

Cotswolds VIP

Breeding Bird Survey Report and Impact Assessment

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Executive Summary

Arcadis Consulting (UK) Limited was commissioned by National Grid to provide an Ecological Impact Assessment in support of the undergrounding of the central section of National Grid's ZF.2 overhead line (OHL) route through the Cotswolds Natural Landscape (CNL) formally known as Area of Outstanding National Beauty (AONB) as part of their VIP project. This report informs the Ecological Impact Assessment in relation to breeding birds.

Breeding bird surveys were carried out during Spring and early summer 2023, based on guidelines in the British Trust for Ornithology (BTO) Common Bird Census methodology (see Gilbert et al., 1998) and standard survey guidance (Bird Survey & Assessment Steering Group, 2023).

Fifty-two species of birds were recorded across the wider survey area, of which 22 were considered to be breeding or potentially breeding on or within the Zone of Influence (Zoi) of the site (ie within 200m of the scheme).

Nine of these breeding bird species recorded were on the BoCC red list (corn bunting *Emberiza calandra*, linnet *Linaria cannabina*, skylark *Alauda arvensis*, yellowhammer *Emberiza citrinella*, marsh tit *Poecile palustris*, mistle thrush *Turdus viscivorus*, lesser spotted woodpecker *Dryobates minor*, house martin *Delichon urbicum* and house sparrow *Passer domesticus*) and twelve species were BoCC amber listed (common whitethroat *Silvia communis*, meadow pipit *Anthus pratensis*, stock dove *Columba oenas*, song thrush *Turdus philomelos*, bullfinch *Pyrrhula pyrrhula*, willow warbler *Phylloscopus trochilus*, rook *Corvus frugilegus*, redstart *Phoenicurus phoenicurus*, wood pigeon *Columba palumbus*, wren *Troglodytes troglodytes*, mallard *Anas platyrhynchos* and kestrel *Falco tinnunculus*).

The general breeding bird assemblage of the survey area was considered to be of site to local importance, the majority of which were common and widespread species within the county. There were two uncommon breeding species of up to County importance (ie lesser spotted woodpecker, and redstart).

The majority of the birds were either woodland or farmland species reflecting the majority of the habitat encountered within the Zoi. They have the potential to be impacted by the proposed scheme.

Barn owl (a Schedule 1 species) was not confirmed to be breeding, but there were three trees within the Zoi that had the potential to support breeding barn owl. Habitats within the wider survey area were also suitable to support foraging barn owl *Tyto alba*.

The value of the habitat within the impact zone for foraging barn owl however was considered to be poor or sub-optimal at best. It is unlikely that the impact zone is required to sustain the local population of barn owl. Although suitable roosting sites exist within the Zoi.

The main impacts to breeding birds without mitigation are considered to be a direct loss of breeding habitat, direct mortality of species through construction activities and disturbance.

Mitigation measures to reduce the impact for breeding birds include:

- Retention of the majority of existing habitat / vegetation clearance to be kept to a minimum
- Protection of nests and habitat through embedded mitigation measures as outlined within a CEMP eg fencing of sensitive areas, timing of works, pollution control measures, sensitive use of lighting, Ecological Clerk of Works (ECOW)
- Use of existing access tracks where possible
- Pre-construction nesting bird check of any vegetation to be cleared within the bird nesting season (mid February – August inclusive)
- Pre-construction power outage to remove old nests / application of nesting deterrents
- Pre-construction surveys for barn owl should suitable trees be impacted
- Reinstatement and/or enhancement of habitat where possible (including installation of nest boxes)

- Creation of new habitat (underneath the existing overhead line within Breakheart Plantation, and within both sealing compound locations (beginning and end of the scheme).

Overall, it is considered that habitat loss and disturbance of nesting, foraging and roosting birds will be a minor temporary adverse level of impact that won't affect the conservation status of the bird populations concerned in the longer term. Therefore, the effect on the bird populations of Site to Local importance will be Not Significant at any level.

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1 Introduction

1.1 Overview

In 2014, National Grid commissioned a Landscape and Visual Impact Assessment to identify areas across the UK that would benefit from the Visual Impact Provision (VIP) project. The purpose of the Landscape and Visual Impact Assessment was to identify those sections of electricity transmission lines within England and Wales that have the most important impacts on the landscape and visual amenity of these designated landscapes.

Arcadis Consulting (UK) Limited was commissioned by National Grid to provide an Ecological Impact Assessment in support of the undergrounding of the central section of National Grid's ZF.2 overhead line (OHL) route through the Cotswolds Natural Landscape (CNL), formally Area of Outstanding National Beauty (AONB) as part of their VIP project. This report informs the Ecological Impact Assessment in relation to breeding birds.

1.2 Site Location and setting

ZF.2 (the 400kV Feckenham-Walham/Feckenham-Minety OHL) enters the Cotswolds AONB from the north-east of Dixton heading in a southerly direction, rising to Prescott where it turns southeast across high ground before descending into subsection 3 southeast of Cheltenham. For the purposes of this project, it has been split into three sections; A, B and C, of which the middle section B has been taken forward.

Section ZF.2(B) is the section which is proposed to be removed and undergrounded. This section of OHL is approximately 7km long and starts immediately south of the B4632 (tower ZF306), in close proximity to Postlip/Postlip Mills. From Breakheart Plantation, the OHL runs in a southwesterly direction to the east of Cleeve Common Site of Special Scientific Interest (SSSI), past Wontley, Drypool and Wood Farms, and down towards Dowdeswell Wood (tower ZF325). There are a number of disused quarries either side of the OHL. The closest villages are Langley (north), Winchcombe (north-east), Cleeve Hill (west) and Charlton Kings to the south-west. The route crosses the three Local Authority administrations of Tewkesbury Borough Council, Cheltenham Borough Council and Cotswolds District Council.

The site consists primarily of an agricultural open field setting with the existing OHL adjacent to the proposed underground route. The route is located within an CNL, and sections of the route are in close proximity to Ancient Woodland. The site layout is presented on [Drawing 30167905-ARC-EGN-ZZ-DR-ZZ-00001-52 EcIA report](#).

1.3 Proposed scheme

In summary, the proposed project comprises:

- Construction of two new cable sealing end compounds (CSECs) and associated replacement terminal pylons where required at either end to connect the new underground cables to the remaining existing overhead line;
- Installation of approximately 7 km of underground cabling;
- Permanent removal of the existing overhead line section including 18 pylons;
- Associated temporary works to facilitate the construction of the project including temporary / permanent access junctions and roads, construction compounds, material storage and welfare facilities; and

- Ancillary off-site infrastructure (including installation of arcing horns and shunt reaction installation / connection).

1.4 Overview of UK bird biology

It is estimated that 247 bird species are regularly recorded within the UK and these species are assessed within the Birds of Conservation Concern (BoCC) surveys and assessments. However, the lifecycles, resource requirements and biology of these species varies greatly, and these species can be split into four broad categories:

- Resident birds, which spend the entire year within the UK;
- Summer visitors who usually breed within the UK;
- Winter visitors, who breed elsewhere and migrate to the UK for winter; and
- Passage migrants, which visit at certain times of year, particularly, spring and autumn.

The assemblage of birds within areas of the UK varies, dependent upon the habitats present and climate. In addition, the habitats utilised by different bird species vary greatly, dependent upon the breeding habits, feeding resources utilised and lifecycle of each species. Considering the habitats present within the site, the key bird groups (as informed by the BTO Wild Bird Indicators, BTO, 2023) which were considered and surveyed to inform the development were:

- Breeding farmland birds
- Breeding woodland birds

2 Legislation and Key Policy

This assessment has been undertaken in accordance with current national legislation, national planning policy, local plans and policies relating to biodiversity in the context of the Proposed Project.

2.1 Relevant Legislation

The following legislation concerning bird species is relevant to the breeding bird baseline.

In the UK, all wild bird species and their eggs are protected when nesting by law. In addition, there are several pieces of legislation or policy which afford certain species extra legal protection, or emphasise their conservation importance, as outlined below:

- Species that are specially protected when breeding under Schedule 1 Part 1 of the Wildlife and Countryside Act (WCA) 1981 (as amended)).
- Species of Principal Importance listed under Section 41 of the 2006 Natural Environment and Rural Communities (NERC) Act).

2.2 Relevant Policy and Conservation Guidance

2.2.1 Relevant Policy

The National Planning Policy Framework (NPPF) sets out how the planning system should protect and enhance the natural and local environment (HMSO 2021). Detail about this and other local policy that has informed this assessment is given within the main EclA document (Ref XX).

2.2.2 Conservation Status

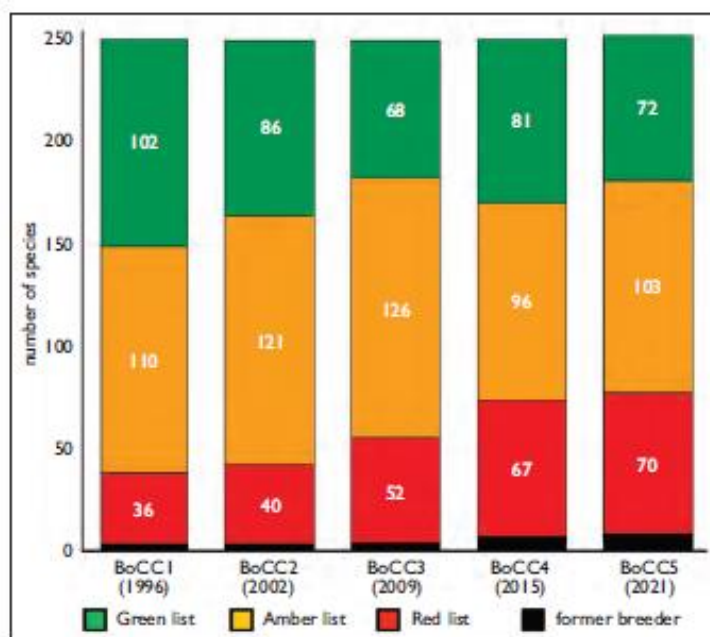
It is difficult to place an overall trend on bird conservation status, as the large number of species within the UK each have varying requirements and whilst some are adversely impacted by changes in management, development and climate change, others benefit. However, reviewing the overall status of the UK's birds can be achieved by reviewing the BoCC list which gives an indication of the status of birds known to be resident in the UK (Stanbury et al., 2021).

In 2021, of the 245 species considered, 70 species were on the red list, 103 were on the amber list and 72 were on the green list (for an explanation of the categories refer to Table 1 Outline of BoCC traffic light criteria. Overall, the red list now accounts for more than on quarter (29%) of UK species. This is indicative of an overall negative trend in the status of bird populations overall in the UK. This trend appears to be a continuous trend since the first survey was conducted in 1996. This is presented below in Image 1 The status of British bird species within the BoCC categorisation 1996 – 2021 extracted from Stanbury et al (2021).which shows the proportion of the UK bird species listed in each of the BoCC categories since surveys began in 1996.

Table 1 Outline of BoCC traffic light criteria

Criteria	Status
Red	Globally threatened Historical population decline in UK during 1800–1995 Rapid (> or =50%) decline in UK breeding population over last 25 years Rapid (> or =50%) contraction of UK breeding range over last 25 years
Amber	Moderate (25-49%) decline in UK breeding population over last 25 years Moderate (25-49%) contraction of UK breeding range over last 25 years Moderate (25-49%) decline in UK non-breeding population over last 25 years Species with unfavourable conservation status in Europe (SPEC = Species of European Conservation Concern) Five-year mean of 1–300 breeding pairs in UK > or =50% of UK breeding population in 10 or fewer Sites, but not rare breeders > or =50% of UK non-breeding population in 10 or fewer Sites > or =20% of European breeding population in UK > or =20% of NW European (wildfowl), East Atlantic Flyway (waders) or European (others) non-breeding populations in UK
Green	No identified threat to the population's status

Image 1 The status of British bird species within the BoCC categorisation 1996 – 2021 extracted from Stanbury et al (2021).



The following sections show the status of three broad groupings of bird species within the UK, their current status and identified conservation issues.

2.2.3 Farmland bird conservation

Farmland birds have undergone a significant decline in numbers since 1950, with a decline in more than 55% between 1970 and 2021 and a significant short-term decline of 5% between 2015 and 2020 (breeding farmland bird index, BTO 2023). Farmland specialists showed the most prominent declines with corn bunting, grey partridge *Perdix perdix*, turtle dove *Streptopelia turtur* and tree sparrow *Passer montanus* showing a decline of at least 90% since 1970 apart from stock dove and goldfinch which have more than doubled since the 1970's.

It is considered that this decline is not solely due to loss of farmland, but primarily due to intensification of farming, loss of hedgerows and changes in farming practices (such as the loss of field margins and increasing planting of winter sown crops, which reduce the availability of feeding resources over winter).

2.2.4 Woodland bird conservation

Woodland birds have shown a decline of 34% between 1970 and 2021, and by 12% just over the recent short-term period, with woodland specialists declining by 53% since 1970 (BTO 2023). Specialists like lesser spotted woodpecker, spotted flycatcher *Muscicapa striata* and willow tit *Poecile montanus* have shown the steepest declines (greater than 80%), with blackcap *Sylvia atricapilla*, nuthatch *Sitta europaea* and great spotted woodpecker *Dendrocopos major* increasing in abundance.

There are potentially multiple causes for this decline, from a loss of habitat, climate change and changes in management within woodlands.

2.2.5 Gloucestershire Bird Report

The Gloucestershire bird report (2019) was also consulted to give local context to the birds encountered within the survey area. Notes describing the breeding status of each species within Gloucestershire, as described within the Gloucestershire bird report, are given in Table 7 and Table 8, Appendix C.

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3 Approach and Methodology

3.1 Desk Study

Prior to the field surveys, a desk study was undertaken to identify any existing ecological information relating to the survey area and its surroundings. The search areas applied for the information in relation to birds was 2km. The following resources were used:

- The Multi-Agency Geographical Information for the Countryside (MAGIC) (MAGIC, 2023) website was used to search for statutory designated sites of nature conservation value.
- OS mapping and aerial photography (Google mapping) were studied to place habitats within the study area in the wider context; identify potential ecological features of value to birds that may not be evident on the ground during the field survey; and identify potential barriers to animal movements and sources of mortality (such as road networks and railway lines).
- The Gloucestershire Centre for Environmental Records (GCER) was approached to provide records of rare, notable and protected bird species within a 2km search area. They also provided records of local sites within a 2km search area, national sites within 2km and international sites within 10km which had been designated for their ornithological importance.
- S41 of the NERC Act 2006 (HMSO, 2006) lists of breeding bird species. These are referred to as Species of Principal Importance in England (SPIEs).
- Gloucestershire Bird Report (Goodall et al, 2019).

3.2 Habitat assessment

3.2.1 Assessment of habitat suitability for breeding bird species

The Phase 1 habitat survey undertaken between March and May 2022 identified and mapped habitats with suitability for breeding birds. This was updated by Arcadis in July 2023.

3.2.2 Assessment of habitat suitability for barn owl

As part of the assessment the habitat suitability for barn owl, *Tyto alba* has also been considered by Arcadis, comprising both foraging and roosting habitat.

This was based upon the 'Phase 1' habitat categories recorded as well as feedback from the breeding bird surveys and data collected during the bat roost assessment of trees across the site conducted by Arcadis in 2023, which also identified potential roosting / breeding potential for barn owl.

A foraging assessment graded the habitats under four categories, dependent upon their value for foraging barn owl. The categorisations utilised are based upon the guidance provided within the CIEEM guidance (Shawyer, 2011) and are presented in Table 2 Barn Owl habitats as defined within the CIEEM guidelines (Shawyer 2011) below.

Table 2 Barn Owl habitats as defined within the CIEEM guidelines (Shawyer 2011)

Habitat Name	Value for foraging barn owl	Description from guidance
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Type 1 Habitat	Optimal	<i>Type 1 Habitats are those which provide optimum habitat to field voles <i>Microtus agrestis</i> (for breeding, foraging and shelter) and are of the highest value to barn owl. This habitat type is usually permanent, unimproved or semi-improved grassland, rank and heterogeneous in appearance, often of mixed height, with fully or partly collapsed dead grass stems (straw) often dominating the leaf sward. This grassland possesses a high abundance of raised tussocks per unit area (typically 4-40/m²) coupled with a basal litter layer or 'thatch' of straw, at least 30 mm deep (Note: won't find this if viewed from distance but assume where you can) (Shawyer 1998). Type 1 Habitats usually receive no real management or anything other than periodic light grazing by farm animals. Long-term set-aside grassland and unmanaged fields, wasteland, ditches, riverbanks, field margins and road verges are the most common examples of this habitat type. When viewed in the wider landscape, Type 1 Habitats can usually be recognised, particularly in the autumn, winter and early spring, by their golden or green/brown appearance, and are sometimes described as 'white grassland'.</i>
Type 2 Habitat	Sub-optimal	<i>Type 2 Habitats are sub-optimal to field voles and are of intermediate and often transient value to barn owl. This type of improved or semi-improved grassland is characterised by having a homogeneous, more even-height sward, sometimes displaying some lush and emerging tussock structure but little sign of a litter layer or 'thatch'. It can sometimes constitute a mature clover/grass ley and usually receives some level of farm management such as occasional fertilization, annual topping or light grazing. When seen in the wider landscape, Type 2 Habitats normally have a more uniform, dark green appearance, than Type 1 Habitats.</i>
Type 3 Habitat	Very poor	<i>Type 3 Habitats offer very poor habitat for field voles and most other small mammals and as such are of low value to barn owl. These improved grasslands are characterised by having a homogeneous sward, which is often kept short throughout much of the year, no tussock structure and are devoid of any litter layer at their base. They are usually mown closely for hay or silage, heavily grazed by sheep, horses or cattle or used for public amenity. They normally display a uniform bright green appearance when viewed in the wider landscape. Acid grasslands and those grasslands overgrown with scrub which can restrict barn owl from hunting, also fall into this habitat category. Type 3 Habitat is not normally illustrated on the final survey map because of its poor suitability to barn owl.</i>
Other Habitats	Little or no value	<i>Non-grassland habitats, such as arable fields and mature woodland are generally of little or no value as a permanent foraging resource to barn owl. Arable fields containing cereals, rapeseed, or other food crops do not provide suitable habitat for field voles, although at certain times of the year, such as during harvest, they can, for short periods, expose wood mice <i>Apodemus sylvaticus</i> and temporarily attract barn owl. Prior to harvest, however, arable crops are largely impenetrable to foraging barn owl because of the stiff nature of the crop and high density of planting. For the purpose of the survey, arable fields without grass margins and woodlands (except those possessing wide grass rides or young plantations) are, therefore, considered unsuitable for barn owl and are not illustrated on the eventual survey map.</i>

3.3 Breeding Bird Survey

It was decided that further survey work should be undertaken to help understand the numbers and species diversity of breeding birds in support of an impact assessment. The survey data collected was used to inform the underground cable route and subsequently the red line boundary of the site. Therefore, an initial extended

survey boundary that covered a much wider area (referred to in this document as the Ecology Survey Boundary) was used prior to the definition of the final red line boundary. A buffer of 200m from the redline boundary was then considered suitable to define the area over which effects on birds might arise (the Zone of Influence, ZoI) for the Proposed Project. Any birds outside of this zone were considered unlikely to be impacted by the scheme and were therefore excluded from further assessment.

Breeding bird surveys were carried out in accordance with Bird Survey and Assessment Guidelines (Bird Survey and Assessment Steering Group, 2023). All the birds present within the survey areas were mapped using BTO species codes and symbology, noting their behaviour with priority given to:

- breeding signs;
- Schedule 1 species; or
- species of high conservation value..

All surveys were started up to one hour before sunrise and were completed within three hours. The route taken by the surveyors across the site was varied between visits to optimise detection rate and minimise recording bias. Surveys were completed in optimum field conditions where possible, for example with no wind or rain.

A total of six survey visits were undertaken as per the survey guidelines (Bird Survey & Assessment Steering Group 2023).

Surveys were undertaken by experienced ornithologist David Foster and Morgan Lees on 3-6 April, 17-20 April, 8-11 May, 22-25 May, 5-8 June 2023 and 20-22 June. The weather data for the surveys is presented in Table 5, Appendix A.

Population ranges were calculated based on the number of records of birds exhibiting breeding behaviour in the same location across multiple surveys. Habitat quality, the potential for secretive/rare species and the potential for low population sizes were taken into account when estimating population sizes of each species of breeding bird.

All mature trees with cavities or potential roosting sites for barn owl were also inspected as part of bat tree assessments carried out by Arcadis in 2023, looking for evidence of use including droppings, feathers, pellets, or eggs.

The data obtained from each visit was then interpreted to identify clusters of records of each species that might indicate the activity of particular birds throughout the season and determine the number of territories that might be present (territory mapping). A breeding territory was interpreted as clusters which showed as a series of territorial behaviours across most of the survey visits. Maps were then produced for those species considered to be breeding within the ZoI. Where there was a degree of uncertainty around the interpretation of the clusters, the territory was mapped as a possible territory.

3.4 Survey Limitations

The surveys were conducted during the main breeding bird season, in line with survey guidelines and the vast majority during suitable weather conditions. There were minor deviations to the transect routes marked due to access arrangements and sub-optimal weather conditions on the first survey visit to the southern area, however these are considered unlikely to impact significantly on the survey results. As such the results are likely to be a fair representation of the bird population across the survey area at the time. Survey metadata are presented in Appendix A.

The species assemblages and population sizes of those present may change in the years subsequent to this survey.

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4 Results

4.1 Desk Study

The desk study returned records of 71 bird species within 2km of the Site within the last 10 years. Twenty-two were afforded full protection when breeding (including disturbance) under Schedule 1 of the Wildlife and Countryside Act 1981. Thirty-one species were listed on the red list Birds of Conservation Concern (BoCC) (Stanbury et al., 2021), 27 species were listed on the amber List of the BoCC and two were former breeders. Twenty-four were also listed as species of principle importance (HMSO 2006).

Table 9 in Appendix D gives details of these species. Of those listed, there was potentially suitable habitat for barn owl, kingfisher *Alcedo atthis* and red kite *Milvus milvus* within the zone of influence.

There were no sites designated for their bird interest within 2km of the site.

4.2 Habitat assessment

Much of the site comprised mostly open landscape with mixed farming of arable and pasture fields, as well as areas of woodland, semi-natural and plantation and stream / river valleys. Hedgerows (and dry-stone walls) were also a widespread feature. The use of the site by birds was largely focussed on the woodland and farmland areas. Maps showing the areas surveyed are shown in Drawing 30167905-ARC-XX-260-DR-E-00002-Cotswolds VIP Breeding Bird Survey Areas Map.

Table 4 in Section 5.2.1 summarises the key habitats for breeding birds that will be impacted by the scheme.

4.3 Barn owl foraging habitat assessment

The wider survey area provided optimal (Type 1) and sub-optimal (Type 2) foraging habitat for barn owl. However, the majority of the grassland habitat to be impacted by the scheme is deemed to be poor foraging habitat for barn owl (improved and poor semi-improved grassland fields with narrow field margins).

Thirteen trees were identified within the wider area that had potential to support roosting barn owl. Of these only three were within the Zol. These are presented on Drawing 30167905-ARC-XX-260-DR-E-00001-Cotswolds VIP Barn Owl Survey Results Map. One tree, T458 (a mature Ash tree) is on the boundary of the site.

4.4 Breeding bird survey results

4.4.1 Overview

Fifty-two species of birds were recorded across the wider survey area, of which 22 were considered to be breeding or potentially breeding on or within the Zone of Influence of the site (ie within 200m of the site boundary). Table 3 Breeding bird species recorded during the 2023 breeding bird surveys below presents the total number of birds of conservation concern of each species identified within the Zol.

Separate maps showing the number of confirmed or possible territories for each of the species identified in Table 3 Breeding bird species recorded during the 2023 breeding bird surveys are presented in Drawings 30167905-ARC-EGN-ZZ-DR-ZZ-00002 to 30167905-ARC-EGN-ZZ-DR-ZZ-00022.

Full survey results for each species can be found in Appendix B.

Table 7 and Table 8 in Appendix C describe the main areas favoured for breeding for each red and amber listed species and any relevant notes for each species within the local context.

Table 3 Breeding bird species recorded during the 2023 breeding bird surveys

Common Name	Scientific Name	Conservation Status	Total number of birds recorded	Estimated population size range of breeding species (no. of confirmed and possible territories within Zol)	Territory within cabling route and OHL that might be impacted (Y/N)
Farmland bird assemblage					
Barn Owl	<i>Tyto alba</i>	Schedule 1, Green	1	Breeding not confirmed	Sub-optimal
Corn Bunting	<i>Emberiza calandra</i>	Red	4	0-1	N (adjacent to access route)
Linnet	<i>Carduelis cannabina</i>	Red, NERC S41	138	5 - 9	Y
Skylark	<i>Alauda arvensis</i>	Red, NERC, S41	328	17	Y
Yellowhammer	<i>Emberiza citrinella</i>	Red, NERC S41	142	11-17	Y
Common whitethroat	<i>Sylvia communis</i>	Amber	93	10 - 13	Y
Meadow pipit	<i>Anthus pratensis</i>	Amber	64	4	Y
Stock dove	<i>Columba oenas</i>	Amber	74	3 - 6	Y
Song thrush	<i>Turdus philomelos</i>	Amber, NERC S41	111	-7-8	Y
Kestrel	<i>Falco tinnunculus</i>	Amber	20	2	Y
Woodland & scrub					
Marsh tit	<i>Poecile palustris</i>	Red, NERC S41	67	3 - 6	Y
Mistle thrush	<i>Turdus viscivorus</i>	Red	11	1	Y

Common Name	Scientific Name	Conservation Status	Total number of birds recorded	Estimated population size range of breeding species (no. of confirmed and possible territories within Zol)	Territory within cabling route and OHL that might be impacted (Y/N)
Lesser spotted woodpecker	<i>Dendrocopos minor</i>	Red, NERC S41	2	1	N (adjacent to access route)
Bullfinch	<i>Pyrrhula pyrrhula</i>	Amber, NERC S41	43	1-5	Y
Willow warbler	<i>Phylloscopus trochilus</i>	Amber	51	4	Y
Rook	<i>Corvus frugilegus</i>	Amber	522	1 Rookery (communal birds)	N
Redstart	<i>Phoenicurus phoenicurus</i>	Amber	28	3	N (adjacent to access route)
Wood pigeon	<i>Columba palumbus</i>	Amber	313	3 - 8	Y
Wren	<i>Troglodytes troglodytes</i>	Amber	295	28 - 33	Y
Wetland Birds					
Mallard	<i>Anas platyrhynchos</i>	Amber	12	1	N (adjacent to access route)
Birds associated with buildings					
House martin	<i>Delichon urbica</i>	Red	78	1 (possible)	N (adjacent to access route)
House sparrow	<i>Passer domesticus</i>	Red, NERC S41	7	1 (possible)	N

Red / Amber = Species of conservation concern (Stanbury et al 2021)

NERC S41 = Species of Principle Importance (HMSO 2006)

Tree pipit *Anthus trivialis* were recorded breeding outside of the Zol. As they are unlikely to be impacted by the scheme, they will not be considered further within this assessment.

Birds not of conservation concern (green listed species) included raven *Corvus corax*, chaffinch *Fringilla coelebs*, cormorant *Phalacrocorax carbo*, red kite, lesser redpoll *Acanthis cabaret*, buzzard *Buteo buteo* and

Canada goose *Branta canadensis*. These species have also not been considered further within this assessment.

Birds encountered during the surveys, but not identified as breeding within the ZOI included hobby *Falco subbuteo*, sparrowhawk *Accipiter nissus*, greenfinch *Ligurinus chloris*, common crossbill *Loxia curvirostra*, cuckoo *Cuculus canorus*, redwing *Turdus iliacus*, fieldfare *Turdus palustris*, spotted flycatcher, reed bunting *Emberiza schoeniclus*, common gull *Larus canus*, willow tit, herring gull *Larus argentatus*, swift *Apus apus*, moorhen *Gallinula chloropus*, grey wagtail *Motacilla cineria*, starling *Sturnus vulgaris*, grey partridge, pied flycatcher *Ficedula hypoleuca*, woodcock *Scolopax rusticula*, and sedge warbler *Acrocephalus schoenobaenus*. The majority of these species were likely to be on passage or winter visitors or released birds for shooting (grey partridge).

4.4.2 Schedule 1 birds

Barn owl were the only Schedule 1 species seen flying north on one occasion (visit 5) north west of Drypool Farm, in the middle of the survey area (see 30167905-ARC-XX-260-DR-E-00001-Cotswolds VIP Barn Owl Survey Results Map). Three trees were identified as potential breeding sites within the ZOI of the scheme (see Drawing 30167905-ARC-XX-260-DR-E-00001-Cotswolds VIP Barn Owl Survey Results Map), although breeding was not confirmed. Areas of grassland were present within the wider survey area that had the potential for use by foraging barn owl. Barn owl could be foraging within 200m of the scheme where the grassland habitat is suitable.

4.4.3 Notable birds and/or birds of conservation concern

Nine of these breeding bird species recorded were on the BoCC red list (linnet, skylark, yellowhammer, marsh tit, mistle thrush, lesser spotted woodpecker, tree pipit, house martin and house sparrow) and twelve species were BoCC amber listed (common whitethroat, meadow pipit, stock dove, song thrush, bullfinch, willow warbler, rook, redstart, wood pigeon, wren, mallard and kestrel).

Nine bird species were also Species of Principal Importance listed under Section 41 of the 2006 Natural Environment and Rural Communities (NERC) Act (HMSO 2006) (see Table 3 Breeding bird species recorded during the 2023 breeding bird surveys above).

4.4.4 Farmland birds

Of the breeding birds identified within the survey area, nine species were associated with farmland habitat. Of these, four were on the BoCC red list (corn bunting, linnet, skylark and yellowhammer) and five were on the BoCC amber list (common whitethroat, meadow pipit, stock dove, song thrush and kestrel).

4.4.5 Woodland birds

During the survey ten species of bird associated with woodland habitat were recorded within the ZOI. Of these four species were on the BoCC red list (marsh tit, mistle thrush, lesser-spotted woodpecker and tree pipit) and six species were on the BoCC amber list (bullfinch, willow warbler, rook, redstart, wood pigeon, wren).

5 Discussion

5.1 Overview

The number of species recorded in an area is a simple measure of diversity that can indicate its importance at each season of the year. Fuller (1980) gives the breeding diversity criteria for local importance at 25-49 species. The breeding total for the survey area as identified by the surveys was 23 species. Based on Fuller's criteria, the breeding bird assemblage of the site is of site to local importance on a precautionary basis, given the criteria were developed 40 years ago and species have been in decline since then.

For clarity different aspects of the bird assemblage will be discussed below.

5.2 Schedule 1 Birds

Barn Owl was the only Schedule 1 species recorded within the Zol. No evidence of breeding was recorded within the Zol but three trees suitable for roosting/breeding barn owl were identified within the Zol. One tree is on the boundary of the site. It is not anticipated that these trees will be impacted by the proposed works. The value of the foraging habitat within the impact zone is considered to be poor or sub-optimal at best. It is unlikely that the impact zone is required to sustain the local population of barn owl. Although suitable roosting sites exist within the Zol.

The field surveys made no record of kingfisher within the Zol, and it was noted that habitats which appeared suitable during the desk study were not suitable – polluted water would provide a lack of suitable prey species (fish) and there were no suitable banks to be used for nesting.

There were also no field records of red kite within the Zol, though suitable nesting habitat was present, for example in the plantation woodland within the Zol. The presence of breeding corvid species (whose nests red kite will often use as a base for their own nest) also contributes to the habitat suitability. This species could potentially begin breeding in the area in future.

5.3 Birds of Conservation Concern

The Zol supports a number of birds of conservation concern. These were mainly associated with the woodland and farmland habitat. These will be discussed in more detail below.

Other species associated with wetland and buildings were present within 200m of the site, but will not be directly impacted by the scheme, these species included mallard, house sparrow and house martin.

5.4 Farmland bird assemblage

During the survey, nine species of farmland birds were recorded which suggests the Zol has value in supporting farmland birds. Yellowhammer, linnet and skylark are of high conservation value. Yellowhammer are associated with hedgerows, linnet with hedgerows and scrub and skylark are ground-nesting species within arable and grassland areas. Despite their conservation status, all species are reported as common and widespread breeders within Gloucestershire and especially across the Cotswolds.

Of the six amber-listed species, meadow pipit also nests on the ground, whilst the rest, common whitethroat, stock dove, song thrush and kestrel are associated with hedgerow or trees.

Farmland birds have the potential to be impacted by the proposed scheme.

5.5 Woodland bird assemblage

During the survey ten species of woodland bird were recorded which suggests the ZOI has value in supporting woodland birds. Of these marsh tit, mistle thrush, lesser spotted woodpecker and tree pipit are of high conservation value. Species of particular note are lesser spotted woodpecker and tree pipit that are uncommon breeding residents and uncommon breeding summer visitors respectively in Gloucestershire making them more important within the County and of at least local importance. The lesser spotted woodpecker territory was immediately adjacent to the site, so will not be directly impacted by the scheme.

Of the amber-listed species (bullfinch, willow warbler, rook, redstart, wood pigeon, wren), redstart are also uncommon breeding summer visitors with more specific habitat requirements. The rest are more common and widespread species.

Woodland birds have the potential to be impacted by the proposed scheme.

5.6 Areas of site of particular value for breeding birds

The majority of the birds were either woodland and scrub/hedgerow species or species found in farmland (arable and pasture) reflecting the majority of the habitat encountered within the ZOI.

6 Impact Assessment

6.1 Overview

The sections below discuss potential impacts, mitigation and enhancement opportunities for breeding birds.

6.2 Potential Impacts

This section outlines the potential impacts in the absence of mitigation.

6.2.1 Summary of construction and operational phase impacts

The potential impacts for the construction and operational phases are detailed in Table 4 below.

Table 4: Construction and operational phase impacts

Construction Phase Impacts	
Impact	Description
Direct Habitat Loss	• Temporary or permanent habitat loss – reduction of available nesting sites and foraging resources for birds. • Short-term impacts will particularly affect species associated with farmland and woodland.
Direct Mortality of Species	• Breeding birds (adults, nests, eggs and dependent young) are vulnerable to works occurring in close proximity that may damage or destroy a nest site during the breeding bird season.
Disturbance	• Breeding birds are vulnerable to disturbance from changes in lighting, vibration and noise.
Operational Phase Impacts	
Impact	Description
Disturbance	• Breeding birds are vulnerable to disturbance from changes in lighting, vibration and noise resulting from upkeep and maintenance of underground cables.

6.2.2 Direct habitat loss

All habitat types within the site have the potential to be used by nesting (both ground-nesting and otherwise), foraging and roosting birds. The full extent of the habitat loss is presented in Table 5 Key habitats for breeding birds to be impacted by the scheme below. The temporary or permanent loss of any habitats will reduce the availability of potential nesting sites and foraging resources for birds throughout the duration of construction. In the short-term, this will result in adverse effects, particularly for species that are associated with farmland and woodland habitat, whilst habitat is re-established.

Table 5 Key habitats for breeding birds to be impacted by the scheme

Habitat	Description	Value to breeding birds
Arable	Arable crops dominated by Rye, Oil Seed Rape, Field Beans, Barley and Beet. Narrow grass margins (1m) recorded under hedgerow.	Important foraging habitat for a range of bird species, especially farmland birds. A limited subset of species will nest in this habitat. The management of this habitat impacts greatly upon its value for birds.
Woodland	0.32 km broadleaved semi-natural woodland, 0.1km mixed woodland	Woodlands are important for a range of bird species, for both nesting and foraging.
Hedgerow	Several species-rich hedgerow and species rich hedgerow with trees, plus non-native, species-poor and species-poor hedgerow with trees	Hedgerows can provide foraging and nesting opportunities for a range of bird species.
Grassland	Two areas of poor semi-improved grassland, as well as part of twelve improved grassland fields	This habitat is of value for bird foraging, and dependent upon management, this habitat may have some suitability for ground nesting birds.

6.2.3 Direct mortality of species through construction activities

6.2.4 Nesting birds (the adult birds, nests, eggs and dependent young) are vulnerable to works occurring in close proximity that might damage or destroy a nest site during breeding (mid-February to August inclusive). Disturbance

Nesting birds are also vulnerable to disturbance from changes in noise, lighting and vibration. Construction-related activities will result in an increase in noise levels and construction impact noise that could cause disturbance to foraging and roosting birds in the surrounding area. Visual disturbance will also be likely to affect birds by causing them to avoid areas of habitat that might otherwise be used for foraging and resting.

Species nesting nearby within the wider survey area, but beyond the site, may adapt their foraging behaviour and continue to breed successfully as prior to commencement of construction. Others, such as skylark, may be displaced from breeding territories and may occur in reduced numbers because suitable retained habitat is already well used by breeding pairs.

6.3 Mitigation

6.3.1 Summary

A summary of mitigation for the construction and operational phases is provided in Table 6 below:

Table 6: Summary of mitigations

Construction Phase

Impact	Mitigation
Direct Habitat Loss	- Habitat to be replanted / enhanced post-construction. - Establishment of artificial habitats through bird box installation. - During construction, the majority of woodland, grassland and arable land will be retained. - Refer to the final CEMP.
Direct Mortality of Species	- Clearance of vegetation and structure removal will occur outside the main breeding bird season, falling between mid-February and August inclusive. - If this is not possible, a suitably qualified ECoW will check for presence of breeding birds prior to the commencement of any clearance and construction activities. - Where any active nests are found, a buffer zone (as specified by the ECoW) will be implemented until the chicks have fledged. - For Schedule 1 species, a larger buffer zone will be implemented and will only be lifted once the chicks are independent.
Disturbance	- The use of existing access routes will help minimise disturbance. - Nocturnal works will be kept at a minimum with the use of sensitive lighting to ensure minimal disturbance of nocturnal species i.e., barn owl. - Refer to the final CEMP.
Operational Phase	
Impact	Mitigation
Disturbance	- Operational lighting to be directed away from woodland areas during maintenance of the cable sealing end compounds. - Nocturnal works will be kept at a minimum with the use of sensitive lighting to ensure minimal disturbance of nocturnal species i.e., barn owl. - For Schedule 1 species, buffer zones will be implemented and will only be lifted once maintenance works have ceased.

6.3.2 CEMP

A Construction Environmental Management Plan (CEMP) will be finalised by the contractor (once appointed) prior to commencement of the works which will outline the standard pollution control and environmental protection measures for the scheme. This will ensure that on and offsite habitats are protected during the construction phase.

Implementation of the embedded and good practice mitigation measures described in the CEMP will avoid direct (mortality) and indirect (noise and visual disturbance) impacts and will provide protection for birds and their nests throughout the construction phase.

These will include consideration of the timing of vegetation clearance and structure removal outside of the bird nesting season (March to August inclusive) wherever possible. Where this is not possible, appropriate measures will be taken to avoid harming birds or their nests (such as temporary fencing around nesting sites where they are immediately adjacent to construction works), under supervision by a suitably experienced Ecological Clerk of Works (ECoW).

Nocturnal works are to be kept to a minimum, with the sensitive use of lighting ensuring negligible disturbance to nocturnal species such as foraging barn owl.

Any trees with suitability for barn owl will be retained within the scheme. Pre-construction surveys will be undertaken no more than one month before works commence of trees that have been recorded to have barn owl roosting potential. Following pre-construction surveys, should trees still hold roosting potential, a suitably qualified ECoW will advise on the extent of buffer zones around all recorded trees with barn owl roosting potential and define when the buffer zone may be lifted. As barn owls can breed throughout the year, vigilance must be applied during clearance, construction and operational works at any time.

6.3.3 Construction Design

During construction, the majority of woodland, grassland and arable areas will be retained and will continue to provide opportunities for foraging and nesting birds. Vegetation clearance will be kept to a minimum in compounds, working areas and associated infrastructure. Any areas that will be temporarily lost will also be reinstated following construction, with only a relatively small number of woodland, grassland and arable species potentially displaced in the short-term, with suitable habitat still available within the wider survey area, and surrounding countryside.

The use of existing access routes (eg adjacent to the lesser spotted woodpecker and redstart territory) will help to mitigate disturbance for these species, which are likely to be nesting within the woodland, rather than on the woodland edge.

The installation of bird nest boxes within areas of retained woodland, whilst newly created habitat establishes, will also off-set the temporary loss of habitat during construction in liaison with the landowners. In addition, the BNG strategy will improve habitat condition and provide additional habitat resources for breeding birds.

6.3.4 Preconstruction Surveys / Power Outage

It should be noted that barn owl, which could be present within the ZOI, can breed throughout the year, and that this species receives legal protection against disturbance during breeding. Therefore breeding barn owl surveys of potential roosting/breeding sites should be undertaken throughout the year if any trees with potential for roosting barn owl are likely to be impacted by the scheme.

Should vegetation clearance be undertaken during the breeding season, nesting bird checks will be undertaken 48 hours in advance of works and any active nest identified will be protected by a suitable buffer (as specified by the ECoW) until the chicks have fledged.

A pre-construction survey to check for signs of breeding birds, particularly nesting birds on the overhead powerlines, will be undertaken no more than one month before works commence. Removal of old nests and the installation of nest deterrents as appropriate will also be undertaken during an arranged outage prior to OHL removal. This will reduce the likelihood of nesting birds on the overhead powerlines before works commence. All works taking place near suitable habitat for breeding birds will be undertaken under supervision of a suitably qualified ECoW.

6.4 Enhancement measures and BNG

Opportunities to enhance the scheme for biodiversity, in line with national and local planning policy have been identified and are detailed in the Biodiversity Net Gain report (Ref XX).

Habitat creation and enhancement measures within Breakheart Plantation under the existing overhead line and at either end of the scheme within the cable sealing end compound areas will provide a benefit to foraging

and breeding birds in the medium to longer term. Habitat would be created / reinstated on a like for like or of a higher quality basis. Habitat creation would include woodland and hedgerow screening as well as species-rich grassland planting that would benefit a number of species.

Breeding bird nest boxes for species eg redstart (woodland) and barn owl nest boxes should be installed at suitable locations to provide additional nesting opportunities for key bird species.

6.5 Residual Effects

This section outlines the residual effects following the mitigation measures applied to address potential impacts on breeding birds resulting from the clearance, construction and operational works. This information is summarised in Table 7 below:

Table 7: Ecological Impact Assessment Summary

Feature scoped in	Scale of importance	Type of impact (construction or operation)	Significance and nature of effects (without mitigation)	Mitigation/ compensation/ enhancement	Significance and nature of residual effects (with mitigation)
Breeding Birds	Local	Construction: Direct habitat loss	- Significance at local level - Negative	Habitat to be replanted / enhanced post-construction. Establishment of artificial habitats through bird box installation. Refer to the final CEMP (to be completed).	- Non-significant - Neutral
		Construction: Direct mortality	- Significance at local level - Negative - Irreversible	Clearance of vegetation and structure removal to occur outside main breeding bird season (mid-February and August inclusive). A suitably qualified ECoW to check for breeding bird presence prior to construction if the above is not possible. Where any active nests are found, a buffer zone (as specified by the ECoW) will be implemented until the chicks have fledged. For Schedule 1 species, a larger buffer zone will be implemented and will only be lifted once the chicks are independent.	- Non-significant - Neutral
		Construction: Disturbance	- Significance at local level - Negative - Irreversible	Use existing access routes to help minimise disturbance. Nocturnal works will be kept at a minimum with the use of sensitive lighting to ensure minimal disturbance of nocturnal species i.e., barn owl.	- Non-significant - Neutral

				Disturbance control measures within the CEMP.	
		Construction: Removal of overhead powerlines	- Significant at local level - Positive	The removal of overhead powerlines will reduce the collision risk for birds in flight.	- Non-significant - Positive
		Operational: Disturbance	- Significant at local level - Negative - Irreversible	Operational lighting associated with the sealing end compound to be directed away from areas of woodland. Nocturnal works will be kept at a minimum with the use of sensitive lighting to ensure minimal disturbance of nocturnal species i.e., barn owl. Disturbance control measures within the CEMP.	- Non-significant - Neutral

7 Conclusion

Fifty-two species of birds were recorded across the wider survey area, of which 22 were considered to be breeding or potentially breeding on or within the Zone of Influence (Zol) of the site (ie within 200m of the scheme).

The general breeding bird assemblage of the survey area was considered to be of site to local importance, the majority of which were common and widespread species within the county. There were two uncommon breeding species of up to County importance (ie lesser spotted woodpecker, and redstart).

The majority of the birds were either woodland or farmland species reflecting the majority of the habitat encountered within the Zol. They have the potential to be impacted by the proposed scheme.

Barn owl (a Schedule 1 species) was not confirmed to be breeding, but there were three trees within the Zol that had the potential to support breeding barn owl. However, it is unlikely that the impact zone is required to sustain the local population.

The main impacts to breeding birds without mitigation are considered to be a direct loss of breeding habitat, direct mortality of species through construction activities and disturbance. Indirect impacts to breeding birds without mitigation may include habitat degradation and disturbance of breeding bird (i.e., from additional noise, lighting during construction). Mitigation measures have been proposed in order to reduce these impacts.

Overall, it is considered that habitat loss and disturbance of nesting, foraging and roosting birds will be a minor temporary adverse level of impact that won't affect the conservation status of the bird populations concerned in the longer term. Therefore, the effect on the bird populations of Site to Local importance will be Not Significant at any level.

8 References

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Drawings

DRAFT

Appendix A

Breeding bird survey visit meta data

Table 8 Details of the breeding bird field surveys

	Survey 1			2			3			4			5			6		
Surveyor	DF and ML			DF and ML			DF and ML			DF and ML			DF and ML			DF and ML		
Transact	Mid	North	South	Mid	North	South	Mid	North	South	Mid	North	South	Mid	North	South	Mid	North	South
Date	04/04/23	05/04/23	06/04/23	18/04/23	19/04/23	20/04/23	10/05/23	11/05/23	12/05/23	23/05/23	24/05/23	25/05/23	06/06/23	07/06/23	08/06/23	21/06/23	22/06/23	23/06/23
Start Time	7:00am	6:45am	6:30am	6:30am	6:30am	6:30am	5:30am	5:30am	5:30am	5:30am	5:30am	5:30am	5:30am	5:30am	5:30am	5:30am	5:30am	5:30am
Finish Time	12pm	11:00am	10am	10:30am	10am	9:30am	10am	9:30am	9:00am	10am	9:30am	9:00am	10am	9:30am	9:00am	10am	9:30am	9:00am
Temp (oC)	-1°C rising to 13°C	9°C	10°C	7°C	9°C	8°C	9°C	10°C	10°C	12°C	12°C	14°C	13°C	15°C	16°C	19°C	19°C	19°C
Wind Direction	SW2	SW3	W2	NE2	NE3	NE2	SW2	SW2	NE3	SW1	S	S	NE	NE	NE2	SW	N	SW
Wind speed	0.62mph	4.5mph	8.7mph	10.5mph	11.1mph	11.8mph	4.9mph	1.2mph	11.8mph	1.8mph	7.4mph	4.3mph	9.9mph	8mph	11.8mph	7.5mph	1.8mph	6.8mph
Cloud cover	1/8	6/8	8/8	6/8	5/8	3/8	8/8	6/8	5/8	3/8	2/8	4/8	7/8	6/8	4/8	4/8	3/8	2/8
Snow	0mm	0mm	0mm	0mm	0mm	0mm	0mm	0mm	0mm	0mm	0mm	0mm	0mm	0mm	0mm	0mm	0mm	0mm

Breeding bird survey visit meta data

	Survey 1			2			3			4			5			6		
Rain	0mm	0mm	Persistent light (with occasional heavy) rain until 9:15am . Dry thereafter	0mm	0mm	0mm	0mm	0mm	0mm	0mm	0mm	0mm	0mm	0mm	0mm	0mm	0mm	0mm
Visibility	Excellent	Good	Good	Good	Excellent	Excellent	Good	Excellent	Excellent	Excellent	Excellent	Excellent	Good	Good	Excellent	Good	Excellent	Excellent

Appendix B

Breeding bird survey complete results

Table 9 Details of bird species recorded during each breeding bird survey. N.B. peak counts are highlighted for each species.

Name	3-6 April	17-20 April	8-11 May	22-25 May	5-8 June	21-23 June	Total	Average no. per visit
Barn Owl (<i>Tyto alba</i>)	0	0	0	0	1	0	1	0.17
Bullfinch (<i>Pyrrhula pyrrhula</i>)	4	4	5	8	8	14	43	7.17
Buzzard (<i>Buteo buteo</i>)	0	12	4	6	5	10	37	6.17
Canada Goose (<i>Branta canadensis</i>)	0	0	1	0	6	0	7	1.17
Chaffinch (<i>Fringilla coelebs</i>)	0	2	13	19	14	24	72	12.00
Common Crossbill (<i>Loxia curvirostra</i>)	0	1	0	0	2	5	8	1.33
Common Gull (<i>Larus canus</i>)	0	0	0	0	1	0	1	0.17
Common Whitethroat (<i>Sylvia communis</i>)	0	3	33	24	13	0	73	12.17
Cormorant (<i>Phalacrocorax carbo</i>)	0	0	0	0	2	0	2	0.33
Corn Bunting (<i>Emberiza calandra</i>)	1	3	0	0	0	0	4	0.67
Cuckoo (<i>Cuculus canorus</i>)	0	1	1	1	0	1	4	0.67
Curlew (<i>Numenius arquata</i>)	0	1	0	0	0	0	1	0.17
Fieldfare (<i>Turdus palustris</i>)	0	1	0	0	0	0	1	0.17
Greenfinch (<i>Ligurinus chloris</i>)	1	0	1	0	2	10	14	2.33
Grey Partridge (<i>Perdix perdix</i>)	2	1	0	0	0	0	3	0.50
Grey Wagtail (<i>Motacilla cinerea</i>)	0	1	0	0	0	0	1	0.17
Herring Gull (<i>Larus argentatus</i>)	1	0	0	0	1	0	2	0.33
Hobby (<i>Falco subbuteo</i>)	0	0	1	0	0	0	1	0.17
House Martin (<i>Delichon urbica</i>)	0	1	7	34	24	12	78	13.00
House Sparrow (<i>Passer domesticus</i>)	0	0	0	0	1	6	7	1.17

Breeding bird survey complete results

Name	3-6 April	17-20 April	8-11 May	22-25 May	5-8 June	21-23 June	Total	Average no. per visit
Kestrel (<i>Falco tinnunculus</i>)	3	2	4	1	2	8	20	3.33
Lesser Redpoll (<i>Acanthis cabaret</i>)	0	1	0	0	0	0	1	0.17
Lesser Spotted Woodpecker (<i>Dendrocopos minor</i>)	1	1	0	0	0	0	2	0.33
Linnet (<i>Linaria cannabina</i>)	16	43	11	25	15	28	138	23.00
Mallard (<i>Anas platyrhynchos</i>)	3	3	2	2	0	2	12	2.00
Marsh Tit (<i>Poecile palustris</i>)	4	12	6	3	30	12	67	11.17
Meadow Pipit (<i>Anthus pratensis</i>)	23	6	3	6	7	19	64	10.67
Mistle Thrush (<i>Turdus viscivorus</i>)	2	0	0	4	4	1	11	1.83
Moorhen (<i>Gallinula chloropus</i>)	0	1	0	0	0	0	1	0.17
Pied Flycatcher (<i>Ficedula hypoleuca</i>)	0	0	1	1	1	1	4	0.67
Raven (<i>Corvus corax</i>)	1	4	1	0	9	4	19	3.17
Red Kite (<i>Milvus milvus</i>)	0	2	2	2	6	2	14	2.33
Redstart (<i>Phoenicurus phoenicurus</i>)	0	2	0	7	11	8	28	4.67
Redwing (<i>Turdus iliacus</i>)	0	0	9	0	0	0	9	1.50
Reed Bunting (<i>Emberiza schoeniclus</i>)	0	0	0	1	0	0	1	0.17
Rook (<i>Corvus frugilegus</i>)	80	11	86	129	79	137	522	87.00
Sedge Warbler (<i>Acrocephalus schoenobaenus</i>)	0	0	2	1	0	0	3	0.50
Skylark (<i>Alauda arvensis</i>)	40	44	49	60	63	72	328	54.67
Song Thrush (<i>Turdus philomelos</i>)	16	19	19	23	14	20	111	18.50
Sparrowhawk (<i>Accipiter nisus</i>)	3	0	0	1	0	1	5	0.83
Spotted Flycatcher (<i>Muscicapa striata</i>)	0	0	0	2	0	0	2	0.33
Starling (<i>Sturnus vulgaris</i>)	0	0	0	0	0	12	12	2.00
Stock Dove (<i>Columba oenas</i>)	4	11	19	14	15	11	74	12.33

Breeding bird survey complete results

Name	3-6 April	17-20 April	8-11 May	22-25 May	5-8 June	21-23 June	Total	Average no. per visit
Swift (<i>Apus apus</i>)	0	0	0	4	0	3	7	1.17
Tree Pipit (<i>Anthus trivialis</i>)	0	2	8	5	5	7	27	4.50
Willow Tit (<i>Poecile montanus</i>)	0	0	0	0	2	0	2	0.33
Willow Warbler (<i>Phylloscopus trochilus</i>)	1	10	12	14	11	3	51	8.50
Woodcock (<i>Scolopax rusticola</i>)	0	0	1	0	0	0	1	0.17
Whitethroat (<i>Curruca communis</i>)	0	2	29	18	13	31	93	15.50
Wood pigeon (<i>Columba palumbus</i>)	0	25	55	65	78	90	313	52.17
Wren (<i>Troglodytes troglodytes</i>)	35	33	52	57	57	61	295	49.17
Yellowhammer (<i>Emberiza citrinella</i>)	22	25	23	21	17	34	142	23.67

Appendix C

Areas favoured by red and amber listed species and local context

Table 10 Red listed species breeding within the survey area including habitat preferences and local context.

Common Name	Population (territory)	Main Areas	Notes	Gloucestershire Bird Report, 2017 - 2019
Corn Bunting	1	One possible territory within 200m of the site boundary, middle of the route near West Down.	Usually nests on ground, well hidden in arable crop or weedy growth of field margin.	Uncommon localised resident breeder. Now restricted to the Cotswold region.
Linnet	6-7	Within and adjacent to the construction swathe, Northern end – farmland at Hill Barn Farm Southern end – farmland north and south of Middle Colgate Farm.	Nests in dense scrub and bushes / vegetation.	Common breeding resident, especially in the Cotswold area.
Skylark	11-18	Distributed across the survey area in arable and grassland habitats, concentrated south of Hill Barn Farm (north), in the centre to the north-west of Drypool farm, and at the southern end of the scheme (north of Middle Colgate Farm).	Ground nesting, in crop or grassland	Common breeding resident.
Yellowhammer	2-5	In farmland habitat at Wontley Farm, and Drypool Farm, and southern end of the scheme (north of Middle Colgate Farm).	Nests in hedgerow	Common resident breeder especially in the Cotswolds area.
Marsh tit	7-9	Semi-natural broad-leaved woodland in north of survey area, within vicinity of Breakheart Plantation.	Woodland - cavity nester	Fairly common breeding resident, especially in the Cotswold area.

Areas favoured by red and amber listed species and local context

Common Name	Population (territory)	Main Areas	Notes	Gloucestershire Bird Report, 2017 - 2019
Mistle thrush	3	Found in farmland to the north of Breakheart Plantation.	Nests in trees	Common breeding resident.
Lesser spotted woodpecker	1	Within broad-leaved semi-natural woodland, west of the scheme to the east of Postlip Hall Farm, adjacent to access route.	Cavity nesting in rotting wood. Very rare and hard to detect.	Uncommon breeding resident. Peak count of 24 reports in 2019 in 16 tetrads*.
House martin	1 (possible)	Corndean Cottages (northern end of route).	Associated with buildings, nesting under eaves or in nest box.	Common breeding summer visitor, with an even distribution across the county.
House sparrow	1 (possible)	Wood Farm (southern end of route)	Associated with buildings, nesting in enclosed space, hole or crevice or in nest box.	Common breeding resident.

*Tetrad = 2km x 2km square

Table 11 Amber listed species breeding within the survey area, including habitat preferences and local context.

Common Name	Population	Main Areas	Notes	Gloucestershire Bird Report 2017 - 2019
Common whitethroat	4-6	Majority of records to the east of the construction swathe, in farmland between Hill Barn Farm and Wontley Farm	Favours bramble, rough herbage or low thorn bushes.	Common breeding summer visitor.

Areas favoured by red and amber listed species and local context

Common Name	Population	Main Areas	Notes	Gloucestershire Bird Report 2017 - 2019
Meadow pipit	13	All records concentrated within improved grassland habitat within and adjacent to route between Hill Barn Farm and Wontley Farm	Ground nester in grass tussocks or dense cover.	Fairly common breeder along the Cotswold edge.
Stock dove	9-11	Northern end of scheme – within semi-natural broadleaved woodland, scrub and farmland to east and west of construction swathe at Corndean cottages and Hill Barn Farm. Middle of route – arable habitat to east of construction swathe, north-west of Drypool farm. Southern end of route associated with buildings at Middle Colgate Farm	Nests in tree cavities, buildings or nest boxes or flat branches in hedgerow.	Fairly common breeding resident, especially in the Cotswolds.
Song thrush	7-10	Concentrated to the north of the scheme, within broadleaved semi-natural woodland and farmland within, to the east and west of the construction swathe at Postlip and Breakheart Plantation north of Hill Barn Farm	Favours dense scrub and bushes or trees	Common breeding resident.

Areas favoured by red and amber listed species and local context

Common Name	Population	Main Areas	Notes	Gloucestershire Bird Report 2017 - 2019
Bullfinch	1-5	Possible territories recorded in the north and middle of the scheme, with one confirmed territory at Wood Farm at the southern end of the scheme.	Shy species, very difficult to locate in hedgerow or understorey	Fairly common breeding resident, especially in the Cotswold area.
Willow warbler	3-4	Recorded to the north and middle of the scheme, within woodland and hedgerow. Records at Breakheart Plantation and Hill Barn Farm, and northwest of Drypool Farm.	Ground nesting species, in shallow depression	Common but declining breeding summer visitor.
Rook	1 Rookery (137 peak count)	Present in the north of the survey area to the east of Postlip Hall Farm.	Communal nester in tops of large trees.	Common breeding resident.
Redstart	9-10	Two of the territories were east of the construction swathe at Breakheart Plantation, with one territory in the middle of the survey area northwest of Drypool farm.	Cavity nester in trees, walls, buildings or nest box	Uncommon breeding summer visitor, most numerous in the Cotswolds. Reported from 10% of tetrads in three years.
Wood pigeon	2-4	The majority of wood pigeon encountered were in the north of the survey area to the west and east of Corndean cottages, with one	Nest in trees, bushes or hedgerow	Abundant breeding resident.

Areas favoured by red and amber listed species and local context

Common Name	Population	Main Areas	Notes	Gloucestershire Bird Report 2017 - 2019
		territory in the south at Wood Farm.		
Wren	24-34	Present across the survey area, most concentrated in the north of the scheme, with clusters at Drypool farm (middle) and Wood and Middle Colgate Farm (southern end).	Very variable, often crevice or hole in tree trunk, wall, bank, roots or thick cover (ivy, brambles) or old nests of other species	Abundant breeding resident.
Mallard	1	One territory along within wetland habitat at Postlip, in the north of the survey area.	Nests on dry ground in cover, usually near water	Common resident breeder.
Kestrel	2	At the southern end of the survey area, at Wood Farm and Middle Colgate Farm.	Variable, can nest in large tree cavity, large structures eg pylons, bridges, or old nest of corvid species, and nesting boxes	Fairly common breeding resident.

Appendix D

Full desk study results

Table 12 Full Desk Study Results

Common Name	Scientific Name	No. of Records	Date	Distance (km) and bearing	Abundance	Sch 1	BoCC	NERC / S41
Barn owl	<i>Tyto alba</i>	17	31/08/2021	Within site boundary	1 adult, 4 chicks	Y	Green	
Black Redstart	<i>Phoenicurus ochrurus</i>	14	01/04/2019	On site boundary	1	Y	Amber	
Black-Headed gull	<i>Chroicocephalus ridibundus</i>	13	21/11/2015	Within site boundary	8		Amber	
Brambling	<i>Fringilla montifringilla</i>	60	09/01/2014	Within site boundary	2	Y	Green	
Bullfinch	<i>Pyrrhula pyrrhula</i>	27	04/06/2016	Within site boundary	2		Amber	
Cetti's Warbler	<i>Cettia cetti</i>	2	06/02/2012	0.8km SE	1	Y	Green	Y
Common Crossbill	<i>Loxia curvirostra</i>	14	01/07/2011	0.1km E		Y	Green	
Common Gull	<i>Larus canus</i>	14	09/04/2016	On site boundary	30		Amber	
Common Sandpiper	<i>Actitis hypoleucos</i>	7	31/08/2013	0.4km S	1		Amber	
Corn bunting	<i>Emberiza calandra</i>	12	04/05/2018	Within site boundary	1		Red	
Cuckoo	<i>Cuculus canorus</i>	22	05/05/2017	Within site boundary	1		Red	

Full desk study results

Common Name	Scientific Name	No. of Records	Date	Distance (km) and bearing	Abundance	Sch 1	BoCC	NERC / S41
Curlew	<i>Numenius arquata</i>	6	07/06/2014	0.1km E	1		Red	Y
Dunlin	<i>Calidris alpina</i>	1	12/11/2016	0.9km S	1		Red	
Dunnock	<i>Prunella modularis</i>	27	17/09/2017	Within site boundary	1		Amber	
Fieldfare	<i>Turdus pilaris</i>	197	05/02/2018	Within site boundary	15	Y	Red	Y
Firecrest	<i>Regulus ignicapilla</i>	12	25/05/2019	0.2km E	1	Y	Green	
Golden Oriole	<i>Oriolus oriolus</i>	1	10/06/2015	0.1km N	1	Y	FB	
Goshawk	<i>Accipiter gentilis</i>	9	27/01/2017	0.3km SW	2 (pair)	Y	Green	
Grasshopper Warbler	<i>Locustella naevia</i>	15	08/07/2012	Within site boundary	1		Red	Y
Grey Partridge	<i>Perdix perdix</i>	7	07/10/2018	Within site boundary	3		Red	
Grey Wagtail	<i>Motacilla cinerea</i>	13	21/11/2015	Within site boundary	2		Amber	Y
Hawfinch	<i>Coccothraustes coccothraustes</i>	2	03/12/2017	0.35km SE	2		Red	
Hen Harrier	<i>Circus cyaneus</i>	9	31/10/2018	On site boundary	1 female	Y	Red	Y
Herring Gull	<i>Larus argentatus</i>	11	10/06/2017	Within site boundary	1		Red	Y
Hobby	<i>Falco subbuteo</i>	17	29/07/2015	Within site boundary	1	Y	Green	Y

Full desk study results

Common Name	Scientific Name	No. of Records	Date	Distance (km) and bearing	Abundance	Sch 1	BoCC	NERC / S41
House martin	<i>Delichon urbicum</i>	14	06/08/2017	Within site boundary	1		Red	
House Sparrow	<i>Passer domesticus</i>	12	2012-02-26 to 2012-03-03	Within site boundary	8		Red	
Kestrel	<i>Falco tinnunculus</i>	28	08/04/2012	Within site boundary	1		Amber	Y
Kingfisher	<i>Alcedo atthis</i>	42	13/09/2012	0.1km SW		Y	Green	
Lapwing	<i>Vanellus vanellus</i>	13	28/10/2018	On site boundary	10		Red	
Lesser black-backed gull	<i>Larus fuscus</i>	16	06/08/2017	Within site boundary	12		Amber	Y
Lesser Redpoll	<i>Acanthis cabaret</i>	7	30/03/2017	0.35km SE	3		Red	
Lesser Spotted Woodpecker	<i>Dryobates minor</i>	3	18/03/2015	0.1km N	1		Red	Y
Linnet	<i>Linaria cannabina</i>	22	11/12/2018	Within site boundary	75		Red	Y
Little gull	<i>Hydrocoloeus minutus</i>	2	29/08/2013	0.35km SE	3	Y	Green	Y
Mallard	<i>Anas platyrhynchos</i>	14	07/03/2016	On site boundary	12		Amber	
Marsh Harrier	<i>Circus aeruginosus</i>	1	18/08/2012	1km NW	I Juv	Y	Amber	
Marsh Tit	<i>Poecile palustris</i>	19	21/11/2015	Within site boundary	1		Red	

Full desk study results

Common Name	Scientific Name	No. of Records	Date	Distance (km) and bearing	Abundance	Sch 1	BoCC	NERC / S41
Meadow Pipit	<i>Anthus pratensis</i>	19	30/03/2018	Within site boundary	6		Amber	Y
Merlin	<i>Falco columbarius</i>	15	09/01/2014	Within site boundary	1	Y	Red	
Mistle thrush	<i>Turdus viscivorus</i>	20	05/02/2018	Within site boundary	2		Red	
Mute swan	<i>Cygnus olor</i>	4	12/08/2018	0.9km S	1		Green	
Nightjar	<i>Caprimulgus europaeus</i>	1	08/05/2018	On site boundary	1		Amber	
Osprey	<i>Pandion haliaetus</i>	5	15/09/2014	1km NW	1	Y	Amber	Y
Peregrine	<i>Falco peregrinus</i>	18	03/11/2017	Within site boundary	1 on pylon	Y	Green	
Pochard	<i>Aythya ferina</i>	6	15/10/2012	0.4km S	3		Red	
Quail	<i>Coturnix coturnix</i>	12	10/09/2015	Within site boundary	1	Y	Amber	
Red Kite	<i>Milvus milvus</i>	105	19/07/2016	Within site boundary	2	Y	Green	
Redstart	<i>Phoenicurus phoenicurus</i>	27	04/05/2018	Within site boundary	1		Amber	
Redwing	<i>Turdus iliacus</i>	161	2012-02-05 to 2012-02-11	Within site boundary	2	Y	Amber	
Reed Bunting	<i>Emberiza schoeniclus</i>	14	03/10/2016	Within site boundary	4		Amber	

Full desk study results

Common Name	Scientific Name	No. of Records	Date	Distance (km) and bearing	Abundance	Sch 1	BoCC	NERC / S41
Ring Ouzel	<i>Turdus torquatus</i>	14	05/04/2013	Within site boundary	2		Red	Y
Short-eared owl	<i>Asio flammeus</i>	5	08/05/2016	On site boundary	1		Amber	
Shoveler	<i>Spatula clypeata</i>	4	27/08/2013	0.4km S	1		Amber	
Skylark	<i>Alauda arvensis</i>	16	30/03/2018	Within site boundary	10		Red	
Snipe	<i>Gallinago gallinago</i>	7	28/10/2018	On site boundary	5		Amber	Y
Spotted flycatcher	<i>Muscicapa striata</i>	8	07/07/2017	0.1km N	2		Red	Y
Song thrush	<i>Turdus philomelos</i>	23	21/11/2015	Within site boundary	3		Amber	
Starling	<i>Sturnus vulgaris</i>	25	05/02/2018	Within site boundary	350		Red	
Stock Dove	<i>Columba oenas</i>	25	15/06/2018	Within site boundary	1 pair		Amber	Y
Swift	<i>Apus apus</i>	11	23/06/2017	Within site boundary	50		Red	
Tawny Owl	<i>Strix aluco</i>	16	20/07/2017	Within site boundary	1		Amber	
Teal	<i>Anas crecca</i>	4	27/08/2013	0.4km S	2		Amber	
Tree Pipit	<i>Anthus trivialis</i>	25	16/07/2017	Within site boundary	1		Red	

Full desk study results

Common Name	Scientific Name	No. of Records	Date	Distance (km) and bearing	Abundance	Sch 1	BoCC	NERC / S41
Whimbrel	<i>Numenius phaeopus</i>	2	02/09/2017	1km NW	1	Y	Red	
Whinchat	<i>Saxicola rubetra</i>	12	24/09/2018	Within site boundary	2		Red	
Willow warbler	<i>Phylloscopus trochilus</i>	21	20/07/2017	Within site boundary	4		Amber	Y
Woodcock	<i>Scolopax rusticola</i>	9	02/11/2017	0.1km N	1		Red	Y
Wryneck	<i>Jynx torquilla</i>	1	31/08/2018	1km NW	1	Y	Former Breeder	Y
Yellow wagtail	<i>Motacilla flava</i>	9	02/09/2014	Within site boundary	1		Red	
Yellowhammer	<i>Emberiza citrinella</i>	20	05/10/2019	Within site boundary	25		Red	Y

Sch 1 = Full protection under the Wildlife and Countryside Act (as amended) HMSO 1981

BoCC = Red / Amber, Species of conservation concern (Stanbury et al 2021)

NERC/S41 = Species of Principle Importance (HMSO 2006)

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