

A303 Sparkford to Ilchester Dualling Scheme TR010036

6.3 Environmental Statement

Appendix 8.6 Breeding Bird Technical Report

APFP Regulation 5(2)(a)
Planning Act 2008

Infrastructure Planning (Applications: Prescribed
Forms and Procedure) Regulations 2009
July 2018

Volume 6.0



Infrastructure Planning

Planning Act 2008

**The Infrastructure Planning
(Applications: Prescribed Forms
and Procedure) Regulations
2009**

**A303 Sparkford to Ilchester Dualling
Scheme**

Development Consent Order 201[X]

**6.3 Environmental Statement
Appendix 8.6 Breeding Bird Technical Report**

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Executive summary

The proposed A303 Sparkford to Ilchester Dualling scheme (hereafter referred to as 'the Scheme') is to provide a continuous dual-carriageway on the A303 linking the Podimore Bypass and the Sparkford Bypass. Field surveys for breeding birds were carried out across 3 visits in 2017 by Mott MacDonald Sweco. A total of 47 species were recorded during the surveys, 9 of which are listed in Section 41 of the *NERC Act 2006* and 1, the hobby *Falco Subbuteo*, is listed on Schedule 1 of the *Wildlife and Countryside Act (1998, as amended)*.

The highest areas of species richness and abundance corresponded with hedgerow, scrub and woodland with notable areas at Parson's Steeple, Steart Wood, Annis Hill and Camel Hill. The breeding bird community is considered to be of regional conservation importance.

Effects during construction without mitigation, as a result of the scheme would include damage and / or destruction of active bird's nests, permanent and temporary loss of habitats used for breeding, loss and fragmentation of habitat and increased levels of disturbance from noise and light.

During operation, isolation and fragmentation of the habitat, noise, lighting and air pollution impacts and mortality on the road are considered to be the main impacts.

The magnitude of the overall impact on the population of breeding birds in the study area is considered to be moderate adverse during both construction and operation. This results in a moderate adverse effect during construction and operation when mitigation measures are not considered.

Mitigation would include removal of vegetation outside the breeding bird season (September to February) to avoid killing or injury of nesting birds. If this is not achievable suitable nesting habitat would be checked immediately prior to vegetation removal by an ecologist (no more than 48 hours), in order to confirm no nesting birds are present. Should an active nest be found, an exclusion area around the nest site would be established and works within that area ceased until all young birds are fledged.

Permanently lost habitats such as trees and hedgerow would be replaced by habitat creation off site. Temporarily lost habitats would be reinstated through planting / reseeded. Lighting would be minimised by using full cut off high pressure sodium lights that direct light downwards to the carriageway. Installation of woodcrete nest boxes on existing trees with a density of between 1 and 40 per hectare with a variety of entrance hole diameters, would mitigate for the loss of nesting habitats such as trees, hedgerow and scrub. Areas of habitat lost mean that approximately 100 nest boxes will be required to replace lost mature trees.

1 Introduction

1.1 Overview of the scheme

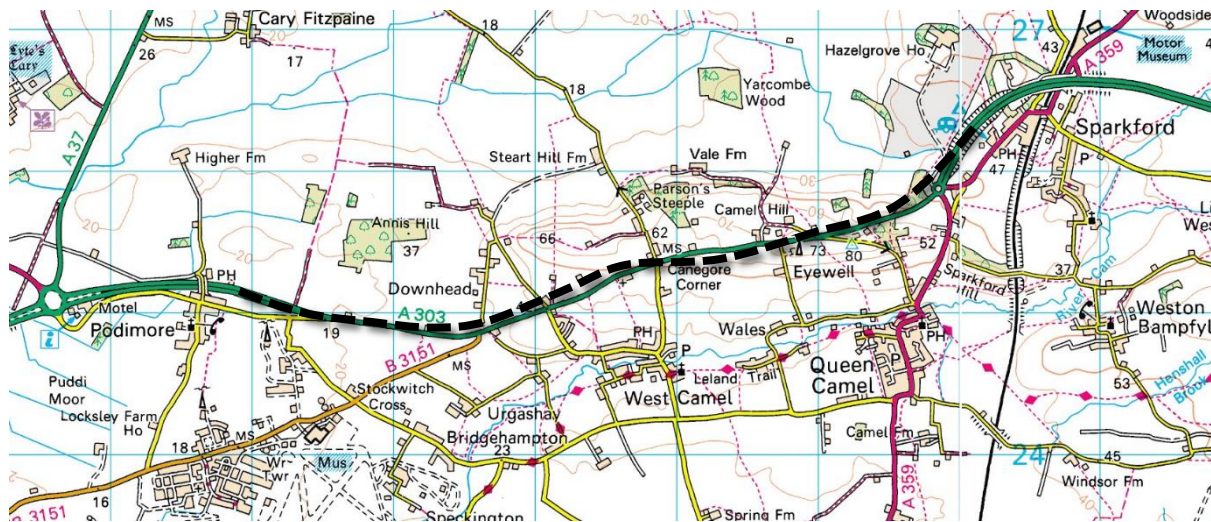
Existing corridor

- 1.1.1 The A303 forms part of Highways England's Strategic Road Network (SRN) and a strategic link between the south west and the rest of the south, south-east and London. The route comprises multiple road standards, including dual carriageway, single carriageway and single carriageway sections with overtaking lanes. Speed limits also vary between 40 miles per hour and 70 miles per hour, depending on the character of the road and its surroundings.

Existing road

- 1.1.2 The section of the A303 that is being upgraded as part of this scheme commences at the eastern limits of the existing dual carriageway, the Podimore Bypass. Travelling east, the corridor reaches the junction with the B3151 before bearing north east and rising upwards through Canegore Corner to reach the crest of Camel Hill at Eyewell. This section of the corridor is characterised by a single lane road, with double white lines negating overtaking and subject to a 50 miles per hour speed limit. There are several priority junctions along the route giving access to the settlements of Queen Camel and West Camel to the south and Downhead to the north, as well as several farm accesses and parking laybys.
- 1.1.3 From the crest of Camel Hill, the corridor descends to meet the roundabout at the western limit of the dual carriageway Sparkford Bypass (Hazlegrove Roundabout). This section comprises 2 lanes in the westbound direction, 1 lane in the eastbound direction and is also subject to a 50 miles per hour speed limit. Hazlegrove Roundabout forms a junction between the A303 and the A359 which runs south through Queen Camel and north-east through Sparkford. The roundabout also provides access to a service station, and to a school at Hazlegrove House.
- 1.1.4 The section of the A303 that is to be upgraded is almost 3.5 miles, or approximately 5.6 kilometres long.
- 1.1.5 The extents of the scheme are illustrated in Figure 1.1 below. Figure 2.1 of Volume 6.2 shows the proposed red line boundary for the scheme.

Figure 1.1: Scheme extents



Source: Mott MacDonald Sweco Joint Venture (MMSJV)

Scheme proposals

1.1.6 The proposed scheme is to provide a continuous dual-carriageway linking the Podimore Bypass and the Sparkford Bypass. The scheme would involve the removal of at-grade junctions and direct accesses. The Hazlegrove Junction would be constructed to grade-separated standards and Downhead Junction and Camel Cross Junction would be constructed to compact grade-separated standards, as illustrated on Figure 2.3 General Arrangement Plans, contained in Volume 6.2.

1.1.7 A detailed description of the scheme is provided within Chapter 2 The Scheme of Volume 6.1.

1.2 Scope of the report

1.2.1 The scope of this report includes all wild birds recorded within the scheme footprint (the red line boundary), and surrounding areas to 250 metres from the red line boundary during the peak breeding season survey period (1 April to 31 July)¹, and in particular those species where:

- The Local Planning Authority (LPA) has a duty to conserve the species or its habitats on site
- The presence of wild bird species on site during the breeding season would likely result in a constraint to the scheme
- Mitigation is likely to be required to avoid, reduce or manage any negative effects on wild birds.

¹ Gillings, S., Balmer, D. E., Caffrey, B. J. & Swann, B., 2013. *Survey methods and data sources*. In: Balmer, D. E., Gillings, S., Caffrey, B. J., Swann, R. L., Downie, I. S. & Fuller, R. J. (eds) (2013) *Bird Atlas 2007–11: The Breeding and Wintering Birds of Britain and Ireland*. BTO Books, Thetford, UK. pp.34–45.

1.2.2 The aim of this report is to:

- Identify constraints imposed by statutory instruments related to the protection of wild birds
- Assess the potential impacts of the Scheme on wild birds
- Provide recommendations for mitigation, habitat creation and enhancement

1.3 Legislation

1.3.1 The *Wildlife and Countryside Act 1981 (as amended)* and *The Conservation of Habitats and Species Regulations 2010 (as amended)* form the cornerstones for species and habitat protection in England and Wales. In the UK all wild birds, their nests and their eggs are protected by *The Wildlife and Countryside Act 1981*. Offences under this Act include:

- Intentionally killing, injuring or taking any wild bird
- Intentionally taking, damaging or destroying the nest of any wild bird whilst it is in use or being built
- Intentionally taking or destroying the egg of any wild bird

1.3.2 Birds listed on Schedule 1 of *The Wildlife and Countryside Act 1981* have further protection making it an offence to intentionally or recklessly disturb any wild bird listed on Schedule 1 whilst it is nest building, or at / near a nest containing eggs or young, or to disturb the dependent young of such a bird.

Status of breeding birds at the national level

1.3.3 The *UK Biodiversity Action Plan (UK BAP) 1994 – 2010*² has been superseded by the *UK Post-2010 Biodiversity Framework* covering the period 2011-2020³. UK BAP priority habitats and species were used to form the basis for the statutory list of habitats and species of 'principal importance for the conservation of biodiversity in England' under Section 41 of the *Natural Environment and Rural Communities (NERC) Act 2006*.

Status of breeding birds at county level

1.3.4 Section 40 of the NERC Act requires public bodies, including local LPAs 'to have regard to the conservation of biodiversity in England' when carrying out their normal functions. The list of species of 'principal importance for the conservation of biodiversity in England' (Section 41) guides public bodies in implementing their duty. The LPA therefore must consider the impact on

² JNCC (2012) *The UK Biodiversity Action Plan – UK BAP* [online] available at: <http://jncc.defra.gov.uk/ukbap> (last accessed March 2018).

³ JNCC (2012) *The UK Post-2010 Biodiversity Framework* [online] available at: <http://jncc.defra.gov.uk/page-6189> (last accessed March 2018).

biodiversity of the proposed development. The recommendations section of this report illustrates ways in which this biodiversity duty can be met.

1.3.5 The LPA must also have regard to the conservation of biodiversity when carrying out their normal functions and ensure the potential impacts on protected species and habitats as a result of the scheme have been fully assessed and appropriate mitigations proposed. Section 118 of the *National Planning Policy Framework* (NPPF)⁴, which relates to conserving and enhancing the natural environment, requires LPAs in England to apply the following principles:

- If significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or at last resort, compensated for, then the planning permission should be refused.
- Development proposals where the primary objective is to conserve or enhance biodiversity should be permitted.
- Opportunities to incorporate biodiversity in and around developments should be encouraged.
- Planning permission should be refused for developments resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of ages or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss. The assessment of the potential impacts on protected species and habitats therefore must be finalised prior to planning permission and must be submitted with the planning application.

⁴ Department for Communities and Local Government (2012) *National Planning Policy Framework* [online] available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf (last accessed March 2018).

2 Methodology

2.1 Desk study

- 2.1.1 Biological record data was obtained from the Somerset Environmental Records Centre (SERC) in May 2017 within 3 kilometres of the red line boundary of the scheme.

2.2 Study area

- 2.2.1 The study area has been defined as the area of land take (footprint) of the scheme and the zone of influence (Zol). The Zol is the area over which ecological features may be subject to significant effects as a result of a proposed project and associated activities⁵. In some cases, it is difficult to define the Zol, as some breeding birds can use a large area for foraging and each species has different spatial requirements. For this scheme a Zol of 250 metres has been chosen. This also takes into account the likelihood that significant changes to the baseline noise conditions from the development would likely be confined to the scheme footprint and the nearby area.

2.3 Field survey

- 2.3.1 Field methods were based on the British Trust for Ornithology's Common Bird Census⁶ with the number of visits undertaken in accordance with Scottish Natural Heritage⁷.
- 2.3.2 The field survey involved 3 visits to the site evenly spread across the peak breeding bird season (1 April to 31 July inclusive)⁸. Survey transect routes were devised to enable the surveyor access to a good representative sample of the on-site habitats. Transects were walked on each of the 3 visits but the starting point and direction was reversed on alternate visits to avoid potential temporal bias.
- 2.3.3 The surveys were conducted by an appropriately qualified and experienced surveyor in accordance with British Standard 42020:2013⁹. The first hour after sun rise was avoided as there is generally heightened bird activity during this

⁵ Chartered Institute of Ecology and Environmental Management (CIEEM) (2016). *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal*. 2nd Edition.

⁶ Marchant, J.H. (1983) *Common Birds Census Instructions*. Tring: British Trust for Ornithology.

⁷ Scottish Natural Heritage (2005) *Survey methods for use in assessing the impacts of onshore windfarms on bird communities*. Scottish Natural Heritage [online] available at:

http://www.snh.org.uk/pdfs/strategy/renewable/bird_survey.pdf (last accessed February 2018).

⁸ Gillings, S., Balmer, D. E., Caffrey, B. J. & Swann, B., 2013. *Survey methods and data sources*. In: Balmer, D. E., Gillings, S., Caffrey, B. J., Swann, R. L., Downie, I. S. & Fuller, R. J. (eds) (2013) *Bird Atlas 2007–11: The Breeding and Wintering Birds of Britain and Ireland*. BTO Books, Thetford, UK. pp.34–45.

⁹ British Standard (20113) *BS 42020:2013 Biodiversity: Code of practice for planning and development*.

period that may lead to uneven coverage as a result of rapid changes in the detection of birds¹⁰.

- 2.3.4 Birds were identified by sight or sound and registered electronically on an Ordnance Survey Master Map using a Trimble Juno® handheld computer. The number of birds of each species were recorded with breeding evidence (Table 2.1) based on the standard list of conventions described in Sharrock (1974). In order to maintain a relatively consistent ability to detect breeding bird activity, the surveys were conducted where practicable in optimal or near optimal conditions and avoided periods of heavy rain and/or strong wind.

Table 2.1: Summary of breeding evidence categories

Possible	Probable	Confirmed
<ul style="list-style-type: none"> Observed in suitable nesting habitat. Singing male in suitable breeding habitat. 	<ul style="list-style-type: none"> Pair observed in suitable nesting habitat. Permanent territory presumed through registration of territorial behaviour (song etc.) from many individuals on one day. Courtship and display. Visiting probable nest site. Agitated behaviour or calls suggesting probable presence of nest or young nearby. Nest building or excavation. 	<ul style="list-style-type: none"> Distraction display or injury feigning. Used nest or eggshells. Recently fledged young. Adults entering or leaving nest site or adults seen incubating. Adult carrying faecal sac or food for young. Nest containing eggs. Nest with young.

Source: Based on Sharrock, J.T.R., 1974.

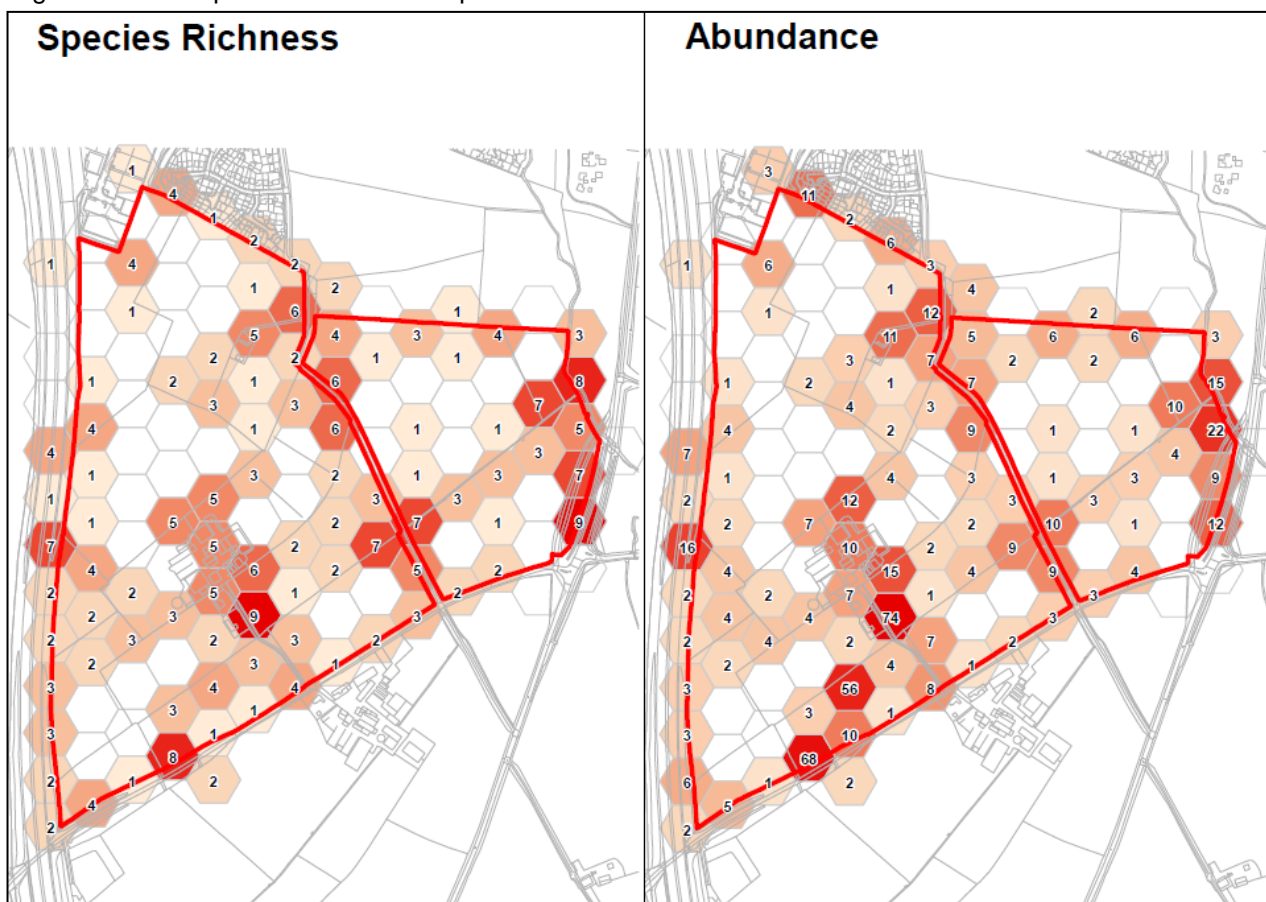
2.4 Mapping and data analysis

- 2.4.1 Data was spatially analysed using ArcGIS 10.3. A hexagonal grid with 50 metre-wide grid cells covering the full extent of the survey site was created using the 2D Beehive Tool¹¹. Individual maps were produced illustrating, on a grid cell basis, the spatial variation in the number of records, species richness, abundance, and the distribution of notable species across the survey site (Figure 2.1).

¹⁰ Bibby, C.J., Burgess, N.D., & Hill, D.A. (2000) *Bird Census Techniques*: 2nd Edition. London: Academic Press.

¹¹ Mehta, S. (2012) *Create Hexagons*. [online] available at: <http://www.arcgis.com/home/item.html?id=7fa102df350f40a087816b93e862e21f> (last accessed February 2018).

Figure 2.1: Example of distribution maps



Source: Contains Ordnance Survey data © Crown copyright and database right 2015

- 2.4.2 An assessment of the breeding bird community of the site has been undertaken on the basis of species richness and the breeding bird community quality¹². The conservation importance of the site with respect to species richness is set against the criteria in Table 2.1.
- 2.4.3 With respect to breeding bird community quality, each breeding species is assigned a score as detailed in Table 2.2 based on its national breeding population¹³. These scores are summed to produce an index value that is set against the criteria in Table 2.3 to identify the conservation importance of the site in terms of breeding bird community value.

¹² Fuller, R. (1980) *A method for assessing the ornithological interest of sites for conservation*. Biological Conservation, 17, 229-239.

¹³ Holling and the Rare Breeding Bird Panel (2015) *Rare breeding birds in the United Kingdom in 2013*. British Birds, 108: 373-422.

Table 2.2: Species richness criteria

Conservation importance	National	Regional	County	Local
Number of species	85+	70-84	50-69	25-49

Source: Based on Fuller, R., 1980.

Table 2.3: Breeding population status categories (breeding pairs per annum)

Very Rare (A)	Rare (B)	Scarce (C)	Less Scarce (D)	Not Scarce (E)
<30	30-300	301-1,000	>1,000*	>1,000^

*/^ Species assessed/not assessed by the Rare Birds Breeding Panel.

Table 2.4: Breeding bird community quality criteria scores

Conservation importance	National	Regional	County	Local
Index	60+	40-59	20-39	10-19

Source: Based on Fuller, R., 1980.

Table 2.5: Example calculation of breeding bird community index

Category (score per species)	A (5)	B (4)	C (3)	D (2)	E (1)	Index
Number of species	1	2	4	9	21	-
Category score totals	5	8	12	18	21	64

2.5 Assessment of impacts

- 2.5.1 The assessment methodology follows guidance as outlined within Highways England Interim Advice Note (IAN130/10)¹⁴, and DMRB Volume 11, Section 3, Part 4¹⁵.
- 2.5.2 Only species which were determined to be probable or confirmed as breeding were considered as part of the impact assessment and for which targeted mitigation measures will be undertaken.

Magnitude of impact

- 2.5.3 Once the value of each resource was identified using the criteria shown above, the magnitude of impact was assessed as described in Table 2.6.

¹⁴ Highways England (2010) Interim Advice Note 130/10 *Ecology and nature Conservation: Criteria for Impact Assessment* [online] available at:

<http://www.standardsforhighways.co.uk/ha/standards/ians/pdfs/ian130.pdf> (last accessed March 2018).

¹⁵ Highways England (2008) *Volume 11 Environmental Assessment, Section 3, Part 4 'Ecology and Nature Conservation'* [online] available at:

<http://www.standardsforhighways.co.uk/ha/standards/dmr/vol11/section3/11s3p04.pdf> (last accessed February 2018).

Table 2.6: Criteria for determining the magnitude of impact

Magnitude of impact	Criteria	
	Adverse	Beneficial
Major	Loss of resources and/or quality and integrity of resources; severe damage to key characteristics, features or elements.	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality.
Moderate	Loss of resources, but not adversely affecting the integrity; partially loss of/damage to key characteristics, features or elements.	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Minor	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration, to one (maybe more) key characteristics, features or elements.	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements.	Very minor benefit to or positive addition of one or more characteristics, features or elements.
No change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.	

Source: Based on Highways England, DMRB Volume 11, Section 3, Part 4, *Ecology and Nature Conservation*.

Significance of effect

2.5.4 The significance of effect upon each resource was then ascertained using the criteria set out in Table 2.7. For the purposes of this assessment, effects of Moderate Adverse or Beneficial and above are considered to be significant.

Table 2.7: Overall appraisal category

		Environmental / conservation value (sensitivity)				
		Very High	High	Medium	Low	Negligible
Magnitude of Impact	Major	Very Large	Large to Very Large	Moderate to Large	Slight to Moderate	Slight
	Moderate	Large to Very Large	Moderate to Large	Moderate	Slight	Neutral to Slight
	Minor	Moderate to Slight	Slight to Moderate	Slight	Neutral to Slight	Neutral
	Negligible	Slight	Slight	Neutral to Slight	Neutral to Slight	Neutral
	No change	Neutral	Neutral	Neutral	Neutral	Neutral

Source: Based on Highways England, DMRB Volume 11, Section 2 Part 5

2.6 Survey constraints

2.6.1 No constraints or limitations were identified.

2.7 Species excluded from analysis

2.7.1 Species observed during surveys but excluded from the analysis include:

- Non-native species, including those protected under the *Game Act 1831* (as amended) but likely to be derived from a self-sustaining population.
- Non-native species considered to be under the permanent or temporary control of man.
- Species observed flying over the site and not actively hunting or foraging.

2.8 Nomenclature

2.8.1 The English vernacular and the scientific bird names used in the report will follow that of the 9th Edition of the British Ornithologists' Union official list of species recorded in Great Britain¹⁶.

¹⁶ McNery, C. J., Musgrove, A. J., Stoddart, A., Harrop, A.H.J., and Dudley, S.P. (2017) *The British List: A Checklist of Birds of Britain* (9th Edition). The British Ornithologists' Union Records Committee.

3 Results

3.1 Desk Study

- 3.1.1 Forty-five species of breeding birds have been previously recorded within 3 kilometres of the site between 2013 and 2018, including 7 red list Birds of Conservation Concern (BoCC), and 15 amber list BoCC protected or notable species. None of these are listed as Schedule 1 of *The Wildlife and Countryside Act 1981*. Ten species were recorded that are mentioned under the *Somerset Local Biodiversity Action Plan* (LBAP) including chiffchaff *Phylloscopus collybita*, bullfinch *Pyrrhula pyrrhula*, song thrush *Turdus philomelos*, house sparrow *Passer domesticus*, yellowhammer *Emberiza citrinella*, lapwing *Vanellus vanellus* and skylark *Alauda arvensis*.
- 3.1.2 Whilst barn owls were not recorded during the survey, they are recorded by the Barn Owl Trust as nesting within the area by the Barn Owl Trust, and 2 active nesting locations were identified during barn owl surveys. Further detail is covered in the barn owl report and not discussed further here.

3.2 Survey results summary

- 3.2.1 Surveys were undertaken in April, with survey 1 week commencing 3 April 2017, survey 2 week commencing 10 April and survey 3 week commencing 24 April 2017 in fair, clear conditions.
- 3.2.2 A total of 47 species were recorded during the surveys within the study area and a total of 45 species were recorded within the works boundary.
- 3.2.3 The following sections describe the confirmed, probable and possible breeding species recorded. A summary of the protected and notable species are given in Table 3.1. A full species list is provided in appendix A.
- 3.2.4 Nine species are listed on Section 41 of the NERC Act 2006 and 1, the Hobby *Falco subbuteo*, is listed on Schedule 1 of *The Wildlife and Countryside Act 1981*.
- 3.2.5 BoCC, a measure to categorise and help set priorities for conservation action¹⁷, were recorded and include 8 Red List and 5 Amber List BoCC.

¹⁷ Eaton, M.A., Aebischer, N.J., Brown, A.F., Hearn, R., Lock, L., Musgrove, A.J., Noble, D.G., Stroud, D. & Gregory, R.D. (2015) *Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man*. British Birds, 108, 708–746.

Table 3.2: Protected and notable species recorded inside the study area

Common Name	Scientific name	BOCC	Schedule 1	S41	Number of confirmed and probable territories
Bullfinch	<i>Pyrrhula pyrrhula</i>	Amber		●	1
Dunnock	<i>Prunella modularis</i>	Amber		●	21
Herring Gull	<i>Larus argentatus</i>	Red		●	1
Hobby	<i>Falco subbuteo</i>	Green	●		1
House Sparrow	<i>Passer domesticus</i>	Red		●	14
Linnet	<i>Linaria cannabina</i>	Red		●	9
Mallard	<i>Anas platyrhynchos</i>	Amber			2
Meadow Pipit	<i>Anthus pratensis</i>	Amber			1
Mistle Thrush	<i>Turdus viscivorus</i>	Red			2
Skylark	<i>Alauda arvensis</i>	Red		●	5
Song Thrush	<i>Turdus philomelos</i>	Red		●	8
Starling	<i>Sturnus vulgaris</i>	Red		●	0
Stock Dove	<i>Columba oenas</i>	Amber			5
Yellowhammer	<i>Emberiza citrinella</i>	Red		●	11

3.3 Confirmed and probable breeding species

- 3.3.1 Two noteworthy species were confirmed to be breeding within the study area but outside the scheme boundary. These include hobby and song thrush, both of which are of county conservation importance.
- 3.3.2 A pair of hobby's were observed with 3 juveniles on a nest to the south of Hazlegrove House. The juveniles were fledged by 21 August 2017 and were still present around the nest on 23 August 2017.
- 3.3.3 A recently fledged song thrush was also recorded near Eyewell House. It is possible that this species may breed in other areas throughout the study area within thick hedges or wide grass margins.
- 3.3.4 The only other species confirmed to be breeding was robin *Erithacus rubecula*, which is a Green List BoCC.
- 3.3.5 Five noteworthy species probably breeding within the study area were Bullfinch *Pyrrhula pyrrhula*, dunnock *Prunella modularis*, house sparrow *Passer domesticus*, linnet *Linaria cannabina* and yellowhammer *Emberiza citrinella*.
- 3.3.6 House sparrow, dunnock and bullfinch were all observed either as pairs in suitable nesting habitat or actively nest building within the scheme boundary and are associated with breeding in trees, hedgerows and scrub.
- 3.3.7 All other species considered to be probable breeders on in the study area are Green List BoCC associated with trees, hedgerows or scrub.

3.4 Possible breeding species

- 3.4.1 Mallard *Anas platyrhynchos*, meadow pipit *Anthus pratensis*, mistle thrush *Turdus viscivorus*, skylark *Alaudia arvensis*, starling *Sturnus vulgaris* and stock dove *Columba oenas* all were recorded as possibly breeding within the study area. None of these observations were within the scheme boundary however, meadow pipit, mistle thrush and skylark were all recorded immediately adjacent to the scheme boundary.
- 3.4.2 All other species considered to be probable breeders are Green List BoCC associated with breeding in trees, hedgerows or scrub.

3.5 Schedule 1 species

- 3.5.1 A pair of hobby were observed with 3 juveniles on a nest to the south of Hazlegrove House. The juveniles were fledged by the 21 August 2017 and were still present around the nest on the 23 August 2017.

3.6 Species richness, abundance and breeding bird community conservation importance

- 3.6.1 Overall the abundance of birds across the study area was low with more birds encountered in hedgerow, scrub and woodland habitats compared to open fields. Notable areas include the 3 areas in which the highest numbers of birds recorded corresponded to the presence of rookeries, the highest of which were carrion crows *Corvus corone*, followed by rooks *Corvus frugilegus*. The breeding bird species richness, abundance and notable species is presented within the drawings contained within appendix B.
- 3.6.2 Notable areas include the 3 areas mentioned above and are located at:
- Parson's Steeple and Steart Wood
 - Annis Hill
 - Camel Hill
- 3.6.3 In terms of species richness (n=47) the breeding bird community conservation importance of the study area is considered to be local.
- 3.6.4 On the basis of the breeding bird community quality calculation (Table 3.3), the study area is considered to be of regional importance, with an index score of 49. Based on the occurrence of confirmed or probable breeding species with the works area (n=45) the community is also considered to be of regional importance.

Table 3.3: Calculation of the breeding bird community index

Category (score per species)	A (5)	B (4)	C (3)	D (2)	E (1)	Index
Number of species	0	0	1	0	46	-
Category score totals	0	0	3	0	46	49

4 Potential impacts on breeding birds

4.1.1 The potential impacts of the development on breeding birds may include, but are not limited to:

- Damage and/or destruction of active birds' nests.
- Loss of habitats used for breeding.
- Loss and fragmentation of foraging habitat.
- Increased levels of disturbance resulting from noise, light and the presence of people.

4.1.2 The resulting effects may include:

- A reduction in species richness and/or abundance.
- Displacement of birds from areas used for breeding.

4.1.3 The development will impact and potentially contribute to the localised loss or displacement of relatively small numbers of notable bird species (Table 3.1). The magnitude of these impacts is considered to be moderate adverse.

4.2 Construction

4.2.1 Potential construction impacts could include:

- Damage and / or destruction of active birds' nests.
- Permanent and temporary loss and fragmentation of habitats.
- Disturbance of a Schedule 1 species nesting location.
- Noise pollution.
- Light pollution.

Disturbance of a Schedule 1 species nesting location

4.2.2 A pair of hobby were recorded nesting in the parkland to the south of Hazlegrove House and approximately 100 metres from the works boundary. It has been recorded that, while hobbies are unconcerned by the presence of humans inside vehicles near the nest site, they are usually alarmed by humans on foot close to the nest¹⁸).

4.2.3 The magnitude of the impact here will be minor adverse if no mitigation is implemented.

¹⁸ Messenger, A. and Roome, M. (2007) *The breeding population of the Hobby in Derbyshire*. British Birds 100: 594-608.

Damage and / or destruction of active birds' nests

- 4.2.4 Construction activities have the potential to damage and/or destroy active birds' nest through vegetation removal, access routes and laydown areas. This would constitute an offence under *the Wildlife and Countryside Act 1981* (as amended).
- 4.2.5 The magnitude of the impact is considered to be major adverse.

Permanent and temporary loss and fragmentation of habitats

- 4.2.6 As the scheme would require removal of vegetation, there would be a reduction of nesting, foraging and roosting habitats for breeding birds.
- 4.2.7 The upgrade of the A303 along this section from a single carriageway to dual would change the ability of some species to move through the landscape due to the increased width of the road and associated landscaping.
- 4.2.8 The loss and fragmentation of breeding bird habitat would have a wide-ranging impact with about a third of all the species recorded utilising this habitats within the study area. The importance of hedgerows is especially pertinent considering the wider arable landscape. Farmland birds such as yellowhammer would be affected by the loss of their hedgerow breeding and summer foraging habitat. Furthermore, species such as song thrush would be affected and this species' scarcity within the study area means that any losses would be particularly significant.
- 4.2.9 The areas of woodland at Parson's Steeple, Steart Wood, Annis Hill and Camel Hill that are highlighted as having high species richness and abundance would not be directly impacted by the scheme.
- 4.2.10 The magnitude of the impact is considered to be moderate adverse.

Noise pollution

- 4.2.11 Noise pollution has been found to have a fundamental influence on the population density of breeding birds. This not only has consequences for individual species but also impacts on the composition of bird communities. The impact of noise varies between species and the adverse effects are not universal.
- 4.2.12 It has been found in several studies that males in noisier environments sing at higher sound levels than males in quieter territories¹⁹. The perceived energy

¹⁹ Brumm, H. (2001). *The impact of environmental noise on song amplitude in a territorial bird*. Journal of Animal Ecology **73**: 434-440.

cost of having to sing louder may be relatively small but the increased rate of detection by predators may be more significant.

- 4.2.13 It is not known exactly what the impacts of noise are likely to be on the local breeding bird population but as the majority of the species recorded during the survey are song-birds the potential for noise impact is wide ranging. The impacts are most likely to be significant in areas where the density of breeding territories is highest for example, between Annis Hill and Camel Hill.
- 4.2.14 The magnitude of the impact is considered to be minor adverse.

Light pollution

- 4.2.15 While no owls were recorded during the breeding bird surveys they were recorded during the barn owl surveys and are likely to be present in the area as the surveys were not conducted during hours that owl species are active. Lighting of construction areas and access routes during times when the owl species are active may cause individual owls to avoid areas and cause a barrier to dispersal. Movement between foraging areas even where lighting is not directed towards nests and roosts will also be impacted.
- 4.2.16 The magnitude of the impact is considered to be moderate adverse.

4.3 Operation

- 4.3.1 Potential operation impacts could include:
- Noise, lighting and air pollution impacts.
 - Mortality on the road.

Noise, lighting and air pollution

- 4.3.2 The current noise levels for the existing road will likely not be significantly less than the noise levels after the upgrade and noise impacts on birds are likely to be reduced where the Scheme is in cutting and/or is immediately adjacent to woodlands or noise barriers.
- 4.3.3 Artificial light has been found to impact on birds in a number of ways. Extending the number of hours available for feeding could be conceived as a positive impact however it could potentially have an adverse impact on prey populations and result in food shortages for the bird species concerned.
- 4.3.4 Research by Lofts and Merton²⁰ identified 60 species brought in to breeding condition prematurely by artificially long days in winter. Early breeding attempts

²⁰ Lofts, C. and Merton, D. (1968) *Photoperiodic and Physiological Adaptations Regulating Avian Breeding Cycles and their Ecological Significance*. Journal of Zoological Society of London 155, 327-394.

could potentially fail if there is insufficient food to feed young or if weather conditions prove too adverse for young birds to survive. In addition, owls are said to be adversely affected by artificial light. There is some evidence of repulsion by some animal species and that this could act to reinforce habitat fragmentation and isolation.

4.3.5 Birds may be directly and indirectly affected by air pollution. Changes in plant and invertebrate communities are well documented and these may have secondary effects on some bird species. Studies on both point source (industrial) and diffuse source (traffic exhaust) pollution have found direct impacts on birds²¹. The level of the problem from traffic exhaust emissions in the UK is not well known.

4.3.6 The magnitude of the impact is considered to be moderate adverse.

Mortality on the road

4.3.7 Mortality rates are not evenly distributed in space or in time. The area in which the road passes through and the behaviour of the birds present in that area can have an effect on the total number of road casualties recorded. Where the road is level without screening vegetation, or elevated above the surrounding area birds are more likely to fly into the path of oncoming traffic²². Birds also appear to be more susceptible on bends, where roads pass through areas of high habitat heterogeneity such as Camel Hill areas or where hedges line both sides of the road. In northern Europe 2 peaks in casualty numbers (April to May and July to September) correspond with peak breeding activities and the dispersal of young respectively²³.

4.3.8 Improvements to traffic congestion would also increase the speeds of traffic along this section thus increasing the chances of birds to be struck by vehicles.

4.3.9 The speed at which vehicles travel is not clearly a deciding factor in the rate of road deaths. For owls however, the risk of road collision can increase as much as twenty-fold when vehicle speeds reach 80 kilometres per hour and that this is independent to traffic density.

4.3.10 The magnitude of the impact is considered to be moderate adverse.

²¹ Eeva, T., Lehtikoinen and Ronka, M. (1996). *Air pollution fades the plumage of the Great tit*. Functional Ecology 12: 607-612.

²² Erritzoe J., Mazgajski T. D., Rejt Ł. (2003) *Bird casualties on European roads — a review*. Acta Ornithol. 38: 77–93.

²³ Illner, H. (1992) *Road deaths of Westphalian owl*. In: The ecology and conservation of European owls, eds. C.A. Galbraith, I.R. Taylor and S.M. Percival, 94-100. Peterborough Joint Nature Conservation Committee, Peterborough.

4.4 Summary

- 4.4.1 There are wide-ranging impacts of major roads on breeding birds due to the loss of habitats with the barrier that the road causes to the habitats to the south of the road. The magnitude of the overall impact on the population of breeding birds in the study area is considered to be slight adverse during the operation and construction of the road.
- 4.4.2 This results in an overall impact assessment of slight adverse during construction and operation when mitigation measures are not considered.

5 Recommendations and mitigation

- 5.1.1 Outline mitigation measures to avoid and reduce impacts are given below and are considered sufficient to meet the Local Planning Authority's biodiversity duty to ensure that appropriate mitigations are proposed as part of the scheme. These are presented on the Environmental Masterplan (Figure 2.8, Volume 6.2).

5.2 Schedule 1 species

- 5.2.1 Temporary screening would be provided around the works to avoid disturbance of the nest during the breeding season for hobby (May to September).

5.3 Vegetation clearance

- 5.3.1 It is advised that the clearance and removal of hedgerows, mature trees and areas of scrub is avoided and / or minimised. If this is not possible it is recommended that any vegetation clearance as part of the scheme would be undertaken outside of the main breeding bird season (September to February)²⁴. If this is not achievable, suitable nesting habitat would be checked immediately prior to vegetation removal by an ecologist (no more than 48 hours) in order to confirm no nesting birds are present. Should an active nest be found, an exclusion area around the nest site would be established and works within that area ceased until all young birds are fledged.

5.4 Tree and hedgerow replacement

- 5.4.1 Hedgerow is a *Somerset Local Biodiversity Action Plan* (LBAP) priority habitat. If practicable, any existing hedgerows to be removed would be translocated to a nearby location, or incorporated into the planned landscaping. Where this is not feasible, replanting would be undertaken.
- 5.4.2 A number of trees would be removed as part of the scheme. New native trees, in accordance with Herbert *et al.*²⁵, would be planted as part of the landscape design.
- 5.4.3 To increase the extent and enhance existing hedgerows, gaps would be filled and connectivity between hedgerows increased where practicable. Planting would be made up of a mix of typical hedgerow species, for example hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, field maple *Acer campestre*, dogwood *Cornus sanguinea* and buckthorn *Rhamnus cathartica*. This would

²⁴ Natural England (2015) *Planning and development – guidance. Wild birds: surveys and mitigation for development projects*. [online] available at: <https://www.gov.uk/wild-birds-surveys-and-mitigation-for-development-projects> (last accessed February 2018).

²⁵ Herbert, R., Samuel, S. & Patterson, G. (1999) *Using local stock for planting native trees and shrubs*. Forestry Commission Practice Note 8. Forestry Commission Edinburgh.

ensure that the time between the habitat loss, replacement and maturation is minimised.

5.5 Lighting

- 5.5.1 To minimise light emissions, full cut off high pressure sodium lights that direct light downwards to the carriageway would be used.

5.6 Nest boxes

- 5.6.1 The installation of nest boxes on retained trees would mitigate for the loss of nesting habitats such as trees, hedgerow and scrub. It is recommended that between 1 and 40 nest boxes be installed per hectare in mitigation areas. The types of nest boxes would be distributed as follows:
- 60% with 32 millimetre entrance hole
 - 20% with 26 / 25 millimetre entrance hole
 - 20% to be boxes suitable for species which nest in recesses or cavities
- 5.6.2 The nest boxes would ideally be made of durable materials (for example, woodcrete) to increase their longevity.
- 5.6.3 Areas of habitat lost mean that approximately 100 nest boxes would be required to replace lost mature trees.

5.7 Enhancements

- 5.7.1 It is recommended that biodiversity enhancements are included within the landscape design, to maintain or enhance connectivity to surrounding habitats. This will assist in ensuring the long-term persistence of breeding bird diversity and abundance in and around the development area. This will also help to fulfil the local planning authority's obligations to maintain or enhance biodiversity through the course of their normal activities under Section 40 of the NERC Act 2006.
- 5.7.2 The enhancement or creation of species-rich semi-improved grassland within and off-site is likely to be more practicable. A matrix of grassland habitats is recommended to appeal to a wide variety of breeding birds. This would include the creation of species-rich semi-improved grassland on what is largely arable land. This would be tailored to meet the requirements of farmland birds with particular emphasis on foraging habitat in relation to invertebrates and seed resources. Some areas would be left long to create rough grassland which would provide abundant small mammals for birds of prey.

6 Conclusion

- 6.1.1 Through implementing the above mitigations, the impact of the proposed scheme on breeding birds would be reduced, by ensuring that vegetation clearance is undertaken outside the bird nesting season, habitats are created to compensate for the permanent loss of trees, hedgerow and scrub, and installation of compensatory nest boxes.
- 6.1.2 However, even if the mitigation and compensation package were developed to the best advantage of breeding birds there would still be an adverse effect on the breeding bird population. These impacts would be through unavoidable disturbance during construction, the barrier effect that the road may have on dispersal, some residual mortality on the road, as well as noise and light pollution.
- 6.1.3 The community of breeding birds impacted by the works is considered to be of regional importance. There are wide-ranging impacts of major roads on breeding birds due to the loss of habitats with the barrier that the road causes to the habitats to the south of the road. The magnitude of the overall impact on the population of breeding birds in the study area is considered to be moderate adverse during the operation and construction of the road.
- 6.1.4 There would therefore be a regional impact of the scheme on the breeding bird population. This would result in an overall impact assessment of moderate during construction and operation when mitigation measures are not considered. Where mitigation measures are implemented the residual impact is considered to be slight adverse, during both construction and operation.

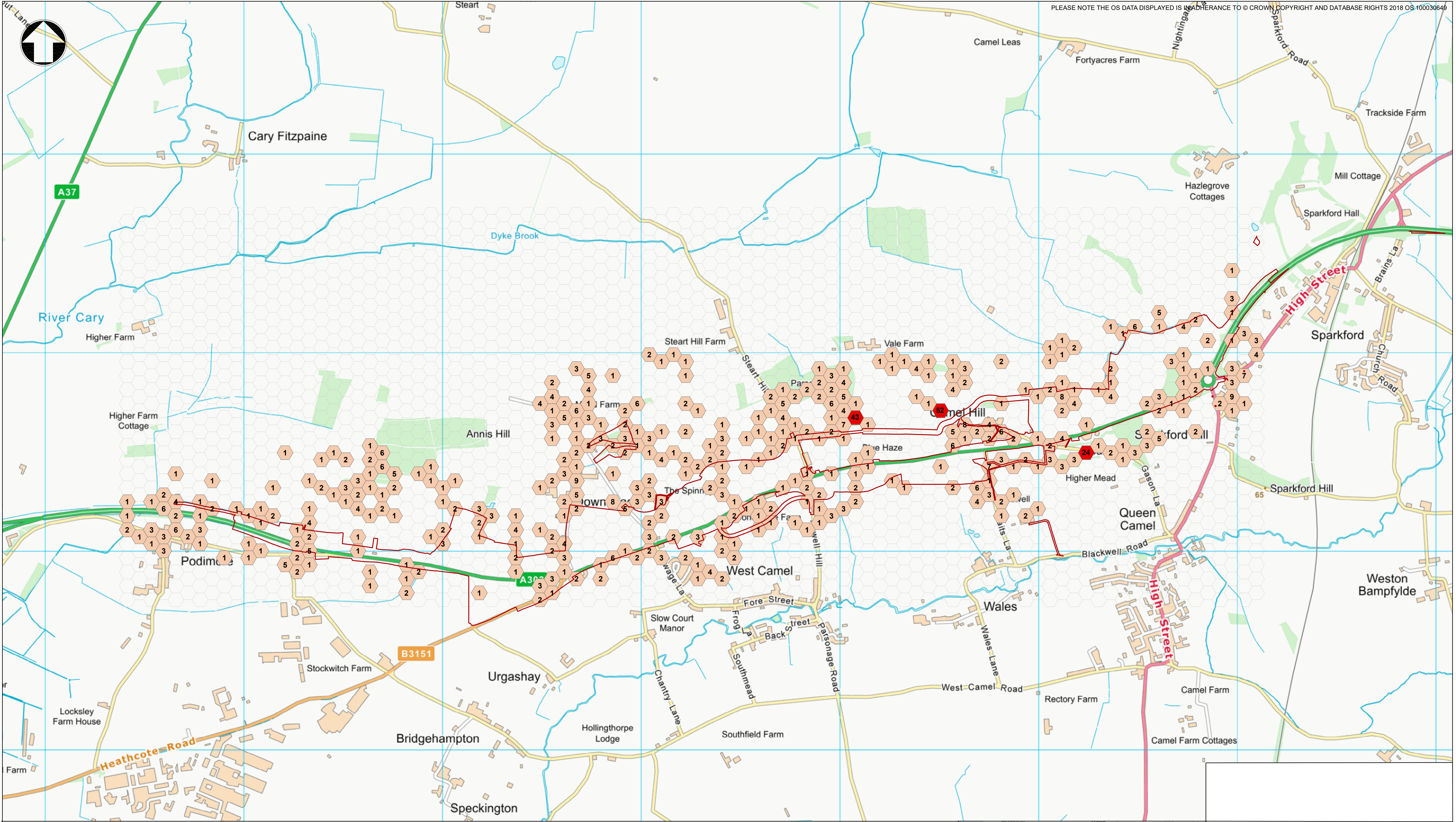
Appendix A: Breeding bird survey: species abundance

Table A.1: Breeding bird survey – species abundance

BTO	Common name	Scientific name	BOCC4	Annex 1	Schedule 1	S41
BZ	Buzzard	<i>Buteo buteo</i>	Green			
MA	Mallard	<i>Anas platyrhynchos</i>	Amber			
C.	Carrion Crow	<i>Corvus corone</i>	Green			
GT	Great Tit	<i>Parus major</i>	Green			
LT	Long-tailed Tit	<i>Aegithalos caudatus</i>	Green			
CC	Chiffchaff	<i>Phylloscopus collybita</i>	Green			
BC	Blackcap	<i>Sylvia atricapilla</i>	Green			
TC	Treecreeper	<i>Certhia familiaris</i>	Green			
R.	Robin	<i>Erithacus rubecula</i>	Green			
PW	Pied Wagtail	<i>Motacilla alba</i>	Green			
GR	Greenfinch	<i>Chloris chloris</i>	Green			
GO	Goldfinch	<i>Carduelis carduelis</i>	Green			
PH	Pheasant	<i>Phasianus colchicus</i>	n/a			
LG	Little Grebe	<i>Tachybaptus ruficollis</i>	Green			
MH	Moorhen	<i>Gallinula chloropus</i>	Green			
HG	Herring Gull	<i>Larus argentatus</i>	Red			•
SD	Stock Dove	<i>Columba oenas</i>	Amber			
WP	Woodpigeon	<i>Columba palumbus</i>	Green			
CD	Collared Dove	<i>Streptopelia decaocto</i>	Green			
GS	Great Spotted Woodpecker	<i>Dendrocopos major</i>	Green			
G.	Green Woodpecker	<i>Picus viridis</i>	Green			
HY	Hobby	<i>Falco subbuteo</i>	Green		•	
J.	Jay	<i>Garrulus glandarius</i>	Green			
MG	Magpie	<i>Pica pica</i>	Green			
JD	Jackdaw	<i>Coloeus monedula</i>	Green			
RO	Rook	<i>Corvus frugilegus</i>	Green			
RN	Raven	<i>Corvus corax</i>	Green			
CT	Coal Tit	<i>Parus ater</i>	Green			
BT	Blue Tit	<i>Cyanistes caeruleus</i>	Green			
S.	Skylark	<i>Alauda arvensis</i>	Red			•
SL	Swallow	<i>Hirundo rustica</i>	Green			
LW	Lesser Whitethroat	<i>Sylvia curruca</i>	Green			
WH	Whitethroat	<i>Sylvia communis</i>	Green			
GC	Goldcrest	<i>Regulus regulus</i>	Green			
WR	Wren	<i>Troglodytes troglodytes</i>	Green			
NH	Nuthatch	<i>Sitta europaea</i>	Green			
SG	Starling	<i>Sturnus vulgaris</i>	Red			•
B.	Blackbird	<i>Turdus merula</i>	Green			
ST	Song Thrush	<i>Turdus philomelos</i>	Red			•
M.	Mistle Thrush	<i>Turdus viscivorus</i>	Red			
HS	House Sparrow	<i>Passer domesticus</i>	Red			•
D.	Dunnock	<i>Prunella modularis</i>	Amber			•
MP	Meadow Pipit	<i>Anthus pratensis</i>	Amber			
CH	Chaffinch	<i>Fringilla coelebs</i>	Green			
BF	Bullfinch	<i>Pyrrhula pyrrhula</i>	Amber			•
LI	Linnet	<i>Linaria cannabina</i>	Red			•
Y.	Yellowhammer	<i>Emberiza citrinella</i>	Red			•

Appendix B: Drawings

Breeding Bird Survey - Species Abundance



KEY

PROPOSED RED LINE BOUNDARY

SPECIES ABUNDANCE

1 - 11

12 - 22

23 - 52

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Project Title

A303 SPARKFORD TO ILCHESTER DUALLING

Drawing Title

BREEDING BIRD SURVEY
SPECIES ABUNDANCE

Drawing Status

Published - DEFINITION

Suitability

A3

Scale

NTS

Designed

JL

Drawn

ER

Checked

VC

Approved

ER

Original Size

A1

Date

JULY 2018

Date

JULY 2018

Date

JULY 2018

Date

JULY 2018

Drawing Number

HE PIN

Originator

JL

Volume

000

Project Ref. No.

389107

HE551507 - MMSJV - EBD

Revision

C01

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- DR - LB - 0047

Location

Type

Role

Number

REV.

DATE

AMENDMENT DETAILS

ORIG

CHK'D

APP'D

Breeding Bird Survey - Species Richness

Breeding Bird Survey - Notable Bird Species

