas of woodland include a small woodland block at the far west of the site (**W1** - see Photograph 12), as well as an area of Arnold's Wood Complex LWS / ancient woodland located at the east (**W2** - see Photograph 13). Woodland **W1** is a small pocket of woodland located adjacent to the A1023. The woodland has a fairly dense understorey with young to semi-mature trees, and an impoverished ground flora due to heavy shading from the vegetation. Species recorded during the September 2018 survey include Ash, Oak and Horse-chestnut, with Blackthorn and Hawthorn in the understorey.

Ground-flora noted was limited to Ivy, Cleavers *Galium aparine* and Bramble. A number of brash piles were noted within **W1**, along with an abundance of litter along the woodland edge adjacent to the footpath.

4.1.38 During the September 2018 survey, Arnold's Wood Complex LWS (**W2**) was noted to predominantly comprise Hornbeam with some Oak and Cherry trees, and very limited understorey and ground-flora. Species noted within the understory include Holly *Ilex aquifolium*, Elder, Hawthorn and Hazel. Trees noted along the western boundary of the woodland include Hybrid Poplar, Oak, Willow, Silver Birch, Hornbeam and Ash, with scrub including Blackthorn, Bramble and Dog-rose. Some of the Hornbeam trees were noted to have been previously coppiced. Some deadwood was recorded, along with an earth bank along the eastern and western boundaries of the woodland. Informal footpaths are present within the woodland. A specific woodland botanical survey was undertaken in April 2022 which noted the woodland to be largely as previous described. A shallow dry ditch was noted along the western edge, and the deadwood and informal paths are still present, with additional evidence of informal use including den building. The canopy layer comprised the same species and composition as previously described with occasional Silver Birch and Ash, dead Field Maple and possible ancient/veteran/notable Pedunculate Oak. The understorey remains very sparse, with Blackthorn and young Hornbeam also noted, and the ground-flora was also noted to be generally sparse with large areas of bare ground and leaf litter. Species recorded including locally abundant Bluebell *Hyacinthoides non-scripta* and Wood Anemone *Anemone nemorosa*, with Lesser Celandine *Ficaria verna*, Bramble, Ivy, Wood Avens, Red Campion *Silene dioica*, Honeysuckle *Lonicera periclymenum*, Lords-and-Ladies *Arum maculatum*, Cleavers, Moschatel *Adoxa moschatellina*, Chickweed *Stellaria media*, dense Nettle at the north-east, and some stands of Spanish Bluebell *Hyacinthoides hispanica*.

4.1.39 The adjacent off-site woodland (**W3**) predominately comprises native broadleaved species, with a canopy and understorey layer, and limited ground-flora due to heavy shading from the canopy vegetation. The woodland also contains a single pond (**P4**) and a number of ditches which were noted to be dry during the 2022 survey. Species recorded within the woodland during the September 2018 survey include Oak, Silver Birch and Willow, along with Willow, Oak, Field Maple, Elder, Blackthorn and Hawthorn along the woodland edge.

4.1.40 Two wooded belts are also present within the site, with **WB1** located towards the eastern extent of the site and **WB2** present within the centre of the site (see Photographs 14 and 15). The wooded belt **WB1** was noted to comprise trees and scrub including Ash, Oak, Field Maple, Willow, Hawthorn, Dog-rose, Bramble, Elder during the September 2021 survey. Some deadwood was also noted. Ground-flora associated with the wooded belt includes Yorkshire-fog, Meadow-grass, Common Bent, Timothy, Creeping Thistle, Dock, Willowherb, Ragwort and White Clover. The wooded belt **WB2** was noted to comprise trees and a dense understorey of scrub including Ash, Oak, Silver Birch, Field Maple, Willow, Hawthorn, Dog-rose, Bramble and Elder during the September 2021 survey. Ground-flora noted includes Prickly Sowthistle *Sonchus asper*, Creeping Thistle, Willowherb, Creeping Bent, Yorkshire-fog, Nettle, Goose-foot, Bristly Oxtongue.

Evaluation

4.1.41 The area of woodland **W1** is small in extent and it comprises a limited diversity of woodland species. Woodland **W1** does not qualify as a Priority Habitat and does not constitute an important ecological feature.

4.1.42 Woodland **W2** forms part of the Arnold's Wood Complex LWS. It qualifies as a Priority Habitat and is identified as 'ancient' in its citation as well as on the MAGIC database, and is

therefore an irreplaceable habitat. This woodland is an important ecological feature of district level value.

4.1.43 Woodland **W3** is located off-site and is not identified as ancient or as a Priority Habitat and it does not constitute an important ecological feature, albeit the woodland is of inherent ecological value.

4.1.44 The wooded belts are of intrinsic ecological value but do not constitute important ecological features, albeit as noted previously a veteran Oak tree is present at the western end of **WB2**.

4.1.45 Overall, **W2** forms an important ecological feature of value at the district level and will be subject to specific safeguarding measures for ancient woodland. Furthermore, **W1**, **W2** and **W3**, along with **WB1** are retained under the proposals, and will be buffered from development with new native scrub, woodland and grassland planting as part of the landscape scheme. Furthermore, the opportunity exists as part of the proposals to bring the on-site woodlands and wooded belts under an ecologically sensitive management regime to improve age and species diversity.

Invasive Species

Description

4.1.1 Frequent stands of Himalayan Balsam were recorded along watercourse **WC1** within the site and along the western boundary. Himalayan Balsam was also recorded along the section of **WC1** which extends off-site, and within at least one of the ditches within **W3**. A single stand of Spanish Bluebell was also noted within **W2** during the woodland botanical survey in April 2022, along with stands of Spanish Bluebell and ornamental Bluebell along the northern boundary during 2023. Himalayan Balsam is listed under Schedule 9 Part II of the Wildlife and Countryside Act 1981 (as amended) and Spanish Bluebell is a non-native, invasive species of particular concern in an ancient woodland context due to its ability to hybridise with native Bluebell.

Evaluation

4.1.2 Himalayan Balsam is listed under Schedule 9 Part II of the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to cause to grow in the wild any plant listed on the schedule. Further discussion of this issue along with a number of recommendations for removing these species are included at Chapter 6.

Hardstanding [Urban – Developed Land; Sealed Surface]

Description and Evaluation

4.1.3 Small and infrequent areas of hardstanding are present within the site. The hardstanding is predominantly devoid of vegetation, aside from occasional cracks. These cracks and gaps support small areas of colonising vegetation, restricted to common and widespread species, and are therefore of negligible ecological value. As such, they do not form important ecological features and their removal under the proposals is of negligible ecological significance.

Habitat Evaluation Summary

4.1.4 On the basis of the above, the following habitats within and adjacent to the site are considered to form important ecological features:

Table 4.3. Evaluation summary of habitats forming important ecological features.

Habitat	Level of Importance
Hedgerows	Local
Veteran Tree	Local
Woodland W2 (Arnold's Wood)	District

4.1.5 Other habitats present within the site include arable, semi-improved grassland, ponds, ditches, scrub, tall ruderal, introduced shrub and hardstanding. However, these habitats do not form important ecological features.

5 Faunal Use of the Site

Overview

5.1.1 During the survey work, general observations were made of any faunal use of the site with specific attention paid to the potential presence of protected or notable species. Specific survey work was undertaken in respect of Badgers, bats, Dormouse, Water Vole, Otter, reptiles and Great Crested Newt, with the results described below.

Priority Species

5.1.2 Section 40 of the Natural Environment and Rural Communities (NERC) Act 2006 places duties on public bodies to have regard to the conservation of biodiversity in the exercise of their normal functions. In particular, Section 41 of the NERC Act requires the Secretary of State to publish a list of species which are of principal importance for conservation in England. This list is largely derived from the 'Priority Species' listed under the former UK Biodiversity Action Plan (BAP), which continue to be regarded as priority species under the subsequent country-level biodiversity strategies.

5.1.3 During the survey work undertaken, the Priority Species Dormouse, Slow-worm *Anguis fragilis*, Grass Snake *Natrix natrix*, Common Lizard *Zootoca vivipara*, Starling *Sturnus vulgaris*, Song Thrush *Turdus philomelos*, Skylark *Alauda arvensis*, House Sparrow *Passer domesticus*, Bullfinch *Pyrrhula pyrrhula*, Linnet *Caduelis cannabina*, Soprano Pipistrelle *Pipistrellus pygmaeus*, and possible *Myotis* sp. and *Nyctalus* sp. albeit some bat recordings could not be attributed to species level, were recorded within the site. This is discussed further below.

Bats

5.1.4 **Legislation.** All British bats are classed as European Protected Species under the Conservation of Habitats and Species Regulations 2017 (as amended) and are also listed under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). As such, both bats and their roosts (breeding sites and resting places) receive full protection under the legislation. If proposed development work is likely to result in an offence a licence may need to be obtained from Natural England which would be subject to appropriate measures to safeguard bats. Given all bats are protected species, they are considered to represent important ecological features. A number of bat species are also considered S41 Priority Species.

5.1.5 **Background Records.** No specific records of bats from within or adjacent to the site were returned from the desktop study. Information received from the desktop study returned records of Serotine *Eptesicus serotinus*, *Myotis* sp., Natterer's Bat *Myotis nattereri*, Leisler's Bat *Nyctalus leisleri*, Common Pipistrelle *Pipistrellus pipistrellus*, Soprano Pipistrelle, Brown Long-eared Bat, Long-eared Bat *Plecotus* sp. and Pipistrelle *Pipistrellus* sp. within 2km of the site. The closest record is for a Common Pipistrelle, recorded in 2016, located approximately 0.5km to the north of the site.

5.1.6 Survey Results

Visual Inspection Surveys

Trees

5.1.7 A number of semi-mature and mature trees are present on site. The results of the tree assessment work undertaken at the site between 2018 and 2021 are illustrated on Plan 5014/ECO3 and summarised in Table 5.1 below:

Table 5.1. Tree inspection results.

Tree No.	Species	Age	Potential Roost Features	Suitability
T1	Field Maple	Semi-mature	Limb fusion	Low
T2	Field Maple	Semi-mature	Restricted view	Low
T12	Oak	Young	Dense Ivy coverage	Low
T30	Oak	Semi-mature	Large rot hole, split limbs, woodpecker holes, deadwood, Ivy covering and stripped bark	High
T36	Hornbeam	Semi-mature	Rot holes	Low
T43	Oak	Mature	Rot and woodpecker holes	Moderate
T45	Oak	Semi-mature	Dense Ivy coverage	Low
T55	Oak		Dense Ivy coverage	Low
T56	Oak	Semi-mature	Lifted bark	Low
T60	Oak	Mature	Dense Ivy coverage	Low
T62	Oak	Mature	Deadwood, possible cavity and dense Ivy	Low
T67	Lombardy Poplar	Semi-mature	Dense Ivy coverage	Low
T68	Oak	Semi-mature	Dense Ivy coverage	Low
T69	Ash	Mature	Dense Ivy coverage	Low
T70	Horse-Chestnut	Semi-mature	Rot holes and lifted bark	Low
T71	Oak	Semi-mature	Cracks	Low
T151	Oak	Mature	Broken limb, multiple deadwood wounds, rot holes, cracks and fissures plus peeling bark	High
T154	Oak	Mature	Rot hole and peeling bark	Moderate
T155	Ash	Mature	Woodpecker hole, peeling bark and deadwood	Moderate
T156	Oak	Deadwood	Peeling bark	Low
T159	Oak	Mature	Broken limbs with shallow split/cracked limbs	Low
T160	Oak	Semi-mature	Fused trunk	Low
T163	Oak	Mature	Woodpecker hole, peeling bark and deadwood	Moderate
T165	Oak	Mature	Rot hole in trunk leading to large cavity	High
T168	Oak	Dead	Crack and hole in trunk, woodpecker holes, split limb and hollow and lifted bark	Moderate

Tree No.	Species	Age	Potential Roost Features	Suitability
T169	Oak	Mature	Lifted bark	Low
T170	Ash	Mature	Coppiced Ash with woodpecker hole	Moderate
T171	Unknown	Deadwood	Two woodpecker holes, split limb and lifted bark	Moderate
T172	Ash	Mature	Woodpecker holes	Moderate
T173	Oak	Mature	Split limbs, lifted bark and cracks	Moderate
T174	Ash	Mature	Dense Ivy coverage	Low
T175	Ash	Young	Rot holes	Low
T177	Oak	Mature	Split limbs	Low
T180	Oak	Semi-mature	Cracks and lifted bark	Low
T181	Oak	Semi-mature	Lifted bark and cracks	Low
T182	Oak	Unknown	Peeling bark and cracked limb	Low
T183	Oak	Semi-mature	Dense Ivy coverage	Low
T184	Oak	Mature	Rot hole, dead limbs with splits and peeling bark	Low
T185	Oak	Mature	Dead limbs with splits and peeling bark	Low
T186	Oak	Mature	Dead limbs with splits and peeling bark	Low
T187	Oak	Mature	Split limbs, Woodpecker hole	Moderate
T188	Oak	Mature	Dead limbs with splits and peeling bark	Low
T228	Oak	Mature	Limb tear leading to cavity, peeling bark and limb tears	High
T236	Elder	Mature	Cracks	Moderate
T242	Oak	Semi-mature	Lifted bark	Low
T243	Oak	Mature	Rot hole in limb leading to potential crevice	Low
T244	Oak	Semi-mature	Large hole at the base of the trunk	Moderate
T245	Oak	Semi-mature	Dense Ivy coverage	Low
T246	Oak	Mature	Split limbs, rot holes and dense Ivy coverage	High
T250	Oak	Mature	Split limbs, rot holes and cracks	Moderate
T251	Oak	Semi-mature	Dense Ivy coverage	Low
T243	Oak	Mature	Rot hole	Low
T254	Oak	Mature	Several knot holes and damaged limb	Moderate
T256	Oak	Mature	Several split limbs	Moderate
T266	Oak	Over-mature	Multiple rot holes and splits in trunk	High
T269	Oak	Semi-mature	Lifted bark	Low
T271	Oak	Mature	Dense Ivy coverage	Low
T283	Oak	Semi-mature	Dense Ivy coverage	Low
T288	Cherry	Mature	Cracks	Low

Tree No.	Species	Age	Potential Roost Features	Suitability
T290	Oak	Semi-mature	Split limbs	Low
G35	Unknown	Deadwood	Rot holes, lifted bark and cracks	Low
Tb	Oak	Mature	Rot holes	Low

Dusk and Dawn Surveys

Emergence / re-entry surveys (tress)

5.1.8 A number of trees exhibit moderate-high suitability for roosting bats, and are identified as being removed under the proposals. These trees were therefore subject to further survey work in the form of dusk emergence and dawn re-entry surveys. The results of the dusk emergence and dawn re-entry surveys are summarised in Table 5.2 below.

Table 5.2. Emergence / re-entry survey results.

Tree	Date	Sunset/ sunrise	Emergence/ re-entry	Summary of other activity
T30	22 June 2023 (dusk	Sunset: 21:20	**None**	Occasional passes by Common Pipistrelle.
	11 July 2023 (dusk)	Sunset: 21:14	**Total of 5x Common Pipistrelle emergences, with 3x bats recorded at 21:30; followed by 2x bats emerging at 21:45 from dead limb.**	Frequent passes by Common Pipistrelle.
	8 August 2023 (dawn)	Sunrise: 05:47	**None**	Occasional passes by Common and Soprano Pipistrelle.
T266	23 June 2023 (dawn)	Sunrise: 04:45	**Single Common Pipistrelle re-entry at 04:08.**	Very occasional passes by Common Pipistrelle.
	12 July 2023 (dawn)	Sunrise: 04:54	**Total of 2x Common Pipistrelle re-entries into deadwood at 03:19 and 03:22 respectively.**	Very occasional passes by Common Pipistrelle.
	7 August 2023 (dusk)	Sunset: 20:38	**None**	Very occasional passes by Common Pipistrelle.
T155	12 July 2023 (dawn)	Sunrise: 04:54	**None**	Frequent activity and passes by Common Pipistrelle and occasional passes by Soprano Pipistrelle.
	7 August (dusk)	Sunset: 20:38	**Single Common Pipistrelle emerged at 21:10**	Occasional to frequent passes by Common Pipistrelle along treeline. Very occasional passes by Noctule.
T168	22 June (dusk)	Sunset: 21:20	**Two Common Pipistrelle emerged from large cavity at 21:59.**	Frequent activity and passes by Common Pipistrelle, occasional passes by Soprano Pipistrelle and one pass by of Noctule.

Tree	Date	Sunset/ sunrise	Emergence/ re-entry	Summary of other activity
	12 July (dawn)	Sunrise: 4:54	**None.**	Frequent activity and passes by Common Pipistrelle.
T172	22 June (dusk)	Sunset: 21:20	**None**	Occasional passes by of Common Pipistrelle and very occasional passes by of Soprano Pipistrelle.
	11 July (dusk)	Sunset: 21:14	**None**	Occasional passes by Common Pipistrelle.

Activity surveys (foraging /commuting)

5.1.9 The majority of the site comprises arable and is therefore sub-optimal habitat for foraging and commuting bats. The site contains areas of woodland, including an area of ancient and semi-natural woodland, as well as areas of boundary vegetation including woodland W3, hedgerows, watercourse and wooded belts that provide suitable foraging and commuting habitat for bats. As such, these habitats likely form linear corridors that could act as navigational aids for commuting bats and provide connectivity to similar off-site habitats in the surrounding area, including the railway corridor and wider Arnold's Wood Complex LWS. As such, bat activity surveys were undertaken at the site between June and September 2022.

5.1.10 **Manual walked transect surveys.** The detailed activity survey results are illustrated on Plan 5014/ECO7, with summary tables provided below.

Table 5.3. Results of the dusk walked transect on 15th June 2022.

Species	Number of Passes Recorded	Approximate % of Total Passes Recorded
Common Pipistrelle	30	42
Soprano Pipistrelle	2	3
Big Bat sp.	39	55
Total	**71**	**100**

Table 5.4. Results of the dusk walked transect on 8th August 2022.

Species	Number of Passes Recorded	Approximate % of Total Passes Recorded
Common Pipistrelle	25	69
Soprano Pipistrelle	11	31
Total	**36**	**100**

Table 5.5. Results of the dusk walked transect on 20th September 2022.

Species	Number of Passes Recorded	Approximate % of Total Passes Recorded
Common Pipistrelle	32	91
Soprano Pipistrelle	2	6
Big Bat sp.	1	3
Total	**35**	**100**

Table 5.6. Results of the dawn walked transects on 21st September 2022.

Species	Number of Passes Recorded	Approximate % of Total Passes Recorded
Common Pipistrelle	1	100
Total	**1**	**100**

5.1.11 Overall, during the four manual walked activity surveys, the highest levels of activity were recorded at the south-west of the site and within proximity of wooded belt WB1.

5.1.12 The August and September 2022 walked activity surveys revealed similar results with Common Pipistrelle being the most frequently recorded bat species, accounting for 69% and 91-100% of registrations each month respectively. Soprano Pipistrelle accounted for the second most calls in August (31%) and dusk September survey (6%). No other species of bat was recorded during the August and September surveys.

5.1.13 During the dusk survey in June 2022, the registrations for Common Pipistrelle was lower compared to later months, accounting for 42% of registrations. Soprano Pipistrelle were also recorded, with a similar number of registrations for the dusk September survey (6%). During this survey, big bat sp. represented the highest number of registrations at 55%, with no other registrations for the following walked activity surveys.

5.1.14 **Remote Detector Surveys.** The results of the automated static bat surveys are illustrated on Plan 5014/ECO8, with summary tables provided below.

Table 5.7. Automated static bat survey summary for Location 1 (***LP5***).

Survey Date	Detector Location 1: centre of site at Wooded Belt WB2					
	Number of registrations by species#					
	Myotis	'Big Bat'	Pip 45	Pip 55	Pip Naths	BLE
15/06/2022	0	46	51	0	0	0
16/06/2022	0	27	44	1	0	0
17/06/2022	0	16	64	1	0	1
18/06/2022	0	1	16	0	0	0
19/06/2022	0	0	1	0	0	0
20/06/2022	1	0	40	0	0	0
21/06/2022	0	2	25	2	0	0
08/08/2022	1	0	55	8	0	0
09/08/2022	0	2	37	7	0	0
10/08/2022	0	4	73	9	0	0
11/08/2022	0	11	57	5	0	1
12/08/2022	0	2	72	2	0	0
13/08/2022	0	1	99	8	0	0
14/08/2022	1	0	68	7	0	0
13/09/2022	0	0	9	1	1	0
14/09/2022	0	0	9	0	0	0
15/09/2022	0	0	6	1	1	0
16/09/2022	1	0	0	0	0	0
17/09/2022	0	0	0	0	0	0
18/09/2022	0	1	2	0	0	0
19/09/2022	3	2	7	2	0	0
Total registrations	**7**	**115**	**735**	**54**	**2**	**1**
Approximate % of total registrations	**0.8**	**12.6**	**80.3**	**5.9**	**0.2**	**0.2**

Key:
Myotis- *Myotis* sp.

Pip 45- Common Pipistrelle
Pip 55- Soprano Pipistrelle
Pip Naths- Nathusius' Pipistrelle
'Big Bat' - Noctule, Leislers or Serotine
BLE - Brown Long-eared bat
- Figures shown are the total no. of registrations recorded during the dusk to the proceeding dawn period for each date shown, i.e. a recording 'night' for the 20th June will be registrations recorded from ~20.45 on the 20/06 till 05.30 on the morning of the 21/06.

Table 5.8. Automated static bat survey summary for Location 2 (***LP8***).

Survey Date	Detector Location 2: east of site at Hedgerow H8					
	Number of registrations by species#					
	Myotis	'Big Bat'	Pip 45	Pip 55	Pip Naths	BLE
15/06/2022	0	4	64	3	0	0
16/06/2022	0	0	112	0	0	0
17/06/2022	0	3	89	2	0	0
18/06/2022	0	2	86	2	0	0
19/06/2022	0	0	82	4	0	0
20/06/2022	0	1	22	0	0	0
21/06/2022	0	3	27	0	0	0
08/08/2022	1	1	28	47	0	0
09/08/2022	0	1	11	24	0	0
10/08/2022	1	5	10	39	0	0
11/08/2022	0	2	34	16	0	1
12/08/2022	0	2	15	6	0	2
13/08/2022	0	2	31	20	0	0
14/08/2022	0	1	73	3	0	1
13/09/2022	0	4	6	2	0	1
14/09/2022	0	1	14	0	1	2
15/09/2022	0	0	2	9	1	0
16/09/2022	0	0	1	1	0	0
17/09/2022	0	2	18	8	0	3
18/09/2022	0	1	24	7	2	0
19/09/2022	2	0	23	21	2	1
Total registrations	**4**	**35**	**772**	**214**	**6**	**11**
Approximate % of total registrations	**0.4**	**3.4**	**74.1**	**20.5**	**0.6**	**1.1**

Key:
Myotis- *Myotis* sp.
Pip 45- Common Pipistrelle
Pip 55- Soprano Pipistrelle
Pip Naths- Nathusius' Pipistrelle
'Big Bat' - Noctule, Leislers or Serotine
BLE - Brown Long-eared bat
- Figures shown are the total no. of registrations recorded during the dusk to the proceeding dawn period for each date shown, i.e. a recording 'night' for the 20th June will be registrations recorded from ~20.45 on the 20/06 till 05.30 on the morning of the 21/06.

5.1.15 **Summary.** During the first survey, carried out in June 2022, ~71% of all registrations at location 1 within WB2 were attributed to Common Pipistrelle, ~27% to Big Bat and ~1% to Soprano Pipistrelle, with the remainder attributed to *Myotis* species and Brown Long-eared bat. At Location 2, within H8, ~95% of registrations were attributed to Common Pipistrelle, ~2% to Soprano Pipistrelle and ~3% to Big Bat.

5.1.16 During the second survey in August 2022, 87% of all registrations at location 1 were attributed to Common Pipistrelle, ~9% to Soprano Pipistrelle and ~4% to Big Bat, with the remainder attributed to *Myotis* species and Brown Long-eared bat. At Location 2, ~54% of registrations were attributed to Common Pipistrelle, ~41% to Soprano Pipistrelle and ~4% to Big Bat, with the remainder comprising *Myotis* species and Brown Long-eared bat.

5.1.17 During the final survey in September 2022, 72% of all registrations at location 1 were attributed to Common Pipistrelle, ~9% to Soprano Pipistrelle and Myotis, ~7% to Big Bat and ~4% Nathusius' Pipistrelle *Pipistrellus nathusii*. At Location 2, ~55% of registrations were attributed to Common Pipistrelle, ~30% to Soprano Pipistrelle, 5% to Big Bat, and ~4% to Brown Long-eared and Nathusius' Pipistrelle, with the remainder comprising *Myotis* species.

5.1.18 Overall, the highest level of activity was recorded at static detector location 2 which had the highest number of registrations in total. The highest number of Myotis, Big Bat and Common Pipistrelle registrations were recorded at detector location 1, albeit similar numbers of Common Pipistrelle registrations were recorded at both locations. The highest number of Soprano Pipistrelle, Nathusius' Pipistrelle and Brown Long-eared bat were recorded at detector location 2.

5.1.19 **Evaluation and Assessment of Likely Effects**

Roosting

Trees

5.1.20 The majority of trees with potential bat roost features described above are set to be retained under the proposals. The presence of roosting bats was recorded for trees T30, T266, T155 and T168 during the survey work undertaken. Due to the loss of bat roosts within the trees surveyed, a Natural England mitigation licence will be required prior to felling, with appropriate mitigation measures implemented to safeguard bats. An outline mitigation strategy is set out in Chapter 6 below, which will be provided in more detail within the licence application method statement. The mitigation strategy will ensure the conservation status of the local bat population is maintained under the proposals.

5.1.21 Furthermore, regarding the trees with potential bat roost features to be retained, artificial illumination of bat roosts has the potential to cause disturbance to bats in occupation of a roost and artificial light directly falling onto roost access points has been shown to delay emergence times which in turn can adversely affect foraging success. As such, recommended precautionary mitigation measures in relation to lighting are set out at Chapter 6 below and subject to their implementation it is considered that bats will be fully safeguarded under the proposals.

Foraging / Commuting

5.1.22 As noted above, the woodland, trees, wooded belts, hedgerows, watercourse, scrub and ancient woodland within the site offer foraging/commuting habitat for bats and indeed foraging and commuting bats were recorded during the activity surveys, including frequent passes from two common species (Common and Soprano Pipistrelle) and occasional passes from a rarer species (Nathusius' Pipistrelle). This combination of habitat types occurs relatively frequently in the surrounding area and taking this into the account, together with the levels of activity and species recorded during the survey work, the site is considered to be of at least local or district level value to bats.

5.1.23 The static detectors at location 1 (wooded belt **WB2**) recorded overall lower levels of bat activity than the other detector, albeit higher numbers of Myotis and Big Bat were recorded at this location. This detector was located within a wooded belt and along a possible commuting corridor from the adjacent woodland. However, at the northern extent of the wooded belt are the A1023, and A12 beyond, which are well-lit roads that likely reduce the number of bats utilising this commuting route.

5.1.24 Static detector location 2, within **H8** which connects to the ancient woodland, recorded higher total numbers of bat registrations and higher numbers of Common Pipistrelle, Soprano Pipistrelle, Nathusius' Pipistrelle Brown Long-eared bat. This is reflective of its location adjacent to Arnold's Wood Complex LWS and ancient woodland which provides potential features suitable for bat foraging and commuting, including connecting to suitable on-site habitats and surrounding habitat including ancient woodland, hedgerows and River Wid. Furthermore, the manual walked transect surveys recorded higher levels of bat activity in the vicinity of static detector location 2. Overall, the manual and static detector data indicate that, although bats utilise the majority of the site, the south-western field and the wooded belt (**WB1**) in close proximity to the ancient woodland tend to support the highest levels of activity across the active season.

5.1.25 The vast majority of bat activity recorded on site was attributed to Common and Soprano Pipistrelle, the two most common bat species in Britain[27]. At the peak, registrations of Common Pipistrelle averaged approximately 69 per night. However, higher levels of Big Bat and Myotis were recorded on a few occasions, with higher average number of passes per night recorded for Big Bat at both locations in June and average number of passes per night matching Soprano Pipistrelle registrations for Myotis in September at location 1. Overall, levels of Common and Soprano Pipistrelle at the site are not considered to be high for the habitats present, especially as the site provides foraging opportunities in close proximity to potential roosts, as well as connectivity to the local area.

5.1.26 Very low numbers of Long-eared Bat species registrations were recorded in total for the two static bat detectors and none were recorded during the manual walked transect surveys. Long-eared Bat are known to have quiet calls which are not always recorded on bat detectors, such that given the on-site and adjacent habitats, it is expected that the site supports higher levels of activity of this species than recorded; albeit activity levels for Brown Long-eared Bat at the site are not likely to be high.

5.1.27 Very low numbers of *Myotis* sp. registrations were also recorded at both static detector locations. Registrations of Myotis were recorded during all three surveys at location 1, and the total number of registrations for Myotis are higher at location 1. Detector location 1 is in proximity of the wet ditch in D5 which connects to the adjacent woodland and which also connects with the watercourse, which was anticipated as a number of *Myotis* species are known to forage along watercourses.

5.1.28 Low numbers of Nathusius' Pipistrelle registrations were recorded at both static detector locations, albeit only during the month of September. This species is rare in England and favours woodland habitat and waterbodies for foraging. As expected, the highest number of registrations were recorded at detector location 2, which is adjacent and connects to the ancient woodland. Considering the low number of registrations, the site as a whole is deemed to be of relatively low value for this species.

[27] Natural England (2011) *Focus on bats: discovering their lifestyle and habitats.*

Summary

5.1.29 The static detector at location 2 recorded overall higher levels of bat activity, albeit detector location 1 recorded a higher number of Myotis and Big Bat registrations. The site supports a range of common and rare bat species. Considering the bat species recorded on-site and the levels of bat activity, in combination with the habitats present on site and the urban edge location, the site is considered to be of value to bats at no more than the Local level.

Impact of the Proposals

5.1.30 The proposals will result in the loss of large areas of sub-optimal habitat for foraging/ commuting bats, in the form of vacant / arable land. All of the woodland, some of the wooded belts, the watercourse and the majority of the trees and hedgerows within the site will be retained under the proposals. Key foraging opportunities afforded by the interface between these habitats will be enhanced through new native woodland planting, species-rich wildflower grassland creation, new wetland features and additional native scrub planting which in combination will significantly increase the foraging potential of the site, whilst connectivity along these features will also be maintained and enhanced. Accordingly, subject to the implementation of the recommendations outlined at Chapter 6 below, along with other ecological enhancements, it is considered that the conservation status of local bat populations will be safeguarded under the scheme.

Badger

5.1.31 **Legislation.** Badger receive legislative protection under the Protection of Badgers Act 1992, and as such should be assessed as an important ecological feature. The legislation aims to protect the species from persecution, rather than being a response to an unfavourable conservation status, as the species is in fact common over most of Britain. It is the duty of planning authorities to consider the conservation and welfare impacts of development upon Badger and issue permissions accordingly.

5.1.32 Licences can be obtained from Natural England for development activities that would otherwise be unlawful under the legislation. Guidance on the types of activity that should be licensed is laid out in the relevant best practice guidance. [28, 29]

5.1.33 **Survey Results and Evaluation.** Survey results and evaluation in respect of Badger are set out in a Confidential Appendix separate to this report.

Dormouse

5.1.34 **Legislation:** Dormouse is fully protected under the Wildlife and Countryside Act 1981 (as amended) and is a European Protected Species under the Conservation of Habitats and Species Regulations 2017 (as amended). Such legislation affords protection to individuals of the species and their breeding sites and places of rest. Dormouse is also a S41 Priority Species. On this basis, Dormouse is considered to form an important ecological feature.

5.1.35 **Background Records:** No specific records of Dormouse were returned from the 2022 desktop study from within or adjacent to the study area. A single Dormouse record was returned, dated 2010, and located approximately 1.3km to the south of the site and Dormice are known to occur in this area of the UK

[28] English Nature (2002) '*Badgers and Development*'
[29] Natural England (2011) '*Badgers and Development: A Guide to Best Practice and Licensing*', Interim Guidance Document

5.1.36 **Survey Results:** The site provides good opportunities for Dormouse, particularly in the form of areas of woodland, hedgerows, wooded belts and scrub. The majority of the site however is dominated by arable land which is unsuitable for Dormouse. Given the presence of potential Dormouse habitat within the site, specific Dormouse survey work was undertaken at the site (see Plan 5014/ECO4). The results of the nest tube surveys undertaken confirmed the presence of Dormouse within the site, with evidence in the form of three nests located along the northern boundary.

5.1.37 **Evaluation:** Based on recorded occurrence, it is likely that the dense scrub along the northern boundary forms the main area of habitat for Dormouse within the site. No evidence of Dormice was found throughout the remainder of the site. However, given the presence of the connected woodland, including Arnold's Wood Complex LWS, wooded belt and hedgerows, it is feasible Dormouse is present, albeit at low densities throughout suitable habitat across the site.

5.1.38 Essex is located within the current distribution area for Dormouse, and the species is relatively widespread across the county[30]. As such, the population supported by the site is considered to be of importance at the local level.

5.1.39 The development at the site will result in the loss of Dormouse habitat at the site, approximately 1.9ha of scrub. Based on typical population densities supported by wooded habitats (which ranges between 4-10 adults / ha for optimal habitat), this would result in loss of habitats likely supporting two Dormice.

5.1.40 In order to maintain connectivity through the site, hop over points will be created by planting trees either side of the new roads, where practicable, to provide a continuous canopy to facilitate the continued movement of Dormouse through the site.

5.1.41 To compensate for habitat losses substantial new areas of woodland and scrub planting are proposed at the peripheries of the development under the scheme, totalling ~1.8ha. Furthermore, given the legal protection afforded to Dormice, consideration will be given to licensing and implementation of appropriate safeguarding measures during vegetation clearance. Further discussion of this is set out at Section 6.

Water Vole

5.1.42 **Legislation.** Water Vole is fully protected under the Wildlife and Countryside Act 1981 (as amended). Water Vole is also a S41 Priority Species. As such, this species is considered to represent an important ecological feature. The legislation affords protection to individuals of the species and their breeding sites and places of shelter. There is no provision under the Act for licensing what would otherwise be offences for the purpose of development. Such activities must be covered by the defence in the Act that permits otherwise illegal actions if they are the incidental result of a lawful operation and could not reasonably be avoided.

5.1.43 If, despite all reasonable efforts, properly authorised development will adversely affect Water Vole and there are no alternative habitats nearby, Natural England may issue a licence to trap and translocate Water Vole for the purpose of conservation. To issue such a licence, Natural England would need to be assured there is no reasonable alternative to the development and that there are no other practical solutions that would allow Water Vole to be retained at the same location. NE would also require assurance that the actions would make a positive contribution to Water Vole conservation.

[30] Mammal Watch South East (2015) *South East Mammal Atlas: covering Hampshire, Surrey, Sussex, Kent and the Isle of Wight*

5.1.44 **Background Records.** No specific records of Water Vole within or adjacent to the site were returned from the desktop study. A number of records of Water Vole were returned from the surrounding search area, with the closest specific record of this species being located approximately 0.6km north-east of the site.

5.1.45 **Survey Results and Evaluation.** The habitats within the site itself are generally unsuitable for Water Vole, mostly comprising arable fields. However, the watercourse (**WC1**) offers potential opportunities for this species, and as such, specific survey work was undertaken in September 2022.

5.1.46 During the Water Vole survey, a number of footprints characteristic of Water Vole were recorded within silt at the watercourse edge along the southern boundary. However, no corroborating evidence such as burrows, latrines or feeding stations were recorded, and therefore the surveys were unable to confirm the presence of Water Vole.

5.1.47 Furthermore, the northern end of the watercourse was dry at the time of the survey, and the banks of the southern end that continues off-site have been artificially reinforced with concrete-composite. Artificial stonework forms part of the banks and bed of the watercourse, which reduces the suitability of the watercourse for Water Vole, however, Water Vole can burrow into banks behind stonework where suitable gaps are present[31]. Nevertheless, the stonework was noted to be generally well-fitted with no notable gaps recorded.

5.1.48 Therefore, based on the survey work undertaken and results of the desktop study, it is possible Water Vole may occasionally make use of the on-site watercourse, however no definitive evidence of presence was recorded and a local population is likely prevented from establishing due to the separation of the watercourse from the River Wid (where records of Water Vole were returned) by the A1023 and railway corridor. As such, considering the lack of firm evidence of Water Vole occupation, it is concluded that, if present, they do not rely on the site beyond sporadic use. On this basis, the on-site section of watercourse is unlikely to support a resident Water Vole population.

Otter

5.1.49 **Legislation.** Otter is fully protected under the Wildlife and Countryside Act 1981 (as amended) and is a European Protected Species under the Conservation of Habitats and Species Regulations 2017 (as amended). Such legislation affords protection to individuals of the species and their breeding sites and places of rest. Otter is also a S41 Priority Species. On this basis, Otter is considered to represent an important ecological feature.

5.1.50 **Background Records.** No specific records of Otter within or adjacent to the site were returned from the desktop study. A number of records of Otter were returned from the surrounding search area, with the closest specific record of this species located approximately 0.5 km north-east of the site, dated 2010.

5.1.51 **Survey Results and Evaluation.** The habitats within the site itself are generally unsuitable for Otter, mostly comprising arable fields. However, the watercourse (**WC1**) offers potential opportunities for this species for commuting and foraging, together with areas of bankside vegetation which provides potential opportunities for shelter or lying up during the day. As such, specific survey work for Otter was undertaken in September 2022.

[31] Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016). *The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series).* Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.

5.1.52 During the Otter survey, a single old Otter spraint on a fallen tree and two possible holts in the bank were identified, one of which was noted to have a possible slide leading into the watercourse. However, the possible holts were fairly small in size and no footprints, fresh spraint, or food remains were recorded, and therefore the survey was unable to confirm whether Otter currently occupy the watercourse.

5.1.53 Therefore, based on the survey work undertaken and results of the desktop study, it would appear Otter may occasionally make use of the on-site watercourse, however the local population which is recorded from the River Wid is separated from the on-site watercourse by the A1023 and railway corridor. As such, considering the lack of firm evidence of Otter occupation, it is concluded that, if present, they are at a very low density. On this basis, the on-site section of watercourse is reasonably unlikely to support a resident Otter population.

Other Mammals

5.1.54 **Legislation.** A number of other UK mammal species do not receive direct legislative protection relevant to development activities but may receive protection against acts of cruelty (e.g. under the Wild Mammals (Protection) Act 1996). In addition, a number of these mammal species are S41 Priority Species and should be assessed as important ecological features.

5.1.55 **Background Records.** No specific records of other mammals from within or adjacent to the site were returned from the desktop study. A number of records of Hedgehog *Erinaceus europaeus*, Brown Hare *Lepus europaeus* and Harvest Mouse *Micromys minutus* (Priority Species) was returned from within the search area around the site, with the closest specific record being a Hedgehog located approximately 0.2km to the north of the site.

5.1.56 **Survey Results and Evaluation.** No evidence of any other protected, rare or notable mammal species was recorded within the site, albeit Roe Deer *Capreolus capreolus* was noted on-site during the 2021 update survey.

5.1.57 The desktop study returned background records of Hedgehog, Brown Hare and Harvest Mouse within the surrounding area. These are Priority Species, albeit Hedgehog remains common and widespread in England. The site offers potential opportunities for these species, particularly in the form of areas of longer sward grassland and hedgerows for Brown Hare, with woodland, wooded belts, areas of dense scrub and Bramble also forming suitable Hedgehog habitat. The on-site grassland, hedgerows, Bramble, arable and wet areas also form suitable Harvest Mouse habitat. However, the on-site habitats are unlikely to be of particular importance in a local context.

5.1.58 The closest record for Brown Hare is located ~1km to the north-east of the site, and the nearest Harvest Mouse record is located ~0.3km to the west. Although longer sward grassland and hedgerows are present on site, the majority of the site is intensively managed land which is sub-optimal for Brown Hare. Furthermore, suitable habitat is present within the site for Harvest Mouse, however, the records returned from the LRC are separated from the site by the A1023 and railway corridor. Therefore, it is unlikely that the development will adversely affect the local populations of these species. Furthermore, similar habitat opportunities are present within the local area. As such, at most, the site is considered to be of importance at the local level for Brown Hare, Harvest Mouse and Hedgehog. Nevertheless, it is recommended that a habitat manipulation exercise be undertaken during suitable vegetation clearance, as well as precautionary safeguards put in place to minimise the risk of harm to these species in the event they are present, as detailed in Chapter 6 below.

5.1.59 Other mammal species likely to utilise the site, such as Fox *Vulpes vulpes*, remain common in both a local and national context, and as mentioned above do not receive specific legislative protection in a development context. As such, these species are not a material planning consideration and the loss of potential opportunities for these species to the proposals is of negligible significance.

Amphibians

5.1.60 **Legislation.** All British amphibian species receive a degree of protection under the Wildlife and Countryside Act 1981 (as amended). Great Crested Newt is protected under the Act and is also classed as a European Protected Species under the Conservation of Habitats and Species Regulations 2017 (as amended). As such, both Great Crested Newt and habitats utilised by this species are afforded protection. Great Crested Newt is also a S41 Priority Species, as are Common Toad *Bufo bufo*, Natterjack Toad *Epidalea calamita*, and Pool Frog *Pelophylax lessonae*. As such, these species should be assessed as important ecological features.

5.1.61 **Background Records.** No specific records of Great Crested Newt from within or adjacent to the site were returned from the desktop study. A number of records of Great Crested Newt, Palmate Newt, Smooth Newt *Lissotriton vulgaris*, Common Toad *Bufo bufo* and Common Frog *Rana temporaria* were returned from the search area surrounding the site. The closest record of Great Crested Newt is located approximately 1km to the east of the site, dated 2014. The nearest amphibian record is for a Common Frog located approximately 0.4km south-west of the site.

5.1.62 **Survey Results.** Three ephemeral waterbodies have been identified on-site, and an initial appraisal of each pond was made using the HSI system to identify potential suitability to support Great Crested Newt in December 2021. An additional five ponds were identified in close proximity, with access available to three of these ponds, which were subsequently surveyed in April 2022. The results are set out in Table 5.8 below.

Table 5.9. HSI survey results.

Pond	Suitability Indices										HSI Score	Suitability
	SI 1 Location	**SI 2** Pond Area	**SI 3** Pond Drying	**SI 4** Water Quality	**SI 5** Shade	**SI 6** Water Fowl	**SI 7** Fish	**SI 8** Ponds	**SI 9** Terrestrial Habitat	**SI 10** Macrophytes		
Onsite Ponds												
P1	1	0.05	0.1	0.33	1	1	1	0.83	0.33	0.45	**0.43**	*Poor*
P2	1	0.925	0.1	0.33	1	1	1	0.83	0.33	1	**0.62**	*Average*
P3	1	0.8	0.1	0.33	0.8	1	1	0.83	0.33	0.4	**0.55**	*Below Average*
Offsite Ponds												
P4	1	0.92	1	0.33	0.3	0.67	1	0.83	1	0.7	**0.72**	*Good*
P5	*No access*											
P6	*Poor*											
P7	1	0.2	0.5	0.33	0.2	1	1	0.83	1	0.3	**0.53**	*Below Average*
P8	1	0.2	0.5	0.33	0.2	1	1	0.83	1	0.3	**0.53**	*Below Average*

5.1.63 In summary, of the six ponds which could be accessed, off-site pond **P4** was found to be of 'good' potential to support Great Crested Newts, while on-site pond **P2** was found to be of 'average' suitability. Ponds **P3**, **P7** and **P8** were found to be 'below average' suitability, and on-site pond **P1** of 'poor' suitability to support Great Crested Newts. As such, eDNA surveys of ponds **P2**, **P3**, **P4** and **P8** were undertaken in April 2022. Ponds **P5**, **P6** and **P7** were not subject to an eDNA survey as access was not available, and **P1** was dry at the time of the survey. The results of the eDNA surveys returned a negative result for the ponds surveyed.

5.1.64 **Evaluation and Assessment of Likely Effects.** The longer sward grassland, tall ruderal, scrub, hedgerows, wooded belts and woodland offer potential foraging, refuge and commuting habitat for Great Crested Newts. However, the extent of these habitats on-site is limited in respect of the majority of the site which comprises arable land that offers negligible suitability for Great Crested Newt.

5.1.65 Great Crested Newt are confirmed as likely absent from ponds **P2**, **P3**, **P4** and **P8**. Ponds **P5**, **P6** and **P7** could not be accessed for the eDNA survey work, albeit **P6** was noted to be dry and **P7** to be mostly dry during the HSI survey in October 2018.

5.1.66 Therefore, considering the absence of Great Crested Newt in the surveyed waterbodies and absence of records for this species within 500m of the site, it is reasonably unlikely that this species utilises the site. As such, the proposals are unlikely to impact local populations of this species and specific mitigation measures will not be required.

5.1.67 Nevertheless, precautionary measures are advised (see Chapter 6) to ensure any amphibians present are safeguarded during works and clearance of any suitable vegetation. In the unlikely event that Great Crested Newt are encountered during this exercise, works would cease and further ecological advice would be provided.

5.1.68 Landscape proposals for the scheme include the creation of new ponds, marginal planting and tussocky grassland which will provide enhanced opportunities for amphibians at the site post-development.

Reptiles

5.1.69 **Legislation**. All six species of British reptile are listed under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), which protects individuals against intentional killing or injury. Sand Lizard *Lacerta agilis* and Smooth Snake *Coronella austriaca* receive additional protection under the Conservation of Habitats and Species Regulations 2017 (as amended). All six reptile species are also S41 Priority Species. As such, all reptile species should be assessed as important ecological features.

5.1.70 **Background Records.** Information returned from the desktop study returned records for Slow Worm, Grass Snake, Adder *Vipera berus* and Common Lizard within 2km of the site. The closets record is for Slow-worm located approximately 0.8km south-east of the site.

5.1.71 **Survey Results.** Specific survey work for reptiles was undertaken at the site, the results of which are summarised in Table 5.10 below and illustrated on Plan 5014/ECO9.

Table 5.10. Reptile survey results summary.

Visit	Date	Common Lizard		Slow Worm		Grass Snake		Other Species
		Adult	Juv.	Adult	Juv.	Adult	Juv.	
1	13/05/2022	3	0	32	6	0	0	Pygmy Shrew
2	18/05/2022	2	1	12	3	0	2	-
3	21/05/2022	1	0	10	10	0	1	-
4	24/05/2022	5	0	25	8	1	0	-
5	27/05/2022	3	2	20	18	1	0	-
6	30/05/2022	2	0	15	11	0	0	-
7	01/06/2022	2	0	29	18	1	0	-
Peak Count		**5**		**32**		**1**		

5.1.72 **Evaluation and Assessment of Likely Effects.** In summary, survey work recorded a peak count of 32 adult Slow-worm, five Common Lizard and a single Grass Snake. Reptiles were recorded throughout the site, albeit higher peak numbers of Slow-worm were recorded along the northern boundary of the site. High peak numbers of Slow-worm were also recorded to the east of the site and in the south-western corner. High peak numbers of Common Lizard were recorded at the north-west of the site and centrally, with peak numbers of Grass Snake recorded at the east of the site.

5.1.73 The area of suitable reptile habitat at the site measures c.3ha and therefore the peak count equates to a population of ~2 Common Lizard, ~11 Slow-worm and 0.3 Grass Snake per hectare. The Common Lizard, Slow-worm and Grass Snake populations would be classified as a low population under the standard guidance[32]. As such, the populations of reptiles supported by the site are likely of importance at a local level only.

5.1.74 On this basis, the site is considered to be of ecological value for reptile species at the local level. A number of appropriate mitigation measures are required to ensure reptiles are safeguarded during the construction phase of the development and that best practice guidelines are adhered to. A mitigation strategy will be put in place, as set in Section 6 below, to ensure reasonable steps are taken to avoid any significant potential impact on

[32] Herpetofauna Groups of Britain and Ireland (1998) 'Evaluating local mitigation/translocation programmes: Maintaining Best Practice and lawful standards'

common reptiles and avoid contravention of relevant legislation. The new habitat to be created at the site as part of the proposed landscape scheme will likely deliver a net gain in reptile habitat compared to the existing situation, under which the majority of the site is ploughed and sprayed with herbicide.

Birds

5.1.75 **Legislation.** All wild birds and their nests receive protection under Section 1 of the Wildlife and Countryside Act 1981 (as amended) in respect of killing and injury, and their nests, whilst being built or in use, cannot be taken, damaged or destroyed. Species included on Schedule 1 of the Act receive greater protection and are subject to special penalties.

5.1.76 **Conservation Status.** The conservation importance of British bird species is categorised based on a number of criteria including the level of threat to a species' population status[33]. Species are listed as Green, Amber or Red. Red Listed species are considered to be of the highest conservation concern being either globally threatened and or experiencing a high/rapid level of population decline (>50% over the past 25 years). A number of birds are also S41 Priority Species. Red and Amber listed species and priority species should be assessed as important ecological features.

5.1.77 **Background Records.** Information from the data search included records for several bird species in 1km x 1km OS grid squares containing the site, including the Red Listed Herring Gull *Larus argentatus*, House Sparrow, Song Thrush and Starling, which are also all Priority Species, as well as Little Egret *Egretta garzetta*, albeit more specific information was not available that would allow the precise location of these records to be determined in relation to the site. A number of additional bird records were returned from within 2km of the site, including Priority Species Tree Sparrow *Passer montanus*, Skylark, Scaup *Aythya marila*, Cuckoo *Cuculus canorus*, Yellowhammer *Emberiza citrinella*, Reed Bunting *Emberiza schoeniclus*, Linnet, Grasshopper Warbler *Locustella naevia,* Yellow Wagtail *Motacilla flava*, Spotted Flycatcher *Muscicapa striata*, Turtle Dove *Streptopelia turtur*, Curlew *Numenius arquata*, Bullfinch *Pyrrhula pyrrhula* and Lapwing *Vanellus vanellus*.

5.1.78 Information returned from the desktop study also included records for several bird species within 1km of the site, including Barn Owl *Tyto alba*, Kingfisher *Alcedo atthis*, Merlin *Falco columbarius*, Peregrine Falcon *Falco peregrinus*, Hobby *Falco subbuteo*, *Brambling Fringilla montifringilla*, Red Kite *Milvus milvus*, Green Sandpiper *Tringa ochropus*, Redwing *Turdus iliacus* and Fieldfare *Turdus pilaris* which are all listed under Schedule 1 Part 1 of the Wildlife and Countryside Act 1981 (as amended).

5.1.79 **Survey Results.** Several species of bird were observed within the site during the Phase 1 surveys from 2016-2022, including Jackdaw *Corvus monedula*, Green Woodpecker *Picus viridis*, Wood Pigeon *Columba palumbus*, Blackbird *Turdus merula*, Great Tit *Parus major*, Collard Dove *Streptopelia decaocto*, Jay *Garrulus glandarius*, Magpie *Pica pica*, Greater Spotted Woodpecker *Dendrocopos major*, Chiffchaff *Phylloscopus collybita*, Song Thrush, Blue Tit *Cyanistes caeruleus* and Starling flying low over one of the arable fields.

5.1.80 A total of 36 species of bird were recorded on-site during the breeding bird surveys. Of these, 24 species are considered to be breeding, with one species (Lesser White-throat) possibly breeding (i.e. habitat suitable to support the species is present). The remaining 11 species were either breeding in adjacent areas, recorded as migrants or as flying over the

[33] Eaton MA, Aebischer NJ, Brown AF, Hearn RD, Lock L, Musgrove AJ, Noble DG, Stroud DA and Gregory RD (2015) *'Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man'* British Birds *108*, pp.708-746

site, or were represented by non-breeding individuals. A summary of observations for each species is included in Appendix 5014/3 and on Plan 5014/ECO10.

5.1.81 **Evaluation.** The majority of breeding bird activity at the site is associated with **W2** at the east of the site, which is ancient woodland and forms part of Arnold's Wood LWS, as well as the network of hedgerows, wooded belts, woodland, scrub and trees. Species recorded breeding within woodland **W2** include Red Listed Mistle Thrush *Turdus viscivorus* and Amber listed Dunnock *Prunella modularis*, Wren *Troglodytes troglodytes*, Wood Pigeon *Columba palumbus*, Song Thrush and Stock Dove *Columba oenas*.

5.1.82 Breeding birds recorded within the hedgerows and wooded belts include the Red Listed species Greenfinch *Chloris chloris* and Amber listed Whitethroat *Curruca communis*, Wood Pigeon, Song Thrush, Wren, Dunnock, Stock Dove, Bullfinch, of which Song Thrush and Bullfinch are also Priority Species.

5.1.83 Mistle Thrush and Greenfinch are included on the RSPB Red List having undergone major declines in their UK populations over 25 years. All of the species on the RSPB Amber List are included for having undergone moderate declines in their UK populations, although they all remain common and widespread in both a local and national context, as indeed are all the remaining species breeding at the site. No declining farmland species were recorded breeding at the site, although a single Skylark was recorded in May 2022.

5.1.84 Barn Owl was observed on-site, near WB1 and H4, during the bat survey work. Barn Owl are protected under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to intentionally or recklessly disturb a bird while it is building a nest or is in, on or near a nest containing eggs or young, and disturb dependant young. However, no roost or nest site was identified and the site is of very limited suitability for foraging Barn Owl.

5.1.85 Overall, the site supports a modest breeding bird assemblage, which is typical of urban-fringe habitats, and therefore is not of particular ornithological interest. The majority of the birds recorded at the site are not listed as having any special conservation status, albeit Starling, House Sparrow, Linnet and Skylark are included on the Red list as a result of declines in UK breeding populations and are also Priority Species. However, the habitats present within the site are common in the surrounding area and there is no evidence to suggest the site is of elevated value at a local level for these species. Additional species of breeding bird were also noted within the site, albeit these species are common and widespread in both a local and national context.

5.1.86 The proposals will result in the loss of on-site vegetation, including hedgerows, trees and scrub, and this could potentially affect any nesting birds that may be present at the time of works. Accordingly, a number of safeguards in respect of nesting birds are proposed, as detailed in Chapter 6 below. In the long-term, new nesting opportunities will be available for birds as described in Chapter 6 below. The majority of the breeding bird activity at the site was recorded in association with the hedgerow network and woodland, particularly within Arnold's Wood Complex LWS. Although there will be a loss in hedgerow habitat, new hedgerow, tree and scrub planting will be more diverse than the existing species-poor hedgerows, providing benefits for many bird species. The proposals are unlikely to have a significant impact on local bird populations in the long term.

Invertebrates

5.1.87 **Legislation.** A number of invertebrate species are listed under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). In addition, Large Blue Butterfly *Maculinea arion*, Fisher's Estuarine Moth *Gortyna borelii lunata* and Lesser Whirlpool Ram's-horn Snail *Anisus vorticulus* receive protection under the Conservation of Habitats and Species Regulations 2017 (as amended). A number of invertebrates are also S41 Priority Species. Where such species are present, they should be assessed as important ecological features.

5.1.88 **Background Records.** Information returned from the desktop study returned records of Priority Species Small Heath *Coenonympha pamphilus* and Wall *Lasiommata megera* within the 1km x 1km OS grid square containing the south of the site, albeit more specific information was not available that would allow the precise location of these records to be determined in relation to the site. A number of additional records of invertebrate Priority Species were returned from within 2km of the site, including Knot Grass *Acronicta rumicis*, Beaded Chestnut *Agrochola lychnidis*, Green-brindled Crescent *Allophyes oxyacanthae*, Large Nutmeg *Apamea anceps*, Deep-brown Dart *Aporophyla lutulenta*, Sprawler *Asteroscopus sphinx*, Centre-barred Sallow *Atethmia centrago*, Mottled Rustic *Caradrina Morpheus*, Latticed Heath *Chiasmia clathrate*, September Thorn *Ennomos erosaria*, Dusky Thorn *Ennomos fuscantaria*, August Thorn *Ennomos quercinaria*, Ghost Moth *Hepialus humuli*, Rustic *Hoplodrina blanda*, Rosy Rustic *Hydraecia micacea*, Lunar Yellow Underwing *Noctua orbona*, Powdered Quaker *Orthosia gracilis*, White-letter Hairstreak *Satyrium w-album*, Shaded Broad-bar *Scotopteryx chenopodiata*, White Ermine *Spilosoma lubricipeda*, Blood Vein *Timandra comae*, Cinnabar *Tyria jacobaeae* and Oak Hook-tip *Watsonalla binaria*.

5.1.89 **Survey Results and Evaluation.** No evidence for the presence of any protected, rare or notable invertebrate species was recorded within the site. The site is dominated by arable land which likely supports only a limited diversity of invertebrates. The site has areas of woodland, wooded belts, ponds, tall ruderal, longer-sward grassland, hedgerows, some areas of bare ground and occasional patches of scrub; but otherwise contains relatively few micro-habitats that would typically indicate elevated potential for invertebrates[34], such as a variable topography with areas of vertical exposed soil, areas of species-rich semi-natural vegetation; variable vegetation structure with frequent patches of tussocks combined with short turf; free-draining light soils; walls with friable mortar or fibrous dung. Accordingly, given the habitat composition of the site and lack of adjacent sites designated for significant invertebrate interest, it is reasonably unlikely the site supports an important invertebrate assemblage.

Summary

5.1.90 On the basis of the above, a summary of the evaluation of fauna is provided below:

Table 5.11. Evaluation summary of fauna forming important ecological features.

Species / Group	Supported by or associated with the site	Level of Importance
Bats – Roosting	Confirmed presence on site	Local
Bats – Foraging / Commuting	Confirmed presence on site	Local
Badger	See confidential appendix	Local
Dormouse	Confirmed presence on site	Local

[34] Natural England (2010) 'Higher Level Stewardship – Farm Environment Plan (FEP) Manual', 3rd Edition

Species / Group	Supported by or associated with the site	Level of Importance
Water Vole	Likely absent (although potential habitat present)	Negligible
Otter	Likely absent (although potential habitat present)	Negligible
Great Crested Newt	Confirmed absent from two on-site and two off-site ponds and likely absent (although potential habitat present)	Likely absent
Reptiles	Confirmed presence on site	Local
Birds	Confirmed presence on site	Local

5.1.91 Other fauna supported by the site include non-priority species of mammals, amphibians and invertebrates. However, these species do not form important ecological features.

6 Mitigation Measures and Biodiversity Net Gains

Mitigation

6.1.1 Based on the habitats, ecological features and associated fauna identified within/adjacent to the site, it is proposed that the following mitigation measures (**MM1 – 26**) are implemented under the proposals. Further, detailed mitigation strategies or method statements can be secured via suitably-worded planning conditions, as recommended by relevant best practice guidance (BS 42020:2019).

Hedgerows, Woodland, Wooded Belt and Trees

6.1.2 **MM1 – Hedgerow, Woodland, Wooded Belt and Tree Protection.** All hedgerows, wooded belts, woodland and trees to be retained within the proposed development shall be protected during construction in line with standard arboriculturalist best practice (BS5837:2012) or as otherwise directed by a suitably competent arboriculturalist. This will involve the use of protective fencing or other methods appropriate to safeguard the root protection areas of retained trees / hedgerows.

6.1.3 **MM2 – Hedgerow, Tree Line and Woodland Planting.** To mitigate any loss of existing woodland, new woodland pockets, tree lines and species-rich hedgerows shall be created with a range of native tree and shrub species to create a varied vegetation structure. It is recommended this include fruit and nut bearing species, such as Crab Apple *Malus sylvestris*, Hazel, Walnut, Hawthorn and Dogwood *Cornus sanguinea*. To mitigate for the loss of hedgerows on-site, new native species-rich hedgerows with standard trees will be included within the scheme design. New and existing native hedgerows will be trimmed every 2-3 years and kept above a height and width of 2m, to create dense, well-structured hedgerows. Any gaps would be re-planted with native species. New hedgerow and woodland planting shall be located adjacent to existing habitat of elevated value (either on-site or adjacent) to create larger areas of habitat of benefit to wildlife, and incorporated within areas of other new habitat creation to create a mosaic of habitats, rather than distinct blocks. New native species-rich hedgerow planting shall also be created where no habitat connections currently exist, in particular along the northern boundary and along the railway embankment. The existing lines of trees can be enhanced by bolstering gaps and lengthening the features with additional planting to connect to adjacent similar habitat and widening where appropriate with additional native species.

6.1.4 **MM3 - Veteran Tree Protection.** The veteran Oak trees will be protected from development works by the creation of a buffer zone which is at least 15 times larger than the diameter of the tree, or 5m from the edge of the tree's canopy if that area is larger than 15 times the tree's diameter. The buffer zone shall consist of semi-natural habitats such as grassland or native scrub.

Ancient Woodland (Arnold's Wood Complex LWS)

6.1.5 **MM4 – Ancient Woodland Protection.** Arnold's Wood, which lies at the east of the site, is designated as ancient woodland and as Arnold's Wood Complex LWS. The woodland shall be safeguarded during and after construction in line with the measures detailed within the Outline Woodland Management Report.

Pollution Prevention

6.1.6 In order to safeguard the hedgerows, woodland, watercourse, ponds and ancient woodland which are present within and adjacent to the site against any potential run-off or pollution

events during construction, the following air and water quality safeguards will be implemented.

6.1.7 **MM5 – Air Quality (dust prevention measures)**. The following dust control and abatement measures will be implemented during construction:

- Surfaces and dusty activities will be damped down as required by the use of agreed wet cleaning methods or mechanical road sweepers during periods of dry weather;
- All relevant loads entering and leaving the site will be covered;
- Stock piles of materials shall exist for the shortest possible period of time; and
- Machinery, fuel and chemical storage and dust generating activities should not be located close to the hedgerows, woodland, watercourse, ponds or wooded belts. Should this not be possible then the above habitats should be protected by the use of dust barriers/screens where practicable.

6.1.8 **MM6 – Water Quality**. Water quality will be safeguarded by adherence to best management practice, which will essentially reduce potential pollution impacts to nil. The following key safeguards will be implemented:

- During all construction works, good site management will ensure that pollution incidences are kept to a minimum. This will include checking all machinery for any oil-leaks and installing drip trays as required;
- Appropriate spillage kits or absorbent materials will be held on site and staff informed of what to do in an emergency. An up-to-date drainage plan will be maintained, hazards identified and a contingency plan drawn up, giving advice on what action to take and who to inform;
- Storage areas for chemicals, fuels, etc. will be stored on an impervious base within an oil-tight bund with no drainage outlet, located at least 15m from sensitive features. Spill kits with sand, earth or commercial products approved for the stored materials shall be kept close to storage areas for use in case of spillages;
- Where possible, and with prior agreement of the sewage undertaker, silty water will be disposed of to the foul sewer or via another suitable form of disposal, e.g. tanker off-site;
- Water washing of vehicles, particularly those carrying fresh concrete and cement, mixing plant, etc. will be carried out in a contained area at least 15m from sensitive features to avoid contamination; and
- Refuelling of plant will take place in a designated area, on an impermeable surface, at least 15m from sensitive features.

6.1.9 Additional mitigation measures to safeguard the watercourse include the implementation of an undeveloped buffer zone adjacent to the watercourse. The buffer zone shall remain free of any built development including lighting.

6.1.10 The buffer zone will be protected during construction by the installation of appropriate fencing (e.g. Heras fencing) to prevent access and potential damage to trees and other vegetation.

6.1.11 All construction lighting within 15m of the watercourse, wooded belts, hedgerows, woodland and ponds will be stopped before dusk, to reduce disruption to the natural diurnal rhythms of wildlife using and inhabiting the canal and its corridor habitat. Any lights elsewhere on site will be baffled and face away from the watercourse and woodland.

6.1.12 Post-development, the drainage system for the development will ensure the watercourse is not subject to adverse changes in surface water run-off or quality.

Bats

6.1.13 **MM7 – Update Survey.** Should any considerable time (e.g. >2 years) elapse between the survey work detailed above and any development works, a further survey of the trees with potential to support roosting bats should be undertaken prior to the commencement of works.

6.1.14 **MM8 – Sensitive Lighting.** Light-spill onto retained and newly created habitat, in particular the retained hedgerows, tree lines and scrub (especially along the south- western boundary), will be minimised in accordance with good practice guidance[35] to reduce potential impacts on light-sensitive bats (and other nocturnal fauna). This may be achieved through the implementation of a sensitively designed lighting strategy, with consideration given to the following key factors:

- **Light exclusion zones –** ideally no lighting should be used in areas likely to be used by bats. Light exclusion zones or 'dark buffers' may be used to provide interconnected areas free of artificial illumination to allow bats to move around the site;
- **Appropriate luminaire specifications** – consideration should be given to the type of luminaires used, in particular luminaries should lack UV elements and metal halide and fluorescent sources should be avoided in preference for LED luminaries. A warm white spectrum (ideally <2,700K) should be adopted to reduce the blue light component;
- **Light barriers / screening –** new planting (e.g. hedgerows and trees) or fences, walls and buildings can be strategically positioned to reduce light spill;
- **Spacing and height of lighting units –** increasing spacing between lighting units will minimise the area illuminated and allow bats to fly in the dark refuges between lights. Reducing the height of lighting will also help decrease the volume of illuminated space and give bats a chance to fly over lighting units (providing the light does not spill above the vertical plane). Low level lighting options should be considered for any parking areas and pedestrian / cycle routes, e.g. bollard lighting, handrail lighting or LED footpath lighting;
- **Light intensity –** light intensity (i.e. lux levels) should be kept as low as possible to reduce the overall amount and spread of illumination;
- **Directionality –** to avoid light spill lighting should be directed only to where it is needed. Particular attention should be paid to avoid the upward spread of light so as to minimise trespass and sky glow;

[35] Bat Conservation Trust and Institute of Lighting Professionals (2018) '*Guidance Note 08/18: Bats and artificial lighting in the UK*'; Stone, E.L. (2013) '*Bats and lighting: Overview of current evidence and mitigation guidance*.'; ILP (2011) '*Guidance notes for the reduction of obtrusive light*' Institution of Lighting Professionals, GN01:2011.

- **Dimming and part-night lighting –** lighting control management systems can be used, which involves switching off/dimming lights for periods during the night, for example when human activity is generally low (e.g. 12.30 – 5.30am). The use of such control systems may be particularly beneficial during the active bat season (April to October). Motion sensors can also be used to limit the time lighting is operational.

6.1.15 **MM9 – Felling of Trees with Confirmed Bat Roost.** Survey work has identified roosts within at least four of the on-site trees to be lost as part of the proposals. As such, works will need to be carried out under a European Protected Species (EPS) development licence obtained from Natural England, with implementation of an appropriate mitigation strategy; this strategy will be detailed within the method statement accompanying the licence application. In summary, mitigation measures will include the following:

- Replacement Roosting Opportunities. Due to the number of roosts to be lost, replacement roosting opportunities shall include a number of suitable integrated bat boxes within the development, as well as bat boxes mounted on retained trees or on poles. A proportion of the replacement roosting opportunities will need to be provided prior to the loss of existing roosts.

- Pre-works Check. A pre-demolition inspection of the trees will be undertaken to search for the presence of roosting bats.

- Soft Felling of Trees supporting bat roosts. Removal of trees with potential to support or conceal roosting bats, shall be undertaken under an ecological watching brief and carried out using the 'soft-felling' technique whereby sections of the tree will be cut and lowered to the ground, followed by leaving the felled sections on the ground for a period of at least 24 hours to allow any bats, should these be present, to escape. The works will be undertaken during favourable weather conditions (e.g. not during heavy rain, high winds or unseasonable low temperatures) under a Natural England mitigation licence and ecological supervision. It is advised that works are conducted outside the summer season, when the roosts are expected to be active, and ideally during spring or autumn, which are considered the less sensitive seasons for bats.

6.1.16 **MM10 – Felling of Trees Supporting Moderate-High Bat Roosting Potential.** A number of additional trees have been identified as providing moderate to high potential for roosting bats, all of which are retained under the proposals. However, should it become apparent that these trees will be lost or subject to other tree works as part of the development, further survey work is advised to determine the presence/likely absence of bat roosts in accordance with latest best practice guidelines. Further survey work would take the form of two or three dusk emergence and/or dawn re-entry surveys, depending on whether the respective tree is of moderate or high roosting potential. The results of the dusk emergence/dawn re-entry survey work would inform the assessment of potential impacts on bats from the proposed development and the level of mitigation required to offset any harm to this species. The accepted survey season for such survey work is May to September inclusive, with the optimal period being May to August.

6.1.17 If any evidence for the presence of roosting bats is recorded, consideration will be given to the need to undertake works under a European Protected Species (EPS) development licence, and a licence application will be made to Natural England as required.

6.1.18 **MM11 – Felling of Trees Supporting Low Bat Roosting Potential.** A number of trees with low bat roosting potential are to be lost under the current proposals, albeit the majority of

the trees with low bat roosting potential are to be retained. The trees to be removed, or subject to other tree works as part of the development, will also involve works under an ecological watching brief and carried out using the 'soft-felling' technique whereby sections of the tree will be cut and lowered to the ground, followed by leaving the felled sections on the ground for a period of at least 24 hours to allow any bats, should these be present, to escape. If any evidence for the presence of roosting bats is recorded, consideration will be given to the need to undertake works under a European Protected Species (EPS) development licence, and a licence application will be made to Natural England as required.

Badger

6.1.19 **MM12 – Badger Construction Safeguards.** In order to safeguard Badger should they enter the site during construction works, the following measures will be implemented:

- Any trenches or excavations within the site that are to be left open overnight will be provided with a means of escape should a Badger enter. This could simply be in the form of a gently graded ramp or roughened plank of wood placed in the trench as a ramp to the surface. This is particularly important if the trench fills with water;
- Any temporarily exposed open pipes (>150mm outside diameter) should be blanked off at the end of each working day so as to prevent Badgers gaining access as may happen when contractors are off-site;
- Any trenches/pits will be inspected each morning to ensure no Badgers have become trapped overnight. Should a Badger become trapped in a trench it will likely attempt to dig itself into the side of the trench, forming a temporary sett. Should a trapped Badger be encountered a suitably qualified ecologist will be contacted immediately for further advice;
- The storage of topsoil or other 'soft' building materials in the site will be given careful consideration. Badgers will readily adopt such mounds as setts. So as to avoid the adoption of any mounds, these will be kept to a minimum and any essential mounds subject to daily inspections with consideration given to temporarily fencing any such mounds to exclude Badgers;
- The storage of any chemicals at the site will be contained in such a way that they cannot be accessed or knocked over by any roaming Badgers;
- Fires will only be lit in secure compounds away from areas of Badger activity and not allowed to remain lit during the night; and
- Unsecured food and litter will not be left within the working area overnight.

6.1.20 **MM13 – Badger Update Survey.** Badgers are dynamic animals and levels of Badger activity can rapidly change at a site, with new setts being created at any time. Given the known presence of Badger setts in the area it is recommended that an update survey is carried out prior to commencement of site works in order to confirm the current status of Badgers at the site.

Dormice

6.1.21 **MM14 – Dormouse Licensing.** The construction of the new school will result in the loss of Dormouse habitat at the site (approximately 1.9ha of scrub), likely to support two adult Dormice. To avoid an offence under the relevant legislation, it will be necessary for the vegetation clearance to be carried out under a European Protected Species (EPS) development licence, obtained from Natural England.

6.1.22 **MM15 – Safeguarding measures during vegetation clearance.** In order to minimise the risk to Dormice during vegetation clearance works, a number of safeguarding measures will need to be implemented. This will include sensitive timing of works, involving clearance outside of the peak hibernation or breeding periods, or as a two-stage process (removal of above ground vegetation during the winter months, followed by removal of stumps and ground works the following late spring once Dormice have emerged from hibernation). Works will also be carried out under ecological supervision, with progressive clearance of vegetation by hand, and will be preceded by check surveys of habitats for nests. These measures will be detailed in the method statement accompanying the EPS licence application.

6.1.23 **MM16 – Replacement habitat provision.** To compensate for losses of habitat under the proposals, new woodland and scrub planting will be provided around the periphery of the site. Over 0.4ha of new woodland and >1ha of new native scrub planting is proposed under the scheme. Nest boxes will also be provided in retained habitat areas to increase breeding opportunities for this species. Further detail is provided in the habitat creation and ecological enhancement section below. Where crossing of existing linear habitat features is required / unavoidable, impacts to connectivity can be minimised by the incorporation of hop-overs, where practicable.

Water Vole and Otter

6.1.24 **MM17 – Pre-commencement Survey.** Prior to the commencement of works, in accordance with best practice, an update survey will be undertaken of the on-site section of watercourse to determine whether Water Vole or Otter have successfully established. This survey should take place between mid-April and September. Should Water Vole or Otter be confirmed as present, a suitable mitigation strategy will need to be devised.

6.1.25 **MM18 – Habitat Provision.** The survey work undertaken to date indicates Water Vole and Otter may be utilising the on-site section of the watercourse on a sporadic basis, but are not establishing an on-site population. Nonetheless, the watercourse will be enhanced, with design elements suitable for Water Vole; including steep earth banks (approaching 1:1 gradient), lush marginal vegetation to provide food and cover, and established bank top vegetation to provide a corridor of suitable habitat facilitating future dispersal through the site. Native species plug planting as well as seeding should be utilised to establish species-rich marginal, bank-side and bank-top vegetation quickly. Where road crossings are required, bridges, or appropriately designed culverts would be installed to prevent habitat fragmentation and any culverting that is necessary would need to be as short as possible and appropriately designed to retain connectivity for Otter and Water Vole.

Other Mammals

6.1.26 **MM19 – Hedgehog Safeguards.** In order to safeguard Hedgehogs and other small mammals should they enter the site during construction works, the following measures will be implemented:

- A watching brief should be maintained for Hedgehog and other small mammals throughout any clearance works;
- Any piles of material already present on site, particularly vegetation/leaves, etc. and any areas of dense scrub or hedgerows, shall be dismantled/removed by hand and checked for Hedgehog prior to the use of any machinery/disposal;
- Any material to be disposed of by burning, particularly waste from vegetation clearance and tree works, should not be left piled on site for more than 24 hours in

order to minimise the risk of Hedgehogs occupying the pile. If this cannot be avoided, material should be stored within a container such as a skip to prevent animals from gaining access. Any material which has been stored on the ground overnight should be moved prior to burning to allow a thorough check for any animals which may have been occupying the pile;

- In the event that an injured Hedgehog is found, the animal should be wrapped carefully in a towel, the British Hedgehog Preservation Society (BHPS) phoned (01584 890 801) and the Hedgehog taken to a local vet immediately; and

- To maintain connectivity throughout the site for Hedgehog and to allow access to suitable foraging habitat contained within residential gardens, small holes (13cmx13cm) should be created within garden fences or under gates.

6.1.27 **MM20 – Safeguarding measures during vegetation clearance.** In order to minimise the risk to Harvest Mouse during vegetation clearance works, a number of safeguarding measures will need to be implemented. This will include sensitive timing of works, involving clearance outside of the peak hibernation or breeding periods, or as a two-stage process (removal of above ground vegetation during the winter months, followed by removal of stumps and ground works the following late spring once Harvest Mice have emerged from hibernation). Works will also be carried out under ecological supervision, with progressive clearance of vegetation by hand, and will be preceded by check surveys of habitats for nests.

Amphibians

6.1.28 **MM21 – Pond Draining.** It is proposed that the on-site ponds be drained down during the winter period when amphibians are less likely to be present. Should this not be possible, the ponds will be drained down carefully, under ecological supervision, and any amphibians (e.g. Common Toad) present capture and released within suitable habitat.

Reptiles

6.1.29 **MM22 - Habitat Management.** It is advised that habitat management (e.g. ploughing) continues leading up to development to prevent the extent of suitable habitat increasing.

6.1.30 **MM23 - Reptile Receptor Area.** A reptile receptor area will be created within the site, adjacent to where the majority of reptiles were recorded. This receptor area will be enhanced for reptiles through grassland management, control of scrub encroachment and the creation of hibernacula. To ensure the success of the reptile mitigation strategy, the reptile receptor area will be prepared prior to mitigation beginning.

6.1.31 **MM24 – Translocation.** A programme of translocation to the receptor area within the site will be undertaken to ensure that reptiles are protected against killing and injury and hence avoid an offence under the relevant legislation. In order to carry out the translocation and safeguarding of reptiles during works, individual reptiles will be relocated to the undeveloped receptor area prior to commencement of site clearance / construction works at the site, with reptile exclusion fencing installed where necessary to prevent individual reptiles entering the construction zone.

6.1.32 The design of the translocation methodology for the site is based on the guidelines set out within the best practice guidelines[36]. In particular, the design will give consideration to the timing of exercise, duration of exercise, capture method, reptile exclusion fencing, location

[36] HGBI (1998) Evaluating Local Mitigation/Translocation Programmes: Maintaining Best Practice and Lawfun Standards'

of refugia, size of refugia, density of refugia, trapping procedure, data collection, animal welfare, and receptor site.

6.1.33 The HGBI guidelines are discussed in the English Nature [now Natural England] 'Species Conservation Handbook' (updated June 1998). The Species Conservation Handbook sets out English Nature's view that:

"minimum effort (as laid out in the HGBI advisory note) is considered to equate to 'reasonable' trapping effort".

6.1.34 The reptile mitigation strategy would also be used to ensure that amphibians such as the Priority Species Common Toad, should it be present on site, is safeguarded during the development works, with any individuals encountered during the exercise similarly translocated to the reptile receptor area.

6.1.35 Reptile translocation exercises can be undertaken over a series of visits between March/April and September – November (during suitable weather conditions). These visits would be carried out during suitable weather conditions (between 9-18°C, and avoiding windy or rainy conditions), and generally during the morning and late afternoon when reptiles are most likely to be basking.

6.1.36 The aim of any translocation exercise is to remove a significant proportion of the animals from the affected areas. The HGBI guidelines recommend 60 suitable trapping days with refugia laid out at a density of 50 refugia/ha and checked once per day. Based on the low number of reptiles present, it is considered appropriate to base the capture effort on doubling the recommended refugia density (from 50/ha to 100/ha), with a corresponding reduction of the duration of the trapping to 30 days. In addition, daily trapping rounds will be doubled to two visits per day to provide additional trapping effort.

6.1.37 The actual number of trapping days undertaken would be guided by the capture rate of reptiles experienced during the exercise, and the exercise will only be completed when it is clear from the ongoing results that the significant majority of reptiles have been removed from the donor area.

6.1.38 The successful translocation of the majority of the reptile population can usually be confirmed by analysing the results of the translocation exercise in order to confirm if there has been a significant decrease in the numbers of reptiles translocated throughout the exercise. Particular attention will be given to the numbers captured during the final few trapping days.

6.1.39 In order to ensure relocated reptiles remain excluded from the construction zone, it is proposed to use semi-permanent exclusion fencing to create a barrier between the receptor area and areas to be worked. The exclusion fencing would extend along the length of the ancient woodland buffer zone and development area, in addition to the north-eastern and south-western boundaries of the site. The exclusion fence will include a kick-back so as to prevent reptiles re-entering the construction zone. To achieve this a habitat manipulation exercise will be undertaken in the receptor area where the acoustic fencing will be installed, whereby the grassland in this area will be strimmed to a height of 150mm, under the supervision of a suitably qualified ecologist who will then finger-tip search the area for the presence of reptiles before it can be strimmed to ground level.

6.1.40 Appropriate signage will be incorporated to inform site workers and members of the public of the purpose of the fencing. Heras fencing (or similar) should also be installed alongside

the reptile exclusion fencing, to highlight the location of the fencing and prevent accidental damage by plant, machinery, etc.

6.1.41 The reptile exclusion fence would form a vertical barrier above ground with an overlap on top to prevent animals climbing over and would be buried in the ground with an underlap at the base to prevent animals from moving under.

6.1.42 The exclusion fencing would be maintained throughout the construction phase of the development to prevent reptiles re-entering the development footprint. This would include maintenance of habitats either side of the fence through cutting to prevent tall vegetation developing which could assist reptiles in climbing over the fence. Upon completion of the development, fencing would be removed under the supervision of a suitably qualified ecologist.

6.1.43 The habitat at the site specifically created for reptiles will be sensitively managed *in perpetuity* and detailed within a suitable reptile mitigation strategy.

Nesting Birds

6.1.44 **MM25** – **Timing of Works.** To avoid a potential offence under the relevant legislation, no clearance of suitable vegetation should be undertaken during the bird-nesting season (1st March to 31st August inclusive). If this is not practicable, any potential nesting habitat to be removed should first be checked by a competent ecologist in order to determine the location of any active nests. Any active nests identified would then need to be cordoned off (minimum 5m buffer) and protected until the end of the nesting season or until the birds have fledged. These checking surveys would need to be carried out no more than three days in advance of vegetation clearance.

Invasive Species

6.1.45 **MM26 – Invasive Species Safeguards.** Himalayan Balsam and Spanish Bluebell, which are listed on Schedule 9 Part II of the Wildlife and Countryside Act 1981, were recorded within the site. It is an offence to cause to grow in the wild, any plant listed on the schedule. As such, all relevant precautions should be taken when carrying out actions that could potentially spread these plants. The government has set out guidance on what can be considered 'causing to grow in the wild' within a response to the Schedule 9 review which states:

"We would expect that where plants listed in Schedule 9 are grown in private gardens, amenity areas etc., reasonable measures will be taken to confine them to the cultivated area so as to prevent their spreading to the wider environment and beyond the landowner's control. It is our view that any failure to do so, which in turn results in the plant spreading to the wild, could be considered as 'causing to grow in the wild' and as such would constitute an offence…Additionally, negligent or reckless behaviour such as inappropriate disposal of garden waste, where this results in Schedule 9 species becoming established in the wild would also constitute an offence."

6.1.46 As such, it is proposed that appropriate safeguards be put in place to prevent the spread of the Schedule 9 species during the proposed development works. Such measures would likely involve herbicide application and/or excavation and removal of any material within the site itself (which should then be disposed of appropriately to prevent colonisation of off-site areas).

Biodiversity Net Gains

6.1.47 The National Planning Policy Framework (NPPF) encourages new developments to maximise the opportunities for biodiversity through incorporation of enhancement measures. The proposals present the opportunity to deliver ecological enhancements at the site for the benefit of local biodiversity, thereby making a positive contribution towards the broad objectives of national conservation priorities and the local Biodiversity Action Plan (BAP). The recommendations and enhancements summarised below are considered appropriate given the context of the site and the scale and nature of the proposals. Through implementation of the following ecological enhancements (**EE1** – **EE14**), the opportunity exists for the proposals to deliver a number of biodiversity net gains at the site. A Biodiversity Net Gain (BNGA) assessment has been undertaken at the site, the results of which are set out in a separate report (Ref: 1005014 BNGA dv1).

Habitat Creation

6.1.48 **EE1 – New Planting.** It is proposed that where practicable, new planting within the site be comprised of native species of local provenance, including trees and shrubs appropriate to the local area. Suitable species for inclusion within the planting could include native trees such as Oak, Ash, Silver Birch and Field Maple, whilst native shrub species of particular benefit would likely include fruit and nut bearing species which would provide additional food for wildlife, such as Blackthorn, Hawthorn, Crab Apple, Hazel and Elder. Where non-native species are proposed, these should include species of value to wildlife, such as varieties listed on the RHS' 'Plants for Pollinators' database, providing a nectar source for bees and other pollinating insects.

6.1.49 **EE2 – Wildflower Grassland.** It is recommended that areas of wildflower grassland are created within the site such that, in combination with new native landscape planting, opportunities for biodiversity will be maximised under the proposals. New areas of wildflower grassland would be of most benefit when created adjacent to retained habitat of elevated value (e.g. woodland and the watercourse), thereby establishing a mosaic of habitats of elevated value. Consideration should be given to the laying of wildflower turfs, comprising locally appropriate native species, to establish wildflower grassland. This would ensure rapid establishment of these habitats, and reduce the timeframe for delivering the range of ecological benefits that are proposed. Areas of public open space for recreational purposes could also include features of benefit for wildlife such as flowering lawns.

6.1.50 **EE3 – New Woodland and Scrub Planting.** New areas of woodland planting shall be incorporated within the site which will provide opportunities for birds, Badgers, amphibians, small mammals and invertebrates. The woodland should comprise a range of native tree and shrub species to create a varied vegetation structure.

6.1.51 **EE4 – New Hedgerow Planting.** The existing hedgerow network will be enhanced and expanded through the planting of native species-rich hedge planting within the site. New hedgerow planting should have a high composition of native fruit and nut bearing species that will provide a seasonal foraging resource for a range of wildlife, including Badgers and Dormice, as well as providing additional nesting opportunities. Furthermore, native hedgerow planting will provide corridors to facilitate the movement of wildlife, creating additional and stronger links between the site and surrounding habitats.

6.1.52 **EE5 – Wetland Features.** The opportunity exists under the proposals to create new wetland habitats that will provide a range of opportunities for wildlife. It is proposed that the ponds are included as part of the Sustainable Drainage Systems (SuDS). Creation of such habitats would provide opportunities for a range of wildlife while also helping to attenuate surface

water run-off. In addition, SUDS features sown with a neutral grassland mix tolerant of periodic inundation will be created, along with an area of reedbed.

6.1.53 The existing watercourse will also be sensitively managed and enhanced with a variety of aquatic and marginal plants, as well as marginal moisture loving perennials, such as Greater Pond Sedge *Carex riparia*, Purple Loosestrife *Lythrum salicaria*, Branched Bur-reed *Sparganium erectum* and Greater Spearwort *Ranunculus lingua*.

Water Vole and Otter

6.1.54 **EE6 – Wetland Features.** The habitat creation, management and enhancements described above will also increase foraging and shelter opportunities for Otter and Water Vole along the watercourse within the site.

Bats

6.1.55 **EE7 - Bat Boxes.** A number of bat boxes will be incorporated within the proposed development. The provision of bat boxes will provide new roosting opportunities for bats in the area, such as Soprano Pipistrelle, a national Priority Species. So as to maximise their potential use, the bat boxes should ideally be situated on suitable retained trees, erected as high up as possible and sited in sheltered wind-free areas that are exposed to the sun for part of the day, facing a south-east, south or south-westerly direction. In addition, where architectural design allows, a number of integrated bat boxes / roost features should be incorporated into a proportion of the new build. The precise number and locations of boxes / roost features should be determined by a competent ecologist, post-planning once the relevant final development design details have been approved.

Hedgehog

6.1.56 **EE8 – Hedgehog Nest Domes.** It is recommended that Hedgehog nest domes be installed within sheltered areas, such as the existing or newly created hedgerows to provide suitable nesting and hibernation sites for this species. The Hedgehog nest domes should be positioned out of direct sunlight, in areas of dense vegetation.

6.1.57 **EE9 – Foraging Habitat.** Many of the new garden habitats will likely provide foraging opportunities for Hedgehog. To allow access it is proposed that cut outs be provided within garden fences or under garden gates. These gaps should be at least 15cm square to allow free movement.

Birds

6.1.58 **EE10 - Bird Boxes**. A number of bird nesting boxes are to be incorporated within the proposed development, thereby increasing nesting opportunities for birds at the site. Ideally, the bird boxes will have greater potential for use if sited on suitable, retained trees, situated as high up as possible. The precise number and locations of boxes should be determined by a competent ecologist, post-planning once the relevant final development design details have been approved.

6.1.59 Herptiles

6.1.60 **EE11 – Hibernacula.** In addition to the creation of new habitats, in order to provide increased refuge and hibernation opportunities for reptiles and amphibians, a number of hibernacula and log piles will be created within the reptile receptor site and areas of new reptile habitat.

Invertebrates

6.1.61 **EE12 – Habitat Piles.** A proportion of any deadwood arising from vegetation clearance works should be retained within the site in a number of wood piles located within areas of new planting, new wetland habitats or areas of wildflower grassland in order to provide potential habitat opportunities for invertebrate species, which in turn could provide a prey source for a range of other wildlife. In addition, the provision and management of new native landscape planting will likely provide additional opportunities for invertebrates at the site in the long term.

6.1.62 **EE13 – Nectar Source.** The wildflower mix will include various Bents *Agrostis* spp. and Hawkweeds (*Hieracium/Hypochoeris*), which will provide a larval food source and adult nectar source, respectively, for Wall butterfly (Priority Species).

6.1.63 **EE14 – Bee Bricks.** It is proposed that a number of bee bricks be incorporated within the proposed development thereby increasing nesting opportunities for declining populations of non-swarming solitary bee populations. Ideally, bee bricks shall be located within suitable south-facing walls (where architectural design allows), located at least 1m off the ground. The bricks should be unobstructed by vegetation, though within close vicinity of nectar and pollen sources.

7 Conclusions

7.1.1 Aspect Ecology has carried out an Ecological Appraisal of the proposed development, based on the results of a desktop study, Phase 1 habitat survey and a number of detailed protected species surveys.

7.1.2 The available information confirms that no statutory nature conservation designations are present within or adjacent to the site, such that designations within the surrounding area are unlikely to be adversely affected by the proposals. A section of Arnold's Wood Complex LWS and ancient woodland is located within the site which will be retained and buffered from development to a minimum of 15m. Furthermore, a number of mitigation measures are proposed in order to minimise the risk of harm to the LWS.

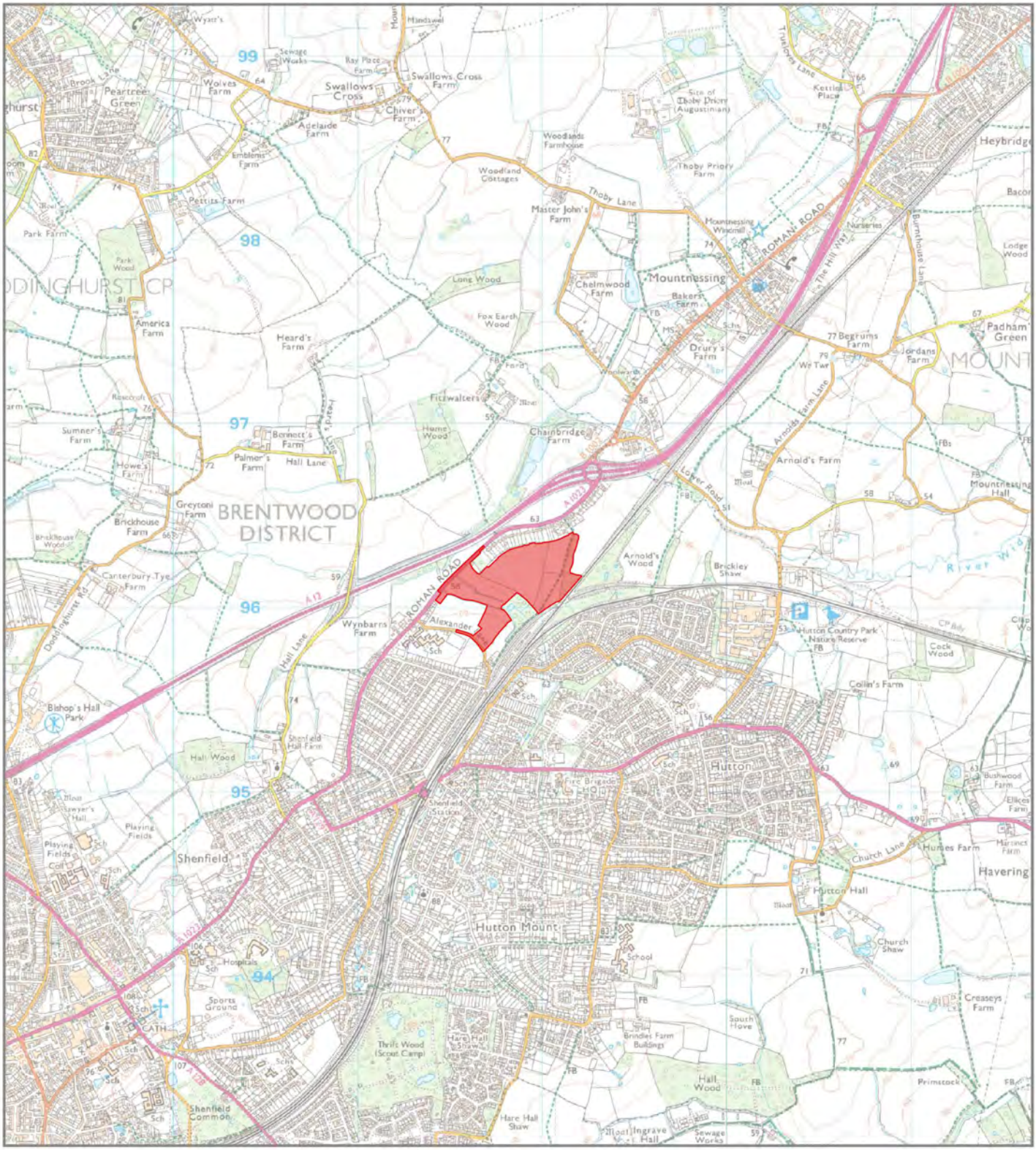
7.1.3 The Phase 1 habitat surveys have established that the site predominately comprises habitats not considered to be of ecological importance, whilst the proposals have sought to retain those features identified to be of value. Where it has not been practicable to avoid loss of habitats, new habitat creation has been proposed to offset losses, in conjunction with the landscape proposals. Furthermore, a number of enhancements are proposed to improve the retained habitats.

7.1.4 The habitats within the site support several protected species, including species protected under both national and European legislation. Accordingly, a number of mitigation measures have been proposed to minimise the risk of harm to protected species, with compensatory measures proposed, where appropriate, in order to maintain the conservation status of local populations.

7.1.5 In conclusion, the proposals have sought to minimise impacts and subject to the implementation of appropriate avoidance, mitigation and compensation measures, it is considered unlikely that the proposals will result in significant harm to biodiversity. On the contrary, the opportunity exists to provide a number of biodiversity net gains as part of the proposals.

Plan 5014/ECO1:

Site Location



Key:

Site Location

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Land at Chelmsford Road, Shenfield	PROJECT
Site Location	TITLE
5014/ECO1	DRAWING NO.
B/JP	REV
August 2023	DATE

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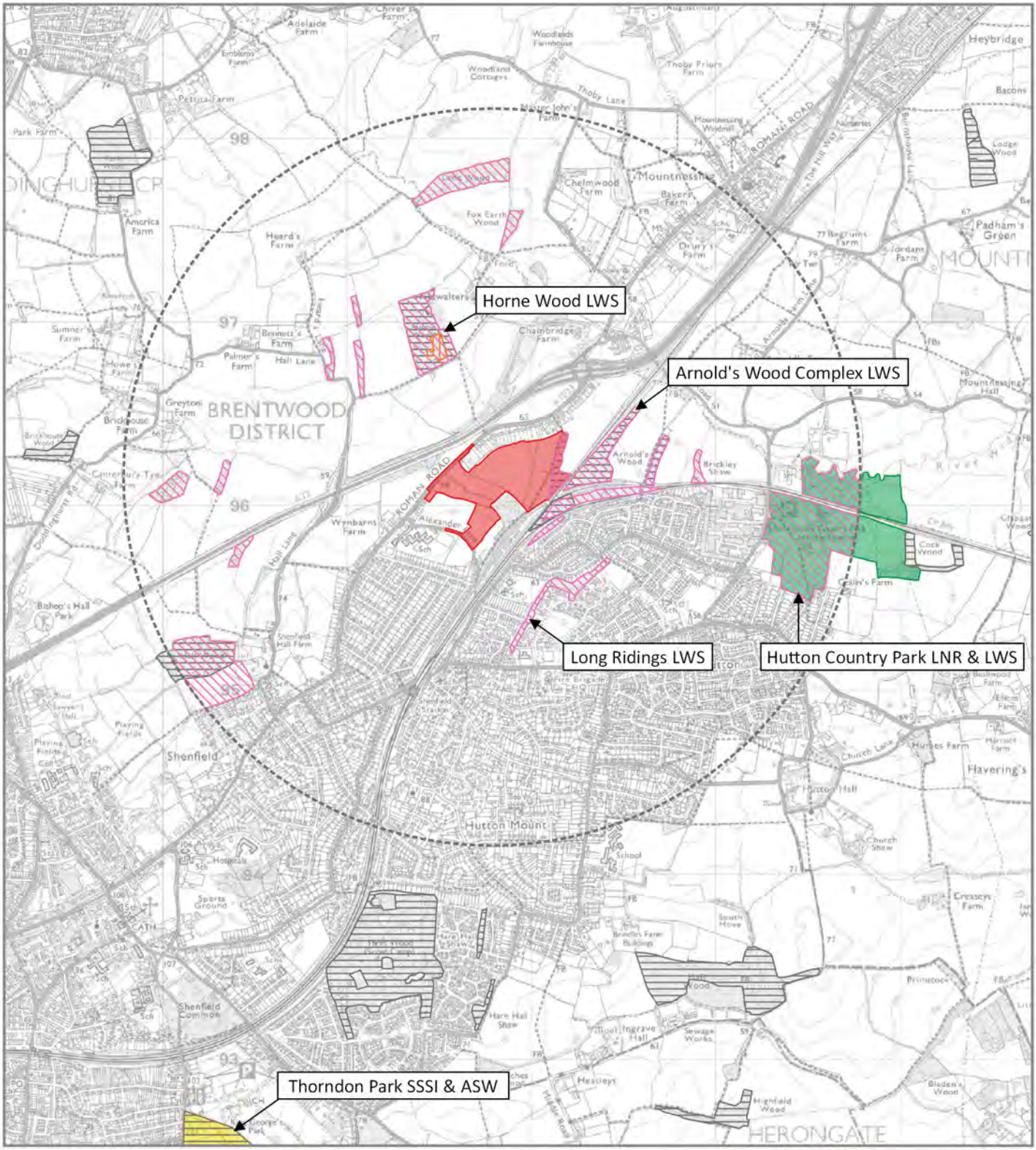
Plan 5014/ECO2:

Ecological Designations



Key:

- Site Location
- Site of Special Scientific Interest (SSSI)
- Local Nature Reserve (LNR)
- Local Wildlife Site (LWS)
- Ancient & Semi-Natural Woodland (ASW)
- Ancient Replanted Woodland (ARW)
- 5014 2km Local Records Centre 2km Search Area (Only non-statuatory designations occurring within 2km of the site centre are shown)

Non-statutory data provided by Essex Records Centre

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Land at Chelmsford Road, Shenfield	PROJECT
Ecological Designations	TITLE
5014/ECO2	DRAWING NO.
B/JP	REV
August 2023	DATE

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Plan 5014/ECO3:

Habitats and Ecological Features

Key:

- Site Boundary
- Arable
- Semi-improved Grassland
- Tall Ruderal Vegetation
- Dense Scrub
- Woodland
- Dry Pond
- Spanish Bluebell
- Brash Pile
- Himalayan Balsam
- Scattered Scrub
- Tree with High Bat Roost Potential
- Tree with Moderate Bat Roost Potential
- Tree with Low Bat Roost Potential
- Hedgerow
- Watercourse
- Dry Ditch

Designations

- Arnold's Wood Complex Local Wildlife Site (LWS) and Ancient Semi-natural Woodland (ASW)

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Land at Chelmsford Road, Shenfield	PROJECT
Habitats and Ecological Features	TITLE
5014/ECO3	DRAWING NO.
B/BG	REV
September 2023	DATE

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Plan 5014/ECO4:

Bat Emergence/Re-entry Survey Results

T30

11.07.23 - 3x Common Pipistrelle emerged at 21:30 followed by 2x Common Pipistrelle emergances at 21:45

T172

T168

22.06.23 - 2x Common Pipistrelle emergences at 21:59

07.08.23 - x1 Common Pipistrelle emergence at 21:10

T155

T266

23.06.23 - 1x Common Pipistrelle re-entered at 04:08.
12.07.23 - 1x Common Pipistrelle re-entry at 03:19 followed by 1x Common Pipistrelle re-entry at 03:22

Key:

- Site Boundary
- Emergence Location
- IR Camera Location
- Surveyor Location

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Land at Chelmsford Road, Shenfield	PROJECT
Bat Emergence and Re-entry Survey Results	TITLE
5014/ECO4	DRAWING NO.
A/BG	REV
September 2023	DATE

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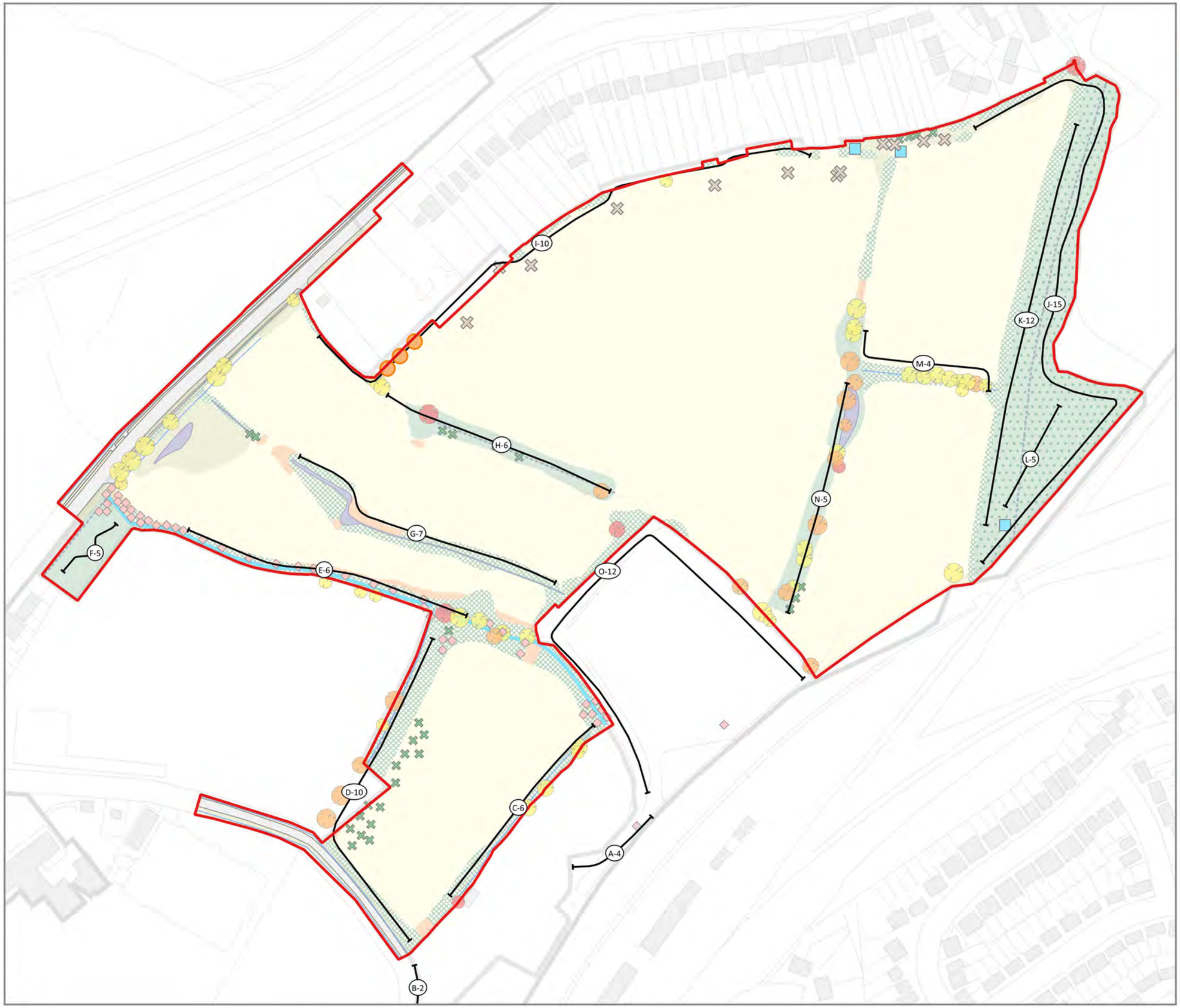
Plan 5014/ECO5:

Dormouse Survey Results



Key:

- Site Boundary
- Dormouse Transect
- Dormouse Nest Location

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Land at Chelmsford Road, Shenfield	PROJECT
Dormouse Survey Results	TITLE
5014/ECO5	DRAWING NO.
B/JP	REV
September 2023	DATE

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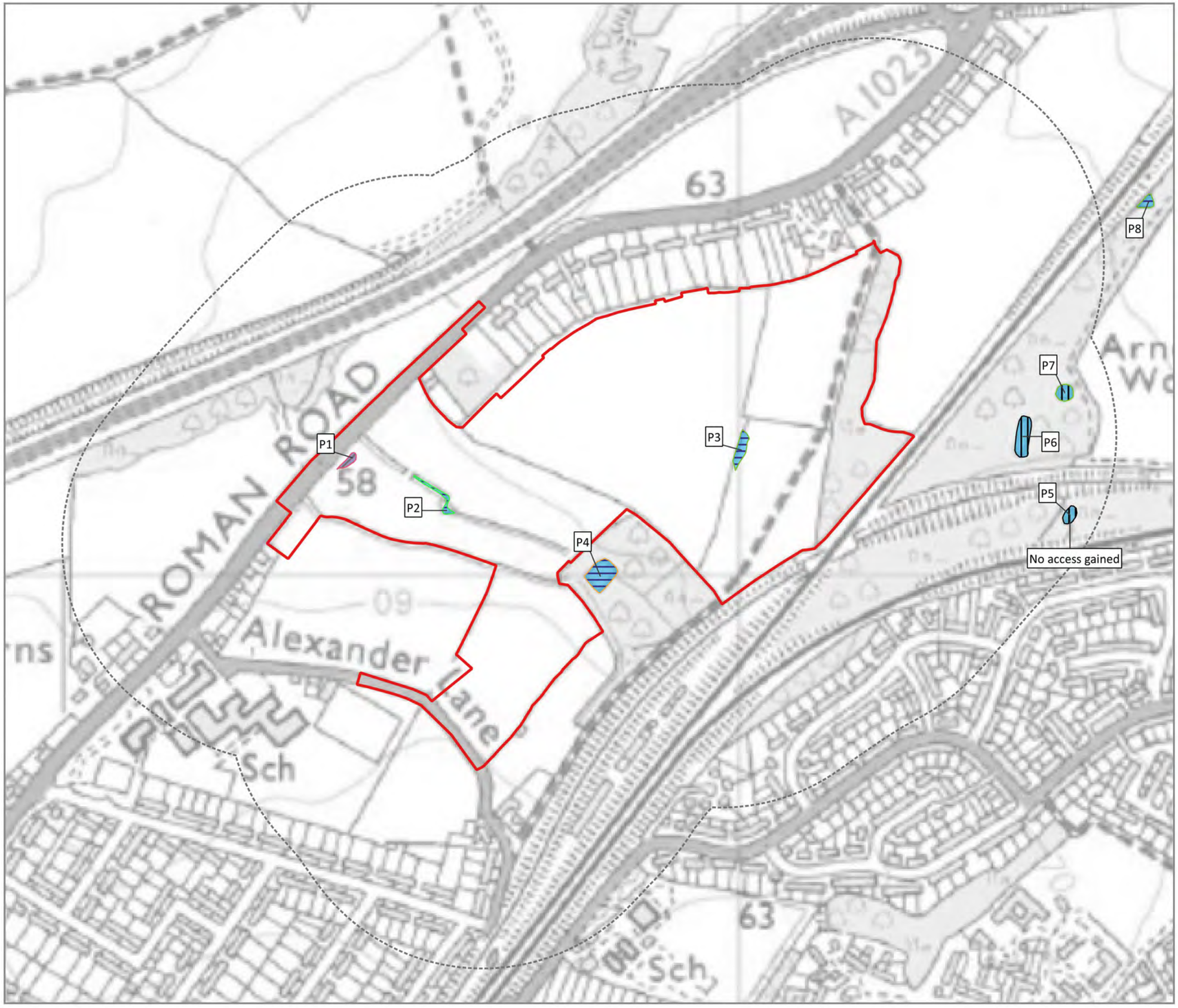
Plan 5014/ECO6:

Pond Locations



Key:

- Site Boundary
- 250m Study Area
- Pond
- Dry Pond

HSI Results

- Good
- Average
- Below Average
- Poor
- Unsuitable
- No access

eDNA Survey Results

- Absent
- Negative
- No access gained

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Land at Chelmsford Road, Shenfield	PROJECT
Pond Locations	TITLE
5014/ECO6	DRAWING NO.
A/BG	REV
August 2023	DATE

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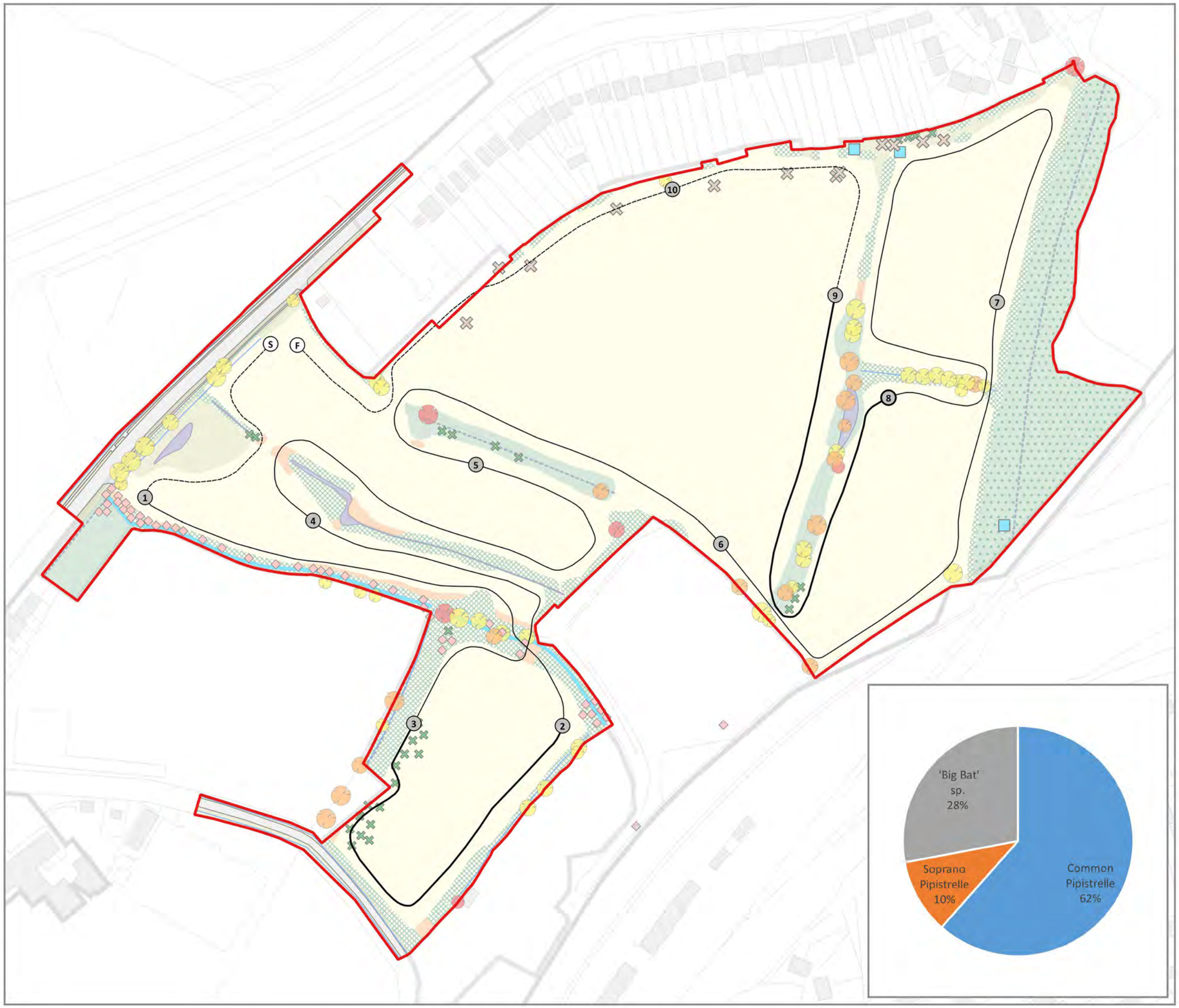
Plan 5014/ECO7:

Bat Walked Activity Survey and Results



Key:

- Site Boundary

Bat Activity (Transect Survey)

Between Listening Points:

- High
- Moderate
- Low
- Negligible

At Listening Points:

- High
- Moderate
- Low
- Negligible

Bat Activity Level Key:
High: >1 Passes per minute

Moderate: 0.51-1.0 Passes per minute

Low: 0.01-0.5 Passes per minute

Negligible: 0 Passes per minute

Note: Number of passes per minute based on the number of sound files produced by Anabat Scout.

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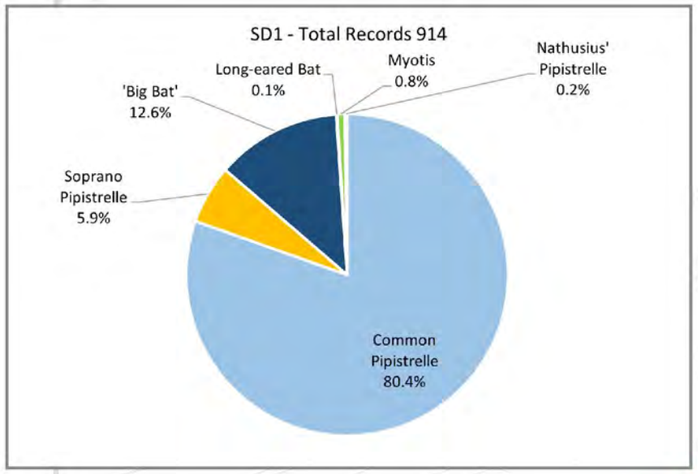
Land at Chelmsford Road, Shenfield	PROJECT
Bat Walked Activity Survey and Results	TITLE
5014/ECO7	DRAWING NO.
B/JP	REV
September 2023	DATE

Plan 5014/ECO8:

Bat Remote Detector Survey and Results



Key:

- Site Boundary
- Bat Static location

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Land at Chelmsford Road, Shenfield	PROJECT
Bat Remote Detector Survey and Results	TITLE
5014/ECO8	DRAWING NO.
A/BG	REV
September 2023	DATE

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Plan 5014/ECO9:

Reptile Survey and Results

Key:

- Site Boundary
- A — Reptile Transec, Transect Letter

Peak Count of Reptiles Recorded per Transect

- Adult Common Lizard
- Juvenile Common Lizard
- Adult Slow Worm
- Juvenile Slow Worm
- Adult Grass Snake
- Juvenile Grass Snake

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Land at Chelmsford Road, Shenfield	PROJECT
Reptile Survey and Results	TITLE
5014/ECO9	DRAWING NO.
B/BG	REV
September 2023	DATE

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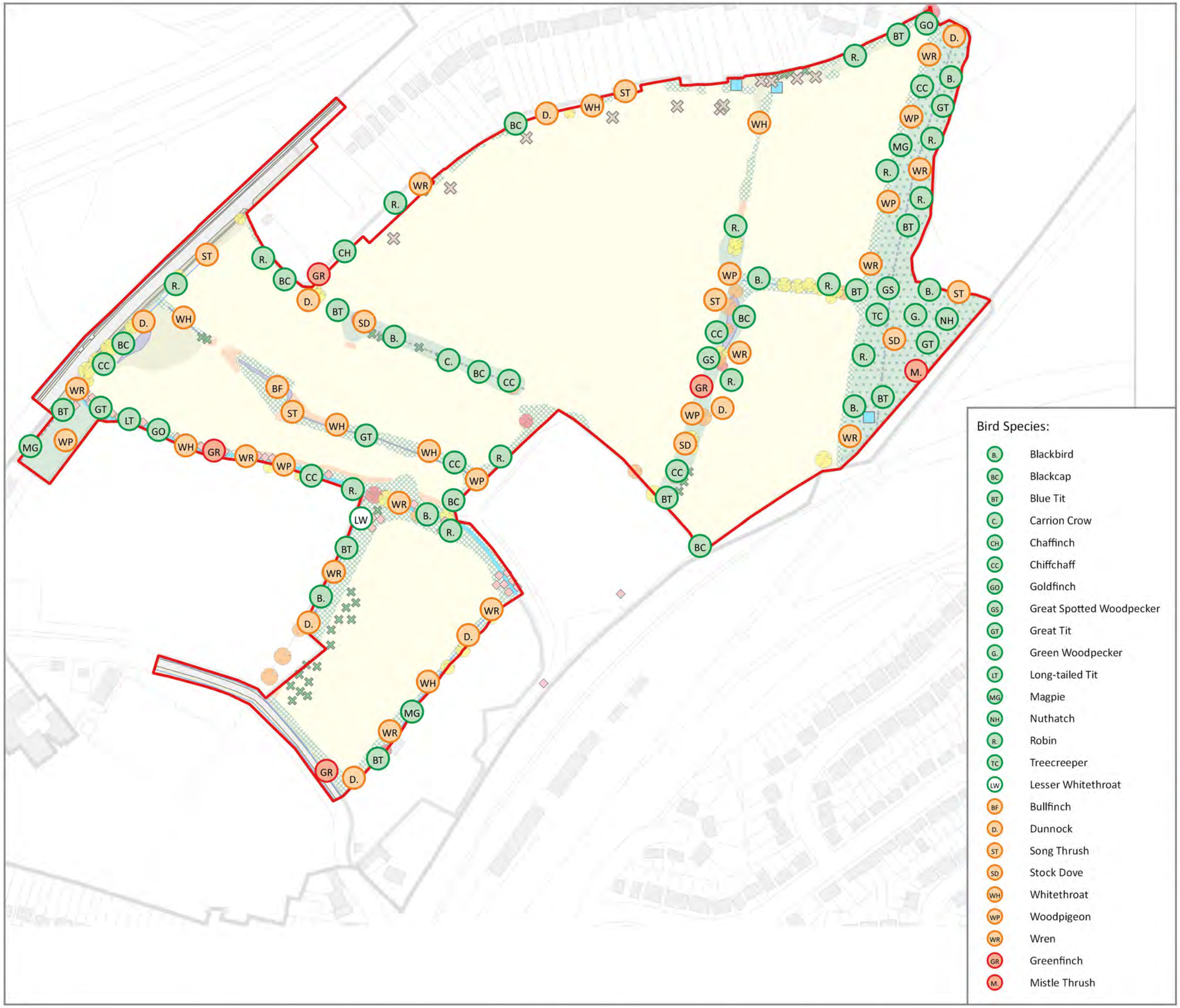
Plan 5014/ECO10:

Breeding Bird Survey Results



Key:

- Site Boundary
- Breeding / Probable Breeding (BOCC Red List)
- Possible Breeding (BOCC Red List)
- Breeding / Probable Breeding (BOCC Amber List Species)
- Possible Breeding (BOCC Amber List Species)
- Breeding / Probable Breeding (BOCC Green List - Not Threatened)
- Possible Breeding (BOCC Green List - Not Threatened)

Bird Species:

B.	Blackbird
BC	Blackcap
BT	Blue Tit
C.	Carrion Crow
CH	Chaffinch
CC	Chiffchaff
GO	Goldfinch
GS	Great Spotted Woodpecker
GT	Great Tit
G.	Green Woodpecker
LT	Long-tailed Tit
MG	Magpie
NH	Nuthatch
R.	Robin
TC	Treecreeper
LW	Lesser Whitethroat
BF	Bullfinch
D.	Dunnock
ST	Song Thrush
SD	Stock Dove
WH	Whitethroat
WP	Woodpigeon
WR	Wren
GR	Greenfinch
M.	Mistle Thrush

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Land at Chelmsford Road, Shenfield	PROJECT
Breeding Bird Survey Results	TITLE
5014/ECO10	DRAWING NO.
A/BG	REV
September 2023	DATE

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Photographs:

Photograph 1 : Arable

Photograph 2 : Hedgerow H1

Photograph 3 : Hedgerow H2

Photograph 4 : Hedgerow H3

Photograph 5 : Hedgerow H4

Photograph 6 : Hedgerow H5

Photograph 7 : Hedgerow H6

Photograph 8 : Pond P1

Photograph 9 : Pond P2

Photograph 10 : Pond P3

Photograph 11 : Watercourse WC1

Photograph 12 : Woodland W1

Photograph 13 : Woodland W2

Photograph 14 : Wooded Belt WB1

Photograph 15 : Wooded Belt WB2

Appendix 5014/1:

Evaluation Methodology

Evaluation Methodology

1. The evaluation of ecological features and resources is based on professional judgement whilst also drawing on the latest available industry guidance and research. The approach taken in this report is based on that described by the Chartered Institute of Ecology and Environmental Management (CIEEM) 'Guidelines for Ecological Impact Assessment in the UK and Ireland' (2018)[1].

Importance of Ecological Features

2. Ecological features within the site/study area have been evaluated in terms of whether they qualify as 'important ecological features'. In this regard, CIEEM guidance states that *"it is not necessary to carry out detailed assessment of features that are sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable".*

3. Various characteristics contribute to the importance of ecological features, including:

- Naturalness;
- Animal or plant species, sub-species or varieties that are rare or uncommon, either internationally, nationally or more locally, including those that may be seasonally transient;
- Ecosystems and their component parts, which provide the habitats required by important species, populations and/or assemblages;
- Endemic species or locally distinct sub-populations of a species;
- Habitat diversity;
- Habitat connectivity and/or synergistic associations;
- Habitats and species in decline;
- Rich assemblages of plants and animals;
- Large populations of species or concentrations of species considered uncommon or threatened in a wider context;
- Plant communities (and their associated animals) that are considered to be typical of valued natural/semi-natural vegetation types, including examples of naturally species-poor communities; and
- Species on the edge of their range, particularly where their distribution is changing as a result of global trends and climate change.

4. As an objective starting point for identifying important ecological features, European, national and local governments have identified sites, habitats and species which form a key focus for biodiversity conservation in the UK, supported by policy and legislation. These are summarised by CIEEM guidance as follows:

Designated Sites

- Statutory sites designated or classified under international conventions or European legislation, for example World Heritage Sites, Biosphere Reserves, Wetlands of International Importance (Ramsar sites), Special Areas of Conservation (SAC), Special Protection Areas (SPA);

[1] CIEEM (2018) '*Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine*', Chartered Institute of Ecology and Environmental Management, Winchester

- Statutory sites designated under national legislation, for example Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR) and Local Nature Reserves (LNR);
- Locally designated wildlife sites, e.g. Local Wildlife Sites (LWS).

Biodiversity Lists

- Habitats and species of principal importance for the conservation of biodiversity in England and Wales (largely drawn from UK BAP priority habitats and priority species), often referred to simply as Priority Habitats / Species;
- Local BAP priority species and habitats.

Red Listed, Rare, Legally Protected Species

- Species of conservation concern, Red Data Book (RDB) species;
- Birds of Conservation Concern;
- Nationally rare and nationally scarce species;
- Legally protected species.

5. In addition to this list, other features may be considered to be of importance on the basis of local rarity, where they enable effective conservation of other important features, or play a key functional role in the landscape.

<u>Assigning Level of Importance</u>

6. The importance of an ecological feature should then be considered within a defined geographical context. Based on CIEEM guidance, the following frame of reference is used:

- International (European);
- National;
- Regional;
- County;
- District;
- Local (e.g. Parish or Neighbourhood);
- Site (not of importance beyond the immediate context of the site).

7. Features of 'local' importance are those considered to be below a district level of importance, but are considered to appreciably enrich the nature conservation resource or are of elevated importance beyond the context of the site.

8. Where features are identified as 'important' based on the list of key sites, habitats and species set out above, but are very limited in extent or quality (in terms of habitat resource or species population) and do not appreciably contribute to the biodiversity interest beyond the context of the site, they are considered to be of 'site' importance.

9. In terms of assigning the level of importance, the following considerations are relevant:

Designated Sites

10. For designated sites, importance should reflect the geographical context of the designation (e.g. SAC/SPA/Ramsar sites are designated at the international level whereas SSSIs are designated at the national level). Consideration should be given to multiple designations as appropriate (where an area is subject to differing levels of nature conservation designations).

Habitats

11. In certain cases, the value of a habitat can be measured against known selection criteria, e.g. SAC selection criteria, 'Guidelines for the selection of biological SSSIs' and the Hedgerows Regulations 1997. However, for the majority of commonly encountered sites, the most relevant habitat evaluation will be at a more localised level and based on relevant factors such as antiquity, size, species-diversity, potential, naturalness, rarity, fragility and typicalness (Ratcliffe, 1977). The ability to restore or re-create the habitat is also an important consideration, for example in the case of ancient woodland.

12. Whether habitats are listed as priorities for conservation at a national level in accordance with Sections 41 and 42 of the Natural Environment and Rural Communities Act (NERC) 2006, so called 'Habitats of Principal Importance' or 'Priority Habitats', or within regional or local Biodiversity Action Plans (BAPs) is also relevant, albeit the listing of a particular habitat under a BAP does not in itself imply any specific level of importance.

13. Habitat inventories (such as habitat mapping on the MAGIC database) or information relating to the status of particular habitats within a district, county or region can also assist in determining the appropriate scale at which a habitat is of importance.

Species

14. Deciding the importance of species populations should make use of existing criteria where available. For example, there are established criteria for defining nationally and internationally important populations of waterfowl. The scale within which importance is determined could also relate to a particular population, e.g. the breeding population of common toads within a suite of ponds or an otter population within a catchment.

15. When determining the importance of a species population, contextual information about distribution and abundance is fundamental, including trends based on historical records. For example, a species could be considered particularly important if it is rare and its population is in decline. With respect to rarity, this can apply across the geographic frame of reference and particular regard is given to populations where the UK holds a large or significant proportion of the international population of a species.

16. Whether species are listed as priorities for conservation at a national level in accordance with Sections 41 and 42 of the Natural Environment and Rural Communities Act (NERC) 2006, so called 'Species of Principal Importance' or 'Priority Species', or within regional or local Biodiversity Action Plans (BAPs) is also relevant, albeit the listing of a particular species under a BAP does not in itself imply any specific level of importance.

17. Species populations should also be considered in terms of the potential zone of influence of the proposals, i.e. if the entire species population within the site and surrounding area were to be affected by the proposed development, would this be of significance at a local, district, county or wider scale? This should also consider the foraging and territory ranges of individual species (e.g. bats roosting some distance from site may forage within site whereas other species such as invertebrates may be more sedentary).

Appendix 5014/2:

Legislation Summary

LEGISLATION SUMMARY

1. In England and Wales primary legislation is made by the UK Parliament, and in Scotland by the Scottish Parliament, in the form of Acts. The main piece of legislation relating to nature conservation in the UK is the Wildlife and Countryside Act 1981 (as amended).

2. Acts of Parliament confer powers on Ministers to make more detailed orders, rules or regulations by means of secondary legislation in the form of statutory instruments. Statutory instruments are used to provide the necessary detail that would be too complex to include in an Act itself[1]. The provisions of an Act of Parliament can also be enforced, amended or updated by secondary legislation.

3. In summary, the key pieces of legislation relating to nature conservation in the UK are:

    - Wildlife and Countryside Act 1981 (as amended)
    - Protection of Badgers Act 1992
    - Hedgerows Regulations 1997
    - Countryside and Rights of Way (CRoW) Act for England and Wales 2000
    - Natural Environment and Rural Communities Act 2006
    - Conservation of Habitats and Species Regulations 2017

4. A brief summary of the relevant legislation is provided below. The original Acts and instruments should be referred to for the full and most up to date text of the legislation.

5. **Wildlife and Countryside Act 1981 (as amended)**. The WCA Act provides for the notification and confirmation of Sites of Special Scientific Interest (SSSIs) identified for their flora, fauna, geological or physiographical features. The Act contains strict measures for the protection and management of SSSIs.

6. The Act also refers to the treatment of UK wildlife including protected species listed under Schedules 1 (birds), 5 (mammals, herpetofauna, fish, invertebrates) and 8 (plants).

7. Under Section 1(1) of the Act, all wild birds are protected such that is an offence to intentionally:

    - Kill, injure or take any wild bird;
    - Take, damage or destroy the nest of any wild bird whilst in use* or being built;
    - Take or destroy an egg of any wild bird.

    * The nests of birds that re-use their nests as listed under Schedule ZA1, e.g. Golden Eagle, are protected against taking, damage or destruction irrespective of whether they are in use or not.

8. Offences in respect of Schedule 1 birds are subject to special, i.e. higher, penalties. Schedule 1 birds also receive greater protection such that it is an offence to intentionally or recklessly:

    - Disturb any wild bird included in Schedule 1 while it is building a nest or while it is in, on or near a nest containing eggs or young;
    - Disturb dependent young of such a bird.

[1] http://www.parliament.uk/business/bills-and-legislation/secondary-legislation/statutory-instruments/

9. Under Section 9(1) of the Act, it is an offence to:

- Intentionally kill, injure or take any wild animal included in Schedule 5.

10. In addition, under Section 9(4) it is an offence to intentionally or recklessly:

- Obstruct access to, any structure or place which any wild animal included in Schedule 5 uses for shelter or protection; or
- Disturb any wild animal included in Schedule 5 while occupying a structure or place which it uses for that purpose.

11. Under Section 13(1) it is an offence:

- To intentionally pick, uproot or destroy any wild plant listed in Schedule 8; or
- Unless the authorised person, to intentionally uproot any wild plant not included in Schedule 8.

12. The Act also contains measures (S.14) for preventing the establishment of non-native species that may be detrimental to native wildlife, prohibiting the introduction into the wild of animals (releases or allows to escape) and plants (plants or causes to grow) listed under Schedule 9.

13. **Protection of Badgers Act 1992.** The Act aims to protect the species from persecution, rather than being a response to an unfavourable conservation status, as the species is in fact common over most of Britain. It should be noted that the legislation is not intended to prevent properly authorised development. Under the Act it is an offence to:

- Wilfully kill, injure, take, possess or cruelly ill-treat* a Badger, or attempt to do so;
- To intentionally or recklessly interfere with a sett# (this includes disturbing Badgers whilst they are occupying a sett, as well as damaging or destroying a sett or obstructing access to it).

* the intentional elimination of sufficient foraging area to support a known social group of Badgers may, in certain circumstances, be construed as an offence

\# A sett is defined as "*any structure or place which displays signs indicating current use by a Badger*". Natural England advice (June 2009) is that a sett is protected so long as such signs remain present, which in practice could potentially be for some time after the last actual occupation by Badger. Interference with a sett includes blocking tunnels or damaging the sett in any way

14. Licences can be obtained from the Statutory Nature Conservation Organisation (SNCO) for development activities that would otherwise be unlawful under the legislation, provided there is suitable justification. The SNCO for England is Natural England.

15. **Hedgerows Regulations 1997**. 'Important' hedgerows (as defined by the Regulations) are protected from removal (up-rooting or otherwise destroying). Various criteria specified in the Regulations are employed to identify 'important' hedgerows for wildlife, landscape or historical reasons.

16. **Countryside and Rights of Way (CRoW) Act for England and Wales 2000.** The CRoW Act provides increased measures for the management and protection of SSSIs and strengthens wildlife enforcement legislation. Schedule 12 of the Act amends the species provisions of the WCA 1981, strengthening the legal protection for threatened species. The Act also introduced a duty on Government to have regard to the conservation of biodiversity and maintain lists of species and habitats for which conservation steps should be taken or promoted, in accordance with the Convention on Biological Diversity.

17. **Natural Environment and Rural Communities Act 2006.** Section 41 of the NERC Act requires the Secretary of State to publish a list of habitats and species that are of principal importance for the conservation of biodiversity in England. The S41 list is used to guide decision-makers such as local planning authorities, in implementing their duty under Section 40 of the Act, to have regard to the conservation of biodiversity in England, when exercising their normal functions. 56 habitats and 943 species of principal importance are included on the S41 list. These are all the habitats and species in England that were identified as requiring action in the UK Biodiversity Action Plan (BAP).

18. **Conservation of Habitats and Species Regulations 2017 (as amended).** The Regulations enact the European Union's Habitats Directive (92/43/EEC) in the UK. The Habitats Directive was designed to contribute to the maintenance of biodiversity within member states through the conservation of sites, known in the UK as Special Areas of Conservation (SACs), containing habitats and species selected as being of EC importance (as listed in Annexes I and II of the Habitats Directive respectively). Member states are required to take measures to maintain or restore these natural and semi-natural habitats and wild species at a favourable conservation status.

19. The Regulations also require the compilation and maintenance of a register of European sites, to include SACs and Special Protection Areas (SPAs)[2] classified under Council Directive 79/409/EEC on the Conservation of Wild Birds (the Birds Directive). These sites constitute the Natura 2000 network. The Regulations impose restrictions on planning decisions likely to significantly affect SPAs or SACs.

20. The Regulations also provide protection to European Protected Species of animals that largely overlaps with the WCA 1981, albeit the provisions are generally stricter. Under Regulation 43 it is an offence, *inter alia*, to:

- Deliberately capture, injure or kill any wild animal of a European Protected Species;
- Deliberately disturb any wild animals of any such species, including in particular any disturbance likely to impair their ability to survive, to breed or reproduce, to rear or nurture their young, to hibernate or migrate, or which is likely to affect significantly their local distribution or abundance;
- Deliberately take or destroy the eggs of such an animal;
- Damage or destroy a breeding site or resting place of such an animal.

21. Similar protection is afforded to European Protected Species of plants, as detailed under Regulation 47.

22. The Regulations do provide a licensing system that permits otherwise illegal activities in relation to European Protected Species, subject to certain tests being fulfilled.

[2] Special Protection Areas (SPAs) are protected sites classified in accordance with Article 4 of the EC Directive on the Conservation of Wild Birds (79/409/EEC) (aka the Birds Directive), which came into force in April 1979. SPAs are classified for rare and vulnerable birds (as listed on Annex I of the Directive), and for regularly occurring migratory species.

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