Breeding Bird Monitoring Report

A1270 Broadland Northway (NDR)

Year 3 Post-construction Survey 2020

Norfolk County Council

Environment Team

Report No: NDR/BBS/20

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The data has been prepared and provided in accordance with the CIEEM's Code of Professional Conduct. We confirm that any opinions expressed are our best and professional bona fide opinions.

Date	Revision	Prepared by	Checked by	Comments
26/06/2020	Initial draft	DW		
13/07/2020	V1	DW	CD	Correction made to analysis

Front cover photograph: Skylark on fence-post by drainage lagoon 5 (Natural Environment Team, NCC)

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1. Non-Technical Summary

1.1. This document reports on the breeding bird survey undertaken in 2020 along the A1270 Broadland Northway corridor (formally the Norwich Northern Distributor Road (NDR)). The survey was completed as part of Requirement 7 of the Development Consent Order (DCO) for the NDR scheme.

1.2. Breeding bird surveys were undertaken in the years prior to construction, as part of a suite of surveys used to establish the ecological baseline situation and to inform the design of the road. In line with the Environmental Statement (Mott MacDonald, 2014), there is a requirement to undertake bird breeding monitoring surveys for 5 years post-construction.

1.3. This report describes the third-year post-construction breeding bird monitoring. The results of the previous monitoring are reported in:

- *Breeding Bird Monitoring Report: Northern Distributor Road Year 1 Post-construction Survey 2018;* (Natural Environment Team, NCC; 2018).
- *Breeding Bird Monitoring Report: Broadland Northway (Northern Distributor Road) Year 2 Post-construction Survey 2019;* (Natural Environment Team, NCC; 2020).

1.4. The methodology of the 2020 breeding bird Year 3 monitoring survey broadly replicated that of the previous two years surveys. However, some changes were enforced due to restrictions imposed by the COVID-19 pandemic. The surveys commenced later than was intended, with the first surveys not starting until 28th April and access to two small areas of the monitoring area was not possible. The implications of these restrictions are discussed.

1.5. Breeding evidence was recorded for 54 species within the road corridor. A total of 10 species were recorded that are on the Red List of Birds of Conservation Concern, of which 8 showed evidence of breeding. A further 20 species were recorded that are on the Amber List of Birds of Conservation Concern, of which 10 showed evidence of breeding.

1.6. The 2020 monitoring survey results are a snapshot in time of the breeding birds in the corridor of the Broadland Northway, although some consistency has been observed over the three years post-construction surveys. In terms of the species of highest conservation concern, there is similarity in the number and abundance of breeding Red-listed species present pre and post-construction. The created habitats are becoming more useable by breeding birds as they mature, and it is anticipated that this situation will continue.

1.7. The breeding bird monitoring will be repeated for a further two years in 2021 and 2022 in accordance with the DCO, and the breeding bird situation will be reported on as the landscape plantings of the road matures.

2. Introduction

2.1. This document has been produced to report on the Year 3 Post-construction breeding bird monitoring survey undertaken in 2020 along the length of A1270 Broadland Northway (formally the Norwich Northern Distributor Road (NDR)). This survey is the third such survey undertaken post-construction.

2.2. Full details of the Development Consent Order (DCO) for the NDR/Broadland Northway can be found in Volume 1 of the Environmental Statement (Mott MacDonald, 2014) that was submitted as part of the DCO application. The details of the DCO including the full ES and the Requirements can be found on Norfolk County Council's webpages[1]. The NDR was completed in early 2018 with the final section opening to traffic on 17th April 2018.

2.3. Breeding bird surveys were undertaken in the years prior to the construction of the road, as part of a suite of surveys used to establish the ecological baseline situation and to inform the design. The results of the breeding bird surveys are summarised in Chapter 8 of Volume 2 of the Environmental Statement (ES), and a more detailed report is included in Technical Appendices of that document (Mott MacDonald, 2013).

2.4. The current monitoring is being completed as part of Requirement 7 of the DCO for the NDR scheme (Norfolk County Council, 2014a). In line with the ES and as summarised in the NDR Mitigation and Monitoring Table (Norfolk County Council, 2014b), there is a monitoring requirement to undertake bird breeding monitoring surveys in each of the years 1- 5 post-construction.

2.5. The current report describes the 2020 Year 3 Post-construction monitoring survey and compares the results to the first two years of post-construction monitoring and the previously established baseline (pre-construction) situation.

[1] https://www.norfolk.gov.uk/roads-and-transport/major-projects-and-improvement-plans/norwich/broadland-northway

3. Methodology

3.1. As required by the DCO, the field methodology for the breeding birds monitoring surveys has been designed to replicate as close as possible the survey undertaken prior to construction (the 'baseline survey') and to be easily repeatable over the 5 years post-construction. Full details of the methodology can be found in the *Breeding Bird Monitoring Report: Northern Distributor Road Year 1 Post-construction Survey 2018* (NCC; 2019).

3.2. In 2020 the data collection was conducted between 28th April 2020 and 22nd June 2020. The commencement of the surveys was delayed as a result of the COVID-19 pandemic; the 'lockdown' period in the UK came into effect on March 20th and confirmation that the bird surveys could be undertaken was received on April 27th.

3.3. The 2020 survey broadly repeated the methodology used in the first two years of post-construction monitoring. The methodology required all parts of the area within 250m of the road centreline to be visited three times, once in each of the months April, May and June. The delayed start meant the first surveys were not completed until 7th May. Therefore, there was a slightly shorter gap between the first and second surveys than in previous years, with the second visits commenced on May 21st. The third visits started on schedule and were completed on 22nd June.

3.4. Surveying started around an hour after dawn and was completed by 10.00-10.30am. There were no weather constraints in 2020 and no evening visits were necessary. Due to the COVID-19 restrictions, access was not possible for two small privately-owned areas that have been surveyed in previous years, including The Springs County Wildlife Site. However, a visit to the Springs for other reasons[2] enabled some additional bird records to be made, and they are included in this report.

Conservation status

3.5. In the same way as the baseline (pre-construction) surveys and the previous post-construction reports, bird species recorded were categorised by their Conservation Status. These were as described in *Birds of Conservation Concern 4* (Eaton *et al.,* 2015). The conservation status of some species has changed since the baseline survey. These changes are noted in this report where appropriate.

3.6. As previously, birds on the Red and Amber lists, i.e. those of the highest conservation status, are given greatest consideration in the analysis of the 2020 monitoring results.

Nomenclature

3.7. The English vernacular names and scientific bird names used in this report follow that of the British Ornithologists' Union (2012) and are the same as those used in the previous reports.

[2] A member of the Natural Environment Team visited the Springs County Wildlife Site on 29th May 2020, with the permission of the landowner and that of the fishing club, to undertake Desmoulin's snail monitoring surveys.

4. Results

Overview

4.1. In 2020, breeding evidence was identified for 54 species within the road corridor. For the other species that were recorded, there was no evidence of breeding. The most commonly recorded species were Blue Tit, Chaffinch, Great Tit, Robin and Wren, and all showed evidence of breeding throughout the road corridor.

4.2. A total of 10 species were recorded that are on the Red List of Birds of Conservation Concern. Of these, 8 species showed evidence of breeding. A further 20 species were recorded that are on the Amber List of Birds of Conservation Concern, of which 10 showed evidence of breeding. A full list of species recorded is given in Table 1.

4.3. 'Hotspots' for breeding birds were identified at 10 locations. These were (from south to north):

Southern section:

- Smee Lane / lagoon 25 (East of Broadland Northway);
- At the eastern side of the Middle Road overbridge / lagoon 23;
- Between the road and Green Lane, Rackheath (South of Salhouse Rd);
- Newman Rd Woods (West of Newman Rd overbridge);
- Gazebo Farm Ecological Area (East of Newman Rd overbridge);
- Drainage lagoons (Nos. 18, 18A, 18B), south of Wroxham Rd
- Drainage lagoon (No.17), adj. to Springs County Wildlife Site

Northern section:

- North of Airport Roundabout;
- Bell Farm track overbridge;
- Marriott's Way (South of Broadland Northway).

4.4. The 'Hotspot' locations are shown on Figure 2 (Southern section) and Figure 3 (Northern section), coloured by the number of species showing evidence of breeding.

Species of Conservation Concern

4.5. The eight Red-listed species that showed evidence of breeding were: House Sparrow, Linnet, Marsh Tit, Mistle Thrush, Skylark, Song Thrush, Starling, and Yellowhammer.

4.6. House Sparrow colonies were noted in three locations, 1 in the southern section and two in the north (Figure 4 and Figure 5). Linnets were observed along most of the Broadland Northway with 11 locations where males were heard singing on more than one occasion. A single Marsh Tit territory was identified in the woodland at the Springs County Wildlife Site (Figure 4).

4.7. Skylarks were heard singing along the full road corridor. A minimum total of 44 territories were identified that were wholly or largely within the road corridor. The locations of these territories are plotted in Figure 6 and Figure 7. Some individual Skylark territories seemed to span the road, with the same bird watched singing on

either side. Birds were also regularly seen feeding on the road verge and on the roundabouts.

4.8. Starlings were heard singing at four locations, with a minimum of 8 males involved. Territories on the southern section of the road were at the Gazebo Farm woodland and at Green Lane, Rackheath (Figure 4), and on the northern section of the road in the area of the Bell Farm overbridge, and at the airport (Figure 5). In the last two locations, large numbers of juvenile starlings were present in June and the local populations were probably much higher.

4.9. Song Thrushes were heard singing in a minimum of 10 locations (Figure 4 and Figure 5). Three singing Mistle Thrushes were recorded on more than one visit, 2 of which were in the vicinity of the Wroxham Road roundabout (Figure 4).

4.10. A minimum of 16 Yellowhammer territories were identified (Figure 4 and Figure 5). These were scattered along the length of the road in the areas where open fields with hedges predominate. No territories were identified between Rackheath and Spixworth.

4.11. Two further Red-listed species were seen in the monitoring surveys but did not show signs of breeding, namely Herring Gull and Yellow Wagtail.

Other observations

4.12. On 1st May, three Northern Wheatears, 2 males and 1 female, were noted at lagoon 5 (west of Holt Road). These birds were considered passage migrants. They were still present until at least 6th May and showed remarkable loyalty to the grassland and bare soil around the lagoon. A Common Sandpiper seen at lagoon 18 was similarly considered a passage migrant.

4.13. A Barn Owl hunting in the grassland around lagoon 5 (west of Holt Road) in the early hours of 17th of June, was the first seen during the three years of Post-construction surveys. It caught prey and flew north in a straight line, indicative of taking prey back to young in nest. Any such nest would have been outside the ZOI. This species is included in Schedule 1 of the Wildlife and Countryside Act[3]. It is Green-listed (it was Amber-listed at the time of the Pre-construction surveys).

4.14. Several of the drainage lagoons held water throughout the survey period despite the exceptional dry conditions in May. Water-birds were observed at three lagoons:

Lagoon 18A (Wroxham Road)

- A pair of Moorhens bred, and three young were observed.
- A Mallard brood of 8 ducklings were seen, indicating breeding nearby.

Lagoon 22 (Plumstead Rd)

- Egyptian Geese were seen on each visit, numbering 2 – 5 birds, but no evidence of breeding was seen.

[3] For birds included on Schedule 1 of the Wildlife and Countryside Act, it is an offence "*to intentionally or recklessly disturb at, on or near an 'active' nest*"

- Mallard were seen on two visits but there were no obvious signs of breeding.

Lagoon 23 (Middle Road):

- A pair of Little Grebes built a nest in sparse young willow growth at the edge of the lagoon. This species had not previously been recorded in the ZOI in either the pre or post-construction surveys. Birds were seen on the nest on the second and third surveys, but the outcome of the nesting attempt is unknown.
- A pair of Coots also nested with a single juvenile observed in May.
- A pair of Tufted Ducks seen in May were still present on 17th June, but no evidence of nesting was observed.
- Egyptian Geese were seen on two visits, numbering 1 – 3 birds, but no evidence of breeding was seen.
- Mallards were seen on each visit in various numbers, although no obvious evidence of breeding was noted.

4.15. A Little Ringed Plover was seen at lagoon 5 during the second round of surveys. The bird in question was unusually marked with many of its remiges (the secondaries flight feathers) and many of its crown feathers being white (Figure 1). It was still present on the 17th June, when it was seen with a second bird (with 'normal' plumage). This probable pair were present in suitable habitat for more than a month and a nest was eventually located (after the completion of the surveys on an additional visit to the site on 26th June). The outcome of the nesting attempt is unknown.[4] This species is included in Schedule 1 of the Wildlife and Countryside Act – although its conservation status is Green-listed – and it has been seen in each of the annual post-construction surveys but has frequently proved difficult to confirm nesting occurred.

***Figure 1: Little Ringed Plover**. The photo on the right is the unusually-marked bird present at lagoon 5 in 2020, while the image on the left is the bird with 'normal' plumage. The photos were taken from the combined cycle and footway adjacent to the Broadland Northway (both images: Natural Environment Team).*

[4] Unconfirmed reports suggest the unusually-plumaged bird was also seen by a local birdwatcher at lagoon 8 or 9 (Cromer Road) in early June.

Table 1: Species recorded in 2020, noting evidence of breeding where applicable, and the conservation status of each species. The species where the conservation status has changed since the baseline surveys are marked with an asterisk. Note 1: Mute swan cygnets were observed at the Springs CWS on 29/05/2020 along as were a pair of nesting Great Crested Grebes, although this visit was not part of the formal surveys (see paragraph 3.4).

English name	Scientific name	Native (N) or non-native (nn)	Evidence of breeding in 2020 Y/N	Birds of Conservation Concern
Barn Owl	*Tyto alba*	N	N	Green*
Blackbird	*Turdus merula*	N	Y	Green
Blackcap	*Sylvia atricapilla*	N	Y	Green
Black-headed Gull	*Chroicocephalus ridibundus*	N	N	Amber
Blue Tit	*Cyanistes caeruleus*	N	Y	Green
Bullfinch	*Pyrrhula pyrrhula*	N	Y	Amber
Buzzard	*Buteo buteo*	N	N	Green
Canada Goose	*Branta canadensis*	nn (feral)	N	unlisted
Carrion Crow	*Corvus corone*	N	Y	Green
Chaffinch	*Fringilla coelebs*	N	Y	Green
Chiffchaff	*Phylloscopus collybita*	N	Y	Green
Coal Tit	*Periparus ater*	N	Y	Green
Collared Dove	*Streptopelia decaocto*	N	Y	Green
Common Sandpiper	*Actitis hypoleucos*	N	N	Amber
Coot	*Fulica atra*	N	Y	Green
Cormorant	*Phalacrocorax carbo*	N	N	Green
Dunnock	*Prunella modularis*	N	Y	Amber*
Egyptian Goose	*Alopochen aegyptiaca*	nn (feral)	Y	Unlisted
Feral pigeon	*Columba livia domestica*	N (feral)	Y	Unlisted
Garden Warbler	*Sylvia borin*	N	Y	Green
Goldcrest	*Regulus regulus*	N	Y	Green
Goldfinch	*Carduelis carduelis*	N	Y	Green
GS Woodpecker	*Dendrocopos major*	N	Y	Green
Great Crested Grebe	*Podiceps cristatus*	N	Y	Green
Great Tit	*Parus major*	N	Y	Green
Green Woodpecker	*Picus viridis*	N	Y	Green
Greenfinch	*Chloris chloris*	N	Y	Green
Grey Heron	*Ardea cinerea*	N	N	Green
Grey-lag Goose	*Anser anser*	N (feral)	N	Amber
Herring Gull	*Larus argentatus*	N	N	Red
House Martin	*Delichon urbicum*	N	Y	Amber
House Sparrow	*Passer domesticus*	N	Y	Red
Jackdaw	*Corvus monedula*	N	Y	Green
Jay	*Garrulus glandarius*	N	Y	Green
Kestrel	*Falco tinnunculus*	N	N	Amber
Lesser BB Gull	*Larus fuscus*	N	N	Amber
Linnet	*Linaria cannabina*	N	Y	Red
Little Egret	*Egretta garzetta*	N	N	Green
Little Grebe	*Tachybaptus ruficollis*	N	Y	Green

English name	Scientific name	Native or non-native	Evidence of breeding in 2020 Y/N	Birds of Conservation Concern
Little Owl	*Athene noctua*	nn	Y	Green
Little Ringed Plover	*Charadrius dubius*	N	N	Green
Long-tailed Tit	*Aegithalos caudatus*	N	Y	Green
Magpie	*Pica pica*	N	Y	Green
Mallard	*Anas platyrhynchos*	N	Y	Amber*
Marsh Tit	*Poecile palustris*	N	Y	Red
Meadow Pipit	*Anthus pratensis*	N	Y	Amber
Mistle Thrush	*Turdus viscivorus*	N	Y	Red*
Moorhen	*Gallinula chloropus*	N	Y	Green
Mute Swan[1]	*Cygnus olor*	N	Y	Amber*
Nuthatch	*Sitta europaea*	N	Y	Green
Oystercatcher	*Haematopus ostralegus*	N	N	Amber
Pheasant	*Phasianus colchicus*	nn	Y	Unlisted
Pied Wagtail	*Motacilla alba*	N	Y	Green
Red Kite	*Milvus milvus*	N	N	Green
Red-legged Partridge	*Alectoris rufa*	nn	Y	Unlisted
Reed Bunting	*Emberiza schoeniclus*	N	N	Amber
Reed Warbler	*Acrocephalus scirpaceus*	N	N	Green
Robin	*Erithacus rubecula*	N	Y	Green
Rook	*Corvus frugilegus*	N	N	Green
Sand Martin	*Riparia riparia*	N	Y	Green*
Sedge Warbler	*Acrocephalus schoeobaenus*	N	Y	Green
Skylark	*Alauda arvensis*	N	Y	Red
Song Thrush	*Turdus philomelos*	N	Y	Red
Sparrowhawk	*Accipiter nisus*	N	N	Green
Starling	*Sturnus vulgaris*	N	Y	Red
Stock Dove	*Columba oenas*	N	N	Amber
Swallow	*Hirundo rustica*	N	Y	Green
Swift	*Apus apus*	N	Y	Amber
Tawny Owl	*Strix aluco*	N	Y	Amber*
Teal	*Anas crecca*	N	N	Amber
Treecreeper	*Certhia familiaris*	N	Y	Green
Tufted Duck	*Aythya fuligula*	N	N	Amber
Wheatear	*Oenanthe oenanthe*	N	N	Green
Whitethroat	*Sylvia communis*	N	Y	Amber
Willow Warbler	*Phylloscopus trochilus*	N	Y	Amber
Wren	*Troglodytes troglodytes*	N	Y	Green
Yellow Wagtail	*Motacilla flava*	N	N	Red
Yellowhammer	*Emberiza citronella*	N	Y	Red

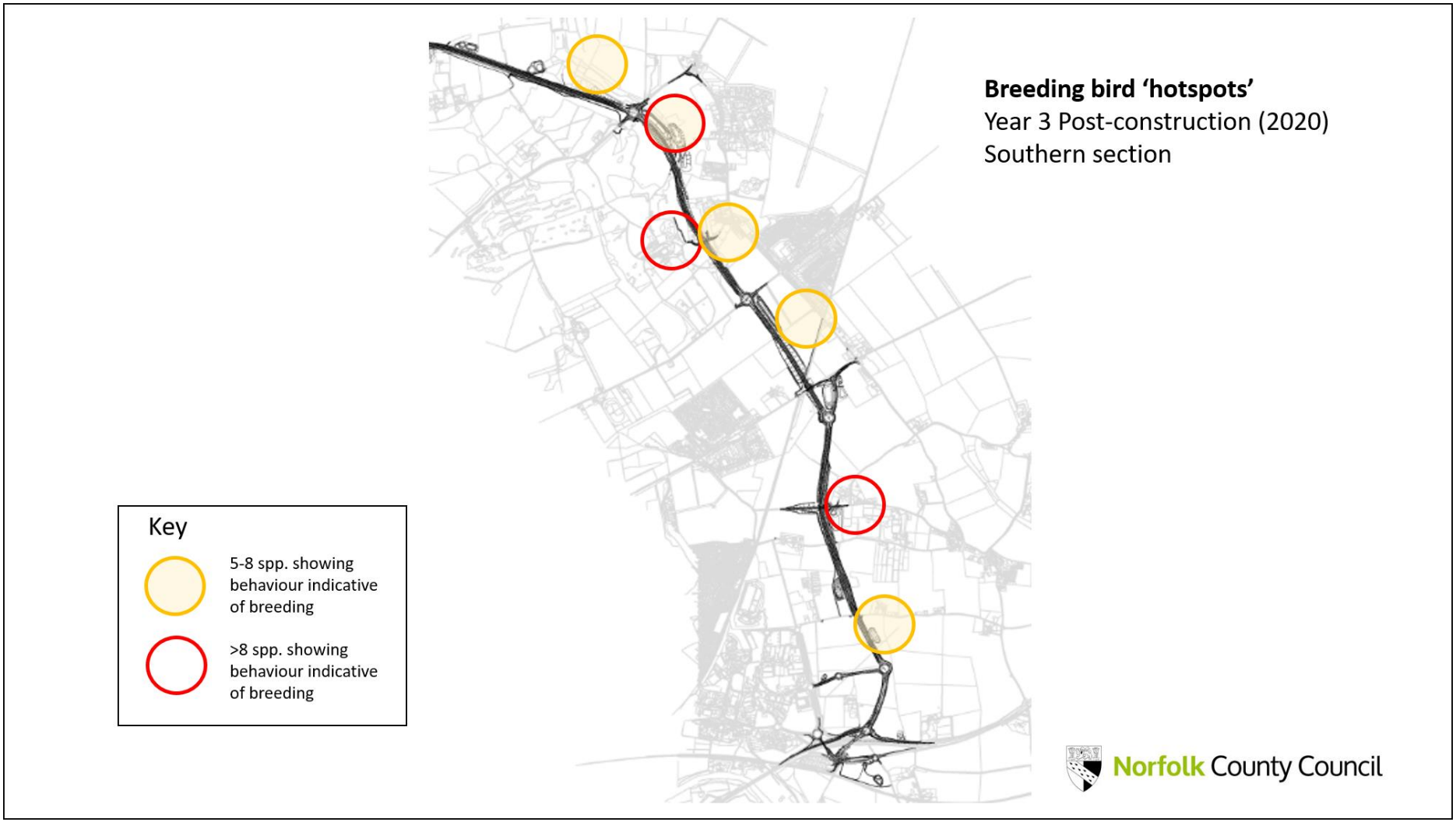

Figure 2: Locations of 'hotspots' of breeding birds in 2020; Broadland Northway Southern Section. *Locations where 5-8 species showed behaviour indicative of breeding are marked by a yellow circle. Locations where >8 species showed behaviour indicative of breeding are marked with a red circle. The extent of the NDR scheme is shown in black.*

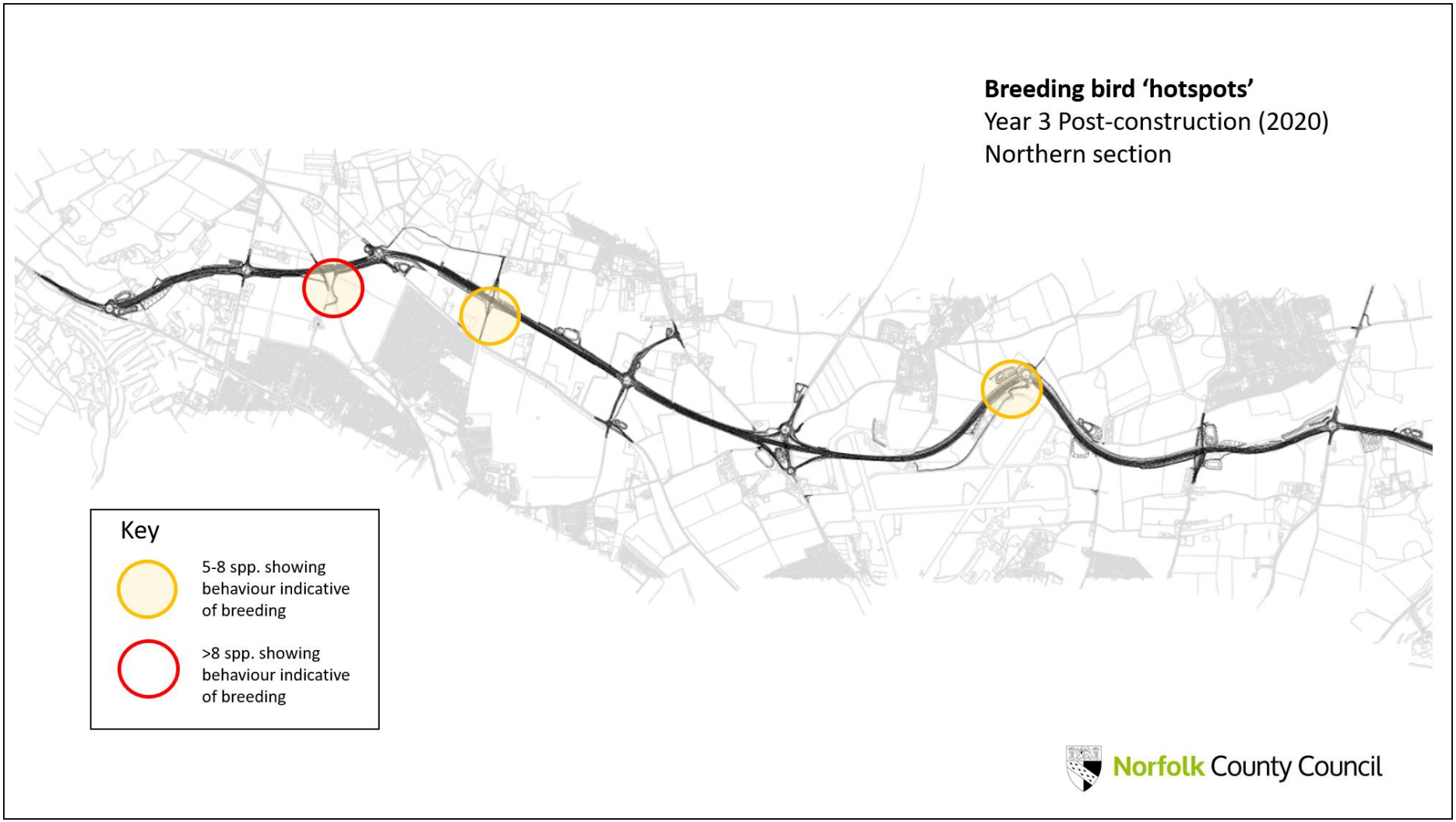

Figure 3: Locations of 'hotspots' of breeding birds in 2020; Broadland Northway Northern section. *Locations where 5-8 species showed behaviour indicative of breeding are marked by a yellow circle. Locations where >8 species showed behaviour indicative of breeding are marked with a red circle. The extent of the NDR scheme is shown in black.*

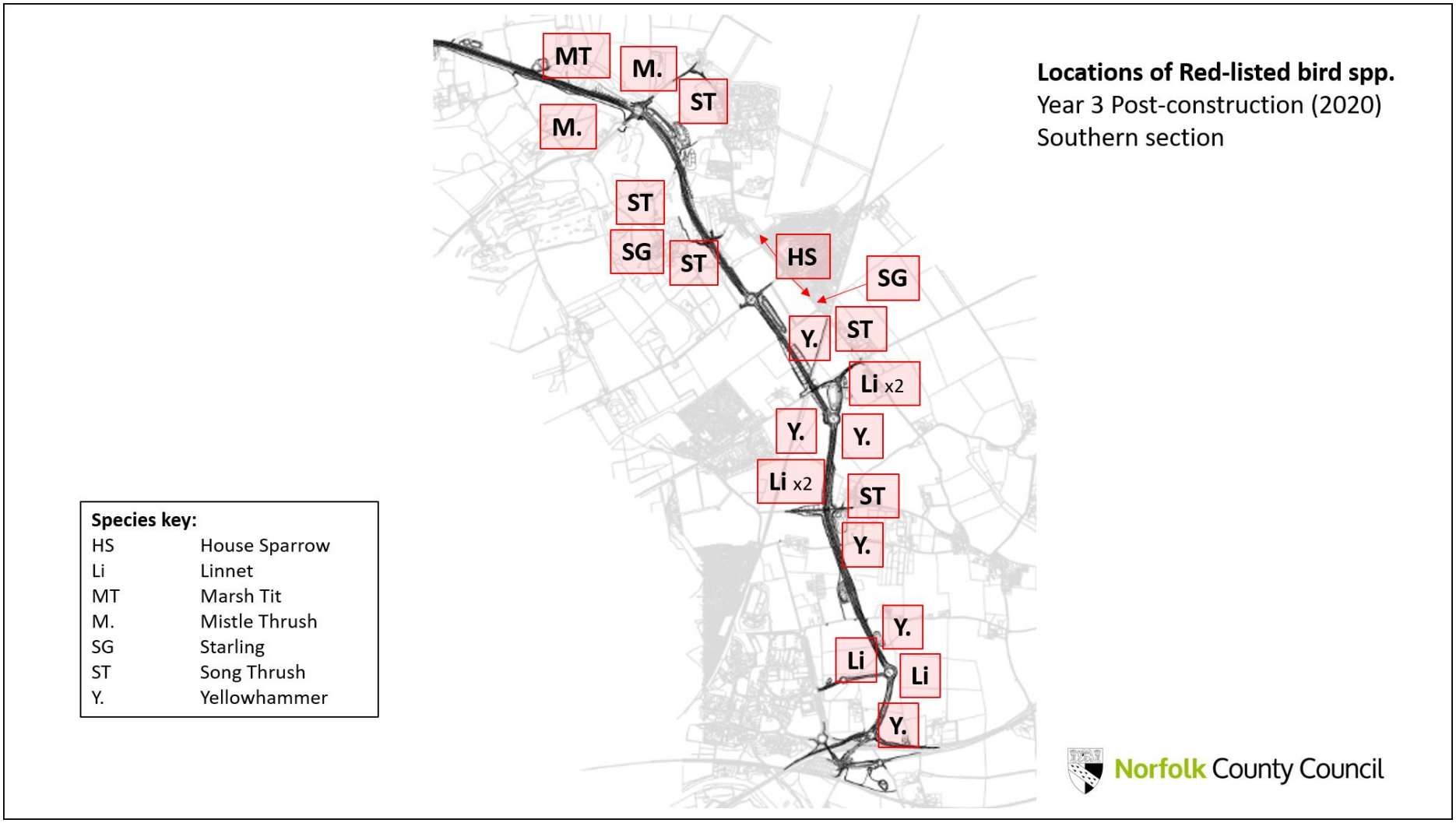

Figure 4: Locations of 'Red-listed' bird species showing behaviour indicative of breeding in 2020; Broadland Northway Southern Section. *For Linnet, Marsh Tit, Mistle Thrush, Starling, Song Thrush, and Yellowhammer the locations where males were singing on at least two visits are marked. For House Sparrow the location of colonies is marked. Note: Skylark records are omitted from this Figure as they are shown in Figure 5. The extent of the NDR scheme is shown in black.*

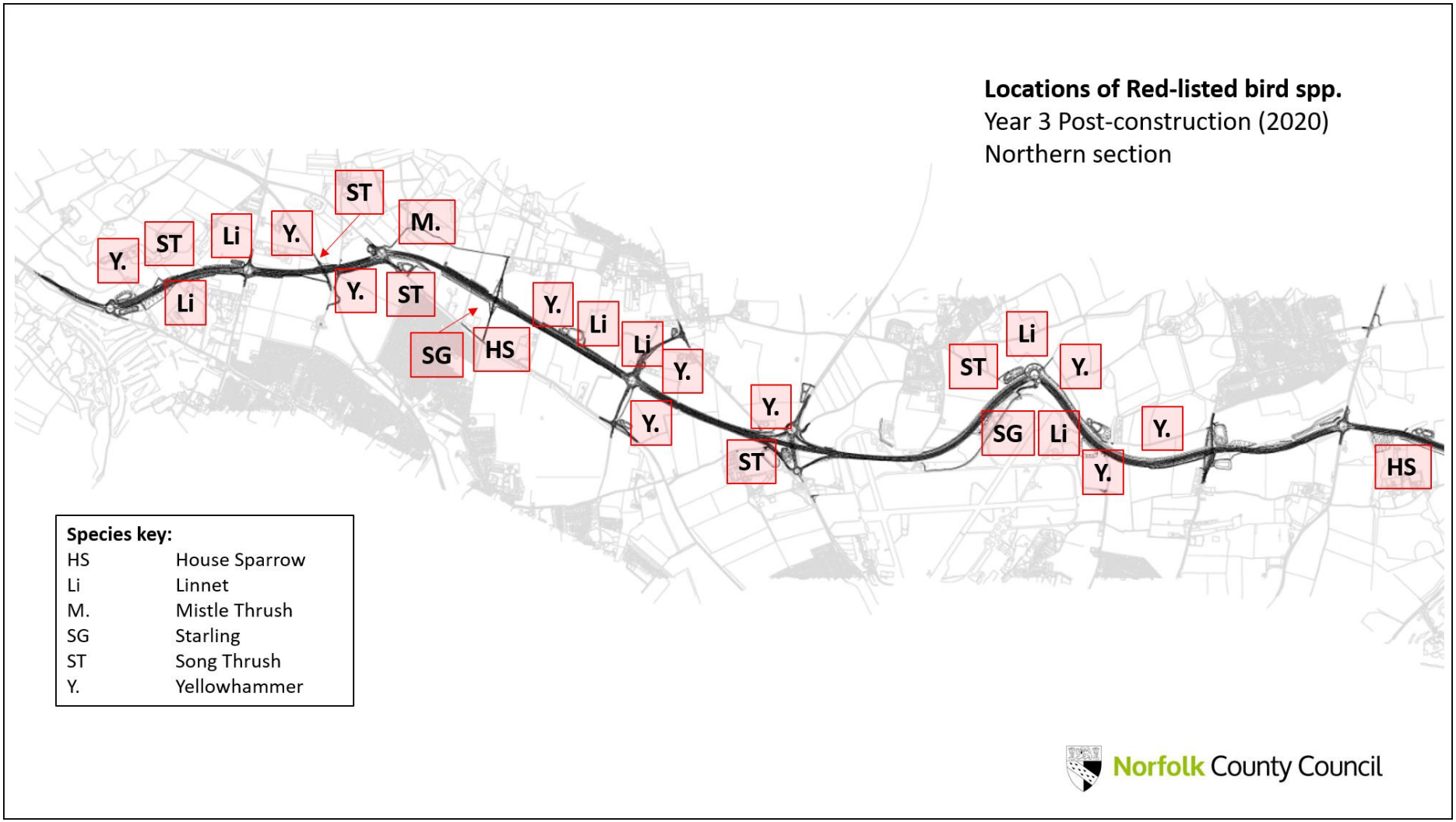

Figure 5: Locations of 'Red-listed' bird species showing behaviour indicative of breeding in 2020; Broadland Northway Northern Section. *For Linnet, Marsh Tit, Mistle Thrush, Starling, Song Thrush, and Yellowhammer the locations where males were singing on at least two visits are marked. For House Sparrow the location of colonies is marked. Note: Skylark records are omitted from this Figure as they are shown in Figure 6. The extent of the NDR scheme is shown in black.*

Figure 6: Location of Skylark Territories in 2020; Broadland Northway Southern Section. *Locations are marked where singing males were heard on more than one occasion. Skylarks are a 'red-listed' species. The extent of the NDR scheme is shown in black.*

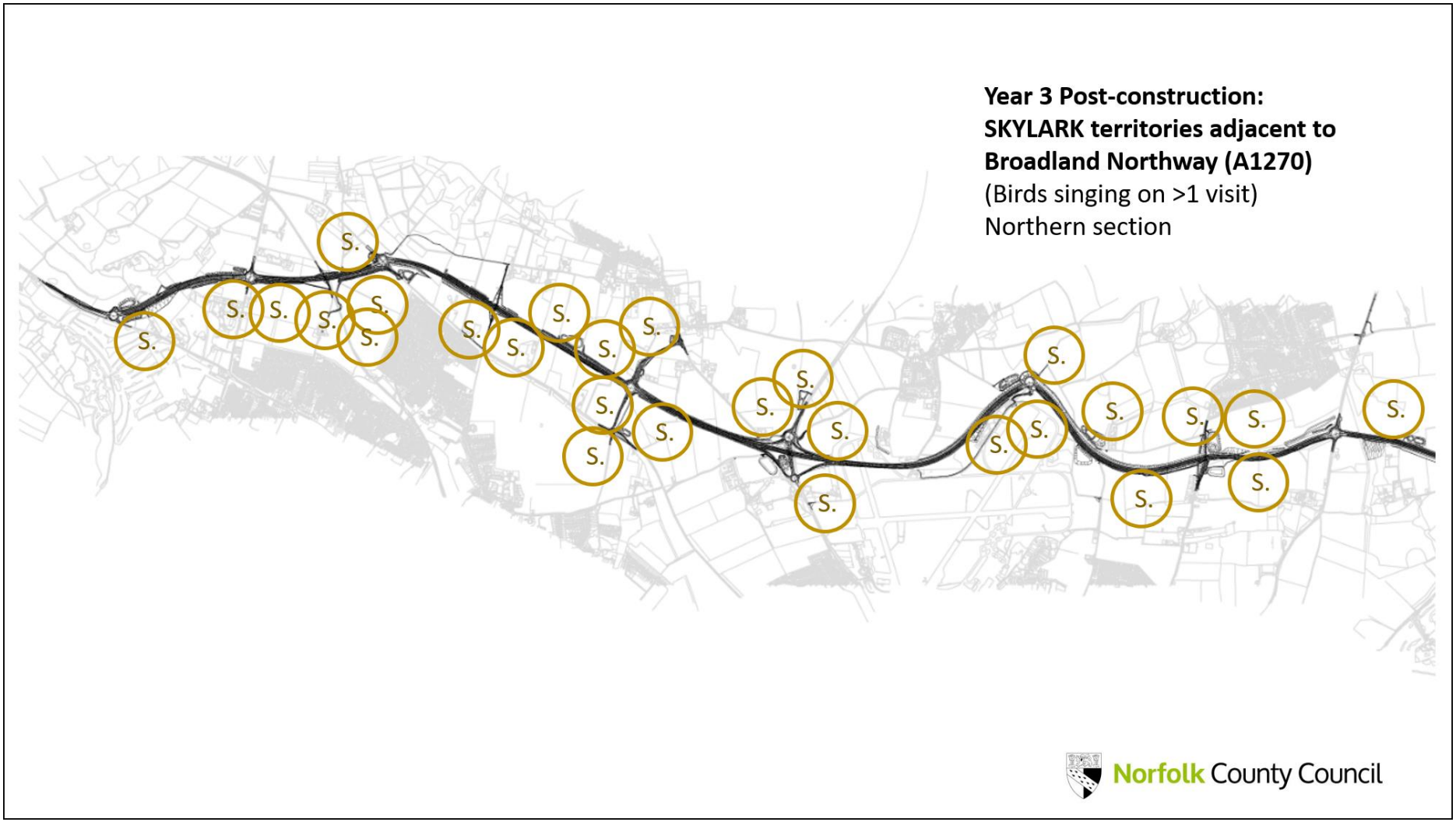

Figure 7: Location of Skylark Territories in 2020; Broadland Northway Northern Section. *Locations are marked where singing males were heard on more than one occasion. Skylarks are a 'red-listed' species. The extent of the NDR scheme is shown in black.*

5. Discussion

Comparison of the 2020 survey with the Year 1 and 2 and the baseline surveys:

5.1. The results of the 2020 Year 3 Post-construction breeding bird monitoring survey were very similar to those of the previous years. Breeding evidence was identified for a total of 54 species, the same number as recorded in 2019 and one less than in 2018. This compares to 61 species for which breeding evidence was observed in the baseline (pre-construction) surveys undertaken in 2012 and 2013.

Between-year comparison: Red-listed Species

5.2. In total, over the pre and post-construction surveys, 12 species that are currently on the Red-list have bred in the location of the road, but not all in the same year (Table 2). In 2020, 8 Red-listed species were observed to be showing signs of breeding. This is the same number as in 2019 and compares with 10 in 2018 and 13 in the baseline surveys (although note the conservation status of some species changed between the pre-construction and post-construction surveys).

*Table 2: Comparison of breeding Red-listed species observed in the road corridor between the baseline surveys (2012/13) and the post-construction surveys of 2018, 2019 and the current year. *Note 1: The approach to recording Skylarks differed between the pre and post-construction surveys (see 2018 report for details). **Note 2: Access restrictions meant locations where these species had been seen in previous years were not surveyed in full in 2020 (see text for details).*

Red-listed Species	Baseline Survey (pre-construction)	2018 survey (Year 1 Post-construction)	2019 Surveys (Year 2 Post-construction)	2020 Surveys (Year 3 Post-construction)
Cuckoo	Max 2 birds recorded	Not recorded	Heard, but outside the ZOI	Not recorded
Grasshopper Warbler	Not recorded	1 singing male	Not recorded	Not recorded
Grey Partridge	Not breeding	1 pair	Not recorded	Not recorded
House Sparrow	3 singing males	4 ‘colonies’	4 ‘colonies’	3-4 colonies
Linnet	10 singing males	13 singing males	21 singing males	11 singing males
Marsh Tit	2 territories	4 territories (1 location)	4 territories (2 locations)	1 territory **
Mistle Thrush	10 territories	4 territories	3 territories	3 territories
Skylark	156 singing males	25 territories	37 territories	44 territories
Song Thrush	22 territories	10 territories	10 territories	10 territories
Spotted Flycatcher	1 pair	Not recorded	Not recorded	Not recorded
Starling	4 singing males	17 males (5 locations)	11 males (4 locations)	c.8 males (4 locations) **
Yellowhammer	34 territories	9 territories	13 territories	16 territories

Between-year comparison: Amber-listed Species

5.3. There is strong similarity in the total number of Amber-listed species recorded in the three Post-construction monitoring surveys. Each year, 18 to 20 species have been recorded, although not the same species every year (Table 3). Also similar was the number of Amber-listed species showing some evidence of breeding; in 2020 there were 10 such species, compared to 9 in 2019 and 10 in 2018.

Table 3: Comparison of Amber-listed species observed in the road corridor between the pre- and the post-construction surveys of 2018, 2019, and the current year, with indication of whether breeding was considered likely.

Amber-listed Species	Year 1 Survey: 2018 Evidence of breeding (Y/N)	Year 2 Survey: 2019 Evidence of breeding (Y/N)	Year 3 Survey: 2020 Evidence of breeding (Y/N)
Black-headed Gull	N	N	N
Bullfinch	Y	Y	Y
Common Sandpiper	Not recorded	Not recorded	N
Dunnock	Y	Y	Y
Grey-lag Goose	N	N	N
House Martin	Y	Y	Y
Kestrel	N	N	N
Lesser BB Gull	N	N	N
Mallard	N	N	Y
Meadow Pipit	Y	Y	Y
Mute Swan	N	N	Y
Oystercatcher	N	N	N
Reed Bunting	Y	Y	N
Stock Dove	N	Not recorded	N
Swift	Y	Y	Y
Tawny Owl	Y	Y	Y
Teal	Not recorded	N	N
Tufted Duck	Y	N	N
Whitethroat	Y	Y	Y
Willow Warbler	Y	Y	Y

Between-year comparison: Hotspots

5.4. There were some minor differences in the number and locations of ‘Hotspots’ for breeding birds in 2020 compared to the previous two years. The 10 locations where more than 5 breeding species were recorded was fewer than in 2019 (13) and 2018 (12). In the southern section there were 7 hotspots (cf. 7 in 2018, 9 in 2019), and in the northern section there were 3 (cf. 5 in 2018, 4 in 2019).

Use of created habitats

5.5. The majority of the birds showing evidence of breeding in 2020 were using habitats that were present before the road was constructed, in areas peripheral to the

construction zone. The hotspots predominantly contained pre-existing habitats. Opportunities for breeding in the landscaped areas remain limited as the specimens that were planted were very immature. Large scale spraying of herbicides in 2020 around the planted trees would have greatly suppressed opportunities for insect and other invertebrates, thus reducing potential food for birds.

5.6. There was an exception to this: in 2020 several species bred in the areas containing the drainage lagoons. Some of the lagoons are designed to retain water for at least some of the year, and these were utilised by birds. In 2020 a pair of Little Grebes built a nest within young willow trees at the edge of a lagoon. This breeding attempt is the first recorded within the road corridor before or post-construction. Coots and Moorhens also nested on lagoons, and the presence of three Mallard broods is strongly suggestive that they nested in very close proximity to the water.

5.7. Skylarks utilised the grassland areas around some of the lagoons, being seen either on the ground or rising from, or descending to, grassed areas. The sward length in these areas may have been preferable for nesting compared to the winter-sown crops in the adjoining fields which were relatively denser in May.

5.8. Little Ringed Plover has been seen annually in the post-construction surveys, but breeding has often proved difficult to confirm. In 2020, two birds were in suitable habitat for more than a month, and a nest was eventually located on an extra visit after the surveys had formally been completed (photo in Figure 8). The outcome of this breeding attempt is unknown. A summary of records of the species in the Broadland Northway corridor is provided in Table 3. Although Green-listed, the species is a scarce breeder in Norfolk; the latest data indicating around 30 nesting attempts are recorded annually (Norfolk & Norwich Naturalists' Society, 2019).

Table 3: Summary of the records of Little Ringed Plover in the corridor of the Broadland Northway. Data extracted from reports submitted with the NDR DCO application and the post-construction monitoring surveys, and from correspondence between the Natural Environment Team and local naturalists.

Year	Survey	Breeding situation
2007	Preliminary surveys to inform road design	Pair present at mineral workings north of Quaker Farm but considered to be breeding at a second larger minerals site further to the north.
2012	Pre-construction	Pairs present at mineral workings North of Quaker Farm but breeding was not confirmed.
2016	Casual records	Pair at Postwick in ground disturbed as part of the development of the Postwick interchange (prior to the commencement of construction of the NDR). It was reported that chicks were seen.
2018	Post-construction year 1 monitoring	One or 2 birds were seen in 2018 around the newly constructed lagoons, but breeding was not confirmed.
2019	Post-construction year 2 monitoring	Breeding confirmed with two young observed in the vicinity of drainage lagoon 8, although the exact location of the nest was unknown (and may have been off-site). There were other sightings at lagoons 5 and 13 that may have involved separate pairs/birds.
2020	Post-construction year 3 monitoring	Two birds in suitable habitat for more than a month and a nest located. The outcome of the breeding attempt is unknown. One of the birds may have also fed in another of the lagoons.

Figure 8: Little Ringed Plovers on nest at lagoon 5. Top photo: the normal-plumaged bird photographed on the 26th June 2020 and lower photo: the bird with white-feathers photographed on the nest on 10th July 2020. The photographs were taken from the combined cycle and footway adjacent to the Broadland Northway.

5.9. The drainage lagoons were also seen to provide resources for other bird species. Three Wheatears utilised the area around lagoon 5 for a minimum of 5 days in late May as a 'stop-over' on their migration, and a Common Sandpiper was seen feeding around lagoon 18 on a single visit, presumably also passing through. Gulls of three species were seen at lagoons, but the large concentrations of these birds that were seen in previous years were not noted.

Discussion of differences between years

5.10. Between-year variation is commonly seen in breeding numbers of bird species. This is often due to weather conditions at critical times in the birds' lifecycles affecting adult survival, fledging rates, migration, dispersal etc (Woodward *et al*., 2018). For bird species in the UK, long-term trends for population change have been established (British Trust for Ornithology, 2018). The results of post-construction monitoring must be seen in this context; any observed changes in the abundance or density of breeding birds could be as a result of weather or long-term environmental change.

5.11. Eight Red-listed species have been recorded breeding in each of the three post-construction surveys. These are: House Sparrow, Linnet, Marsh Tit, Mistle Thrush, Skylark, Song Thrush, Starling, and Yellowhammer. For some of these species, the abundance and distribution of breeding territories has been very similar in each year. The red-listed Yellowhammer demonstrates this. A comparison of breeding locations shows there is consistency across each of the years (Figure 9 and Figure 10 below).

5.12. Similarly, the number and location of House Sparrow colonies has been comparable in each of the three years of surveys post-construction. The number of Mistle Thrush and Song Thrush territories have also been consistent, although the territories have not all been in the same locations each year.

5.13. The number of Skylark territories was greater in 2020 compared to the previous two years. This may in part be due to the species utilising some of the grassed areas around the lagoons where the sward has become increasingly suitable for nesting (see paragraph 5.7).

5.14. The number of Marsh Tit territories was fewer in 2020 than previously but it must be noted that the area of wet woodland where the species has been recorded in earlier years was not entered due to access restrictions arising from the COVID-19 situation. A single territory was noted in this woodland, with the bird heard from the wide road verge. Access limitations may also have affected the identification of Starling territories; access was restricted to an area that previously held several nests. However, the number of locations where Starlings were nesting was the same as in the previous year, and the number of singing birds was only slightly fewer.

5.15. Breeding Linnet numbers have varied over the years. Pre-construction there were 10 pairs, and post-construction the number has varied between 11 and 21. Linnets require a good supply of seeds throughout the year and different crops provide different feeding opportunities. Both spring and winter oilseed rape provide ripening seed for chicks, and local variation in the sowing of this crop may partially explain why numbers are different between years. The favoured breeding habitat of scrub has probably changed little between the surveys.

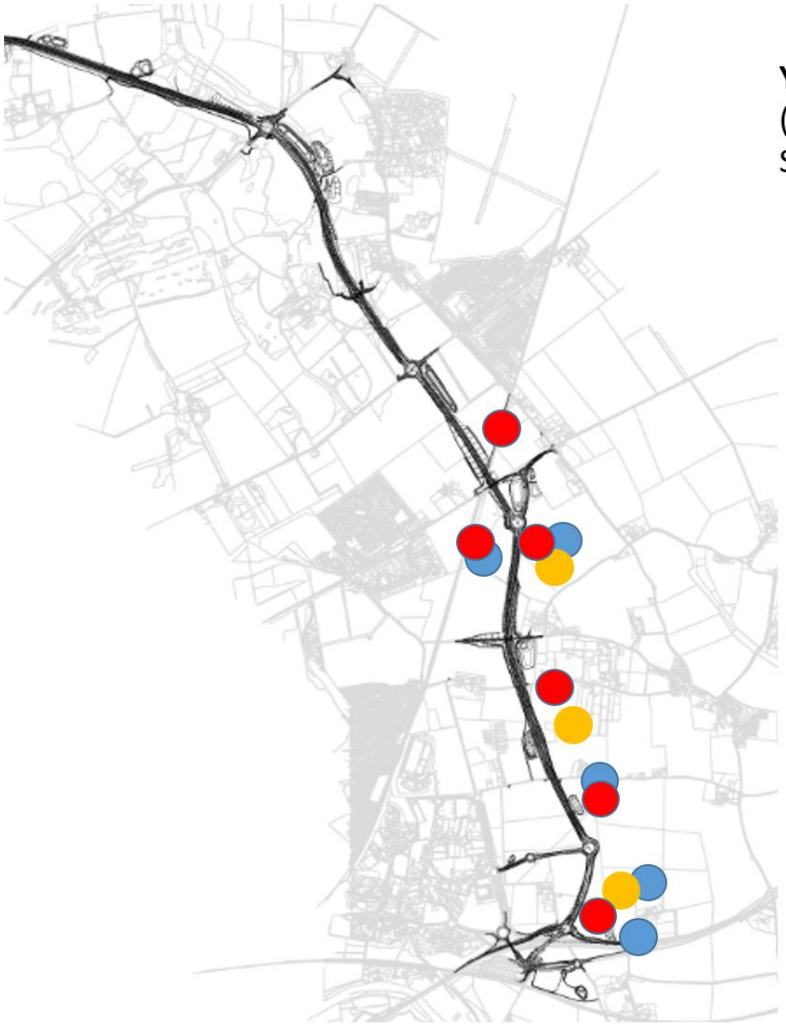

Figure 9: Comparison of Yellowhammer abundance and distribution in the post-construction annual surveys (2018 – 2020): Southern section. *The extent of the NDR scheme is shown in black. Note: the absence of territories between Rackheath and Spixworth is due to the lack of suitable habitat in the vicinity of the road and probably reflects the pre-construction situation. Photo: Male Yellowhammer (Natural Environment Team).*

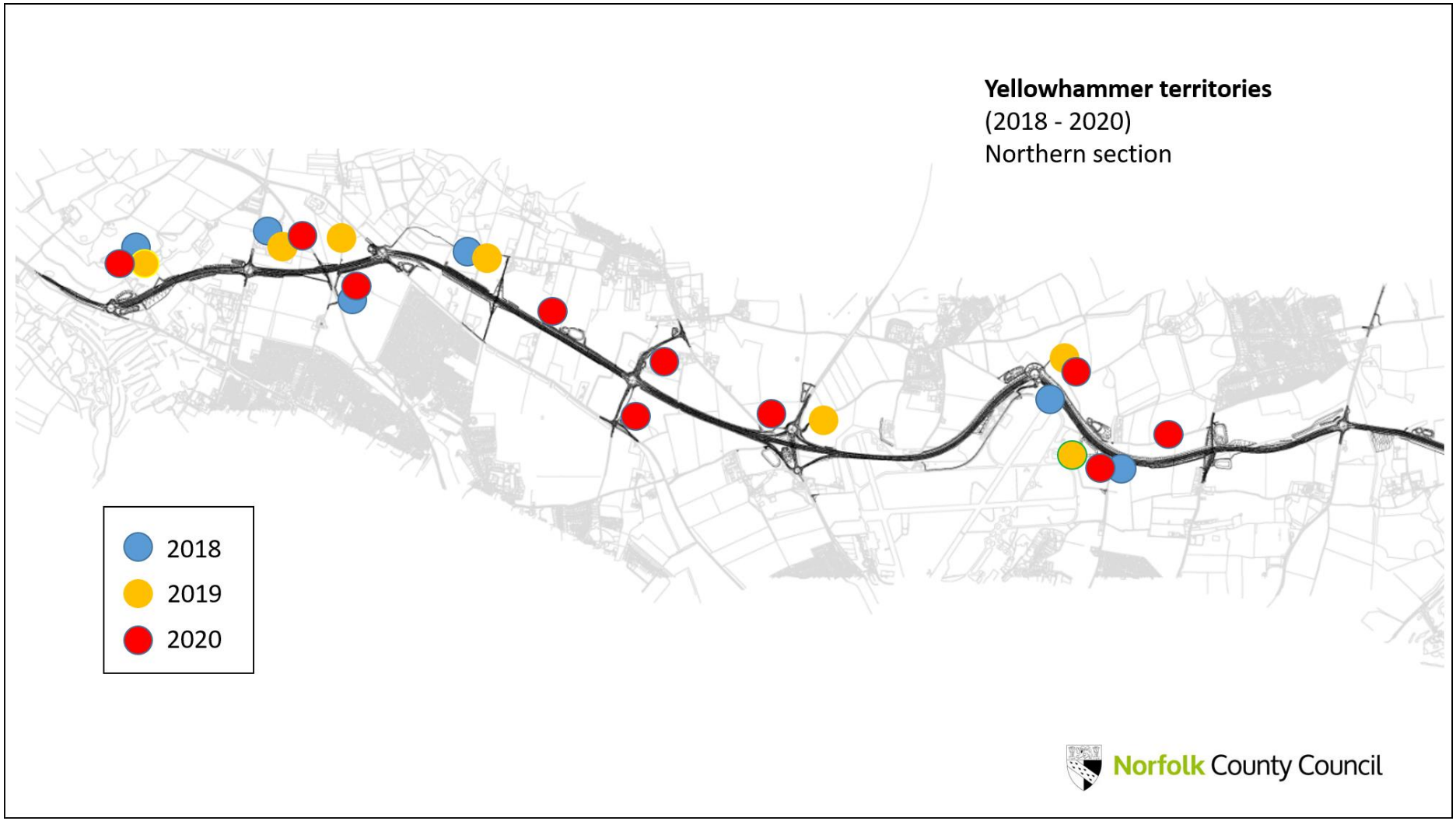

Figure 10: Comparison of Yellowhammer abundance and distribution in the post-construction annual surveys (2018 – 2020): Northern section. *The extent of the NDR scheme is shown in black.*

Conclusions and future surveys

1.1. The 2020 monitoring survey results are a snapshot in time of the breeding birds in the corridor of the Broadland Northway, although some consistency has been observed over the three years post-construction surveys. In terms of the species of highest conservation concern, there is similarity in the number and abundance of breeding Red-listed species present pre and post-construction. The created habitats are becoming more useable by breeding birds as they mature, and it is anticipated that this situation will continue.

1.2. The breeding bird monitoring will be repeated for a further two years in 2021 and 2022 in accordance with the DCO, and the breeding bird situation will be reported on as the setting of the road matures.

6. References

British Ornithologists' Union (2012). BOURC English Names; available at: www.bou.org.uk/british-list/bird-names/

British Trust for Ornithology (2018). *BirdTrends 2018: trends in numbers, breeding success and survival for UK breeding birds;* available at www.bto.org/about-birds/birdtrends/2018

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

Mott MacDonald *(2013); NDR Breeding Bird Survey – Technical Appendices*; in *6.2 Environmental Statement: Volume II: Chapter 8. Ecology and Nature Conservation*

Mott MacDonald (2014); *6.2 Environmental Statement: Volume II: Chapter 8. Ecology and Nature Conservation* for *The Norfolk County Council (Norwich Northern Distributor Road (A1067 to A47(T)) Order*; Document Reference: NCC/EX/6.2

Natural Environment Team, NCC (2019); *Breeding Bird Monitoring Report: Northern Distributor Road Year 1 Post-construction Survey 2018* (unpublished report).

Natural Environment Team, NCC (2020); *Breeding Bird Monitoring Report: Broadland Northway (NDR) Year 2 Post-construction Survey 2019* (unpublished report).

Norfolk and Norwich Naturalist Society (2019); *Norfolk Bird and Mammal Report 2018; Transactions of the Norfolk and Norwich Naturalists' Society; Vol 52*

Norfolk County Council (2014a); *Development Consent Order for the Norfolk County Council (Norwich Northern Distributor Road (A1067 to A47(T)) Order*; Document Reference: NCC/EX/40

Norfolk County Council (2014b); *NDR Mitigation Table for the Norfolk County Council (Norwich Northern Distributor Road (A1067 to A47(T)) Order*; Document Reference: NCC/EX/81

Woodward, I.D., Massimino, D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2018) *BirdTrends 2018: trends in numbers, breeding success and survival for UK breeding birds.* Research Report 708. BTO, Thetford.

Figure 11: *Barn Owl hunting within the highway zone by drainage lagoon 5, 17th June 2020 (Photo: Natural Environment Team)*