

A27 Arundel Bypass Breeding Bird Interim Baseline Survey

Appendix 8-10: Breeding Bird Interim Baseline Survey

16 August 2019

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Executive Summary

WSP was commissioned by Highways England to undertake studies to investigate the breeding bird community within the landscape surrounding the proposed A27 Arundel Bypass scheme, Arundel, West Sussex.

Breeding bird surveys were undertaken between April 2017 and June 2017. Additional surveys were undertaken between April 2018 and June 2018 to cover areas inaccessible in 2017. Nightingale surveys were undertaken in May 2018. Incidental records were collected by WSP surveyors when completing other surveys types which were used to further inform the assessment of the breeding bird community.

Breeding bird surveys undertaken in 2017 found a total of 80 species recorded, of which 22 were confirmed breeding, 13 were considered to be probable breeders, 43 were considered possible breeders and two were considered to be not breeding. Of the species confirmed breeding, probable breeding or possible breeding, four were Annex 1 species, three were Wildlife & Countryside Act (WCA) Schedule 1 species¹, 31 were Birds of Conservation Concern (BoCC) and 16 Species of Principal Importance (SPI) under the Natural Environment and Rural Communities Act 2006 (NERC) Section 41.

Breeding bird surveys in 2018 recorded a total of 43 species, of which one was listed as Annex 1, one species listed on WCA Schedule 1, 17 were Birds of Conservation Concern and six SPI.

The study concluded that notable birds are present in the Field Study area from the following bird communities: urban fringe and common garden species, woodland specialist, mosaic and scrub habitat, farmland specialist, raptors, and waterbirds.

Suitable habitat and records of nightjar are present in Binstead and Rewell Wood, should the Scheme Footprint intersect these areas surveys for nightjar are recommended.

¹ Applicable to the region in question.

1 Introduction

1.1 Project Background

1.1.1.1 The scope of the A27 Arundel Bypass scheme as described in the Road Investment Strategy² is:

1.1.1.2 *“The replacement of the existing single carriageway road with a dual carriageway bypass, linking together the two existing dual carriageway sections of the road”.*

1.1.1.3 This corresponds to the six kilometre section of the A27 from the A284 Crossbush junction (east of Arundel) to the west of Yapton Lane (west of Arundel). The A27 currently goes through the South Downs National Park and the town of Arundel passing over the River Arun and crossing the railway line.

1.1.1.4 The Scheme options taken forward to the Public Consultation were Options 1, Option 3 and Option 5A. These are briefly described individually below.

- **Option 1** consists of new dual carriageway from Crossbush junction south of the current A27 to the south-west of Arundel railway station, joining the A27 east of Ford Road. With a new bridge over the River Arun alongside the existing bridge. From Ford Road roundabout, which will be signalised, the existing A27 would be widened to dual carriageway.
- **Option 3** is an off-line route from the existing A27 alignment. Option 3 would consist of a new dual carriageway Scheme option along its entire length. The proposed alignment will then be joined to the existing A27 via an extension of the existing infrastructure at Crossbush Junction. The alignment that runs westwards across the floodplain south of Tortington Priory and requires two new overbridges, firstly over the Arun Valley Railway Line and secondly over the River Arun. Its alignment diverges north through the Binsted Woods Complex Local Wildlife Site (LWS), Tortington Common and South Downs National Park, re-joining the existing A27 at Havenwood Park. It requires four new underbridges at Old Scotland Lane, Binsted Lane, Tortington Lane and at Ford Road.
- **Option 5A** is a new dual carriageway from Crossbush junction south of the current A27. The alignment crosses the Arun Valley Railway, continuing west across the floodplain, over Ford Road, running south of Tortington Priory Scheduled Monument before going north through the Binsted Woods Complex LWS and the South Downs National Park, re-joining the existing A27 at a new junction near Yapton Lane.

² Road Investment Strategy: for the 2015/2016 – 2019/2020 Road Period, Department for Transport, March 2015

- 1.1.1.5 When referred to the combined footprint of the Scheme (all options), the term ‘Scheme options’ is used in this report. When discussing the footprint of any single option, it is referred to be its number i.e. Option 1, Option 3 or Option 5A.
- 1.1.1.6 In October 2018, Highways England announced that a further, non-statutory public consultation would be undertaken on the Scheme (the Further Consultation) and that the Scheme would return to PCF Stage 2 (Option Selection). Through the additional studies and surveys, Highways England came across new and important information. Highways England wishes to ensure that forthcoming decision on the preferred route is made taking this new information into account and that consultees are given a fair opportunity to comment on the options on the basis of the information available. The further PCF Stage 2 work (Option Selection) (2018/2019) work included the identification of a suite of potential new Scheme options.
- 1.1.1.7 The process for identifying and short-listing the new set of Scheme options for consideration in PCF Stage 2, is set out in **Chapter 3** of the Environmental Assessment Report. Ecological field survey data is not available for the western sections of Option 4/5AV1 and Option 5BV1. This is because these sections were previously too far west of the study area to necessitate a survey. Additional survey work targeting these areas is ongoing in 2019 and will be reported on in winter 2019. The information collected for Option 1, 3 and Option 5A in 2017 and 2018 will be used to inform an assessment of the six Scheme options and Scheme option selection.

1.2 Ecological Background

- 1.2.1.1 Highways England is undertaking an Environmental Impact Assessment of the Scheme options to inform scheme development. Comprehensive survey data for the breeding bird community is required to inform Scheme option selection and ultimately inform an Environmental Impact Assessment of the preferred Scheme option selected.
- 1.2.1.2 The landscape intersected by and adjacent to the Scheme options includes a mixture of natural, semi-natural and man-made habitats with habitat suitable for a range of breeding bird species. This report provides baseline data on breeding birds that use habitats within and surrounding the Scheme options. Field surveys have been undertaken during the 2017 breeding bird season to establish the structure of the breeding bird community present. Additional surveys were undertaken in 2018 to target a habitat which was not accessible in 2017 surveys and target nightingale (*Luscinia megarhynchos*) specifically.

1.2.1.3 Field surveys have been undertaken to assess how the breeding bird community is utilising habitat types which may be affected by the Scheme options. Field surveys in 2017 and 2018 were undertaken to determine the breeding bird community in habitats intersected by Option 1, Option 3 and Option 5A.

1.2.1.4 A comprehensive desk study assessment has been undertaken using data from various sources to gain further clarity on how the breeding bird community functions in the Desk Study area (see **section 2.2**). A desk based assessment aiming to identifying suitable kingfisher (*Alcedo atthis*) breeding habitat has undertaken based upon data collected from WSP water vole (*Arvicola amphibious*) and otter (*Lutra lutra*) surveys³.

1.3 Aims and Objectives

1.3.1.1 The aim of this report is to provide baseline ecological data describing breeding bird communities within and surrounding the Scheme options. The data will be used to inform the A27 Arundel Bypass scheme environmental assessment, specifically the selection of a preferred option at Project Control Framework (PCF) Stage 2.

1.3.1.2 To achieve this aim, the following objectives were set:

- Complete a desk study establishing the number and location of nearby statutory and non-statutory sites designated and important habitats for birds, and bird species records;
- Undertake field surveys to produce a list of bird species encountered and their breeding status, and estimate of the number of breeding territories/colonies of bird species breeding; and
- Describe the communities of birds present and their conservation/legislative status.

1.3.1.3 The results of this survey, and any subsequent recommendations for further surveys, are included within this report.

1.3.1.4 Note that barn owl (*Tyto alba*) is not considered within this report as it has been subject to separate study⁴.

1.3.1.5 The contents of this report represent interim baseline survey findings collected to at Project Control Framework Stage 2 (option selection) and 3 (preliminary design).

³ WSP (2018) A27 Arundel Bypass: Water Vole and Otter Survey Report.

⁴ WSP (2018). A27 Arundel Bypass: Barn Owl Survey Report.

2 Methods

2.1 Study Area

2.1.1.1 The following study areas were used for desk study and field survey work:

- **Desk Study Area** – a zone extending two kilometres from the outer boundary of the Scheme options footprint in which bird records and information on bird habitats and sites designated for the protection of birds was obtained. The Desk Study sought to provide information on the wider landscape to place the birds present into a broader ecological context.
- **Field Survey Area** – this was defined by the transect routes shown in **Appendix F**. The transect routes were designed to survey the diverse range of habitats suitable for birds to ensure the diversity of bird species in the Scheme options Footprint and surrounding landscape could be fully investigated. Transect routes were secondarily designed to make use of public rights of way.

2.2 Desk Study

2.2.1 Desk Study Records and Literature

- 2.2.1.1 WSP requested ecological data from Sussex Biodiversity Record Centre (SxBRC) on 23rd March 2017, and received a dataset capturing records of protected and notable bird species, S41 habitat and designated sites.
- 2.2.1.2 On 08 October 2018 WSP requested an additional desk study report⁵ to provide an updated baseline assessment, the results of which are presented in this report.
- 2.2.1.3 Only species records from the last 10 years were included in the desk study assessment so as to best reflect the current community of birds present in the Desk Study Area.
- 2.2.1.4 The desk study report provided by SxBRC indicated there were confidential records within the Desk Study Area. These records, in addition to the results of firecrest (*Regulus ignicapillus*) surveys undertaken between 14 April and 30 June 2018, were provided by the Sussex Ornithological Society (SOS).
- 2.2.1.5 The objective of the SOS firecrest survey was to improve the understanding of the distribution of breeding firecrest in Sussex. The survey targeted suitable habitat for this species and additionally recorded goldcrest (*Regulus regulus*).

⁵ Sussex Biodiversity Record Centre (2018) Species records supplied as MS excel file. Received October 2018.

2.2.1.6 Data collected and reports produced by Mid-Arun Valley Environment Survey was also used to inform the desk study⁶. There is the potential for data received from MAVES to duplicate records also within the SxBRC dataset. As a result, no inference regards to species abundance is made from this dataset to avoid inaccuracy.

2.2.1.7 In addition, this report refers to literature produced by the South Downs National Park Authority⁷ and the Department of Transport^{8,9}.

2.2.2 Kingfisher Habitat Assessment

Rationale and Scope

2.2.2.1 A desk based habitat assessment for kingfisher was undertaken in February 2019, with the objective of identifying areas of waterway with suitable habitat for kingfishers to breed. This was undertaken using extensive information gathered on the waterways through surveys previously undertaken by WSP in combination with information about the habitat requirements of breeding kingfishers.

2.2.2.2 The Study Area extended 250 metres from the outer boundary of the Scheme option Footprint. An additional area was incorporated from the outer extent of the Scheme options in which potential indirect interactions such as disturbance, or hydrological disturbance might occur (see “Field Survey Area” defined in WSP (2017) Water vole and Otter Report, Figure 2).

2.2.2.3 To undertake the desk-based habitat assessment the following sets of information were compiled and compared:

- Information gathered on the waterways through surveys undertaken by WSP for water vole and otter; and
- Records from the SxBRC – a bespoke data search provided to WSP in October 2018.

2.2.2.4 Data on the following variables were collected for each watercourse surveyed through the otter and water vole surveys³:

- Bank profile, channel profile and characteristics and water levels;
- Availability of food sources for both otter and water vole;

⁶ MAVES (2017). Steward’s Copse Ecological Report; Thompson, J. (October, 2017). The Mid Arun Valley 2015 – 2017 A27 Arundel bypass Road Options 1, 3 and 5A Ecological Impact Report (using current data). Wildlife Splash on behalf of the Mid-Arun Environmental Survey; Thompson, J. (March, 2017). An ecological survey of the Mid Arun Valley. Wildlife Splash on behalf of the Mid-Arun Environmental Survey; Mid-Arun Valley Environmental Survey Marsh Farm. (1993). Species records supplied as an MS Excel file, received February 2019.

⁷ Burgess, J. (March, 2017) A27 Arundel Bypass: Ecological desk based assessment. South Downs National Park Authority.

⁸ Department of Transport (1991) Ecological Impact Assessment Report

⁹ Although this falls outside the 10 year cut off for consideration of data, this EIA describes the landscape of Arundel in 1991 and details the species assemblages that were present at the time. The purpose for review of this was to provide historical data on habitats and species within the wider environment and forms a background to the assessment, and was not used for inclusion with the desk study assessment.

- Availability of suitable riparian/marginal habitat for the construction of burrows for water vole;
- Potential for holt construction for otter;
- Vegetation structure (in particular the extent of suitable marginal vegetation);
- Availability of suitable terrestrial habitat for otters to use for sheltering; and
- Site photographs.

Determining Habitat Suitability

- 2.2.2.5 A set of criteria was used to determine habitat suitability for breeding kingfisher based upon literature¹⁰ indicating ecological features required by this species to breed and features identified in species action plans for kingfishers as key requirements and factors associated with the decline of the kingfisher in the UK.
- 2.2.2.6 Kingfishers are found along running rivers, canals and at still water bodies such as lakes and ponds. The nest is a deep tubular tunnel dug in the bank of the waterbody, usually in vertical banks. The upended roots of fallen trees along banks provide good nest sites. Engineering measures, e.g. reinforcement of banks, is one of the features that can greatly Reduce the availability of suitable nesting sites, as it prevents kingfishers tunnelling. High river levels during the nesting season can have detrimental impacts on kingfishers by flooding their nest chambers.
- 2.2.2.7 Kingfishers rely on sight to hunt fish such as sticklebacks (*Gasterosteus aculeatus*) and minnows (*Phoxinus phoxinus*); therefore, pollution or heavy sedimentation Reduce its ability to locate fish in the water. Trees or bushes with branches overhanging the river provide important fishing perches.
- 2.2.2.8 Based on these requirements, the criteria used to determine the habitat suitability for breeding kingfishers include the following:
- Water quality:
 - Pollution affects the availability of prey (fish) in the watercourse. Pigmentation of the watercourse could affect the kingfishers' ability to see its prey, and thus has a negative impact on its hunting ability.
 - River flow:
 - Still or gently flowing rivers and streams. The flow affects the levels of oxygen in the water column and thus the availability of fish for the kingfisher to prey on.

¹⁰ A. Vilches *et al.* (2012) Habitat selection by breeding Common Kingfishers (*Alcedo atthis* L.) in rivers from Northern Iberia. *Ann. Limnol. Int. J. Lim. and Collar, N. & Christie, D.A.* (2019). Common Kingfisher (*Alcedo atthis*) In: del Hoyo, J., Elliott, A., Sargatal, J., Christie, D.A. & de Juana, E. (eds.). *Handbook of the Birds of the World Alive*. Lynx Edicions, Barcelona. [online] < <https://www.hbw.com/node/55801> > [accessed 15 February 2019].

- Bank features/substrate:
 - The kingfisher requires vertical banks of compact sand or earth to excavate its two metre long nesting tunnel and nest chamber. Stony, rocky or reinforced banks prevent the birds from excavating their nesting tunnels.
- Angle of the bank:
 - The kingfisher prefers to excavate its nest tunnel into a vertical bank rather than a gently sloping bank, as those excavated into the latter are more liable to flooding. Most nests are 90-180 cm above water¹¹. Therefore, ditches were not surveyed.
- Agricultural management of bankside habitat:
 - The agricultural improvement of bankside habitat (for example where scrub has been cleared to allow pasture to be developed up to the water edge or to allow cattle access to the watercourse) has a negative impact on kingfishers by Reducing the number of perches available, increasing erosion and consequently allowing easier access to nests by predators. Agricultural run-off (cattle slurry, fertiliser and pesticide run-off) cause problems by affecting the number of fish in the watercourse, or poisoning the kingfishers.
- Availability of overhanging branches:
 - Kingfisher require suitably situated perches to watch for fish in the water and to act as “marker-posts” to define the limits of its territory.
- Disturbances by humans (and dogs):
 - Kingfisher are susceptible to disturbance from humans and dogs (although not necessarily from anglers) due to its reclusive nature.

2.3 Field Survey

2.3.1 Data Collection

2.3.1.1 Fieldwork and data collection contained three aspects:

- **Dawn transect surveys:** four visits to determine the baseline of the breeding bird community.
- **Dusk transect survey:** a single visit to determine presence of crepuscular species.

¹¹ RSPB, NRA and RSNC (1994) The new rivers & wildlife handbook.

- **Species-specific - Nightingale:** a survey targeting habitat suitable for breeding nightingale to determine presence.

Dawn Transect Surveys

- 2.3.1.2 Transects were designed to provide survey coverage of habitats of importance to breeding birds within the Field Study Area, the locations of which were identified from aerial imagery and Phase 1 habitat survey data. The transect routes were also designed to make use of Public Rights of Way.
- 2.3.1.3 Access to private land was sought through third party access agreements. Transects were extended during the survey period to these areas as access became available. **Appendix F** shows the full extent of transects following the addition of the third-party access agreement and where any access limitations occurred.
- 2.3.1.4 Four transects were defined in total across two breeding bird survey seasons (2017 & 2018), each measuring between seven and 10 kilometres in length depending on its route. Due to third party access constraints additional breeding bird surveys were undertaken for transect 3 in 2018 on the Arun floodplain. **Table 2-1** describes the transect routes and the period in which they were surveyed.
- 2.3.1.5 Four survey visits were undertaken between 24 March 2017 and 08 June 2017 with each transect walked once per visit. Further surveys were undertaken in 2018 to cover incomplete sections of transect 3 on the floodplain. Five survey visits were undertaken between 11 April and 5 June 2018, with the transect walked once per visit. Survey dates, timings and weather data for surveys undertaken in 2017 are shown in **Table 2-2** and 2018 are shown in **Table 2-3**.
- 2.3.1.6 Transects were walked methodically, with surveyors recording birds within habitat adjacent to the transect route. In accordance with good practice guidance¹² (Bibby *et al.*, 2000). The starting point and direction of the route walked were varied on each survey visit. This serves to minimise bias, as birds may be active at different times of day in different areas. The locations of all birds observed through sightings, hearing their songs/calls, or both, were mapped using standard British Trust for Ornithology (BTO) two-letter codes.

¹² Bibby, C., Burgess, N., Hill, D. and S. Mustoe (2000). Bird Census Techniques. Academic Press.

- 2.3.1.7 The activity of observed birds was recorded to allow interpretation of their behaviour, specifically their breeding status, to determine how they use habitats within the Field Survey Area. This followed a modified version of the BTO Common Bird Census methodology¹³. Birds in song and behaviours associated with defending a breeding site (e.g. fights between rival males) were of primary interest to establish which birds breed in the Field Survey Area, along with behaviours associated with nest building and feeding/rearing young. Observations of recently fledged juvenile birds also indicated a species was breeding and as such in these cases the maturity of birds was recorded.
- 2.3.1.8 Transect walks were undertaken in the early morning commencing at or just after sunrise and were completed by midday, but typically lasted approximately four hours. Survey visits were undertaken between April and June, the period covering breeding territory formation, the building of nests and incubation. The data collected therefore was sufficient to assess the importance of the survey area for breeding birds, and their usage of different parts of this area for nesting.
- 2.3.1.9 Surveys were led by surveyors with at least four years of experience of ornithological survey each, supported by a competent survey partner.
- 2.3.1.10 In addition to birds recorded during transect walks, incidental observations of birds were also collected by WSP ecologists during other field surveys. These are reported within this document.

Dusk Transect Surveys

- 2.3.1.11 An additional walk of each transect (outlined above), was undertaken on the fourth visit, which was extended to cover the period up until dusk and typically lasted for four hours. Dusk survey work specifically sought to identify birds with a crepuscular activity profile (i.e. they are most active at dusk and dawn), such as owls and nightjar (*Caprimulgus europaeus*).
- 2.3.1.12 This was not undertaken during 2018 surveys along part of transect 3, which covered the floodplain, as this does not contain suitable habitat for crepuscular species. Survey dates and timings, along with weather data, are shown in **Table 2-2**.

Species-specific - Nightingale

- 2.3.1.13 As a result of desk study data, and following the announcement of the PRA (Preferred Route Announcement), a transect was designed to cover suitable nightingale habitat along the Scheme options in 2018 with the objective of determining presence or absence of this species.

¹³ Marchant, J. (1983). Common Birds Census Instructions. British Trust for Ornithology, Tring.

- 2.3.1.14 Surveys for nightingale were undertaken in 2018 between 03 May and 31 May. Four visits were undertaken one week apart commencing at, or just after dawn, in accordance with best practice guidance for this species¹⁴.
- 2.3.1.15 The transect covered both public and private land and was designed to target habitat suitable for nightingale to breed (see **Appendix F**). This species breeds in lowland open woodland within thicket, dense patches of vegetation and scrub, preferring woodland edge or the edge of waterbodies¹⁵. The transect route was scoped in daylight hours on the 29 March 2018 in conjunction with a scoping visit for bat survey transects to confirmed appropriate habitat was targeted.
- 2.3.1.16 Other notable birds detected through this survey were recorded as incidental records. Survey dates and timings, along with weather data, are shown in **Table 2-3**.

¹⁴ Gilbert, G., Gibbons, W. D. and Evans, J. (2011). Bird Monitoring Methods: A Manual of Techniques for Key UK Species. RSPB> Pelagic Publishing.

¹⁵ Collar, N. & Christie, D.A. (2019). Common Nightingale (*Luscinia megarhynchos*). In: del Hoyo, J., Elliott, A., Sargatal, J., Christie, D.A. & de Juana, E. (eds.). Handbook of the Birds of the World Alive. Lynx Edicions, Barcelona. [online] <<https://www.hbw.com/node/58455>> [accessed 18 February 2019].

Table 2-1 - Transect Description

Transect	Survey Period	Description
Transect 1	2017	Extending along the woodland areas south of the existing A27, this transect covers Barns Copse/ Hundred House Copse, Binsted Woods Complex LWS and Steward's Copse. This transect also covers a residential area west of the river Arun and the managed grassland of the Avisford Park Golf course.
Transect 2	2017	Extending down the River Arun. This transect also covers the adjacent fields. This transect further covers agricultural fields to the west of the River Arun.
Transect 3	2017 and 2018	This transect runs from the north of the existing A27 for the most part, crossing it to the south at its eastern extent. It covers agricultural fields, urban environments, woodland and the Arun floodplain.
Transect 4	2017	Covering predominately woodland habitat to the north of the existing A27 including Rewell Wood.
Nightingale	2018	Covering suitable nightingale habitat on and adjacent to the Scheme options. Extending from Hundred House Copse / Barnes Copse to Tortington Common. This transect covers woodland edge habitat suitable for nightingale.

Table 2-2 - 2017 Survey Schedule and Weather Data

(cloud cover measured in Oktas (8/8) and Wind Speed in Beaufort Scale)

Visit	Tran-sect	Date	Start - End Time	Start - End Temp (°C)	Start - End Wind Speed	Cloud Cover	Rain (Y/N)	Weather Description
1	1	25/04/2017	06:00/09:30	3 - 6 °C	1 - 2	6 – 2	N	Cold, sky clearing during survey.
1	2	26/04/2017	05:46/09:15	1 - 6 °C	3 - 2	7 – 4	N	Dry with a light frost to start.
1	3	28/04/2017	05:50/09:15	6 - 8 °C	2 - 3	5 – 7	N	Clouds building, dry.
1	4	27/04/2017	05:44/09:15	0 - 7 °C	1 - 1	0 – 0	N	Frosty to start, clear sky.
2	1	09/05/2017	05:30/09:30	4 - 11 °C	2 - 2	8 – 2	N	Cloudy to start.
2	2	09/05/2017	05:30/09:25	4 - 13 °C	2 - 2	8 – 2	N	Light wind, sky clearing during survey.
2	3	10/05/2017	05:25/09:30	4 - 11 °C	1 - 2	4 – 2	N	Mostly Clear and sunny, light frost to start.
2	4	10/05/2017	05:30/09:00	4 - 11 °C	1 - 2	4 – 2	N	Mostly Clear and sunny, light frost to start.
3	1	25/05/2017	05:30/11:30	12 - 23 °C	1 - 1	0 – 0	N	Clear sky, warm and sunny by end of the survey.
3	2	25/05/2017	05:15/10:00	12 - 23 °C	1 - 1	0 – 0	N	Clear sky, warm and sunny by end of the survey.
3	3	26/05/2017	05:15/10:30	12 - 23 °C	1 - 1	0 - 0	N	Clear sky, warm and sunny by end of the survey.
3	4	26/05/2017	05:30/09:30	13 - 20 °C	1 - 1	1 – 0	N	Clear sky, warm and sunny by end of the survey.
4	1	07/06/2017	05:15/09:15	12 - 17 °C	1 - 2	1 – 1	N	Clear sky, warm and sunny by end of the survey.
4	2	07/06/2017	05:15/09:45	12 - 15 °C	1 - 2	2 – 1	N	Clear sky, warm and sunny by end of the survey.
4	3	08/06/2017	05:15/09:25	14 - 16 °C	0 - 0	8 – 8	N	Overcast, fresh wind.
4	4	08/06/2017	05:15/07:30	14 - 16 °C	5 - 5	8 – 8	N	Overcast, light wind.
4 (PM)	1	06/06/2017	17:30/21:10	16 - 12 °C	4 - 4	7 – 4	N	Overcast, humid.
4 (PM)	2	06/06/2017	17:00/21:12	17 - 14 °C	4 - 4	7 – 4	N	Overcast, humid.
4 (PM)	3	07/06/2017	17:20/21:12	12 - 13 °C	4 - 4	8 - 8	N	Overcast, humid.
4 (PM)	4	07/06/2017	17:15/ 21:12	12 - 13 °C	4 - 5	8 - 8	N	Overcast, humid.

Table 2-3 - 2018 Survey Schedule and Weather Data

(cloud cover measured in Oktas (8/8) and Wind Speed in Beaufort Scale)

Visit	Tran-sect	Date	Start - End Time	Start - End Temp (°C)	Start - End Wind Speed	Cloud Cover	Rain (Y/N)	Weather Description
1	3	11/04/2018	06:24/07:30	11 – 11 °C	0 – 0	3 – 3	N	Clear, calm and warm.
2	3	24/04/2018	05:56/07:32	10 – 10 °C	1 – 1	6 - 6	N	Clear, calm and warm.
3	3	11/05/2018	05:00/06:20	10 – 10 °C	0 – 0	3 - 3	N	Warm, clear and calm with initial mist lifting.
4	3	24/05/2018	05:02/06:50	12 – 12 °C	2 – 2	8 – 8	N	Breezy and dry.
5	3	05/06/2018	05:10/07:11	15 - 17 °C	2 - 2	8 – 8	N	Overcast and warm.
1	Nightingale	08/05/2018	04:45/08:50	10 - 12 °C	1 - 1	0 - 7	N	Still and calm, very good survey conditions.
2	Nightingale	15/05/2018	04:30/08:00	12 - 13 °C	4 – 2	2 – 1	N	Clear sky and good visibility. Windy was gusty and notable in places.
3	Nightingale	23/05/2018	04:21/07:45	10 - 13 °C	4 – 4	0 – 0	N	Visibility very good. Windy was gusty and notable in places.
4	Nightingale	31/05/2018	04:15/08:00	12 - 15 °C	1 – 3	3 - 8	N	Visibility good.

2.3.2 Data Analysis and Interpretation

- 2.3.2.1 Diversity and abundance of bird species identified within the Field Survey Area was determined from the list of species observed, and peak counts of each species respectively. Important species were those protected from disturbance during the breeding season under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) (WCA), along with those identified as of conservation concern¹⁶, and those known to be rare in Sussex by the Sussex Bird Club. Peak counts were used to indicate the relative abundance of each species within the bird community observed, although such counts do not accurately represent absolute numbers within the local population.
- 2.3.2.2 Recorded activities (singing, territorial defence, nesting behaviours etc) were used to map the extent of individual bird breeding territories and thus define the breeding bird community found within the Field Survey Area. Observations from all four survey visits were combined to identify clusters of behaviours indicating breeding, a method used extensively in BTO national Common Bird Census¹⁷ undertaken between 1962 and 2000.
- 2.3.2.3 Classification of territories was undertaken for species observed within suitable breeding habitat. Criteria used to classify a territory based on bird behaviour were:
- At least two occurrences of song in the same location, indicating a male holding a breeding territory;
 - Behaviour supporting the positive assertion a breeding attempt is being made, including repeated alarm calls by parents protecting a nest, birds carrying faecal sacs from a nest or food to a nest or young birds;
 - Nest containing eggs found, or nest with dependent young (pulli) seen or heard; and
 - A pair observed within suitable habitat during breeding season.
- 2.3.2.4 Following the definition of breeding territories, each species was assigned to a category based on the level of breeding behaviour that was observed.
- 2.3.2.5 These categories are outlined below, and are based on those used by the UK Rare Breeding Birds Panel¹⁸ to identify the likelihood of species breeding in the UK:

¹⁶ Either as Priority Species (previously known as UK Biodiversity Action Plan Priority Species before the introduction of the Post-2010 Biodiversity Framework), analogous to Species of Principal Importance (SPI) for Nature Conservation identified by the Natural Environment and Rural Communities (NERC) Act 2006, or as Birds of Conservation Concern, those birds statutory and non-statutory nature conservation groups including Natural England, the BTO and Royal Society for the Protection of Birds have agreed require conservation action.

¹⁷ Marchant, J. (1983). Common Birds Census Instructions. British Trust for Ornithology, Tring; and Bibby, C., Burgess, N., Hill, D. and S. Mustoe (2000). Bird Census Techniques. Academic Press.

¹⁸ Bibby, C. and Francis, I. (ND) Best Practice Guidance Notes. Rare Breeding Bird Panel, East Lothian.

- Non-breeder – Birds observed flying over, considered to still be on migration or a summering non-breeder.;
- Possible breeding – Birds observed singing, calling or producing alarm calls, present in suitable habitat in breeding season;
- Probable breeding – A pair observed in suitable habitat, territorial behaviour observed in the same place on at least two separate occasions at least one week apart or birds observed visiting a probable nest site, showing courtship or display behaviour in suitable breeding habitat or nest building; and
- Confirmed breeding – Nest containing eggs or young seen or heard, adults observed carrying faecal sac or food in suitable habitat, feigning injury as a distraction display or entering or leaving a nest site in circumstances indicating an occupied nest, a used nest or eggshells found or recently fledged or downy young recorded (showing evidence of dependency on adults).

2.3.2.6 Data from the 2018 nightingale surveys determined presence or absence of this species and a species list was compiled for the transect route.

2.3.2.7 Desk study data from SxBRC, SOS and MAVES was taken into consideration alongside incidental records from WSP ecologists. This information was used to identify species presence that have previously been present and their habitat use, and to provide information on bird use of the wider landscape outside of the Field Study Area.

2.3.2.8 Desk study information is discussed alongside field study results to provide a more comprehensive picture of the breeding bird community.

2.4 Assumptions and Limitations

2.4.1.1 As highlighted in **Section 2.3.1**, access to additional areas of land was sought through third party access agreements, and transects were extended through the survey period as access became available. **Appendix F** shows where transects required third party access and where access limitations could occur. All of the extended sections of transects through third party land were visited at least twice. Access constraints are not considered to affect the results of this report and all suitable habitats received sufficient survey coverage.

2.4.1.2 Instances of survey limitations:

- The 08 June 2017 dawn survey on transect 4 was aborted early due to H&S reasons.
- The first survey visits of transect 3 on 11/04/2018 had limited access due to the health and safety risk presented by cattle on Site and the presence of an EA works site. This resulted in only 50% coverage of the survey route.

Appendix 8-10: Breeding Bird Interim Baseline Survey
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- 2.4.1.3 Because multiple survey visits were undertaken, all suitable habitats received sufficient survey coverage and these limitations are not considered to affect the results of this report.
- 2.4.1.4 No further site-specific limitations were applicable to this survey. Whilst every effort has been made to detect all species present some bird species are more difficult to detect due to their shy or secretive behaviour and therefore may have not been detected during this survey. As this is a constraint applicable to all bird surveys this is not considered to affect the validity of the results.

3 Results

3.1 Desk Study

3.1.1 Desk Study Records and Literature

Overview

3.1.1.1 SxBRC returned records of two Sites of Scientific Interest (SSSi) (Arundel Park and Fairmile Bottom); one Local Nature Reserve (LNR) (Fairmile Bottom); and seven LWSs (Fontwell Parke Racecourse, Binsted Woods Complex LWS, Poling Copse, Warningcamp Hill and New Down, Rewell Wood Complex, Slindon Bottom and Arun Valley, Watersfield to Arundel). Descriptions of these designated sites are provided below.

3.1.1.2 No Natura 2000 sites designated for breeding birds are present within the Desk Study Area. Pagham Harbour SPA is located 17 kilometres west of the eastern extent of the Scheme option Footprints and is therefore outside the zone of influence of the scheme. This site contains mudflats and salt marsh which are important for feeding wading birds and waterfowl. The SPA supports 0.5% of the breeding population of little tern in Great Britain. There is no suitable habitat for breeding little tern (*Sternula albifrons*) within the landscape surrounding the Scheme options.

3.1.1.3 Arun Valley SPA/Ramsar is located approximately 6.7 kilometres north of the eastern extent of the Scheme options and is also notified as three separate SSSI: Amberley Wild Brooks, Pulborough Brook and Waltham Brooks. These sites are of national importance for their aggregations of breeding and non-breeding birds. The site is considered too far from the Scheme options to be affected.

Statutory Designated Sites

3.1.1.4 Arundel Park SSSI is located north of the existing A27 within the eastern section of both the Desk Study Area and Field Study Area. This site is designated for its breeding bird community, which comprises important woodland and scrub birds such as hobby (*Falco Subbuteo*), tawny owl (*Strix aluco*), nightingale and all three British species of woodpecker. The site has a water body, Swanbourne Lake, which supports shelduck (*Tadorna tadorna*), little grebe (*Tachybaptus ruficollis*) and tufted duck (*Aythya fuligula*), and reedbeds support locally notable populations of breeding sedge (*Acrocephalus schoenobaenus*) and reed warblers (*Acrocephalus scirpaceus*).

3.1.1.5 Fairmile Bottom SSSI/LNR is located north of the existing A27 and is not designated for birds.

Non-Statutory Designated Sites

3.1.1.6

Details of five non-statutory designated sites noted for their value to breeding birds within the Desk Study Area are within **Table 3-1** below. These are: Slindon Bottom LWS; Binsted Woods Complex LWS; Rewell Wood Complex LWS and Arun Valley, Watersfield to Arundel LWS and Arundel Park Biodiversity Opportunity Area (BOA) The following four sites are not included in **Table 3-1** as these are not designated for their value to birds: Fairmile Bottom (LNR); Warningcamp

Table 3-1 - Non-statutory sites within 2 kilometres of the Scheme options.

Site Name	Type	Description
Slindon Bottom	LWS	This site is located north of the existing A27 within the western section of the field study area and desk study area. Within the citation it is noted that the woodland on this site supports a diverse community of breeding birds including goldcrest, long-tailed tit (<i>Aegithalos caudatus</i>) willow warbler (<i>Phylloscopus trochilus</i>), chiffchaff (<i>Phylloscopus collybita</i>), blackcap (<i>Sylvia atricapilla</i>), nuthatch (<i>Sitta europaea</i>), mistle thrush (<i>Turdus viscivorus</i>), stock dove (<i>Columba oenas</i>), great spotted woodpecker (<i>Dendrocopos major</i>) and green woodpecker (<i>Picus viridis</i>).
Binsted Wood Complex LWS	LWS	This site is located south of the existing A27. Binsted Woods Complex LWS is a complex of woodland sites which includes Hundred House Copse in the west and Steward's Copse to the east. There is a mixture of ancient woodland, recent woodland, conifer plantation, species rich pasture and old tracks and shaws. Steward's Copse has been surveyed by MAVES who identified BoCC Amber and Red listed birds displaying breeding behaviour.
Rewell Wood Complex	LWS	This site is located north of the existing A27. This site is a large ancient woodland complex which also contains semi natural ancient woodland, a mixture of sweet chestnut coppice, conifer coppice and chalk grassland. Within the citation it is noted there are approximately six pairs of nightjar breeding annually.
Arun Valley, Watersfield to Arundel	SNCI	This site is located adjacent to the existing A27 within the eastern section of the field survey area and the desk study area. This section of the River Arun and its floodplain forms an extensive tract of wetland, a nationally declining habitat. Although many of the flood meadows have been improved, the wet grassland is important for breeding and wintering waders and wildfowl.

Site Name	Type	Description
		These wetlands have ornithological importance. They support breeding Redshank (<i>Tringa tetanus</i>), lapwing (<i>Vanellus vanellus</i>), snipe (<i>Gallinago gallinago</i>) and yellow wagtail (<i>Motacilla flava</i>). In winter these wetlands attract large numbers of waders and wildfowl, including snipe, teal (<i>Anas crecca</i>) and bewick's swan (<i>Cygnus columbianus</i>). The grasslands are important feeding grounds for whimbrel on spring passage. The reedbeds of the Arundel wildfowl and wetlands trust reserve and along the River Arun and ditches are a major stronghold of breeding reed warblers in West Sussex.
Arundel park	BOA	Arundel park has been recognised as a BOA as it represents a priority area for the delivery of biodiversity action plan (BAP) targets. This is one of 75 such areas across Sussex. The BOA covers approximately 1403 hectares.

3.1.2 SxBRC Habitats

3.1.2.1 S41 of the Natural Environment and Rural Communities (NERC) Act 2006, requires the Secretary of State to publish a list of Habitats and Species which are of Principal Importance for the conservation of biodiversity in England (HPI and SPI respectively). There are 56 HPI on the S41 list; 13 of these that are present within the Desk Study Area could provide important habitat for nesting, foraging and roosting birds during the breeding season:

- **Wetland habitats:** chalk stream, lowland fen, reedbed
 - This habitat type can support distinctive breeding bird assemblage including species WaCA Schedule 1 species and BoCC such as bittern (*Botaurus stellaris*), marsh harrier (*Circus aeruginosus*), Cetti's warbler (*Cettia cetti*) and bearded tit (*Panurus biarmicus*). This habitat additionally supports declining breeding waterbirds such as mallard (*Anas platyrhynchos*).
- **Coastal habitats:** intertidal mudflat, coastal saltmarsh, coastal & floodplain grazing marsh
 - This habitat can provide roosting and foraging opportunities for waders and waterfowl, many of which are on the Red and Amber Lists.
- **Grassland/heathland habitats:** lowland traditional orchard, lowland meadow, lowland heathland, lowland calcareous grassland

- This habitat type can support important species at the limits of their range in the northern hemisphere, such as nightjar, and specialists which are not widespread in the UK such as woodlark (*Lullula arborea*) and stonechat (*Saxicola torquatus*).
- **Woodland habitats:** deciduous woodland, ancient woodland, wood-pasture & parkland
 - This habitat type can support distinctive breeding birds such as nightingale, and mature woodland can provide breeding opportunities for species such as bullfinch (*Pyrrhula pyrrhula*) and other woodland specialists.

3.1.3 SxBRC And SOS Species Records

3.1.3.1 The numbers of bird species with specific legislative and conservation designations as reported within desk study data from SxBRC are listed below. It should be noted categories are not exclusive and a species can be listed in more than one conservation category (for example species can be listed as both NERC S41 (SPI) and as either a Red List or Amber List species.

- 10 species listed Annex 1;
- 16 species listed on WaCA Schedule 1;
- 27 Red List species;
- 36 BoCC Amber List species;
- 26 species listed NERC S41 SPI; and
- 80 species listed as Sussex Notable Birds.

3.1.3.2 Full desk study results are shown in **Appendix A, Table A-1**.

SOS Firecrest Surveys¹⁹

3.1.3.3 The SOS provided field survey results from their Firecrest surveys in 2018. Within the Desk Study area three records of firecrest were reported in Rewell Wood, these were located north of the existing A27 route. Of these results there was one confirmed breeding territory and one singing male which indicated possible breeding. These surveys suggest that Rewell Wood has suitable habitat to support breeding firecrest.

3.1.3.4 There were additionally two records of goldcrest but these were not reported to be breeding records.

¹⁹ Bird Records (ND). Species records supplied as an MS Excel file. Received February 2019.

3.1.4 Notable SxBRC Desk Study Species

3.1.4.1 The following species were not recorded during field surveys, but are notable as all may be found within the wider area around the Scheme options within the past 10 years. These species are likely not to have been recorded within Field Survey results because suitable habitat is not present, no longer present or not present in enough quantity in the Field Study Area for breeding, or these species may also have been transient in the area.

Woodland species

3.1.4.2 Two Schedule 1 species were recorded in the SxBRC records: common crossbill (*Loxia curvirostra*) and woodlark.

- **Woodlark and crossbill:** Only one record of woodlark has been reported within the past 10 years with two additional records both from 1999, none of which suggest a breeding population close to the scheme. Similar to woodlark there are relatively few records of common crossbill in the Desk Study Area. The SxBRC records report four record within the past 10 years, with an additional seven between 2002 and 1984. No breeding records are reported as this is a species which disperses south for the winter months.

3.1.4.3 Two BoCC Red list species were recorded in the SxBRC records: woodcock (*Scolopax rusticola*) and wood warbler (*Phylloscopus sibilatrix*) (also NERC S41).

- **Woodcock:** The SxBRC report 11 records of woodcock, seven of which are located within Rewell Wood or adjacent and four of which are breeding records. There are also records within Barn's copse and Paines Wood. The most recent record of breeding behaviour was in 2017 in Rewell Wood in which probable breeding was identified due to display behaviour in suitable habitat. This indicates this species is using Rewell wood for breeding.
- **Wood Warbler:** There are nine records of wood warbler reported, three of which are reported to be located at Rewell Wood and two at the Arundel WWT. A single record from Rewell Wood in 2014 suggests possible breeding with the presence of a singing male. One record outside this desk study from 1985 indicates historic breeding within the desk study area. This is a species which has experienced significant decline in population and range.

Mosaic habitat

- 3.1.4.4 SxBRC reported 12 records of nightingale which indicated possible breeding. These are dispersed through the Desk Study Area. There are a further 34 records of nightingale between 1980 and 1989 which suggests historic habitat suitability. This species has recently been reclassified as BoCC Red following population declines.

Raptors

- 3.1.4.5 The species records provided by SxBRC contain two species of raptor, both WCA Schedule 1, not observed during field surveys: hobby and osprey (*Pandion haliaetus*).

Waterbirds

- 3.1.4.6 The SxBRC records reported four WCA Schedule 1 species: little ringed plover (*Charadrius dubius*), avocet (*Recurvirostra avosetta*), bittern and Mediterranean gull (*Larus melanocephalus*).

- **Little ringed plover:** There are eight records of little ringed plover within the last 10 years, none of which indicate breeding. Records of little ringed plover were predominately over 10 years ago, two from 1986 and 1987 confirming breeding within the Arundel WWT within the northern extent of the desk study area.
- **Avocet:** Three records of avocet were reported in 2013 from the Arundel WWT in the northern extent of the desk study area. None of these records of avocet indicate breeding and it is unlikely that this species would be affected by the proposed development.
- **Bittern:** This species is also listed BoCC Amber, in addition to a WCA Schedule 1 species. There are 30 records of this species, all of which are located in the Arundel WWT. None of these records are breeding records and several records are reported as migratory individuals. It is unlikely that this species would be affected by the proposed development.
- **Mediterranean gull:** This species is also BoCC Amber listed. SxBRC reported six records all of which are reported as breeding records. These records are reported in the Arundel WWT excluding one only identified to the Arun Valley.

- 3.1.4.7 The SxBRC records reported two BoCC Red list species: ringed plover (*Charadrius hiaticula*) and curlew (*Numenius arquata*).

- **Ringed plover:** There are two records of this species reported with one record indicating breeding. There is not detailed spatial information for this species.

- **Curlew:** This species is additionally NERC S41 (SPI). SxBRC records reported three records of curlew, none of which were breeding records. Curlew has recently been added to the BoCC Red List formerly being BoCC Amber Listed, following further declines. This species is considered to be a priority species in terms of conservation effort following a long-term trend of decline, combined with the bird's global status of Near Threatened.

3.1.4.8 The SxBRC records reported three BoCC Amber list gull species: common gull (*Larus canus*), great black-backed gull (*Larus marinus*) and yellow-legged gull (*Larus michahellis*).

- **Common gull:** Four records were reported as breeding records. The location detailed were not detailed;
- **Great black-backed gull:** A single record was reported, this was a breeding record. The location details were not detailed; and
- **Yellow-legged gull:** Two none breeding records were reported, both from the Arundel WWT.

3.1.4.9 The habitat within the desk study area contains large amounts of agricultural land and woodland which are not suitable breeding habitat for gulls.

3.1.5 MAVES

Ecological Survey 2017²⁰

3.1.5.1 MAVES commissioned a report in March 2017 which aimed to give a preliminary assessment as to the habitats and species present within the Mid Arun Valley. The survey area that was considered is bordered by Binsted Lane on the western boundary, the existing A27 on the northern boundary, A284 Lyminster Road on the western boundary and marsh farm approximately at the southern boundary.

3.1.5.2 This report found desk study records were returned for 177 species of bird within the study area outlined above and within a one kilometre buffer extending beyond this. These comprised:

- 45 species are BoCC Red List species and 51 are on the Amber List;
- 38 species are listed under WaCA Schedule 1;
- 149 species are protected under various European conventions;
- 36 species have Biodiversity Action Plans; and
- 36 species are included in the Farm Environment Plan.

²⁰ Thompson, J. (March, 2017) An ecological survey of the Mid Arun Valley. Wildlife Splash on behalf of the Mid-Arun Environmental Survey.

3.1.5.3 The Walberton Action Group undertook a survey in 2008 of land around Walberton, Binsted and Binsted Rife during which 86 bird species were recorded. Of these, seventeen species were on the BoCC Red List and eighteen on the Amber List. Summer visitors included nightjar, turtle dove (*Streptopelia turtur*) and spotted flycatcher (*Muscicapa striata*). Some were residents that have undergone population declines such as lesser spotted woodpecker (*Dendrocopos minor*) and tree sparrow (*Passer montanus*).

Ecological Impact Report 2017²¹

3.1.5.4 MAVES produced a report in October 2017 to appraise the potential impacts of the three Options using recent data, which has been collated over the past two years. Bird records were collected by David and Heather Hart 2015 and Ben Knight 2017.

3.1.5.5 This report found in the Mid Arun Valley a total of 84 species of birds have been recorded, of which 16 are BoCC Red listed species and 20 are Amber listed species. A total of 15 of the birds recorded have Biodiversity Action Plans and six are also Schedule 1 species.

3.1.5.6 Many of the less common species were reported to have had numerous sightings such as: mistle thrush (Red List); song thrush (*Turdus philomelos*) (Red List), linnet (*Carduelis cannabina*) (Red List), nightingale (Red List), yellowhammer (*Emberiza citronella*) (Red List), cuckoo (*Cuculus canorus*) (Red List), grey wagtail (*Motacilla cinerea*) (Red List) and meadow pipit (*Anthus pratensis*) (Amber List).

Steward's Copse Study²²

3.1.5.7 MAVES produced a report outlining surveys undertaken at Steward's Copse in April and June 2017. Steward's Copse is located adjacent to the westbound carriage, south of the existing A27 and forms part of Binsted Woods Complex LWS.

3.1.5.8 The document reports having heard nightjar (BoCC Amber listed, NERC S41 (SPI) and Annex 1) churring within the woodland during the daytime. In addition, marsh tit (*Poecile palustris*) and mistle thrush (BoCC Red listed) were heard and seen. In addition, high levels of activity were observed from common woodland and urban edge species such as blackbird (*Turdus merula*) and robin (*Erithacus rubecula*) which are likely to be breeding.

²¹ Thompson, J. (October, 2017) The Mid Arun Valley 2015 – 2017 A27 Arundel bypass Road Options 1, 3 and 5A Ecological Impact Report (using current data). Wildlife Splash on behalf of the Mid-Arun Environmental Survey.

²² MAVES (2017) Steward's Copse MAVES

Marsh Farm²³

- 3.1.5.9 WSP received data from MAVES on 19 October 2017 from a regular bird survey undertaken by the BTO over approximately 25 years (1989-2013) on the same square kilometre (SU9804) of Marsh Farm. The number of birds and species of birds recorded at Marsh Farm appears to have remained constant with 64 species recorded during the first year and 63 during the last.
- 3.1.5.10 Marsh Farm is located south of the village of Binsted and west of the village of Tortington, outside of the Field Study Area but within the Desk Study Area. This is approximately 1.1 kilometres from the Scheme options and south of transect 2.
- 3.1.5.11 Within the past 10 years this survey has recorded 80 species with 114 species recorded since surveys began in 1989. WSP surveys found 81 species throughout the Field Survey Area during the breeding bird survey season.
- 3.1.5.12 Species recorded within the past 10 years which haven't been recorded between April - June 2017 by WSP include: shelduck, common tern (*Sterna hirundo*), curlew, fieldfare (*Turdus pilaris*), gadwall (*Anas strepera*), great crested grebe (*Podiceps cristatus*), little grebe, pochard (*Aythya farina*), redwing (*Turdus iliacus*), rock dove (*Columba livia*), sand martin (*Riparia riparia*), shoveler (*Anas clypeata*), snipe, teal and wigeon (*Anas penelope*).

MAVES species records²⁴

- 3.1.5.13 MAVES provided WSP with species records recorded by members of their organisation from 2012 – 2018. The dataset predominately contained records from 2015 – 2018. This included 91 species (excluding barn owl).
- 3.1.5.14 WSP surveys recorded 90 species through field surveys in 2017 and 2018 and incidental records captured during other survey types. MAVES recorded the following additional species not recorded through these means:
- five species listed on WaCA Schedule 1: pintail (*Anas acuta*), brambling (*Fringilla montifringilla*), merlin (*Falco columbarius*), hobby and Mediterranean gull;
 - five BoCC Red List species: nightingale, spotted flycatcher, woodcock, merlin and tree sparrow;
 - four BoCC Amber List species: pintail, shelduck, short-eared owl (*Asio flammeus*) snipe and Mediterranean gull; and
 - two species listed as SPI: spotted flycatcher and tree sparrow.

²³ Mid-Arun Valley Environmental Survey Marsh Farm. (1993). Species records supplied as an MS Excel file. Received October 2017.

²⁴ Mid-Arun Valley Environmental Survey Bird Records (ND). Species records supplied as an MS Excel file. Received October 2017.

3.1.5.15 In addition to the species listed above there were also records of goshawk (*Accipiter gentilis*), great crested grebe, little grebe, raven (*Corvus corax*), siskin (*Carduelis spinus*) and stonechat.

3.1.5.16 These records are taken into consideration within this report as appropriate.

3.1.6 Other Sources

South Downs National Park Authority

3.1.6.1 South Downs National Park Authority have produced literature to make an ecological assessment of the A27 bypass options in March 2017²⁵. The study area of this report is two kilometres from the Scheme options. This report found:

- 45 species recorded that are protected under the European Birds directive;
- 39 species listed NERC S41 (SPI); and
- 42 Schedule 1 birds under the WaCA.

3.1.6.2 This document identifies 14 bird species listed on Schedule 9 of the WaCA, and speculates these are likely to be waterfowl associated with escapes from the WWT site.

3.1.6.3 These desk study results differ from those reported within this study as a result of the differing time frame in which this report has based analysis within.

3.1.6.4 This report identifies eight priority habitats: chalk stream; coastal and floodplain grazing marsh; deciduous woodland; wood pasture and parkland; lowland heathland; lowland calcareous grassland; intertidal saltmarsh and mudflat; ancient woodland and veteran trees. Many of these could be used by breeding birds.

Environmental Advisory Unit of Liverpool University (EAULUL)

3.1.6.5 The EAULUL produced an Environmental Impact Assessment (EIA) report in 1991 for the Scheme²⁶. The most pertinent notable birds recorded were nightingale and nightjar. This report outlines the temporary value of the compartment one to nightjar as a result of the open structure of the site at the time. The Slindon Quarry site and Rewell Wood are identified as capable of supporting more important numbers of breeding pairs.

3.1.6.6 Nightingale were recorded breeding throughout the survey Scheme option which stretched across the Binsted Woods Complex LWS to Barn's Copse.

²⁵ Burgess, J. (March, 2017) A27 Arundel Bypass: Ecological desk based assessment. South Downs National Park Authority

²⁶ Environmental Advisory Unit of Liverpool University (1991) Ecological Impact Assessment Report

3.1.7 Kingfisher Habitat Assessment

3.1.7.1 The assessed watercourses were predominately ditches or ponds, dry or filled with vegetation in the majority of the cases, or a river with the bank stabilized with artificial structures. Therefore, all the assessed watercourses were considered as non-suitable for breeding kingfisher.

3.2 Field Survey

3.2.1 2017 Transect Survey

3.2.1.1 A total of 79 species were recorded on or over the Field Survey Area through dusk and dawn survey effort during the breeding bird survey with an additional species (firecrest) recorded as an incidental record through other WSP surveys. Of these 22 were confirmed breeding, 13 were considered to probable breeders, 43 were considered to be possibly breeding and two species were considered not breeding.

3.2.1.2 Of the 80-species recorded on or over the Field Survey Area, four were listed as Annex 1, four species are listed on WaCA Schedule 1, 32 are BoCC Red or Amber Listed and 16 NERC S41 (SPI).

3.2.1.3 Field survey results showing summary of species recorded by conservation concern, protection, breeding status and peak counts are shown in **Table 3-2, Table 3-3 and Figure 3-1** with raw data in **Appendix B**.

Table 3-2 - 2017 (dusk and dawn) summary of field survey results by breeding category, protection and conservation concern.

Conservation Classification*	Count	Confirmed breeding	Probable breeding	Possible breeding	Not breeding
Annex 1	Four species			<ul style="list-style-type: none"> ▪ Lesser spotted woodpecker ▪ Little egret (<i>Egretta garzetta</i>) ▪ Peregrine (<i>Falco peregrinus</i>) 	<ul style="list-style-type: none"> ▪ Red kite (<i>Milvus milvus</i>)
Schedule 1	Four species	-	<ul style="list-style-type: none"> ▪ Cetti's warbler 	<ul style="list-style-type: none"> ▪ Firecrest ▪ Peregrine 	<ul style="list-style-type: none"> ▪ Red kite
NECR S41 (SPI)	16 species	<ul style="list-style-type: none"> ▪ House sparrow (<i>Passer domesticus</i>) ▪ Reed bunting (<i>Emberiza schoeniclus</i>) ▪ Song thrush ▪ Starling (<i>Sturnus vulgaris</i>) 	<ul style="list-style-type: none"> ▪ Dunnock (<i>Prunella modularis</i>) ▪ Bullfinch, ▪ Lapwing, ▪ Skylark (<i>Alauda arvensis</i>) ▪ Yellowhammer 	<ul style="list-style-type: none"> ▪ Corn bunting (<i>Miliaria calandra</i>) ▪ Cuckoo ▪ Herring gull (<i>Larus argentatus</i>) ▪ Lesser spotted woodpecker ▪ Linnet ▪ Marsh tit 	<ul style="list-style-type: none"> ▪ Grey partridge (<i>Perdix perdix</i>)
BoCC Red listed	15 species	<ul style="list-style-type: none"> ▪ House sparrow ▪ Starling ▪ Song thrush 	<ul style="list-style-type: none"> ▪ Skylark ▪ Yellowhammer ▪ Lapwing 	<ul style="list-style-type: none"> ▪ Corn bunting ▪ Cuckoo ▪ Grey wagtail ▪ Herring gull ▪ Lesser spotted woodpecker ▪ Linnet ▪ Marsh tit ▪ Mistle thrush 	-
BoCC Amber listed	17 species	<ul style="list-style-type: none"> ▪ Kestrel (<i>Falco tinnunculus</i>) ▪ Mallard ▪ Mute swan (<i>Cygnus olor</i>) ▪ Reed bunting (<i>Emberiza schoeniclus</i>) 	<ul style="list-style-type: none"> ▪ Bullfinch ▪ Dunnock ▪ Stock dove 	<ul style="list-style-type: none"> ▪ Oystercatcher (<i>Haematopus ostralegus</i>) ▪ Black-headed gull (<i>Larus ridibundus</i>) ▪ Common sandpiper (<i>Actitis hypoleucos</i>) ▪ House martin (<i>Delichon urbicum</i>) 	-

Conservation Classification*	Count	Confirmed breeding	Probable breeding	Possible breeding	Not breeding
				<ul style="list-style-type: none"> ▪ Lesser black-backed gull (<i>Larus fuscus</i>) ▪ Meadow pipit ▪ Oystercatcher ▪ Swift (<i>Apus apus</i>) ▪ Tawny owl ▪ Willow warbler ▪ Greylag goose (<i>Anser anser</i>) 	
BoCC green listed	48 species	<ul style="list-style-type: none"> ▪ Blackbird ▪ Blue tit (<i>Cyanistes caeruleus</i>) ▪ Carrion crow (<i>Corvus corone</i>) ▪ Coal tit (<i>Periparus ater</i>) ▪ Collared dove (<i>Streptopelia decaocto</i>) ▪ Great spotted woodpecker ▪ Great tit (<i>Parus major</i>) ▪ Jackdaw (<i>Corvus monedula</i>) ▪ Moorhen (<i>Gallinula chloropus</i>) ▪ Nuthatch ▪ Robin ▪ Rook (<i>Corvus frugilegus</i>) ▪ Sedge warbler ▪ Treecreeper (<i>Certhia familiaris</i>) ▪ Wren (<i>Troglodytes troglodytes</i>) 	<ul style="list-style-type: none"> ▪ Cetti's warbler ▪ Chaffinch (<i>Fringilla coelebs</i>) ▪ Chiffchaff ▪ Pheasant (<i>Phasianus colchicus</i>) ▪ Reed warbler ▪ Wheatear ▪ Whitethroat (<i>Sylvia communis</i>) 	<ul style="list-style-type: none"> ▪ Blackcap ▪ Buzzard (<i>Buteo buteo</i>) ▪ Canada goose (<i>Branta canadensis</i>) ▪ Coot (<i>Fulica atra</i>) ▪ Cormorant (<i>Phalacrocorax carbo</i>) ▪ Feral pigeon ▪ Firecrest ▪ Garden warbler (<i>Sylvia borin</i>) ▪ Goldcrest ▪ Goldfinch (<i>Carduelis carduelis</i>) ▪ Goosander (<i>Mergus merganser</i>) ▪ Green woodpecker ▪ Greenfinch (<i>Carduelis chloris</i>) ▪ Grey heron (<i>Ardea cinerea</i>) ▪ Jay (<i>Garrulus glandarius</i>) ▪ Little egret ▪ Long-tailed tit ▪ Magpie (<i>Pica pica</i>) ▪ Mandarin duck (<i>Aix galericulata</i>) 	<ul style="list-style-type: none"> ▪ Red kite

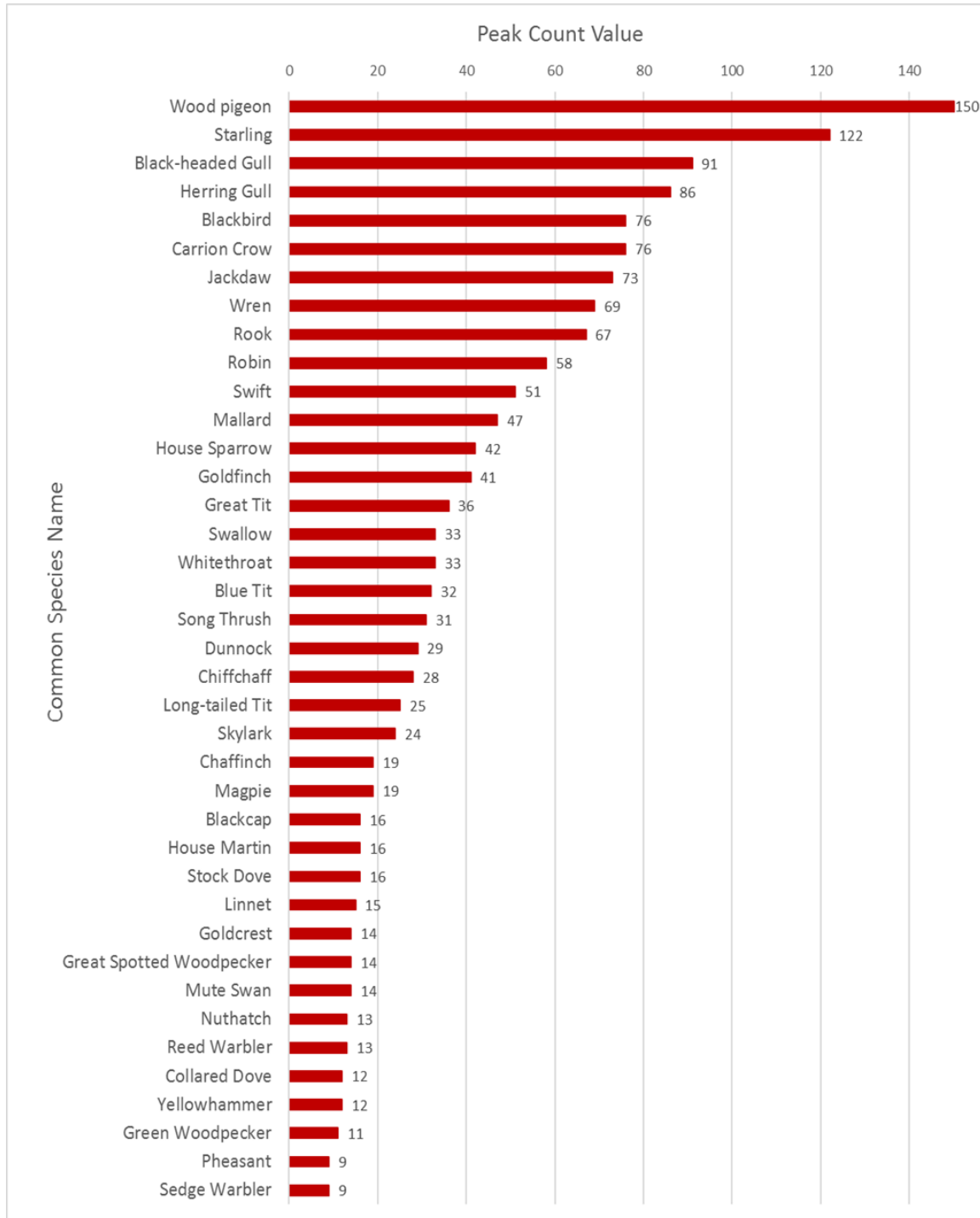
Conservation Classification*	Count	Confirmed breeding	Probable breeding	Possible breeding	Not breeding
				<ul style="list-style-type: none"> ▪ Peregrine ▪ Pied/white wagtail (<i>Motacilla alba</i>) ▪ Sparrowhawk (<i>Accipiter nisus</i>) ▪ Swallow (<i>Hirundo rustica</i>) ▪ Tufted duck ▪ Wood pigeon (<i>Columba palumbus</i>) 	
Total	90 species	22 species	13 species	42 species	2 species

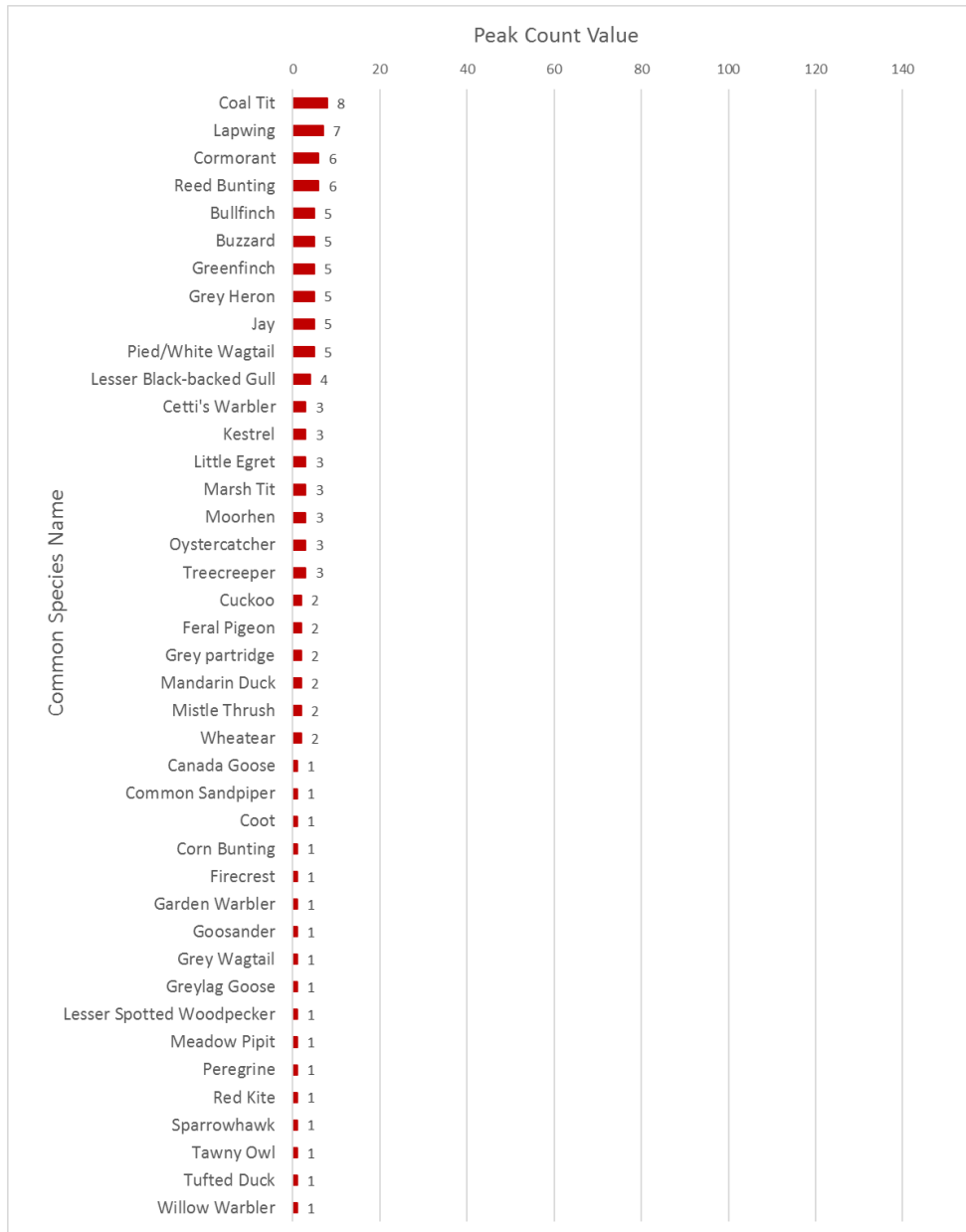
* Species may have multiple protections and designations and may be presented in multiple categories as a result.

Table 3-3 - 2017 (dusk and dawn) breeding territory counts with conservation concern classification and species protection.

Common Name	Scientific Name	Territories	Annex 1	Schedule 1	NERC S41 (SPI)	BoCC Category
Wren	<i>Troglodytes troglodytes</i>	56	NL	N/a	N/a	Green
Robin	<i>Erithacus rubecula</i>	29	NL	N/a	N/a	Green
Blackbird	<i>Turdus merula</i>	18	NL	N/a	N/a	Green
Song thrush	<i>Turdus philomelos</i>	17	NL	N/a	X	Red
Whitethroat	<i>Sylvia communis</i>	13	NL	N/a	N/a	Green
Skylark	<i>Alauda arvensis</i>	12	NL	N/a	X	Red
Chaffinch	<i>Fringilla coelebs</i>	10	NL	N/a	N/a	Green
Mallard	<i>Anas platyrhynchos</i>	7	NL	N/a	N/a	Amber
House sparrow	<i>Passer domesticus</i>	7	NL	N/a	X	Red
Great spotted woodpecker	<i>Dendrocopos major</i>	5	NL	N/a	N/a	Green
Sedge warbler	<i>Acrocephalus schoenobaenus</i>	5	NL	N/a	N/a	Green
Starling	<i>Sturnus vulgaris</i>	5	NL	N/a	N/a	Red
Blue tit	<i>Cyanistes caeruleus</i>	4	NL	N/a	N/a	Green
Chiffchaff	<i>Phylloscopus collybita</i>	4	NL	N/a	N/a	Green
Yellowhammer	<i>Emberiza citrinella</i>	4	NL	N/a	X	Red
Rook	<i>Corvus frugilegus</i>	3	NL	N/a	N/a	Green
Great tit	<i>Parus major</i>	2	NL	N/a	N/a	Green
Jackdaw	<i>Corvus monedula</i>	2	NL	N/a	N/a	Green
Nuthatch	<i>Sitta europaea</i>	2	NL	N/a	N/a	Green
Dunnock	<i>Prunella modularis</i>	1	NL	N/a	N/a	Amber
Kestrel	<i>Falco tinnunculus</i>	1	NL	N/a	N/a	Amber
Reed bunting	<i>Emberiza schoeniclus</i>	1	NL	N/a	X	Amber
Cetti's warbler	<i>Cettia cetti</i>	1	NL	X	N/a	Green
Moorhen	<i>Gallinula chloropus</i>	1	NL	N/a	N/a	Green
Reed warbler	<i>Acrocephalus scirpaceus</i>	1	NL	N/a	N/a	Green
Treecreeper	<i>Certhia familiaris</i>	1	NL	N/a	N/a	Green

Figure 3-1 - Peak counts of all bird species recorded during 2017 field surveys arranged by their frequency, greatest to least.





3.2.2 2018 Transect Survey

3.2.2.1 A total of 43 species were recorded on or over the Field Survey Area through dawn survey effort during the breeding bird survey. Of these seven were confirmed breeding, six are considered to probable breeders, 27 were possible breeding and seven species were considered not breeding.

3.2.2.2 Of the 43 species recorded on or over the Field Survey Area, one is listed in Annex 1, one species is listed on WaCA Schedule 1, six are BoCC Red, 11 BoCC Amber Listed and six NERC S41 (SPI).

3.2.2.3 Field survey results showing summary of species recorded by conservation concern, protection and breeding status are shown in **Table 3-4**, **Table 3-5** and **Figure 3-2** with raw data in **Appendix B**.

Table 3-4 - Summary of field survey results of 2018 transect 3 surveys by breeding category, protection and conservation concern.

Conservation Classification*	Count	Confirmed breeding	Probable breeding	Possible breeding	Not breeding
Annex 1	One Species	-	-	<ul style="list-style-type: none"> ▪ Little egret 	-
Schedule 1	One species	-	-	<ul style="list-style-type: none"> ▪ Cetti's warbler 	-
NERC S41 (SPI)	Six species	<ul style="list-style-type: none"> ▪ House sparrow ▪ Starling ▪ Lapwing 	<ul style="list-style-type: none"> ▪ Reed Bunting 	<ul style="list-style-type: none"> ▪ Dunnock ▪ Song thrush 	-
Red listed	Six species	<ul style="list-style-type: none"> ▪ House sparrow ▪ Starling ▪ Lapwing 	<ul style="list-style-type: none"> ▪ Skylark 	<ul style="list-style-type: none"> ▪ Song thrush 	<ul style="list-style-type: none"> ▪ Linnet
BoCC Amber listed	11 species	<ul style="list-style-type: none"> ▪ Mallard ▪ Mute Swan 	<ul style="list-style-type: none"> ▪ Reed Bunting 	<ul style="list-style-type: none"> ▪ Black-headed gull ▪ Redshank ▪ Teal ▪ Dunnock 	<ul style="list-style-type: none"> ▪ Lesser black-backed gull ▪ Oystercatcher ▪ Swift
BoCC green listed	27 species	<ul style="list-style-type: none"> ▪ Coot ▪ Rook 	<ul style="list-style-type: none"> ▪ Carrion crow ▪ Reed warbler ▪ Wren ▪ Collared dove 	<ul style="list-style-type: none"> ▪ Blackbird ▪ Blackcap ▪ Blue tit ▪ Cetti's warbler ▪ Chiffchaff ▪ Goldfinch ▪ Great tit ▪ Greenfinch ▪ Grey heron ▪ Jackdaw ▪ Little egret ▪ Magpie ▪ Moorhen 	<ul style="list-style-type: none"> ▪ Canada Goose ▪ Cormorant ▪ Red-legged partridge



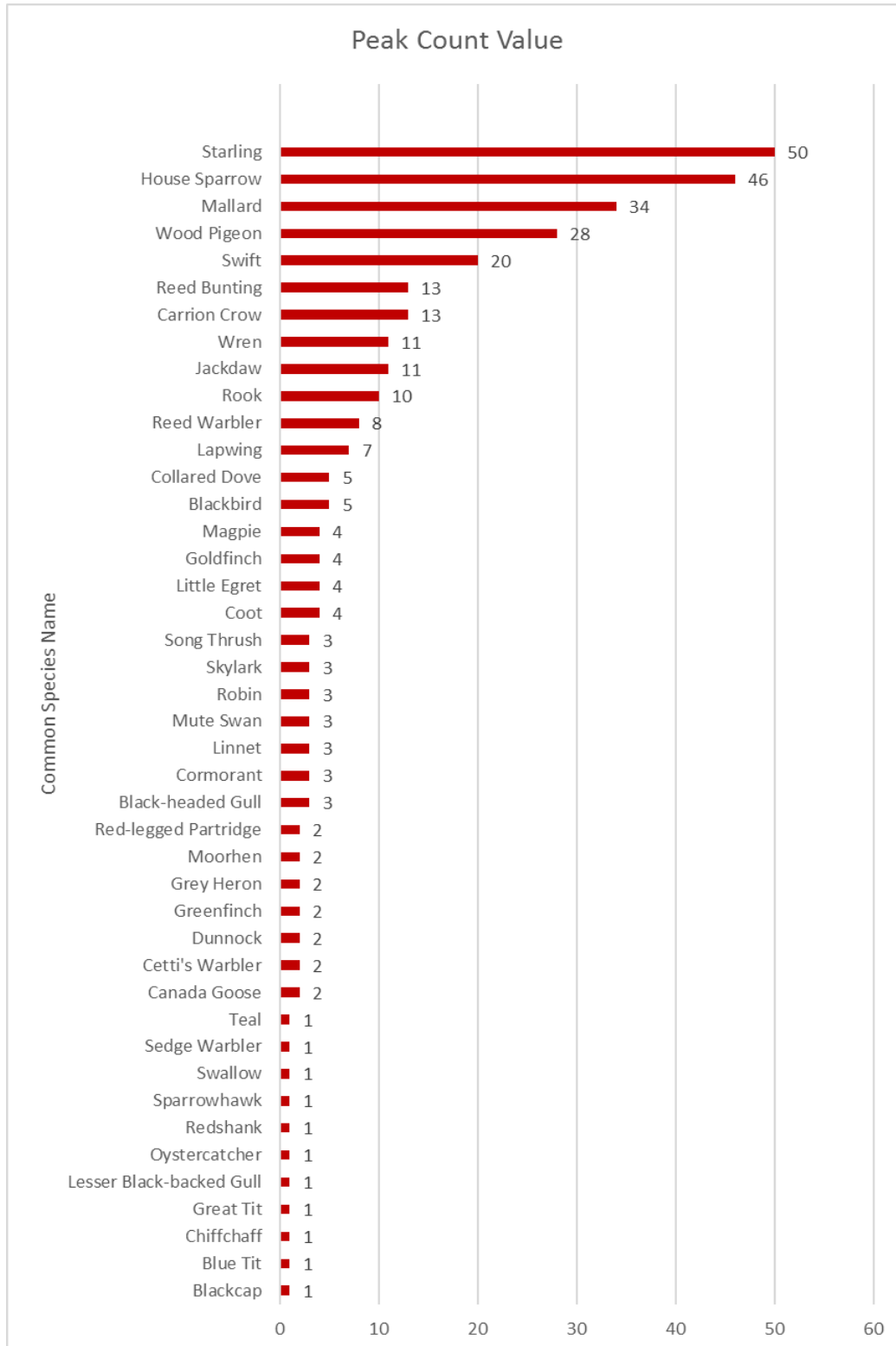
Conservation Classification*	Count	Confirmed breeding	Probable breeding	Possible breeding	Not breeding
				<ul style="list-style-type: none"> ▪ Robin ▪ Sedge warbler ▪ Sparrowhawk ▪ Swallow ▪ Wood pigeon 	
Totals	43 species	7 species	6 species	27 species	7 species

* Species may have multiple protections and designations and may be presented in multiple categories as a result.

Table 3-5 - 2018 Breeding territory counts with conservation concern classification and species protection.

Common Name	Scientific Name	Territories	Annex 1	Schedule 1	BoCC Category	NERC S41 (SPI)
Collared Dove	<i>Streptopelia decaocto</i>	2	NL	NL	NL	NL
Coot	<i>Fulica atra</i>	1	NL	NL	NL	NL
House Sparrow	<i>Passer domesticus</i>	1	NL	NL	Red	X
Lapwing	<i>Vanellus vanellus</i>	2	NL	NL	Red	X
Mallard	<i>Anas platyrhynchos</i>	3	NL	NL	Amber	NL
Mute Swan	<i>Cygnus olor</i>	1	NL	NL	Amber	NL
Reed Bunting	<i>Emberiza schoeniclus</i>	1	NL	NL	Amber	X
Reed Warbler	<i>Acrocephalus scirpaceus</i>	5	NL	NL	NL	NL
Skylark	<i>Alauda arvensis</i>	3	NL	NL	Red	NL
Starling	<i>Sturnus vulgaris</i>	1	NL	NL	Red	X
Wren	<i>Troglodytes troglodytes</i>	14	I *	NL	NL	NL

Figure 3-2 - Peak counts of all bird species recorded during 2018 field surveys of transect 3 arranged by their frequency, greatest to least²⁷



²⁷ Records of house sparrow colonies have been assumed to have a minimum of 10 individuals. There were 12 records of house sparrow colonies in the dataset.

3.2.3 Nightingale Survey

3.2.3.1 The field surveys did not detect the presence of nightingale. Protected species or species of conservation concern which were recorded along the transect route included:

- Common buzzard
- Dunnock
- Green woodpecker
- Herring gull
- House sparrow
- Kestrel
- Linnet
- Marsh tit
- Skylark
- Song thrush
- Starling
- Stock dove
- Swift
- Yellowhammer

3.2.3.2 **Appendix E** shows where these species were located, along with other incidental records.

3.2.4 Data Summary - Notable Bird Community

3.2.4.1 **Table 3-6** discusses birds recorded through the following means:

- Dawn transect surveys: 2017 survey and 2018 additional surveys of transect 3;
- Dusk transect survey: 2017 survey;
- Species-specific survey – Nightingale; and
- Incidental records.

3.2.4.2 **Table 3-6** identifies notable birds recorded with a breeding category of possible, probable or confirmed. Species are considered notable should they be Annex 1, WaCA Schedule 1 species, BoCC Red Listed species, BoCC Amber Listed species or NERC S41 (SPI).

3.2.4.3 Thirty-nine notable species were recorded: 4 Annex 1 species, five WCA Schedule 1, 15 BoCC Red List, 19 BoCC Amber List, 16 NERC S41 (SPI).

Table 3-6 - Notable breeding bird communities

Bird community	Species Description
<p>Urban fringe and common garden species – 7</p> <p><i>(Dunnock, House Martin, House Sparrow, Song Thrush, Starling, Stock Dove, Swift)</i></p>	<p>Stock dove - this species is BoCC Amber listed and classified probable breeding. This species was observed across the field survey area in 2017 within a variety of habitats. Stock dove were observed throughout the survey period and had a peak count of 16. This species was not recorded in 2018 surveys of the floodplain area.</p> <p>Dunnock - this species is BoCC Amber listed, NERC S41 (SPI) and classified probable breeding in 2017 surveys. Records of this species were reported by SxBRC within the desk study area. Dunnock is a species that has recorded population declines and as a result is a BoCC Amber listed species. A single dunnock territory was recorded within hedgerow within fields opposite a residential area in 2017.</p> <p>Starling - this species is BoCC Red listed, NERC S41 (SPI) and confirmed breeding in 2017 and 2018 surveys. Field survey's in 2017 found five attempted breeding territories for this species. This was one of the most common species within the 2017 dataset with a peak count of 122. This species had the highest peak count in 2018 surveys of the floodplain with a peak of 50. This is a colonial species generally found associated with the urban environment.</p> <p>Song thrush - this species is BoCC Red listed, NERC S41 (SPI) and confirmed breeding in 2017. Records of this species were reported by SxBRC with the desk study area. This was one of the most common species within the dataset. Seventeen breeding territories were identified and this species had a peak count of 31 in 2017. This species could be classified as a generalist and was recorded across the field study area, predominately associated with woodland or urban fringe habitat.</p> <p>House sparrow - this species is BoCC Red listed, NERC S41 (SPI) and confirmed breeding in both 2017 and 2018 surveys. House sparrow are colonial breeders and several colonies of breeding house sparrow were recorded using agricultural buildings and residential buildings on the Arun floodplain. Seven breeding territories were identified with a peak count of 42 in 2017 surveys. A single territory was identified on the Arun floodplain in 2018 surveys. This species would be encountered in large groups.</p> <p>Swift and house martin - these species are BoCC Amber listed and classified possible breeding. These species use buildings for breeding in a similar manner to house sparrow. No nests were confirmed for these species in the field study area in either surveys. House martin were found in relatively low numbers and observed within one survey round in June 2017 with a peak count of 16. House martin were not recorded in 2018 surveys on the Arun floodplain.</p> <p>Swift were observed in increasing numbers through the survey period in both 2017 and 2018 surveys with the peak count being in June for both survey periods. The peak was 15 in 2017 and 20 in 2018.</p>

Bird community	Species Description
<p>Woodland specialist birds – 4</p> <p><i>(bullfinch, marsh tit, tawny owl, firecrest)</i></p>	<p>Bullfinch - this species is BoCC Amber listed, NERC S41 (SPI) and classified probable breeding in 2017 surveys. This species wasn't recorded in 2018 surveys of the Arun floodplain but was recorded as an incidental record in woodland south of Binsted Woods Complex LWS.</p> <p>This species was recorded within the SxBRC records for the desk study area. This species has a peak count of five and was recorded within the first three survey rounds but not observed within the final survey rounds in June 2017. This species was recorded across the field survey area, associated with woodland, hedgerow and on occasion the urban fringe.</p> <p>Marsh tit - this species is BoCC Red listed, NERC S41 (SPI) and classified possible breeding within 2017 survey effort and 2018 incidental records in Binsted Woods Complex LWS.</p> <p>This species was recorded within the SxBRC records for the desk study area. This species was found throughout the survey period in 2017 excluding the first survey round in April. Marsh tit were found in relatively low numbers with a peak count of three. This species was found predominately in or near Binsted Woods Complex LWS or north of the existing A27 close to Rewell Wood.</p> <p>Firecrest - this species is designated WaCA Schedule 1 and classified possible breeding in 2017 field surveys. A single firecrest (WaCA schedule 1) was recorded within woodland adjacent to Ford roundabout in May 2017 during field surveys, in addition to two incidental records recorded in May 2017. One of these incidental records was also in close proximity to Ford roundabout and the other in woodland north of Avisford Park and south of the existing A27 route. Four firecrest records were reported in Binsted Woods Complex LWS, Barn's Copse and Lake Copse as incidental records through WSP surveys in 2018. These records suggest the woodland in the Field Survey Area is suitable for breeding firecrest.</p> <p>SOS firecrest surveys reported three records of firecrest within the Desk Study area north of the existing A27 route, one record confirmed a breeding territory. This habitat will not be affected by the proposed development.</p> <p>Firecrest records are dispersed through the desk study area. 23 records were reported within the past 10 years with some of these being reported as breeding records.</p> <p>Tawny owl - this species is BoCC Amber listed and classified as confirmed breeding. This species was recorded north of the existing A27 within Rewell Wood and within Binsteds Wood Complex LWS. Incidental records of this species collected through 2018 bat surveys undertaken by WSP confirmed the presence of juveniles within Binsted Woods Complex LWS.</p>
<p>Other Raptors* - 1</p> <p>*not defined by other community groups</p>	<p>Peregrine - this species is listed on WaCA Schedule 1 and is classified possible breeding.</p> <p>Two observations of peregrine were made across the breeding season with a peak count of one. Two confidential records of peregrine (within the last 10 years) were reported by the SOS within the desk study area, both of which dated from 2016. One</p>

Bird community	Species Description
<p><i>(peregrine)</i></p>	<p>of these records is located to the northern extent of the desk study area, with the other to the southern extent. These records also indicate successful breeding by this species, with one record identifying a pair and the other, a pair with fledged young. This species can have an extensive home range and observations of peregrine may not indicate breeding within the field study area.</p>
<p>Mosaic, scrub and reedbed habitat – 7 <i>(Cetti's warbler, cuckoo, grey wagtail, lesser spotted woodpecker, nightjar, reed bunting, willow warbler)</i></p>	<p>Cetti's warbler – This species is designated WaCA Schedule 1 and is classified probable breeding.</p> <p><i>2017 surveys</i></p> <p>One territory was identified east of the River Arun immediately south of the current A27 route in 2017 field surveys. This species was observed in three survey rounds between April and May but was not recorded within June and peak count of three.</p> <p><i>2018 surveys and incidental records</i></p> <p>This species was recorded in April 2018 in a single survey with a peak of two and recorded as an incidental species on a separate occasion in May. This species has been frequently detected through winter bird surveys on the Arun. Records were clustered within the Arun floodplain in hedgerow and reedbed ditches. Frequent records of Cetti's warbler are reported by SxBRC, with 509 records within the past years of which there are breeding records reported from within the Arundel WWT. This species is resident all year within Great Britain and will use wet ditches with reedbed to breed. This species is utilising the habitat on the Arun floodplain year-round.</p> <p>Cuckoo - this species is BoCC Red listed, NERC S41 (SPI) and classified possible breeding.</p> <p>This species was detected in 2017 surveys and had a peak count of two with two observations on the same survey day on two different transects (1 and 2). These recordings were within 600m of each other recorded by separate surveyors walking separate transect routes, and it is probable that surveyors could hear the same bird. These recordings are located on wet scrub habitat.</p> <p>Grey wagtail - this species is BoCC Red listed and classified possible breeding.</p> <p>There was a single observation of this species on 26 May 2017 within a field adjacent to a small waterbody less than 200m north of the existing A27.</p> <p>Lesser spotted woodpecker - this species is BoCC Red listed, NERC S41 (SPI) and classified possible breeding. This species was recorded on one occasion in May 2017 and had a peak count of one. This species was located within woodland north of the existing A27.</p>

Bird community	Species Description
	<p>Nightjar – this species is classified as Annex 1, NERC S41 (SPI) and through incidental records in 2018 was recorded within a ride in Binsted Woods Complex LWS off Binsted Lane. This species has also been reported in SxBRC records within Rewell wood and Stewards Copse. This species has also been detected by MAVES.</p> <p>Reed bunting - this species is BoCC Amber listed and NERC S41 (SPI). This species is associated with wetland and farmland habitats and nests in thick vegetation and ditches. This species has experienced decline thought to be related to the Reduction in damp habitat and foraging opportunities on farmland.</p> <p><i>2017 surveys</i></p> <p>This species was classified confirmed breeding. One reed bunting territory was recorded within the eastern section of the survey area close to the River Arun. This species was recorded between May and June with a peak count of six observed on the Arun floodplain on the eastern and western side of the River Arun.</p> <p><i>2018 surveys</i></p> <p>A reed bunting territory was identified on the Arun floodplain in reed filled ditches close to the reedbed located on the Arun floodplain.</p> <p>Willow warbler - this species is BoCC Amber listed and classified possible breeding. In 2017 surveys there were two observations of willow warbler, within woodland in Rewell wood and Binsted Woods Complex LWS. Observations of this species were in June with a peak count of one. The recording within Binsted Woods Complex LWS is adjacent to Option 3. Willow warbler have experienced contraction of range and decline in population in Great Britain. The records from the SxBRC report 33 records including breeding records.</p>
<p>Farmland specialist birds – 9</p> <p><i>(Corn Bunting, Kestrel, Linnet, Meadow Pipit, Mistle Thrush, Skylark, Yellowhammer)</i></p>	<p>Corn bunting - this species is BoCC Red listed, NERC S41 (SPI) and classified possible breeding. This species was recorded within the SxBRC records for the desk study area. This species was recorded on one occasion in May, with a peak count of one, located north of the existing A27 within arable fields.</p> <p>Kestrel - this species is BoCC Amber listed and classified confirmed breeding during 2017 and 2018 field surveys. There are SxBRC records within the desk study area.</p> <p><i>2017 surveys</i></p> <p>This species was recorded within three survey rounds between May and June with a peak count of three. Observations of this species were located in arable fields, woodland and the Arun floodplain adjacent to the existing A27. One kestrel breeding attempt was identified during the surveys, the exact breeding territory of which could not be defined, but sightings of kestrel carrying food during the breeding period indicated that a breeding attempt had taken place.</p>

Bird community	Species Description
	<p><i>2018 surveys</i></p> <p>This species was not recorded during transect surveys. A kestrel nest with four discarded egg shells was identified on the Arun floodplain, close to Broomhurst Farm through incidental records in 2018. Additionally, a pair was observed close to St Mary’s church, reported as an incidental record.</p> <p>Linnets - this species is BoCC Red listed, NERC S41 (SPI) and classified possible breeding through 2017 and 2018 surveys, in addition to incidental records. This species was recorded within the SxBRC records for the desk study area.</p> <p><i>2017 surveys</i></p> <p>This species was recorded throughout the period of the field surveys with a peak count of nine recorded. This species was located across the field survey area, predominately associated with arable and agricultural fields north of the existing A27 and south of the field survey area adjacent the Scheme options. This species was also found in fields on the Arun floodplain and a single record in cleared plantation woodland north of the existing A27.</p> <p><i>2018 surveys</i></p> <p>This species was recorded flying over the floodplain but not using this habitat. Incidental records detected this species utilising field margins along the Scheme options. This species is traditionally associated with farmland and arable fields.</p> <p>Meadow pipit - this species is BoCC Amber listed and classified possible breeding. This species was recorded on one occasion in May 2017 with a peak count of one. This observation was on the edge of Binsted Woods Complex LWS adjacent to the Scheme options.</p> <p>Mistle thrush - this species is BoCC Red listed and classified possible breeding. This species was recorded within the SxBRC records for the desk study area.</p> <p>This species was recorded between April and May 2017 but was absent from species recordings in June. This species had a peak count of two and was located within open grassland areas.</p> <p>Two of the four observations were found in the western extent of the field survey area within the Avisford Park golf course.</p> <p>Skylark - this species is BoCC Red listed, NERC S41 (SPI) and classified probable breeding. This species was recorded within the SxBRC records for the desk study area.</p> <p><i>2017 surveys</i></p> <p>Twelve territories were identified in which this species was using the agricultural fields across the central section of the survey area to the south of the existing A27. This species was recorded in relatively high numbers throughout the survey period with a peak count of 21, the highest number of birds being recorded in June. This species was recorded in two clear clusters. High</p>

Bird community	Species Description
	<p>densities of skylark were recorded in arable fields north of the existing A27, and these fields also supported dense numbers of yellowhammer. This species was also distributed in arable and agricultural fields surrounding the River Arun where the proposed bridge for the Scheme options is located and fields west from this location.</p> <p><i>2018 surveys</i></p> <p>Skylark were detected using fields around the River Arun in 2017 surveys and surveys of the floodplain in 2018 also detected this species. This species was recorded throughout the survey period and three territories were identified.</p> <p>Incidental records indicated this species was also using arable fields along the Scheme options. Skylark is a species associated with arable farmland, and has experienced severe population decline following changes in agricultural practices that have affected breeding success.</p> <p>Yellowhammer - this species is BoCC Red listed, NERC S41 (SPI) and probable breeding. This species was recorded within the SxBRC records for the desk study area.</p> <p><i>2017 surveys</i></p> <p>Four territories were identified within the field study area. This species was recorded in relatively high numbers throughout the survey period with a peak count of 12. The four territories identified are intersected by or in close proximity to the Scheme options. This species was predominately found in arable and agricultural fields to the south of the field survey area and in field west of the River Arun. Observations of this species was also found north of the existing A27 in Rewell Wood. Option 3 runs through the densest observations of yellowhammer.</p> <p><i>2018 surveys</i></p> <p>This species was not recorded during 2018 surveys on the Arun floodplain but was detected as an incidental record in arable fields adjacent to Barn’s copse and Tortington Lane.</p>
<p>Waterbirds – 9 <i>(Black-headed Gull, Common Sandpiper, Greylag Goose, Herring Gull, Lapwing, Lesser Black-backed</i></p>	<p>Black-headed gull – this species is BoCC Amber listed and classified as possible breeding. This species is in SxBRC desk study records.</p> <p>Black-headed gull were observed throughout the survey period with a peak count of 91. This species was found predominately around the River Arun or within agricultural fields. This species had a low peak count of three in 2018 surveys.</p> <p>Common sandpiper - this species is BoCC Amber listed and classified possible breeding. This species was observed once throughout the surveys in May. Only one individual was recorded on the banks of the River Arun. This species was not captured during 2018 surveys on the River Arun or during incidental records.</p>

Bird community	Species Description
<p><i>Gull, Mallard, Mute Swan, Oystercatcher)</i></p>	<p>Greylag goose - this species is designated BoCC Amber listed and classified possible breeding. One individual was observed on one occasion within the eastern extent of the field study area. This observation was located within fields close to Broomhurst farm on the Arun floodplain within the final round of surveys on 08 June 2017. This was the only observation of this species within the dataset.</p> <p>Herring gull - this species is BoCC Red listed, NERC S41 (SPI) and classified possible breeding. This species was observed throughout the 2017 survey period with a peak count of 86. Incidental records of herring gull were also captured in 2018. Species observations were spread across the field survey area, located within open agricultural land, urban environments or the floodplain of the River Arun.</p> <p>Lapwing - this species is BoCC Red listed, NERC S41 (SPI) and classified confirmed breeding.</p> <p><i>2017 surveys</i></p> <p>This species was observed throughout the survey period with a peak count of seven. This species was consistently observed through the survey period using the Arun floodplain in small numbers. This species was predominately found using the fields adjacent to the proposed crossing point of the Scheme options where observations are densely clustered.</p> <p><i>2018 surveys</i></p> <p>2018 surveys on the floodplain and incidental records show similar results to 2017 survey effort. This species was recorded throughout the survey period. Two territories were identified close to the reedbed on the floodplain. This species is classified confirmed breeding due to juvenile lapwing being recorded. The species was recorded throughout the breeding season through transect surveys and as incidental records through other WSP surveys on the Arun floodplain.</p> <p>Lesser black-backed gull - this species is BoCC Amber listed and classified possible breeding.</p> <p><i>2017 surveys</i></p> <p>All records from 2017 of this species were recorded within the same survey visit with four birds observed. This species was found within arable fields during the crepuscular element of these surveys, which suggests these may be roosting birds.</p> <p><i>2018 surveys</i></p> <p>In 2018 only one individual was recorded on the Arun floodplain and this was a non-breeding record.</p> <p>Mallard - this species is BoCC Amber listed and classified confirmed breeding.</p> <p><i>2017 surveys</i></p>

Bird community	Species Description
	<p>Mallard breeding attempts were inferred from pairs of birds observed, as this species does not sing to defend territories. All observations of breeding of this species were located close to the River Arun in close proximity to the current bridge on the A27 and the Arun floodplain. This species was observed throughout the survey period with a peak count of 47.</p> <p><i>2018 surveys</i></p> <p>Through surveys on the Arun floodplain successful breeding was identified as juveniles with attending adults were recorded within wet ditched filled with reed. Three territories were identified and this species was one of the most commonly recorded in this survey effort with a peak count of 34.</p> <p>Species observations were predominately located along the River Arun and across the Arun floodplain to the east. This species has recently been added to the BoCC Amber list as non-breeding populations decline.</p> <p>Mute swan - this species is BoCC Amber listed and classified confirmed breeding.</p> <p><i>2017 surveys</i></p> <p>Mute swan were observed throughout the survey period, with a peak count of 14. This species was located frequently along the River Arun and near the existing bridge of the A27. A cluster of mute swan observations was noted at the reedbed or on the bend in the river approximately 450m from the proposed crossing point of the Scheme options. These birds were either observed singularly or in groups of two to three. There are multiple SxBRC records for this species, many of which are from the Arundel WWT in the northern extent of the desk study area, with multiple records of breeding for this species.</p> <p><i>2018 surveys</i></p> <p>This species was confirmed breeding with incubation and juveniles recorded close to the reedbed on the Arun floodplain. One territory was identified.</p> <p>Oystercatcher – this species is BoCC Amber listed and classified possible breeding.</p> <p><i>2017 surveys</i></p> <p>This species was observed along the River Arun and near the existing bridge of the River Arun. This species was recorded between May and June and has a peak count of three.</p> <p><i>2018 surveys</i></p> <p>This species was observed on one occasion and classified as non-breeding as this bird flew over the site with no indication of using the Field Study Area.</p>

4 Discussion and Recommendations

4.1 Discussion

4.1.1.1 The Field Study Area contains a diverse range of habitats which support a diverse range of bird species and this is shown by the presence of a range of species within each bird community. This report has found that the Field Study Area is a valuable landscape for breeding birds with a range of notable birds recorded from various bird communities.

4.1.2 Urban Fringe and Common Garden Species

4.1.2.1 Many species using the urban fringe and garden environments are widespread and not of conservation concern. 23 species in this community were recorded within the Field Study Area of which seven are notable birds. These are: dunnock (BoCC Amber and NERC S41 (SPI)), house martin (BoCC Amber), house sparrow (BoCC Red and NERC S41 (SPI)), song thrush (BoCC Red and NERC S41 (SPI)), starling (BoCC Red and NERC S41), stock dove (BoCC Amber) and swift (BoCC Amber).

4.1.2.2 No species within this community are WaCA Schedule 1 or Annex 1 listed. These species were found across the extent of the Field Survey Area and the urban fringe. This group of birds are often found utilising man-made structures for breeding purposes.

4.1.2.3 House sparrow, starling, swift and house martin are gregarious species which nest colonially. Both breeding house sparrow and starling within the Field Survey Area are associated with housing or urban fringes. Swift are considered possible breeding and are sensitive to the loss of breeding sites. House sparrow, swift and house martin use buildings for breeding and have experienced notable population declines as a result of loss of breeding sites. Should buildings which require removal support these species then mitigation for the loss of breeding site will be required.

4.1.2.4 Removal of dense undergrowth and hedgerow would be detrimental to both dunnock and song thrush. Dunnock (BoCC Amber List) was widespread throughout the Field Study Area. The one breeding territory identified is not within close proximity to the Scheme options. This species is associated with hedgerow habitats.

4.1.2.5 Song thrush (BoCC Red List) is a common species within this data. This species was seen in relatively high numbers throughout the survey period, with a peak count of 31. Confirmed breeding behaviour and breeding territories for this species are frequently found within woodland. Despite being commonly found within desk study records and field survey observations it has experienced significant population decline which is thought to be as a result of the loss and degradation of preferred feeding and nesting habitats which has resulted in being placed on the BoCC Red List. Grazed permanent pasture, woodland and hedgerow are important habitat for the breeding success of this species.

4.1.3 Woodland Specialist Species

4.1.3.1 15 species within this community were found within the Field Survey Area of which four are notable birds. These are: firecrest (WaCA Schedule 1), bullfinch (BoCC Amber listed and NERC S41 (SPI)), marsh tit (BoCC Red listed and NERC S41 (SPI)), tawny owl (BoCC Amber listed).

4.1.3.2 These surveys have found that there is a range of species from this community within the Field Study Area and these are described below. Many species that use woodland habitat are in population decline and are therefore species of conservation concern. Consequently, this is a valuable habitat for breeding birds.

4.1.3.3 Firecrest were recorded as incidental records in 2017 and 2018 and further information was provided by the SOS. This species is commonly associated with coniferous woodland but will use deciduous or mixed woodland. SOS records confirmed this species was breeding in woodland north of the existing A27 route in Rewell Wood. Rewell Wood would not be heavily affected by the scheme and the records reported were too far from the scheme to be affected. Records of males singing were recorded by WSP in areas of woodland which would be directly affected by the scheme. Loss of woodland in Barns Copse, Lakeside Copse and adjacent to Ford roundabout may affect this species.

4.1.3.4 Field surveys in 2017 recorded bullfinch spread across the Field Survey Area, located in Rewell Wood, Lakes Copse and surrounding woodland and woodland east of Stewards Copse close to Arundel town. This species is a woodland specialist but was also found to be associated with buildings and hedgerow in both a residential urban setting and an agricultural one. This species is likely exploiting bird feeders in those locations.

4.1.3.5 Marsh tit is a species with a declining population and a preference for mature woodland or woodland with good scrub cover in the south. This species was recorded with a peak count of three in 2017 field surveys and recorded widely spread through woodland in the Field Survey Area, predominately in Binsted Woods Complex LWS. Further records in Binsted Woods Complex LWS were collected in 2018. This species is considered possible breeding.

- 4.1.3.6 Tawny owl was recorded on one occasion north of the existing A27 route in Rewell Wood in 2017. Through incidental records in 2018 tawny owls are confirmed breeding in Binsted Woods Complex LWS and Barns Copse/ Hundredhouse Copse.
- 4.1.3.7 Woodcock have not been detected through WSP survey effort. This species has been reported in the Field Survey Area through desk study records from SxBRC and MAVES. This species is a BoCC Red Listed species and is a wading bird specialised for woodland and is highly crepuscular, being active at dawn and dusk.
- 4.1.3.8 The SxBRC report 11 records of woodcock within the last 10 years. These were predominately located Rewell Wood in which the mosaic habitat requires for breeding is more likely to be present through the forest management that takes place. This species has positive breeding records classified probable breeding at this Site. It is likely this species is breeding within Rewell Wood but additional records suggest this species can be using woodland outside of this area, likely for foraging. MAVES has reported one record at Ordinance Survey Grid Reference SU989059 described as north of Kent's Cottage but no information is provided on the breeding category.
- 4.1.3.9 The woodland habitat within the Field Study Area is shown to be valuable to breeding birds within these field surveys and a range of species from this community have been recorded. Woodland species have experienced decline due to habitat loss in recent years which has been outlined previously in this report. The loss of woodland habitat would subsequently have a detrimental effect on woodland species, many of which are classified as conservation concern. The presence of mature woodland within the Field Study Area particularly provides nesting opportunities for birds exploiting cavities as nest sites.

4.1.4 Mosaic and Scrub Habitat Species

- 4.1.4.1 Fourteen species within this community were found within the Field Survey Area of which seven are notable birds, these are: Cetti's warbler (WaCA Schedule 1), cuckoo (BoCC Red listed and NERC S41 (SPI)), grey wagtail (BoCC Red listed), lesser spotted woodpecker (BoCC Red listed and NERC S41 (SPI)), nightjar (BoCC Amber listed, NERC S41 (SPI) and Annex 1), reed bunting (BoCC Amber listed and NERC S41 (SPI)) and willow warbler (BoCC Amber listed).

- 4.1.4.2 Cetti's Warbler were recorded as probable breeding with an attempted breeding territory identified in close proximity to the existing A27 on the Arun floodplain, east of the Arun river in 2017. This species was recorded through the breeding season with a peak count of three individuals. This species was recorded on two occasions in different areas of the floodplain in the 2018 transect surveys and no territories were identified in that breeding season. This species was recorded incidentally in hedgerow on the west of the River Arun, close to the reedbed through the summer period in 2018 and in winter bird surveys²⁸ through 2018 to 2019.
- 4.1.4.3 This species is a recent colonist of the UK with breeding confirmed in the 1970s and uses scrub, reedbed and wet ditches. The floodplain adjacent to the river Arun contains suitable habitat for Cetti's warbler. As a WaCA Schedule 1 species this bird has additional protection from disturbance whilst breeding.
- 4.1.4.4 Reed bunting have been identified to be using the wetland and farmland surrounding the River Arun, south of the existing A27. One reed bunting territory was recorded within the eastern section of the survey area close to the River Arun in 2017.
- 4.1.4.5 Juvenile reed bunting were recorded within a field close to the river Arun. Reed bunting were present within hedgerow, fields and reedbed along the Arun from May until the final survey in June 2018. The presence of juveniles confirms successful breeding by this species. Another reed bunting territory was identified in 2018 transect surveys on the Arun floodplain. This species is associated with farmland habitats and nests in thick vegetation and ditches, using a variety of habitat types but is associated with scrub, hedgerow and wetland which it uses for breeding and foraging. This species breeds in thick vegetation and ditches and the removal of these structures would be detrimental to the breeding success of this species. This species has experienced population decline thought to be related to the Reduction in damp habitat in recent years.
- 4.1.4.6 Willow warbler were recorded within the middle of Binsted Woods Complex LWS in 2017 surveys and were classified possible breeding. There were a small number of observations of this species with two individuals recorded. SxBRC report several records of the species predominately located within the Arundel WWT, but also within Binsted Woods Complex LWS and Tortington Common. This species appears to have sharply declined in relative abundance during the breeding season in the south and south east of Britain in recent years.

²⁸ WSP (2017). A27 Arundel Bypass: Winter Bird Survey Report.

- 4.1.4.7 Cuckoo, grey wagtail and lesser spotted woodpecker were all recorded in only one survey round in 2017 transect surveys and are all classified possible breeding. Grey wagtail and lesser spotted woodpecker were recorded once within the entire dataset. These species are subsequently being recorded in low numbers in the Field Study Area but are notable species based upon their level of conservation concern being BoCC Red listed birds.
- 4.1.4.8 Cuckoo was identified using wet scrub habitat surrounded by farmland south of Little Danes Wood with two records reported. The only record of grey wagtail was reported in a field close to an urban area of Arundel town and a waterbody in The Waterwoods. This species is commonly recorded close to water features. The record of lesser spotted woodpecker was reported on Slindon Common.
- 4.1.4.9 Nightjar use scrub habitat and woodland of mixed age, calling from mature trees and nesting in woodland where mature trees have been removed and young growth is developing. This species exploits plantation and managed woodland as a result. There is evidence this species is using Rewell Wood to breed with desk study results from SxBRC indicating birds displaying breeding behaviour recorded at this woodland. The managed woodland provides suitable habitat for this species to breed. Breeding nightjar are reported in the citation for the Rewell Wood LWS.
- 4.1.4.10 Nightjar were detected as incidental records by WSP in Binsted Woods Complex LWS as a result of bat surveys in August 2018. This species has been reported using Stewards Copse which is part of Binsted Woods Complex LWS and south of the existing A27 route by MAVES in April 2017.
- 4.1.4.11 This suggests that this species is utilising managed woodland habitat north of the existing A27 route for breeding where the most optimal habitat can be found. This species has been detected in Binsted Woods Complex LWS by WSP and MAVES in addition to records reported through Birdtrack though these are not able to be verified. This indicates that this species is dispersed outside of Rewell Wood and may be utilising Binsted Woods Complex LWS for foraging though it is not clear if this species is breeding here.
- 4.1.4.12 Nightingale use dense scrub habitat, often close to water for breeding. This species has not been detected through WSP surveys, however desk study records suggest this species is present within the Desk Study Area. SxBRC records suggest this species is utilising the Arun Valley, with breeding records present. These records are located in areas which would not be directly affected by the Scheme options.

4.1.4.13 Nightingale have undergone a contraction in range historically and population decline since the 1980s, the south east has been a stronghold for this species. This species was recorded as breeding within the Field Study Area by EAULUL in 1991 within the EIA. MAVES has reported records of nightingale between June 2016 and June 2018 widely spread across Binsted Woods Complex LWS. These were recorded in Binsted Woods Complex LWS including: Paine's Wood in the north, close to Tortington Lane in the east and Binsted Church in the west.

4.1.4.14 This community contains several summer migrants and species that are classified as conservation concern. Breeding success is particularly important for these species to improve declining populations and these habitats should be preserved where possible.

4.1.5 Farmland Specialist Species

4.1.5.1 Thirteen species within this community were found within the Field Study Area. Nine species found within the Field Study Area are notable birds: corn bunting (BoCC Red and NERC S41 (SPI)), grey partridge (BoCC Red and NERC S41 (SPI)), kestrel (BoCC Amber and NERC S41 (SPI)), linnet (BoCC Red and NERC S41 (SPI)), meadow pipit (BoCC Amber), mistle thrush (BoCC Red), Red kite (WaCA Schedule 1 and Annex 1), skylark and yellowhammer (BoCC Red and NERC S41 (SPI)). Farmland, woodland and mosaic/ scrub habitat provide breeding opportunities for many species which are experiencing population declines and are subsequently classified as birds of conservation concern due to habitat loss, disturbance or changing land use.

4.1.5.2 Grey partridge and Red kite are WaCA Schedule 1 species with red kite additionally classified Annex 1, however both are considered not to be breeding and will subsequently not be affect by the proposed development as a breeding bird. A single observation of Red kite was made in 2017 transect surveys. This species was in flight over the Field Study Area and not recorded at any other time during the breeding period. Partridge were similarly recorded with two individuals in flight over the Field Study Area over arable fields north of the existing A27 route.

- 4.1.5.3 Skylark, yellow hammer and corn bunting are all strongly associated with arable farmland. Skylark have experienced severe population decline following changes in agricultural practices that have affected breeding opportunities for this species. As a result of this, skylark is classified BoCC Red and listed under NERC S41 as SPI, as are yellowhammer and corn bunting. Twelve skylark territories were identified within 2017 transect surveys in which this species was identified to be clustered in arable fields north of the existing A27 route and fields on the Arun floodplain on both the east and west of the River Arun. Skylark territories were recorded on the Arun floodplain in 2018 transect surveys on the floodplain adjacent to the River Arun to the east.
- 4.1.5.4 Yellowhammer are also associated with farmland and four territories were identified during the 2017 transect surveys, two in arable field south of Barn's copse and two south of Tortington Common in Binsted Woods Complex LWS. Incidental records collected through other WSP surveys in 2018 additionally found yellowhammer present in these areas.
- 4.1.5.5 Mistle thrush was recorded within open grassland areas within 2017 transect surveys. Two of the four observations were found in the western extent of the Field Survey Area within the Avisford Park golf course and one other within adjacent fields. This species has been re-classified from BoCC Amber to the BoCC Red List due to reduced breeding populations thought to be associated with Reduced foraging opportunities affecting breeding success. Meadow pipit was observed on a single occasion in 2017 transect surveys in an agricultural field adjacent to Binsted Woods Complex LWS and is an uncommon species in this dataset.
- 4.1.5.6 A kestrel was observed carrying food during the breeding season north of the existing A27 above Rewell Wood in 2017 transect surveys. Carrying food is indicative of breeding, however, the home range in which kestrel find food is from one kilometre to 10 kilometres square²⁹, suggesting that though this bird was observed carrying food within the Field Study Area, it may have been returning to a breeding territory outside of the Field Study Area. A record of a kestrel nest was reported through WSP barn owl surveys on the Arun floodplain in 2018³⁰, close to Broomhurst Farm. This species population historically declined due to pesticides and persecution, it is currently placed on the BoCC Amber List due to moderate decline in UK breeding population.

²⁹ Hardey, J. et al. (2009) Raptors: Field Guide for Surveys and Monitoring. 2nd edn. Edinburgh: Scottish Natural Heritage.

³⁰ WSP (2018). A27 Arundel Bypass: Barn Owl Survey Report.

4.1.5.7 Arable fields to the north of the existing A27 route are identified as valuable habitat for farmland species. This location is important for skylark and yellowhammer in addition to containing the only record of corn bunting within this dataset, indicating that these arable fields are of particular value to traditional farmland species. Many species that use farmland habitat are in decline and of conservation concern.

4.1.6 Other Raptors

4.1.6.1 Peregrine are classified WaCA Schedule 1 giving this species further protection from disturbance during breeding. This species is additionally classified an Annex 1 bird.

4.1.6.2 Two observations of peregrine (WaCA Schedule 1) were made across the breeding season in 2017 transect surveys with a peak count of one. This species was recorded immediately adjacent to the existing A27 with another observation over agricultural fields. This species is classified possible breeding and has a large home range, roaming long distances when foraging which it is probable these individuals were doing.

4.1.6.3 Peregrine use open upland and coastal areas for breeding being associated with exposed rocky outcrops and cliffs. Increasingly this species is utilising urban sites, breeding on exposed cathedral spires and similar structures.

4.1.6.4 Peregrine were not reported within the Desk Study Area but have been reported breeding on chalk cliffs north of the Desk Study area at North Stoke (approximately four kilometres from the existing A27 route), Houghton (4.5 kilometres north of the existing A27 route) and a gas tower in Littlehampton (south of the proposed development on the coast). Due to the large ranges these species have it will therefore be probable to find this species foraging over the suitable habitat in the Field Study Area.

4.1.7 Waterbirds – Waders, Ducks/Geese and Gulls

4.1.7.1 Twenty species within this community were found within the Field Survey Area. Twelve species recorded within the Field Study Area are considered notable, these are: black-headed gull (BoCC Amber), common sandpiper (BoCC Amber), greylag goose (BoCC Amber), herring gull (BoCC Red and NERC S41 (SPI)), kingfisher (WaCA Schedule 1), lapwing (BoCC Red and NERC S41 (SPI)), lesser black-backed gull (BoCC Amber), mallard (BoCC Amber), mute swan (BoCC Amber), oystercatcher (BoCC Amber), redshank (BoCC Amber) and teal (BoCC Amber). The grazed marsh and reedbed habitat is highly valuable for breeding birds from this community which was demonstrated within the field survey results.

- 4.1.7.2 The Arun floodplain was not accessible during field surveys undertaken in the 2017; further surveys were undertaken in 2018 to cover the area of transect 3 previously inaccessible. Records of waterbirds have been collected through 2017 partial coverage of the Arun floodplain, 2018 floodplain surveys and incidental records through other WSP surveys undertaken on the Arun floodplain.
- 4.1.7.3 Kingfisher is the only Annex 1 species recorded in this group and the only WCA Schedule 1 species in which the legislation is applicable. This species was recorded on two occasions as incidental records to the west of the Arun floodplain as non-breeding records. A habitat suitability assessment was carried out for this species and determined that there were no suitable water courses for this species to breed in the Field Survey Area. This species is frequently reported north of the existing A27 route within the desk study where breeding records are reported at the Arundel WWT. This species was recorded frequently through winter bird surveys ³¹ undertaken by WSP. This suggests this bird uses the waterways on the Arun floodplain for foraging, particularly overwinter, but during the breeding season is utilising suitable habitat which is not found within the Field Study Area.
- 4.1.7.4 Greylag goose is WaCA Schedule 1 listed species though this protection only applies in Outer Hebrides, Caithness, Sutherland and Wester Ross which is not relevant to the Field Study Area. This species is a BoCC Amber listed bird. This species was recorded as a single individual on one occasion in the Field Study Area close to Broomhurst Farm and is unlikely to be affected by the proposed development.
- 4.1.7.5 Mallard and mute swan were both confirmed breeding in 2018 surveys on the Arun floodplain. Mute swan was recorded incubating on the Arun floodplain during multiple surveys in 2018. In 2017 surveys mute swan was frequently observed along the river Arun near the existing A27 bridge and the reedbed or on the bend in the river approximately 450 metres south from the crossing point of the Scheme options with the River Arun. These birds were typically observed individually or in groups of two to three and on one occasion juvenile birds were seen on the River Arun. The presence of juveniles confirms successful breeding by mute swan. This species typically hatches between June and July and these juveniles were observed within May. Mute swan are large birds that retain their juvenile plumage until at least a year has passed, and therefore it is likely that the birds observed were juveniles from the previous season's clutch. Their presence does not necessarily indicate that breeding took place within the Field Study Area that year.

³¹ WSP (2017). A27 Arundel Bypass: Winter Bird Survey Report.

- 4.1.7.6 Mallard were confirmed breeding in both 2017 and 2018. One confirmed successful breeding attempt was located at the eastern extent of the Field Study Area immediately adjacent to the existing A27 in 2017 and one confirmed successful breeding attempt on the grazed marsh along transect 3 in 2018. Seven breeding territories of mallard were identified in the Field Study Area in 2017 surveys and three in 2018. Pairs of mallard were observed predominately along the River Arun and the surrounding floodplain area. Mallard prefer to nest near water in dense vegetation and will occupy open water where food is available. The floodplain area surrounding the existing A27 and along the River Arun provides suitable food resources, vegetation cover for nesting and agricultural fields for birds to use this area for breeding.
- 4.1.7.7 Three gull species were found within the Field Survey Area: herring gull, lesser black-backed gull and black-headed gull. Herring gull and black-headed gull were found throughout the survey season in 2017 surveys and were also detected in 2018 surveys. Herring gull and black backed gull were frequently recorded with lesser black-backed gull recorded infrequently being recorded in one survey visit in 2017 and in 2018. These species are using the River Arun, the Arun floodplain and agricultural fields for foraging. These species are often found utilising areas with high levels of human disturbance and will use manmade structures for nesting. Removal of structures during the breeding season will subsequently need to consider mitigation actions for this group of species.
- 4.1.7.8 Lapwing was consistently observed through the survey period in 2017 using the Arun floodplain in small numbers and predominately found using the fields adjacent to the proposed crossing point of the Scheme options and the River Arun, here observations are densely clustered. This species was recorded throughout the breeding season in 2018 through transect surveys and as incidental records through other WSP surveys on the Arun floodplain. Two territories were identified close to the reedbed on the Arun floodplain, this species is classified confirmed breeding due to juvenile lapwing being recorded this species was also recorded showing aggression to other birds at the same site and distraction displays.
- 4.1.7.9 Oystercatcher was observed along the River Arun in 2017 transect surveys and on one occasion in 2018 transect surveys on the Arun floodplain. In 2017 this species was classified as possible breeding but in 2018 surveys was considered non-breeding - only one individual was recorded which flew over the Site without landing at any point.

- 4.1.7.10 Common sandpiper, redshank and teal were recorded infrequently. One observation of common sandpiper was made in 2017 surveys, this species was not recorded in 2018 transect surveys or as incidental records. Redshank and teal were additionally recorded in 2018 surveys on the Arun floodplain. These species were both recorded on one occasion and considered possible breeding. These species are subsequently scarce in the field data collected and unlikely to be affected by the proposed development.
- 4.1.7.11 The Arundel WWT and the Arun Valley SPA/Ramsar, which is also notified as three separate SSSI (Amberley Wild Brooks, Pulborough Brook and Waltham Brooks) is known to be valuable for breeding waterfowl. The Arun floodplain in the eastern extent of the Field Study Area is connected to these sites by the River Arun and waterfowl species. There is likely to be some species transfer between the Arun floodplain and the Arundel WWT site to the north of the Field Study Area. Waders, ducks, gulls and geese that are breeding in this site may be using the Arun floodplain for foraging.

4.2 Further Survey Recommendations

- 4.2.1.1 Suitable habitat and records of nightjar are present in Binsted Woods Complex LWS and Rewell Wood. Further surveys for nightjar are recommended to determine if breeding nightjar are present in these habitats.

Appendix A: Desk Study Data

Table A-1 – SxBRC Desk Study Results

Species	Scientific Name	Annex 1	Schedule 1	NERC S41	BoCC classification (Red or Amber)
Avocet	<i>Recurvirostra avosetta</i>	X	X		Amber
Barn Owl	<i>Tyto alba</i>		X		NL
Bearded Tit	<i>Panurus biarmicus</i>		X		NL
Bittern	<i>Botaurus stellaris</i>	X	X	X	Amber
Black-headed Gull	<i>Larus ridibundus</i>				Amber
Bullfinch	<i>Pyrrhula pyrrhula</i>			X	Amber
Cetti's Warbler	<i>Cettia cetti</i>		X		NL
Common Crossbill	<i>Loxia curvirostra</i>		X		NL
Common Gull	<i>Larus canus</i>				Amber
Common Sandpiper	<i>Actitis hypoleucos</i>				Amber
Common Shelduck	<i>Tadorna tadorna</i>				Amber
Common Tern	<i>Sterna hirundo</i>	X			Amber
Corn Bunting	<i>Miliaria calandra</i>			X	Red
Cuckoo	<i>Cuculus canorus</i>			X	Red
Curlew	<i>Numenius arquata</i>			X	Red
Dunnock	<i>Prunella modularis</i>			X	Amber
Firecrest	<i>Regulus ignicapilla</i>		X		NL
Gadwall	<i>Anas strepera</i>				Amber
Garganey	<i>Anas querquedula</i>		X		Amber
Grasshopper Warbler	<i>Locustella naevia</i>			X	Red
Great Black-backed Gull	<i>Larus marinus</i>				Amber
Green Woodpecker	<i>Picus viridis</i>				NL
Grey Partridge	<i>Perdix perdix</i>			X	Red
Grey Wagtail	<i>Motacilla cinerea</i>				Red
Hawfinch	<i>Coccothraustes coccothraustes</i>			X	Red
Herring Gull	<i>Larus argentatus</i>			X	Red
Hobby	<i>Falco subbuteo</i>		X		NL
House Martin	<i>Delichon urbicum</i>				Amber
House Sparrow	<i>Passer domesticus</i>			X	Red
Kestrel	<i>Falco tinnunculus</i>				Amber

Species	Scientific Name	Annex 1	Schedule 1	NERC S41	BoCC classification (Red or Amber)
Kingfisher	<i>Alcedo atthis</i>	X	X		Amber
Lapwing	<i>Vanellus vanellus</i>			X	Red
Lesser Black-backed Gull	<i>Larus fuscus</i>				Amber
Lesser Spotted Woodpecker	<i>Dendrocopos minor</i>			X	Red
Linnet	<i>Carduelis cannabina</i>			X	Red
Little Egret	<i>Egretta garzetta</i>	X			NL
Little Grebe	<i>Tachybaptus ruficollis</i>				NL
Little Ringed Plover	<i>Charadrius dubius</i>		X		NL
Mallard	<i>Anas platyrhynchos</i>				Amber
Marsh Tit	<i>Poecile palustris</i>			X	Red
Meadow Pipit	<i>Anthus pratensis</i>				Amber
Mediterranean Gull	<i>Larus melanocephalus</i>	X	X		Amber
Mistle Thrush	<i>Turdus viscivorus</i>				Red
Mute Swan	<i>Cygnus olor</i>				Amber
Nightingale	<i>Luscinia megarhynchos</i>				Red
Nightjar	<i>Caprimulgus europaeus</i>	X		X	Amber
Osprey	<i>Pandion haliaetus</i>	X	X		Amber
Oystercatcher	<i>Haematopus ostralegus</i>				Amber
Pochard	<i>Aythya ferina</i>				Red
Quail	<i>Coturnix coturnix</i>		X		Amber
Red Kite	<i>Milvus milvus</i>	X	X		NL
Redshank	<i>Tringa totanus</i>				Amber
Redstart	<i>Phoenicurus phoenicurus</i>				Amber
Reed Bunting	<i>Emberiza schoeniclus</i>			X	Amber
Ringed Plover	<i>Charadrius hiaticula</i>				Red
Sand Martin	<i>Riparia riparia</i>				NL
Shoveler	<i>Anas clypeata</i>				Amber

Species	Scientific Name	Annex 1	Schedule 1	NERC S41	BoCC classification (Red or Amber)
Skylark	<i>Alauda arvensis</i>			X	Red
Snipe	<i>Gallinago gallinago</i>				Amber
Song Thrush	<i>Turdus philomelos</i>			X	Red
Spotted Flycatcher	<i>Muscicapa striata</i>			X	Red
Starling	<i>Sturnus vulgaris</i>			X	Red
Stock Dove	<i>Columba oenas</i>				Amber
Swallow	<i>Hirundo rustica</i>				NL
Swift	<i>Apus apus</i>				Amber
Tawny Owl	<i>Strix aluco</i>				Amber
Teal	<i>Anas crecca</i>				Amber
Tufted Duck	<i>Aythya fuligula</i>				NL
Turtle Dove	<i>Streptopelia turtur</i>			X	Red
Wheatear	<i>Oenanthe oenanthe</i>				NL
Whinchat	<i>Saxicola rubetra</i>				Red
Whitethroat	<i>Sylvia communis</i>				NL
Wigeon	<i>Anas penelope</i>				Amber
Willow Warbler	<i>Phylloscopus trochilus</i>				Amber
Wood Warbler	<i>Phylloscopus sibilatrix</i>			X	Red
Woodcock	<i>Scolopax rusticola</i>				Red
Woodlark	<i>Lullula arborea</i>	X	X	X	NL
Yellow Wagtail	<i>Motacilla flava</i>			X	Red
Yellowhammer	<i>Emberiza citrinella</i>			X	Red
Yellow-legged Gull	<i>Larus michahellis</i>				Amber

Appendix B: Field Survey Data

Table B-1 – 2017 Transect Data Summary

Common Name	Scientific Name	Visit number					Peak Count	Territories	Breeding category	Annex 1	Schedule 1	NERC S41	BoCC Classification
		1	2	3	4	5							
Blackbird	<i>Turdus merula</i>	76	66	57	65	57	76	18	Confirmed	NL	N/A	N/A	Green
Blackcap	<i>Sylvia atricapilla</i>	16	5	6	2	8	16	0	Possible	NL	N/A	N/A	Green
Black-headed Gull	<i>Larus ridibundus</i>	91	26	11	16	23	91	0	Possible	NL	N/A	N/A	Amber
Blue Tit	<i>Cyanistes caeruleus</i>	13	19	32	22	14	32	4	Confirmed	NL	N/A	N/A	Green
Bullfinch	<i>Pyrrhula pyrrhula</i>	4	2	5	0	0	5	0	Probable	NL	N/A	X	Amber
Buzzard	<i>Buteo buteo</i>	2	3	5	1	4	5	0	Possible	NL	N/A	N/A	Green
Canada Goose	<i>Branta canadensis</i>	0	0	1	0	0	1	0	Possible	NL	N/A	N/A	Green
Carrion Crow	<i>Corvus corone</i>	76	36	73	45	50	76	0	Confirmed	NL	N/A	N/A	Green
Cetti's Warbler	<i>Cettia cetti</i>	1	1	3	0	0	3	1	Probable	NL	X	N/A	Green
Chaffinch	<i>Fringilla coelebs</i>	18	15	19	15	19	19	10	Probable	NL	N/A	N/A	Green
Chiffchaff	<i>Phylloscopus collybita</i>	21	28	17	15	19	28	4	Probable	NL	N/A	N/A	Green
Coal Tit	<i>Parus ater</i>	0	6	8	7	5	8	0	Confirmed	NL	N/A	N/A	Green
Collared Dove	<i>Streptopelia decaocto</i>	4	12	9	9	7	12	0	Confirmed	NL	N/A	N/A	Green
Common Sandpiper	<i>Actitis hypoleucos</i>	0	1	0	0	0	1	0	Possible	NL	N/A	N/A	Amber
Coot	<i>Fulica atra</i>	1	0	1	0	1	1	0	Possible	NL	N/A	N/A	Green
Cormorant	<i>Phalacrocorax carbo</i>	6	0	0	4	5	6	0	Possible	NL	N/A	N/A	Green
Corn Bunting	<i>Miliaria calandra</i>	0	0	1	0	0	1	0	Possible	NL	N/A	X	Red
Cuckoo	<i>Cuculus canorus</i>	0	0	2	0	0	2	0	Possible	NL	N/A	X	Red
Dunnock	<i>Prunella modularis</i>	20	15	18	29	5	29	1	Probable	NL	N/A	X	Amber
Feral Pigeon	<i>Columbia livia</i>	0	0	0	0	2	2	0	Possible	NL	N/A	N/A	Green
Firecrest	<i>Regulus ignicapilla</i>	0	1	0	0	0	1	0	Possible	NL	X	N/A	Green
Garden Warbler	<i>Sylvia borin</i>	0	1	0	0	0	1	0	Possible	NL	N/A	N/A	Green
Goldcrest	<i>Regulus regulus</i>	14	4	4	3	7	14	0	Possible	NL	N/A	N/A	Green

Appendix 8-10: Breeding Bird Interim Baseline Survey
A27 Arundel Bypass – PCF Stage 2 Further Consultation



Common Name	Scientific Name	Visit number					Peak Count	Territories	Breeding category	Annex 1	Schedule 1	NERC S41	BoCC Classification
		1	2	3	4	5							
Goldfinch	<i>Carduelis carduelis</i>	34	40	41	15	13	41	0	Possible	NL	N/A	N/A	Green
Goosander	<i>Mergus merganser</i>	1	0	0	0	0	1	0	Possible	NL	N/A	N/A	Green
Great Spotted Woodpecker	<i>Dendrocopos major</i>	7	11	14	10	3	14	5	Confirmed	NL	N/A	N/A	Green
Great Tit	<i>Parus major</i>	28	24	36	12	28	36	2	Confirmed	NL	N/A	N/A	Green
Green Woodpecker	<i>Picus viridis</i>	2	11	4	3	1	11	0	Possible	NL	N/A	N/A	Green
Greenfinch	<i>Carduelis chloris</i>	3	3	5	2	2	5	0	Possible	NL	N/A	N/A	Green
Grey Heron	<i>Ardea cinerea</i>	1	3	0	5	2	5	0	Possible	NL	N/A	N/A	Green
Grey Partridge	<i>Perdix perdix</i>	0	0	0	2	0	2	0	Not breeding	NL	N/A	X	Red
Grey Wagtail	<i>Motacilla cinerea</i>	0	0	1	0	0	1	0	Possible	NL	N/A	N/A	Red
Greylag Goose	<i>Anser anser</i>	0	0	0	0	1	1	0	Possible	NL	X	N/A	Amber
Herring Gull	<i>Larus argentatus</i>	33	43	21	86	9	86	0	Possible	NL	N/A	X	Red
House Martin	<i>Delichon urbicum</i>	0	0	0	16	0	16	0	Possible	NL	N/A	N/A	Amber
House Sparrow	<i>Passer domesticus</i>	32	41	42	36	37	42	7	Confirmed	NL	N/A	X	Red
Jackdaw	<i>Corvus monedula</i>	41	66	31	73	55	73	2	Confirmed	NL	N/A	N/A	Green
Jay	<i>Garrulus glandarius</i>	1	5	2	2	5	5	0	Possible	NL	N/A	N/A	Green
Kestrel	<i>Falco tinnunculus</i>	0	0	2	3	2	3	1	Confirmed	NL	N/A	N/A	Amber
Lapwing	<i>Vanellus vanellus</i>	4	7	4	2	5	7	0	Probable	NL	N/A	X	Red
Lesser Black-backed Gull	<i>Larus fuscus</i>	0	0	0	4	0	4	0	Possible	I	N/A	N/A	Amber
Lesser Spotted Woodpecker	<i>Dendrocopos minor</i>	0	1	0	0	0	1	0	Possible	NL	N/A	X	Red
Linnet	<i>Carduelis cannabina</i>	1	4	15	5	3	15	0	Possible	I	N/A	X	Red
Little Egret	<i>Egretta garzetta</i>	3	0	2	0	1	3	0	Possible	NL	N/A	N/A	Green
Long-tailed Tit	<i>Aegithalos caudatus</i>	3	17	25	19	17	25	0	Possible	NL	N/A	N/A	Green

Appendix 8-10: Breeding Bird Interim Baseline Survey
A27 Arundel Bypass – PCF Stage 2 Further Consultation



Common Name	Scientific Name	Visit number					Peak Count	Territories	Breeding category	Annex 1	Schedule 1	NERC S41	BoCC Classification
		1	2	3	4	5							
Magpie	<i>Pica pica</i>	14	17	17	16	19	19	0	Possible	NL	N/A	N/A	Green
Mallard	<i>Anas platyrhynchos</i>	21	16	15	47	23	47	7	Confirmed	NL	N/A	N/A	Amber
Mandarin Duck	<i>Aix galericulata</i>	0	2	0	0	1	2	0	Possible	NL	N/A	N/A	Green
Marsh Tit	<i>Poecile palustris</i>	0	2	2	1	3	3	0	Possible	NL	N/A	X	Red
Meadow Pipit	<i>Anthus pratensis</i>	0	1	0	0	0	1	0	Possible	NL	N/A	N/A	Amber
Mistle Thrush	<i>Turdus viscivorus</i>	2	1	2	0	0	2	0	Possible	NL	N/A	N/A	Red
Moorhen	<i>Gallinula chloropus</i>	0	0	3	3	2	3	1	Confirmed	NL	N/A	N/A	Green
Mute Swan	<i>Cygnus olor</i>	5	12	4	8	14	14	0	Confirmed	NL	N/A	N/A	Amber
Nuthatch	<i>Sitta europaea</i>	1	4	13	2	8	13	2	Confirmed	NL	N/A	N/A	Green
Oystercatcher	<i>Haematopus ostralegus</i>	0	2	2	3	0	3	0	Possible	NL	N/A	N/A	Amber
Peregrine	<i>Falco peregrinus</i>	0	1	0	1	0	1	0	Possible	I	X	N/A	Green
Pheasant	<i>Phasianus colchicus</i>	9	5	1	3	5	9	0	Probable	NL	N/A	N/A	Green
Pied/White Wagtail	<i>Motacilla alba</i>	1	2	5	1	4	5	0	Possible	Green	N/A	N/A	Pied/White Wagtail
Red Kite	<i>Milvus milvus</i>	0	1	0	0	0	1	0	Not breeding	Green	X	N/A	Red Kite
Reed Bunting	<i>Emberiza schoeniclus</i>	0	4	6	0	1	6	1	Confirmed	Amber	N/A	X	Reed Bunting
Reed Warbler	<i>Acrocephalus scirpaceus</i>	0	2	13	1	0	13	1	Probable	Green	N/A	N/A	Reed Warbler
Robin	<i>Erithacus rubecula</i>	49	53	58	40	27	58	29	Confirmed	Green	N/A	N/A	Robin
Rook	<i>Corvus frugilegus</i>	41	14	44	67	35	67	3	Confirmed	Green	N/A	N/A	Rook
Sedge Warbler	<i>Acrocephalus schoenobaenus</i>	1	9	3	1	7	9	5	Confirmed	Green	N/A	N/A	Sedge Warbler
Skylark	<i>Alauda arvensis</i>	9	8	18	16	24	24	12	Probable	Red	N/A	X	Skylark
Song Thrush	<i>Turdus philomelos</i>	15	21	24	31	23	31	17	Confirmed	Red	N/A	X	Song Thrush
Sparrowhawk	<i>Accipiter nisus</i>	1	0	0	0	0	1	0	Possible	Green	N/A	N/A	Sparrowhawk

Appendix 8-10: Breeding Bird Interim Baseline Survey
A27 Arundel Bypass – PCF Stage 2 Further Consultation



Common Name	Scientific Name	Visit number					Peak Count	Territories	Breeding category	Annex 1	Schedule 1	NERC S41	BoCC Classification
		1	2	3	4	5							
Starling	<i>Sturnus vulgaris</i>	61	75	122	78	61	122	5	Confirmed	Red	N/A	X	Starling
Stock Dove	<i>Columba oenas</i>	5	7	9	16	2	16	0	Probable	Amber	N/A	N/A	Stock Dove
Swallow	<i>Hirundo rustica</i>	8	11	15	33	14	33	0	Possible	Green	N/A	N/A	Swallow
Swift	<i>Apus apus</i>	0	1	8	51	17	51	0	Possible	Amber	N/A	N/A	Swift
Tawny Owl	<i>Strix aluco</i>	0	0	0	1	0	1	0	Possible	Amber	N/A	N/A	Tawny Owl
Treecreeper	<i>Certhia familiaris</i>	3	0	2	0	0	3	1	Confirmed	Green	N/A	N/A	Treecreeper
Tufted Duck	<i>Aythya fuligula</i>	0	0	0	0	1	1	0	Possible	Green	N/A	N/A	Tufted Duck
Wheatear	<i>Oenanthe oenanthe</i>	1	2	0	0	0	2	0	Probable	Green	N/A	N/A	Wheatear
Whitethroat	<i>Sylvia communis</i>	12	33	18	5	14	33	13	Probable	Green	N/A	N/A	Whitethroat
Willow Warbler	<i>Phylloscopus trochilus</i>	0	0	0	1	1	1	0	Possible	Amber	N/A	N/A	Willow Warbler
Wood pigeon	<i>Columba palumbus</i>	119	95	48	150	136	150	0	Possible	Green	N/A	N/A	Wood pigeon
Wren	<i>Troglodytes troglodytes</i>	52	60	69	25	68	69	56	Confirmed	Green	N/A	N/A	Wren
Yellowhammer	<i>Emberiza citrinella</i>	6	9	12	10	8	12	4	Probable	Red	N/A	X	Yellowhammer

Table B-2 – 2018 Transect (3) Data Summary

Species Name	Scientific Name	Visit number					Peak Count	Territories	Breeding Cat	Annex 1	Schedule 1	NERC S41	BoCC Classification
		1	2	3	4	5							
Blackbird	<i>Turdus merula</i>	2	4		5	1	5	3	Possible	NL	NL	NL	Green
Blackcap	<i>Sylvia atricapilla</i>					1	1	0	Possible	NL	NL	NL	Green
Black-headed Gull	<i>Larus ridibundus</i>				3		3	0	Possible	NL	NL	NL	Amber
Blue Tit	<i>Cyanistes caeruleus</i>			1		1	1	0	Possible	NL	NL	NL	Green
Canada Goose	<i>Branta canadensis</i>		1		2		2	0	Non-breeder	NL	NL	NL	Green
Carrion Crow	<i>Corvus corone</i>	2	5		13	1	13	3	Probable	NL	NL	NL	Green

Appendix 8-10: Breeding Bird Interim Baseline Survey
A27 Arundel Bypass – PCF Stage 2 Further Consultation



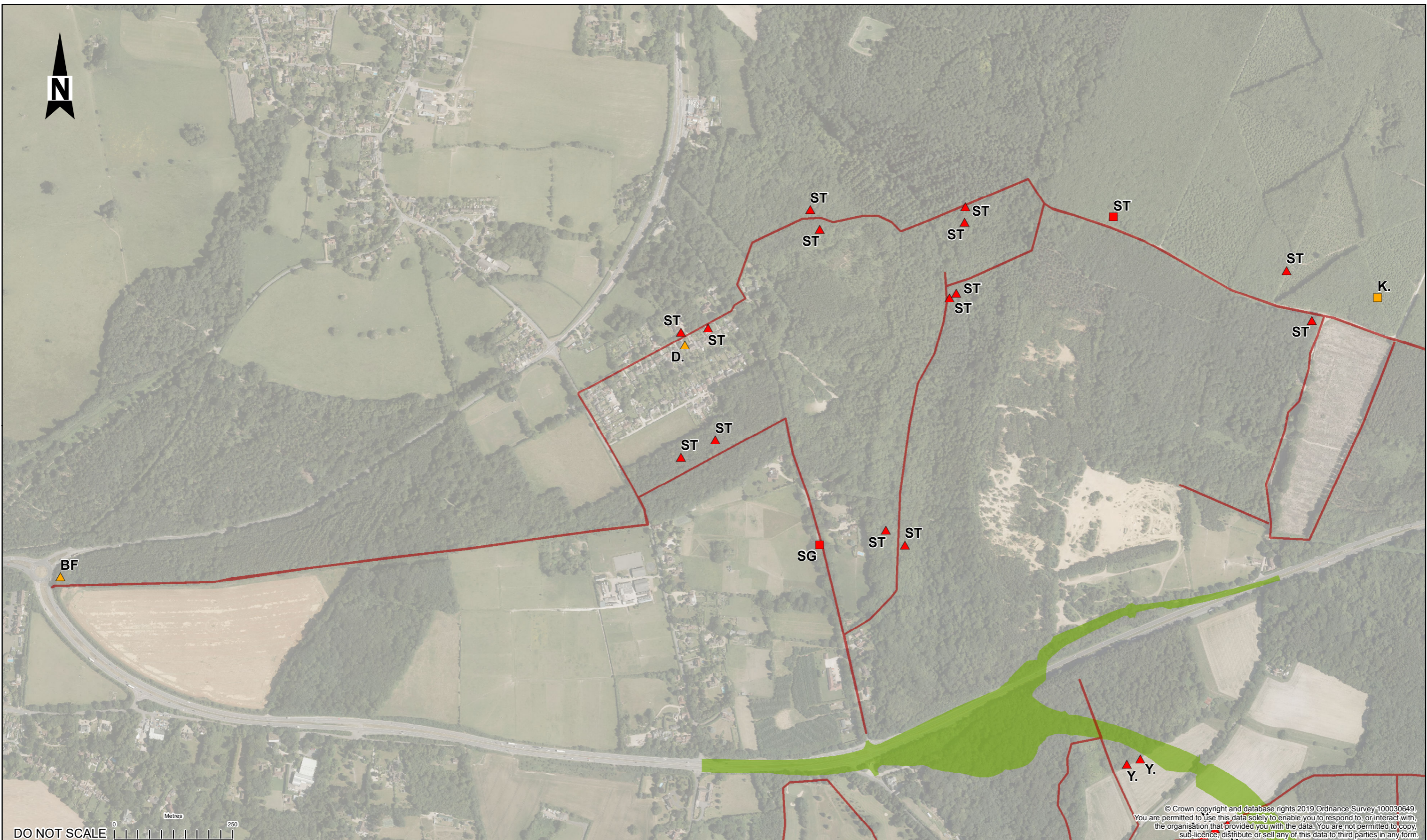
Species Name	Scientific Name	Visit number					Peak Count	Territories	Breeding Cat	Annex 1	Schedule 1	NERC S41	BoCC Classification
		1	2	3	4	5							
Cetti's Warbler	<i>Cettia cetti</i>		2				2	0	Possible	NL	X	NL	Green
Chiffchaff	<i>Phylloscopus collybita</i>		1				1	0	Possible	NL	NL	NL	Green
Collared Dove	<i>Streptopelia decaocto</i>	2	3	2	2	5	5	2	Probable	NL	NL	NL	Green
Coot	<i>Fulica atra</i>		4	2			4	1	Confirmed	NL	NL	NL	Green
Cormorant	<i>Phalacrocorax carbo</i>	3		3			3	0	Non-breeder	NL	NL	NL	Green
Dunnock	<i>Prunella modularis</i>	2		1	1	1	2	0	Possible	NL	NL	X	Amber
Goldfinch	<i>Carduelis carduelis</i>	2		1	4	1	4	1	Possible	NL	NL	NL	Green
Great Tit	<i>Parus major</i>	1		1	1		1	0	Possible	NL	NL	NL	Green
Greenfinch	<i>Carduelis chloris</i>					2	2	0	Possible	NL	NL	NL	Green
Grey Heron	<i>Ardea cinerea</i>			2	1	2	2	0	Possible	NL	NL	NL	Green
House Sparrow	<i>Passer domesticus</i>	30	24	18	21	46	46	3	Confirmed	NL	NL	X	Red
Jackdaw	<i>Corvus monedula</i>	1	1	7	11	1	11	1	Possible	NL	NL	NL	Green
Lapwing	<i>Vanellus vanellus</i>		1	6	6	7	7	1	Confirmed	NL	NL	X	Red
Lesser Black-backed Gull	<i>Larus fuscus</i>		1				1	0	Non-breeder	NL	NL	NL	Amber
Linnet	<i>Carduelis cannabina</i>			3		1	3	0	Non-breeder	NL	NL	NL	Red
Little Egret	<i>Egretta garzetta</i>	4	3	1	2	1	4	1	Possible	I	NL	NL	Green
Magpie	<i>Pica pica</i>	1			4	3	4	5	Possible	NL	NL	NL	Green
Mallard	<i>Anas platyrhynchos</i>	9	27	34	13	13	34	14	Confirmed	NL	NL	NL	Amber
Moorhen	<i>Gallinula chloropus</i>	2	1				2	0	Possible	NL	NL	NL	Green
Mute Swan	<i>Cygnus olor</i>		2	2	3	3	3	2	Confirmed	NL	NL	NL	Amber
Oystercatcher	<i>Haematopus ostralegus</i>					1	1	0	Non-breeder	NL	NL	NL	Amber

Appendix 8-10: Breeding Bird Interim Baseline Survey
A27 Arundel Bypass – PCF Stage 2 Further Consultation



Species Name	Scientific Name	Visit number					Peak Count	Territories	Breeding Cat	Annex 1	Schedule 1	NERC S41	BoCC Classification
		1	2	3	4	5							
Red-legged Partridge	<i>Alectoris rufa</i>					2	2	0	Non-breeder	NL	NL	NL	Green
Redshank	<i>Tringa totanus</i>			1			1	0	Possible	NL	NL	NL	Amber
Reed Bunting	<i>Emberiza schoeniclus</i>		4	13	1	4	13	2	Probable	NL	NL	X	Amber
Reed Warbler	<i>Acrocephalus scirpaceus</i>		4	2	7	8	8	1	Probable	NL	NL	NL	Green
Robin	<i>Erithacus rubecula</i>			3		2	3	1	Possible	NL	NL	NL	Green
Rook	<i>Corvus frugilegus</i>		6		3	10	10	1	Confirmed	NL	NL	NL	Green
Sedge Warbler	<i>Acrocephalus schoenobaenus</i>			1			1	0	Possible	NL	NL	NL	Green
Skylark	<i>Alauda arvensis</i>		3	3	1	2	3	3	Probable	NL	NL	NL	Red
Song Thrush	<i>Turdus philomelos</i>	1			3	1	3	2	Possible	NL	NL	X	Red
Sparrowhawk	<i>Accipiter nisus</i>				1		1	0	Possible	NL	NL	NL	Green
Starling	<i>Sturnus vulgaris</i>	3	4	41	50	28	50	1	Confirmed	NL	NL	X	Red
Swallow	<i>Hirundo rustica</i>		1				1	0	Possible	NL	NL	NL	Green
Swift	<i>Apus apus</i>				1	20	20	1	Non-breeder	NL	NL	NL	Amber
Teal	<i>Anas crecca</i>		1				1	0	Possible	NL	NL	NL	Amber
Wood Pigeon	<i>Columba palumbus</i>	1	8		28	13	28	5	Possible	NL	NL	NL	Green
Wren	<i>Troglodytes troglodytes</i>	9	8	11	7	7	11	14	Probable	NL	NL	NL	Green

Appendix C:
Field
Survey Maps
- Notable
Birds



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KEY:

 OPTION 1	BREEDING CATEGORY
 OPTION 3	<input type="checkbox"/> CONFIRMED
 OPTION 5A	<input type="checkbox"/> PROBABLE
 SURVEY TRANSECTS	BoCC CATEGORY
	● RED
	● AMBER
	● GREEN (SCHEDULE 1 ONLY)

CW - Cetti's Warbler	SD - Stock Dove
BF - Bullfinch	SG - Starling
D. - Dunnock	ST - Song Thrush
HS - House Sparrow	Y. - Yellowhammer
K. - Kestrel	
L. - Lapwing	
MA - Mallard	
MS - Mute Swan	
RB - Reed Bunting	
S. - Skylark	

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION			
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).			
Construction			
Maintenance / Cleaning			
Use			
Decommissioning / Demolition			
Rev	Date	Description	By Chk'd App'd
P01.1		First Issue	

Drawing Status: **FINAL**

Suitability: **S0**



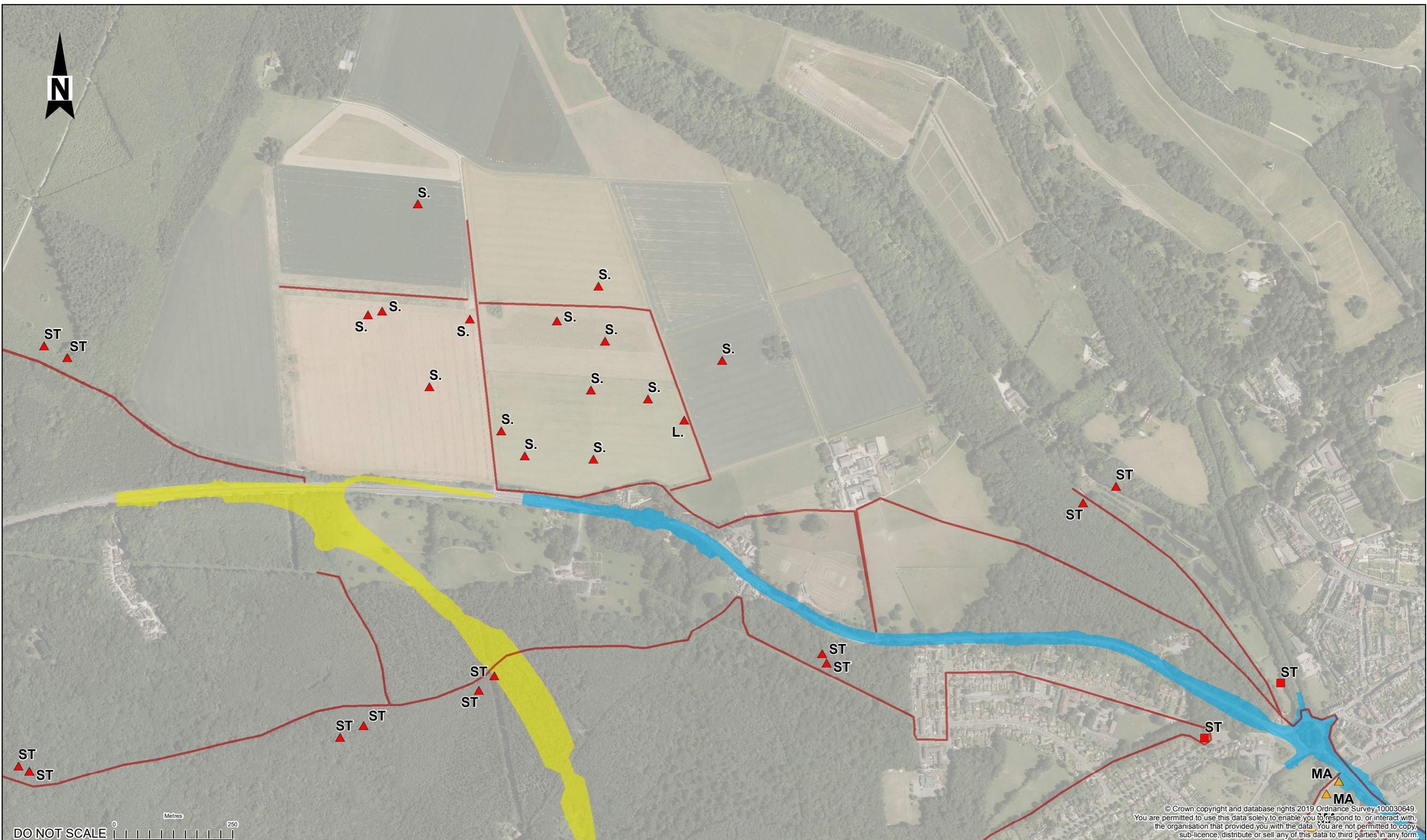
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Client: **Working on behalf of**



Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL				
Drawing Title: BREEDING BIRDS APPENDIX C 2017 FIELD SURVEY MAP - NOTABLE BIRDS PAGE 1 OF 4				
Scale: 1:7,500	Drawn: BS	Checked: ZC	Approved: AB	Authorised: PA
Original Size: A3	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19
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KEY:

- OPTION 1
- OPTION 3
- OPTION 5A
- SURVEY TRANSECTS

BREEDING CATEGORY

- CONFIRMED
- PROBABLE

BoCC CATEGORY

- RED
- AMBER
- GREEN (SCHEDULE 1 ONLY)

CW - Cetti's Warbler SD - Stock Dove
 BF. - Bullfinch SG - Starling
 D. - Dunnock ST - Song Thrush
 HS - House Sparrow Y. - Yellowhammer
 K. - Kestrel
 L. - Lapwing
 MA - Mallard
 MS - Mute Swan
 RB - Reed Bunting
 S. - Skylark

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION			
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).			
Construction			
Maintenance / Cleaning			
Use			
Decommissioning / Demolition			
Rev.	Date	Description	By Chk'd App'd
P01.1		First Issue	

Drawing Status: **FINAL**

Suitability: **S0**

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Client: **Working on behalf of**

Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL				
Drawing Title: BREEDING BIRDS APPENDIX C 2017 FIELD SURVEY MAP - NOTABLE BIRDS PAGE 2 OF 4				
Scale: 1:7,500	Drawn: BS	Checked: ZC	Approved: AB	Authorised: PA
Original Size: A3	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19
Drawing Number: HE551523 -WSP - GEN - A27AR- F1 - GIS - 0000	Originator: WSP	Volume: GEN	Project Ref. No: 70052558	Revision: P01
Location:	Type:	Role:	Number:	



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- KEY:**
- OPTION 1
 - OPTION 3
 - OPTION 5A
 - SURVEY TRANSECTS

- BREEDING CATEGORY**
- CONFIRMED
 - PROBABLE
- BoCC CATEGORY**
- RED
 - AMBER
 - GREEN (SCHEDULE 1 ONLY)

- | | |
|----------------------|-------------------|
| CW - Cetti's Warbler | SD - Stock Dove |
| BF. - Bullfinch | SG - Starling |
| D. - Dunnock | ST - Song Thrush |
| HS - House Sparrow | Y. - Yellowhammer |
| K. - Kestrel | |
| L. - Lapwing | |
| MA - Mallard | |
| MS - Mute Swan | |
| RB - Reed Bunting | |
| S. - Skylark | |

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION			
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).			
Construction			
Maintenance / Cleaning			
Use			
Decommissioning / Demolition			
Rev	Date	Description	By Chk'd App'd
P01.1		First Issue	

Drawing Status: **FINAL**

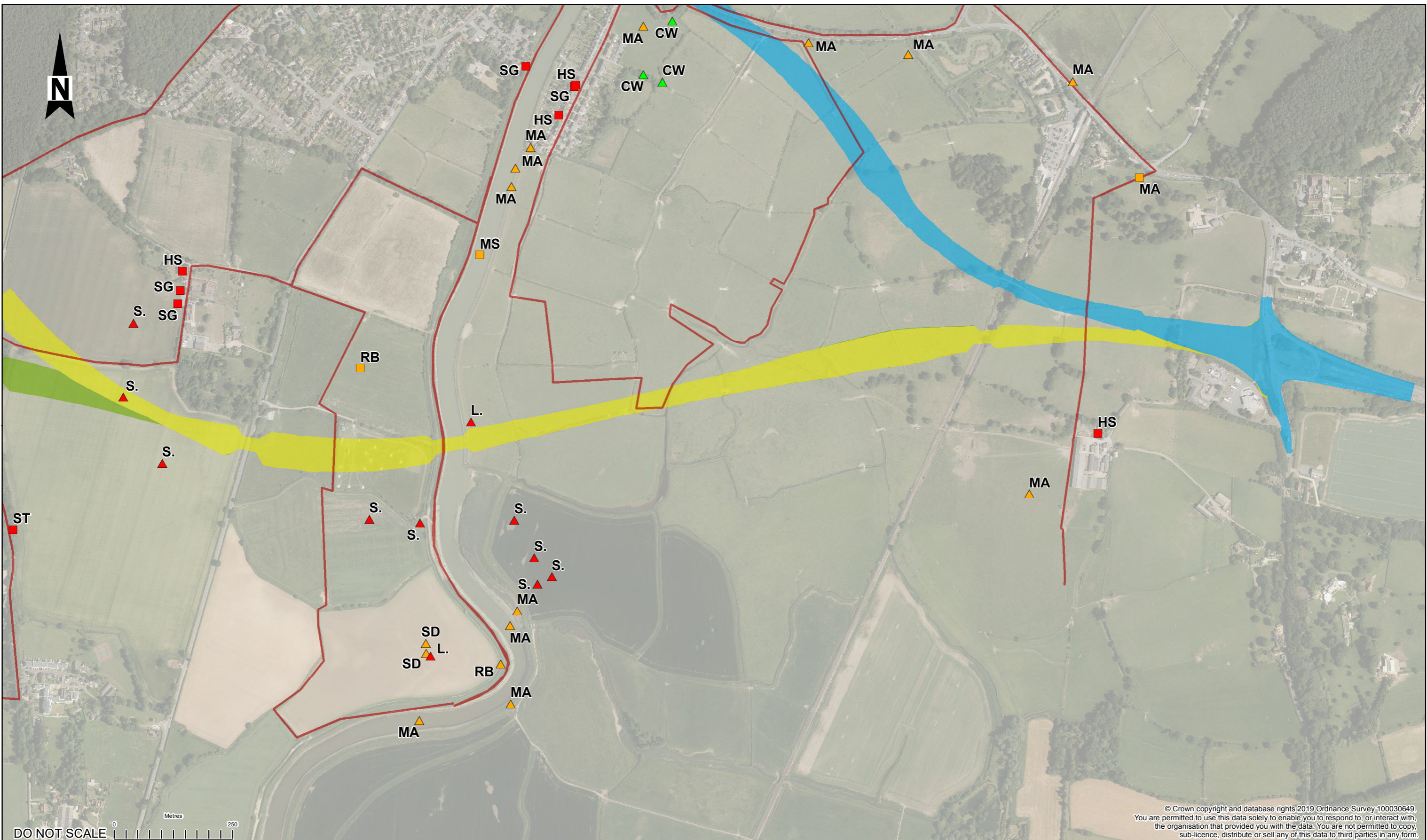
Suitability: **S0**

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Client: **Working on behalf of**
highways england

Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL				
Drawing Title: BREEDING BIRDS APPENDIX C 2017 FIELD SURVEY MAP - NOTABLE BIRDS PAGE 3 OF 4				
Scale: 1:7,500	Drawn: BS	Checked: ZC	Approved: AB	Authorised: PA
Original Size: A3	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19
Drawing Number: HE551523 -WSP - GEN - A27AR- F1 - GIS - 0000	Originator: []	Volume: []	Project Ref. No. 70052558	Revision: P01
Location: []	Type: []	Role: []	Number: []	



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KEY:	BREEDING CATEGORY
OPTION 1	<input type="checkbox"/> CONFIRMED
OPTION 3	<input type="checkbox"/> PROBABLE
OPTION 5A	
SURVEY TRANSECTS	BoCC CATEGORY
	RED
	AMBER
	GREEN (SCHEDULE 1 ONLY)

CW - Cetti's Warbler	SD - Stock Dove
BF. - Bullfinch	SG - Starling
D. - Dunnock	ST - Song Thrush
HS - House Sparrow	Y. - Yellowhammer
K. - Kestrel	
L. - Lapwing	
MA - Mallard	
MS - Mute Swan	
RB - Reed Bunting	
S. - Skylark	

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION	
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).	
Construction	
Maintenance / Cleaning	
Use	
Decommissioning / Demolition	
Rev.	Date Description By Chk'd App'd
P01.1	--- First Issue --- --- ---

Drawing Status: FINAL

Suitability: S0

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Client: Working on behalf of

Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL				
Drawing Title: BREEDING BIRDS APPENDIX C 2017 FIELD SURVEY MAP - NOTABLE BIRDS PAGE 4 OF 4				
Scale: 1:7,500	Drawn: BS	Checked: ZC	Approved: AB	Authorised: PA
Original Size: A3	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19
Drawing Number: HE551523 -WSP - GEN - A27AR- F1 - GIS - 0000	Originator: Volume	Project Ref. No. 70052558	Revision: P01	
Location:	Type:	Role:	Number:	



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- KEY:**
- SCHEME OPTIONS**
- OPTION 1
 - OPTION 3
 - OPTION 5A
 - SURVEY TRANSECTS
- BREEDING CATEGORY**
- CONFIRMED
 - PROBABLE

- BoCC CATEGORY**
- BoCC AMBER
 - BoCC RED

- | | |
|----------------------|------------------|
| CW - Cetti's Warbler | SD - Stock Dove |
| BF - Bullfinch | SG - Starling |
| D - Dunnock | ST - Song Thrush |
| HS - House Sparrow | Y - Yellowhammer |
| K - Kestrel | |
| L - Lapwing | |
| MA - Mallard | |
| MS - Mute Swan | |
| RB - Reed Bunting | |
| S - Skylark | |

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION	
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).	
Construction	
Maintenance / Cleaning	
Use	
Decommissioning / Demolition	
Rev.	Date
Description	
By	Chk'd
App'd	

Drawing Status: **FINAL**

Suitability: **S0**



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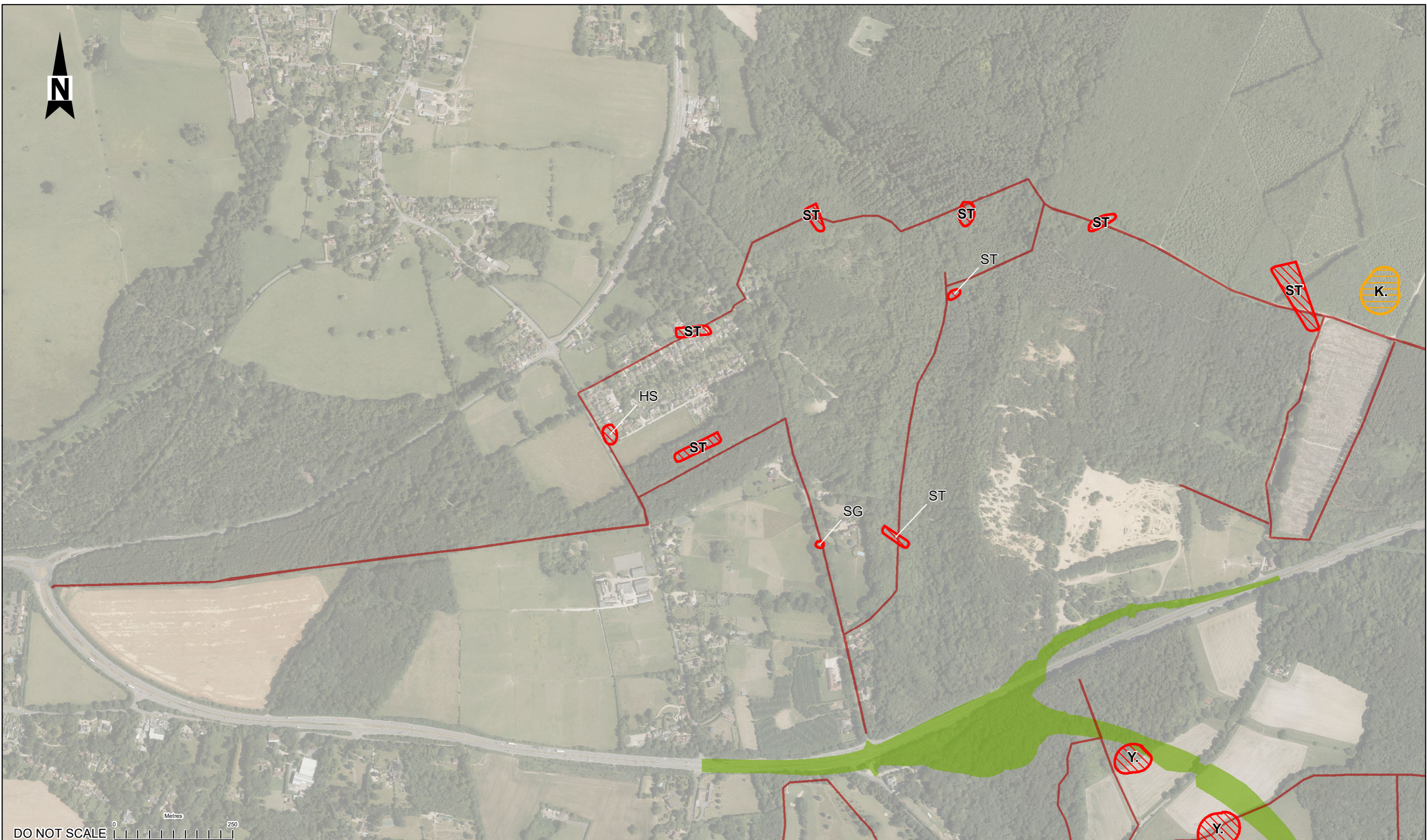
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Client: **Working on behalf of**



Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL BYPASS				
Drawing Title: BREEDING BIRDS APPENDIX C 2018 FIELD SURVEY MAP - NOTABLE BIRDS				
Scale: 1:5,000	Drawn: AS	Checked: ZC	Approved: AB	Authorised: PA
Original Size: A3	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19
Drawing Number: HE551523-WSP-GEN-SWI-GI-DR-0503	Project: SWI-GI-DR-0503	Volume:	Project Ref. No: 70052558	Revision: P01
Location:	Type:	Role:	Number:	

Appendix D: Field Survey Maps - Territories



DO NOT SCALE Metres 0 250

KEY:

	OPTION 1	BoCC CATEGORY
	OPTION 3	
	OPTION 5A	
	SURVEY TRANSECTS	
	RED	
	AMBER	
	GREEN (SCHEDULE 1 ONLY)	

CW - Cetti's Warbler
D. - Dunnock
HS - House Sparrow
K. - Kestrel
MA - Mallard
RB - Reed Bunting
S. - Skylark
SG - Starling
ST - Song Thrush
Y. - Yellowhammer

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION	
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).	
Construction	
Maintenance / Cleaning	
Use	
Decommissioning / Demolition	
Rev.	Date Description By Chk'd App'd
P01.1	--- First Issue --- --- ---

Drawing Status: FINAL

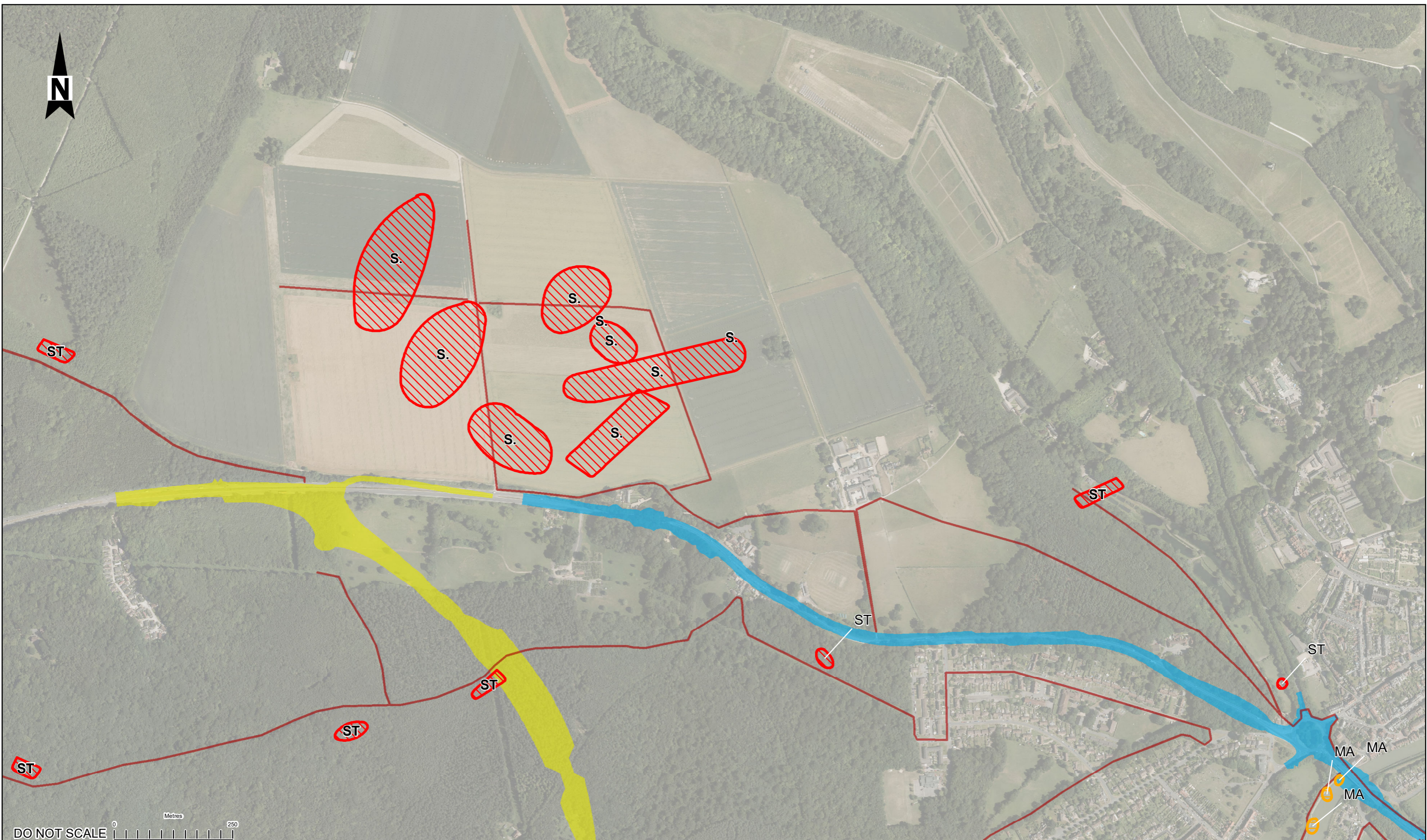
Suitability: S0

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Client: Working on behalf of

Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL				
Drawing Title: BREEDING BIRDS APPENDIX D 2017 TERRITORIES PAGE 1 OF 4				
Scale: 1:7,500	Drawn: BS	Checked: ZC	Approved: AB	Authorised: PA
Original Size: A3	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19
Drawing Number: HE551523 -WSP - GEN - A27AR- F1 - GIS - 0000	Originator: [blank]	Volume: [blank]	Project Ref. No: 70052558	Revision: P01
Location: [blank]	Type: [blank]	Role: [blank]	Number: [blank]	[blank]



- KEY:**
- OPTION 1
 - OPTION 3
 - OPTION 5A
 - SURVEY TRANSECTS

- BoCC CATEGORY**
- RED
 - AMBER
 - GREEN (SCHEDULE 1 ONLY)

- CW - Cetti's Warbler
- D - Dunnock
- HS - House Sparrow
- K - Kestrel
- MA - Mallard
- RB - Reed Bunting
- S - Skylark
- SG - Starling
- ST - Song Thrush
- Y - Yellowhammer

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION			
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).			
Construction			
Maintenance / Cleaning			
Use			
Decommissioning / Demolition			
Rev	Date	Description	By Chk'd App'd
P01.1		First Issue	

Drawing Status: **FINAL**

Suitability: **S0**



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Client: Working on behalf of



Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL				
Drawing Title: BREEDING BIRDS APPENDIX D 2017 TERRITORIES PAGE 2 OF 4				
Scale: 1:7,500	Drawn: BS	Checked: ZC	Approved: AB	Authorised: PA
Original Size: A3	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19
Drawing Number: HE551523 -WSP - GEN - A27AR- F1 - GIS - 0000	Originator: [blank]	Volume: [blank]	Project Ref. No: 70052558	Revision: P01
Location: [blank]	Type: [blank]	Role: [blank]	Number: [blank]	[blank]



- KEY:**
- OPTION 1
 - OPTION 3
 - OPTION 5A
 - SURVEY TRANSECTS

- BoCC CATEGORY**
- RED
 - AMBER
 - GREEN (SCHEDULE 1 ONLY)

- CW - Cetti's Warbler
- D - Dunnock
- HS - House Sparrow
- K - Kestrel
- MA - Mallard
- RB - Reed Bunting
- S - Skylark
- SG - Starling
- ST - Song Thrush
- Y - Yellowhammer

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION			
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).			
Construction			
Maintenance / Cleaning			
Use			
Decommissioning / Demolition			
Rev	Date	Description	By Chk'd App'd
P01.1		First Issue	

Drawing Status: **FINAL**

Suitability: **S0**



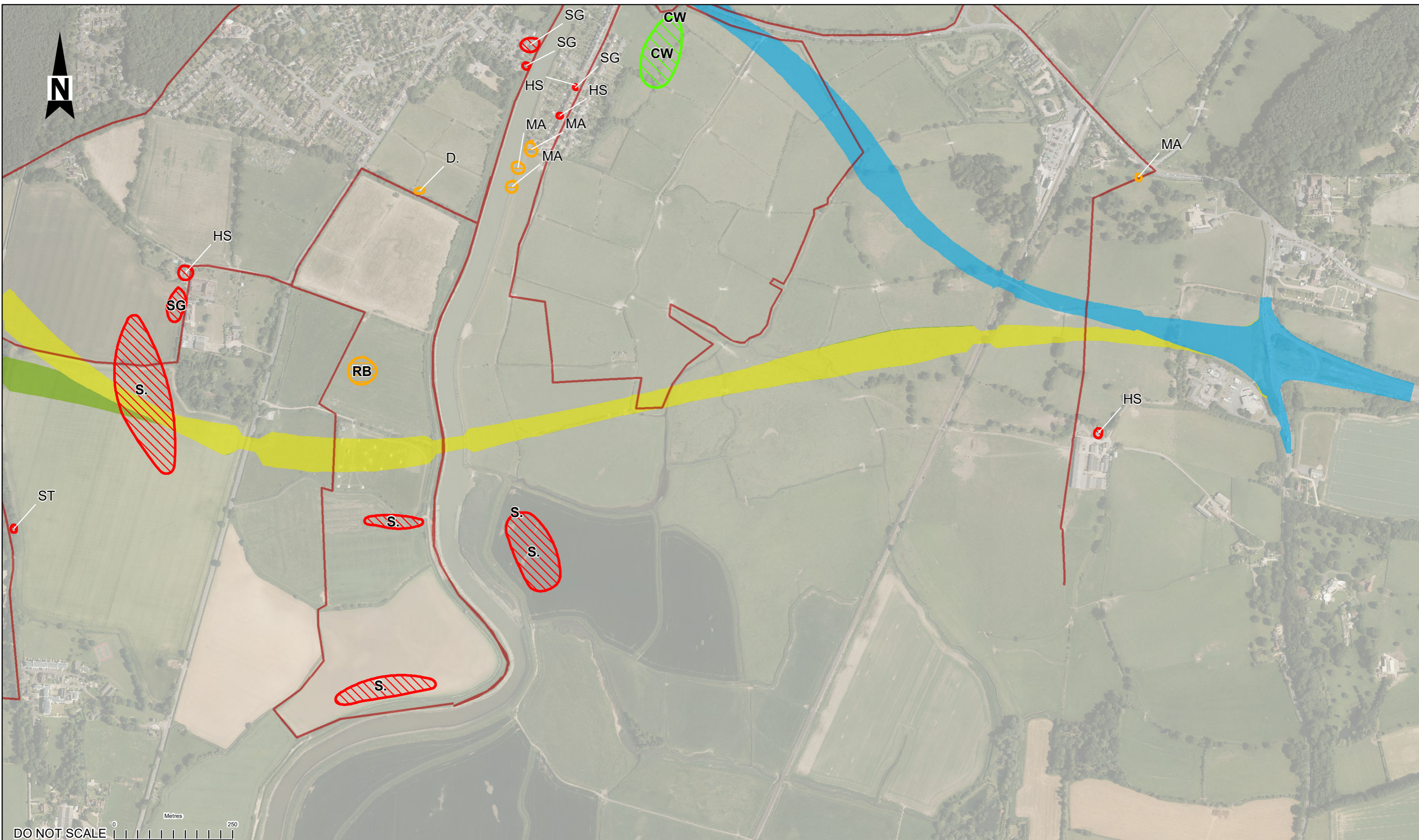
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Client: **Working on behalf of**



Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL				
Drawing Title: BREEDING BIRDS APPENDIX D 2017 TERRITORIES PAGE 3 OF 4				
Scale: 1:7,500	Drawn: BS	Checked: ZC	Approved: AB	Authorised: PA
Original Size: A3	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19
Drawing Number: HE551523 -WSP - GEN - A27AR- F1 - GIS - 0000	Project: HE551523 -WSP - GEN - A27AR- F1 - GIS - 0000	Originator: Volume	Project Ref. No: 70052558	Revision: P01
Location:	Type:	Role:	Number:	



- KEY:**
- OPTION 1
 - OPTION 3
 - OPTION 5A
 - SURVEY TRANSECTS

- BoCC CATEGORY**
- RED
 - AMBER
 - GREEN (SCHEDULE 1 ONLY)

- CW - Cetti's Warbler
- D - Dunnock
- HS - House Sparrow
- K - Kestrel
- MA - Mallard
- RB - Reed Bunting
- S - Skylark
- SG - Starling
- ST - Song Thrush
- Y - Yellowhammer

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION			
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).			
Construction			
Maintenance / Cleaning			
Use			
Decommissioning / Demolition			
Rev	Date	Description	By Chk'd App'd
P01.1		First Issue	

Drawing Status: FINAL

Suitability: S0



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Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL				
Drawing Title: BREEDING BIRDS APPENDIX D 2017 TERRITORIES PAGE 4 OF 4				
Scale: 1:7,500	Drawn: BS	Checked: ZC	Approved: AB	Authorised: PA
Original Size: A3	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19
Drawing Number: HE551523 -WSP - GEN - A27AR- F1 - GIS - 0000	Originator: [blank]	Volume: [blank]	Project Ref. No: 70052558	Revision: P01
Location: [blank]	Type: [blank]	Role: [blank]	Number: [blank]	[blank]



0 100 200 m

DO NOT SCALE

KEY:	
SCHEME OPTIONS	
	OPTION 1
	OPTION 3
	OPTION 5A
BREEDING BIRDS TERRITORIES (2018)	
	BoCC RED
	BoCC AMBER
BTO Code	Common Name
S.	Skylark
RB	Reed Bunting
MA	Mallard
SG	Starling
HS	House Sparrow
L.	Lapwing

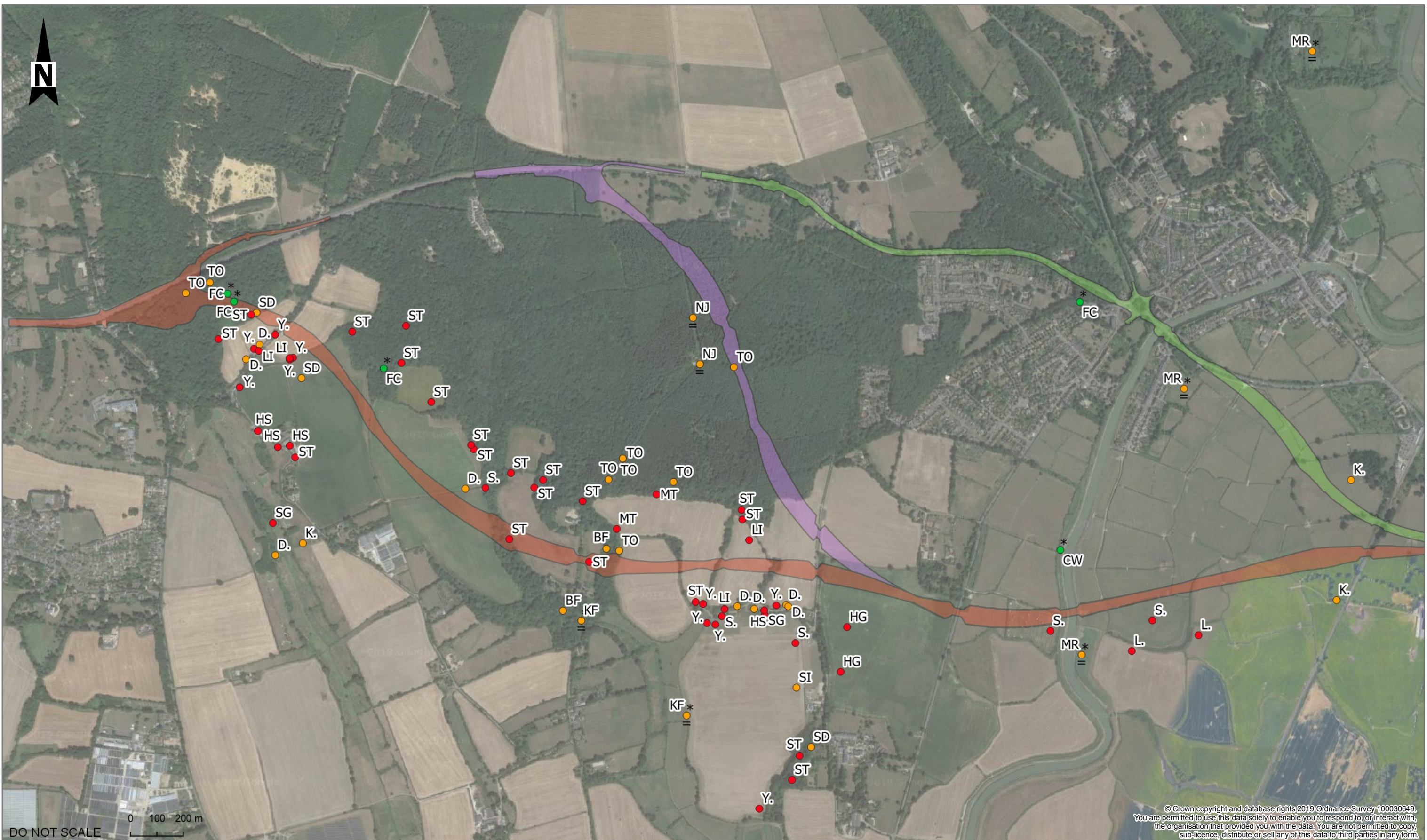
SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON	
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).	
Construction	
Maintenance / Cleaning	
Use	
Decommissioning / Demolition	
Rev.	Date Description By Chk'd App'd

Drawing Status	FINAL
Suitability	S0
Project Title	REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL
Drawing Title	BREEDING BIRDS APPENDIX D: 2018 TERRITORIES
Scale	1:10,820
Original Size	A3
Drawn	ZC
Date	15/08/19
Checked	ZC
Date	15/08/19
Approved	AB
Date	15/08/19
Authorised	PA
Date	15/08/19
Project Ref. No.	70052558
Revision	P01
Drawing Number	HE551523-
Project	WSP
Volume	-GEN
Revision	
A27AR	-FI
Location	-GIS
	0503
	Number

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Appendix E: Incidental Records Map



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KEY:

SCHEME OPTIONS	INCIDENTAL RECORDS
1 (Green)	BoCC AMBER (Yellow dot)
3 (Purple)	BoCC RED (Red dot)
5A (Brown)	BoCC GREEN (NOTABLE) (Green dot)
= ANNEX 1	
* SCHEDULE 1	

BTO CODES	COMMON NAM	BTO CODES	COMMON NAM	BTO CODES	COMMON NAM
FC	FIRECREST	NJ	NIGHTJAR	HS	HOUSE SPARROW
TO	TAWNY OWL	G.	GREEN WOODPECKER	HG	HERRING GULL
BF	BULLFINCH	D.	DUNNOCK	SG	STARLING
NJ	NIGHTJAR	Y.	YELLOWHAMMER	LI	LINNET
LO	LITTLE OWL	S.	SKYLARK	SI	SWIFT
K.	KESTREL	ST	SONG THRUSH	RW	REED WARBLER
BZ	BUZZARD	MT	MARSH TIT	L.	LAPWING
MR	MARSH HARRIER	SD	STOCK DOVE	CW	CETTIS WARBLER

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Clearing

Use

Decommissioning / Demolition

Rev.	Date	Description	By	Ch'kd	App'd

Drawing Status: **FINAL**

Suitability: **S0**

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Client: **Working on behalf of highways england**

Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL BYPASS					
Drawing Title: BREEDING BIRDS APPENDIX E: INCIDENTAL RECORDS MAP					
Scale: 1:13,500	Drawn: AP	Checked: ZC	Agreed: AB	Authorised: PA	
Original Size: A3	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19	
Drawing Number: 70052558	Project: A27AR	Originator: WSP	Volume: -GEN	Product Ref. No: 70052558	
Location: A27AR	Type: -FI	Role: -GIS	Number: 0504	Revision: P01	

Appendix F: Field Study Area Maps



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KEY: SCHEME OPTIONS 1 3 5A NIGHTINGALE SURVEY TRANSECT	SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).			Drawing Status FINAL	Suitability S0	Project Title REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL BYPASS			
	Construction			 WSP House 70 Chancery Lane London WC2A 1AF Tel: +44 (0)20 7314 5000 www.wsp.com Copyright © WSP Group (2019)	Drawing Title BREEDING BIRDS APPENDIX F: NIGHTINGALE SURVEY				
	Maintenance / Clearing				Scale 1:24,831	Drawn AP	Checked ZC	Approved AB	Authorised PA
	Use				Client Working on behalf of 	Original Size A3	Date 15/08/19	Date 15/08/19	Date 15/08/19
Decommissioning / Demolition			Rev. Date Description By Chk'd App'd	Drawing Number Project 70052558	Originator WSP	Volume -GEN	Project Ref. No. 70052558		
				Location A27AR	Type -FI	Role -GIS	Number 0501	Revision P01	