

Technical Note

PROJECT:	NT15821 IAMP Phase 2 / GIGA3/ AESC Plant 3
SUBJECT:	Skylark Mitigation
NOTE REF:	008
DATE:	10 th October 2023 (Rev 01)
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EXECUTIVE SUMMARY

Wardell Armstrong LLP (WA) was commissioned by AESC UK to determine suitable skylark mitigation in support of a proposed International Advanced Manufacturing Park, known as GIGA3/ AESC Plant 3.

The following equation has been used to determine the number of skylark territories on site, and the size of a receptor site needed to mitigate for skylark territories: $Area = Territories/Territories\ per\ ha$.

The data analysis determined that a total of 20 skylark territories are present on site, this figure is derived from empirical survey data.

In order to compensate for the 20 territories that will likely be displaced by the development, a c. 64.51 hectare receptor site of intensive winter cereal, which will be enhanced to spring cereal, is necessary. This calculation assumes that the compensation land will be farmed for winter wheat and that this habitat will be enhanced to a more favourable cropping regime of spring sown wheat/barley in order to accommodate the necessary uplift in breeding density. Furthermore, any retention of viable habitat on site will influence the compensation requirements off site.

It should be noted that the area of compensation land is highly dependent upon crop type prior to enhancements. If the land is farmed for silage for example (an unfavoured habitat for breeding skylark), the degree of uplift/enhancement available would be much greater and hence the required land area would be less.

This calculation does not consider the specific requirements of other farmland birds which would be displaced by the development. Some of these species, for example hedgerow nesting birds can be accommodated within the general arable landscape if appropriately managed hedgerows and buffer strips are also present. Others may have requirements which are mutually exclusive to the habitat requirements of skylark and hence their compensation needs to be considered in addition to that set out in this report. Such species include curlew and lapwing which in general terms require damp, lightly grazed pasture. In reality it is

anticipated that a mosaic of habitats will be provided for farmland birds with a mixture of extremely high value breeding habitats such as organic set-aside, and spring sown cereals, set within other habitats including game cover/buffer strips and lightly grazed pasture. It should also be noted that skylark provisions need to be within large arable fields of >2Ha.

1 INTRODUCTION

- 1.1 Skylark *Alauda arvensis* populations in the UK have been declining since the 1970s. This is mainly attributed to agricultural intensification and habitat loss. Skylark are now classified as a UK Biodiversity Action Plan/Natural Environment and Rural Communities act (NERC 2006) 'Priority' Species.
- 1.2 Recent research (Fox, 2022) has suggested that ground nesting birds (GNBs), such as skylark, are often undervalued in ecological assessments and proposed mitigation for developments supporting skylark territories lack scientific validity.
- 1.3 The lack of effective mitigation for skylark when considering developments is causing the displacement of skylark territories, and is likely contributing to the population decline.
- 1.4 Traditionally, mitigations for skylark territories does not involve creating compensatory land. Instead, it is often assumed that any territories would be displaced into adjacent habitat with equivalent characteristics, and that populations would be absorbed into the vast areas of arable land within which the species typically breeds.
- 1.5 New research suggests that such absorption may not occur as arable habitats (in the absence of specific interventions) may already be at or near carrying capacity. Hence developments should consider the number of territories that will be displaced and the territory density on the receptor site. As territory density varies markedly between habitat types, the habitat type of the development and receptor site also needs to be taken into consideration. Donald (2004) has collated a number of research papers which consider skylark territory densities according to habitat type and management, which can be used to calculate the necessary area of land for a receptor site i.e. arable farmland has an average territory density per hectare of 0.28 territories.
- 1.6 Donald's (2004) research and a bespoke equation has been used to calculate the necessary size of a receptor site (and corresponding habitat type) to mitigate for skylark territories for an International Advanced Manufacturing Park (IAMP) in Sunderland for AESC UK.

2 METHODS

2.1 Survey Methods

UK Habitat Classification Survey

2.1.1 WA carried out a UK Habitat (UKHab) Classification Survey of the Site on 26th September 2023. The survey was carried out by experienced WA ecologists.

2.1.2 The survey followed the 'UK Habitat Classification' (Butcher et al., 2023) methodology with each of the main habitats classified according to the relevant criteria including vegetation composition expressed according to the DAFOR¹ system.

Breeding Bird Survey

2.1.3 Ecology Solutions (2021) conducted breeding bird surveys of the AESC Plant 2 site. The breeding bird survey was carried out using a modified version of the Common Bird Census (CBC) technique, which used a walking transect to identify all bird species observed or heard. Three surveys were completed in total, with one in April, May and June 2021. From the breeding bird surveys, the peak number of singing skylarks from three breeding bird surveys conducted in 2021 (Ecology Solutions, 2021) has been referred to.

2.1.4 Durham Wildlife Services (DWS) was commissioned by Ecology Solutions (2022) to conduct breeding bird surveys of the AESC Plant 3 site. The survey methodology was based on the guidelines developed by the steering group 'The Bird Survey Guidelines'², which used a walking transect to identify all bird species observed or heard. Six surveys were completed from April to early-July. From the breeding bird surveys, the peak number of singing skylarks from the six breeding bird surveys conducted in 2022 (Ecology Solutions, 2022) has been referred to.

2.2 Data Analysis

2.2.1 Throughout this method, the following bespoke calculation has been used to calculate the size of a suitable receptor site for skylarks: $Area = Territories/Territories\ per\ ha$.

2.2.2 Donald's (2004) calculations of average territory density of skylark per hectare (of different habitat types) have been used to calculate the size of receptor site necessary

¹ D = dominant, A = abundant, F = frequent, O = occasional, R = Rare

² <https://birdsurveyguidelines.org/>.

to support the peak number of skylark territories on the AESC Plant 2 and AESC Plant 3 site.

- 2.2.3 We presume that the receptor site will be intensive winter cereal (with an average territory density of 0.15ha) which will be converted to spring cereals (with an average territory density of 0.46ha). These figures have been used to calculate the net change in territory density from the conversion of the receptor site from intensive winter cereal to spring cereal i.e. the level of anticipated uplift.

3 RESULTS

3.1 Survey Results

UK Hab Classification Survey

- 3.1.1 The key habitats on site include other neutral grassland, modified grassland, hedgerows with trees, scrub and ditches.
- 3.1.2 A full habitat description can be found in the Preliminary Ecological Appraisal report (WA, 2023) and the location and extent of habitats are shown in Plate 1.



Plate 1: Image of UKHab survey results for Aesc Plant 2 and AESC Plant 3.

Breeding Bird Surveys

- 3.1.3 The breeding bird surveys for AESC Plant 2 (Ecology Solution, 2021) recorded farmland BoCC Red/amber List species within the site including Grey Partridge *Perdix perdix*, Lapwing *Vanellus vanellus*, Linnet *Linaria cannabina*, Skylark *Alauda arvensis*, Starling *Sturnus vulgaris* Yellowhammer *Emberiza citrinella* and Reed Bunting *Emberiza schoeniclus*.

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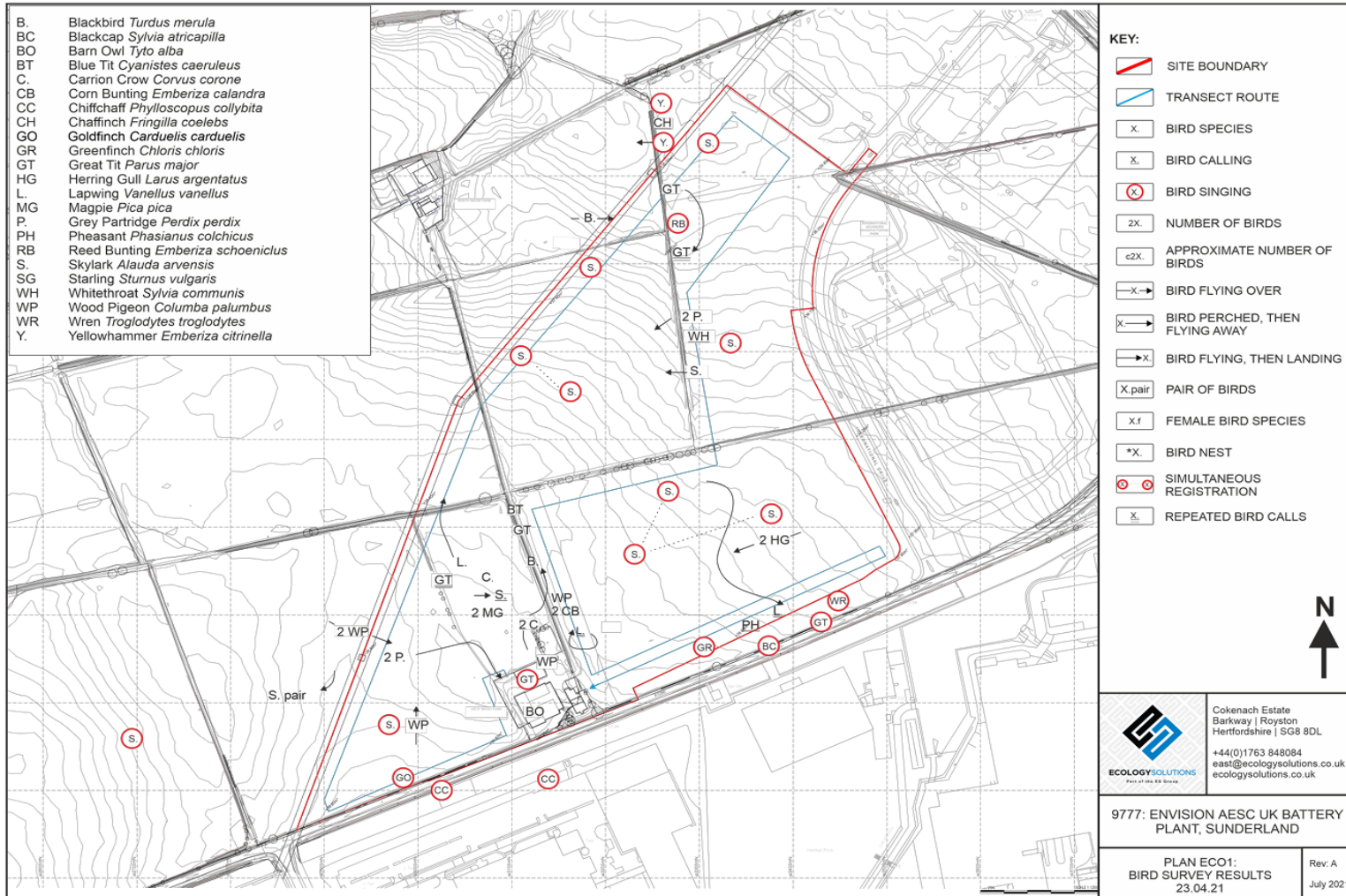


Plate 2: An image of the breeding bird survey results from April 2021.

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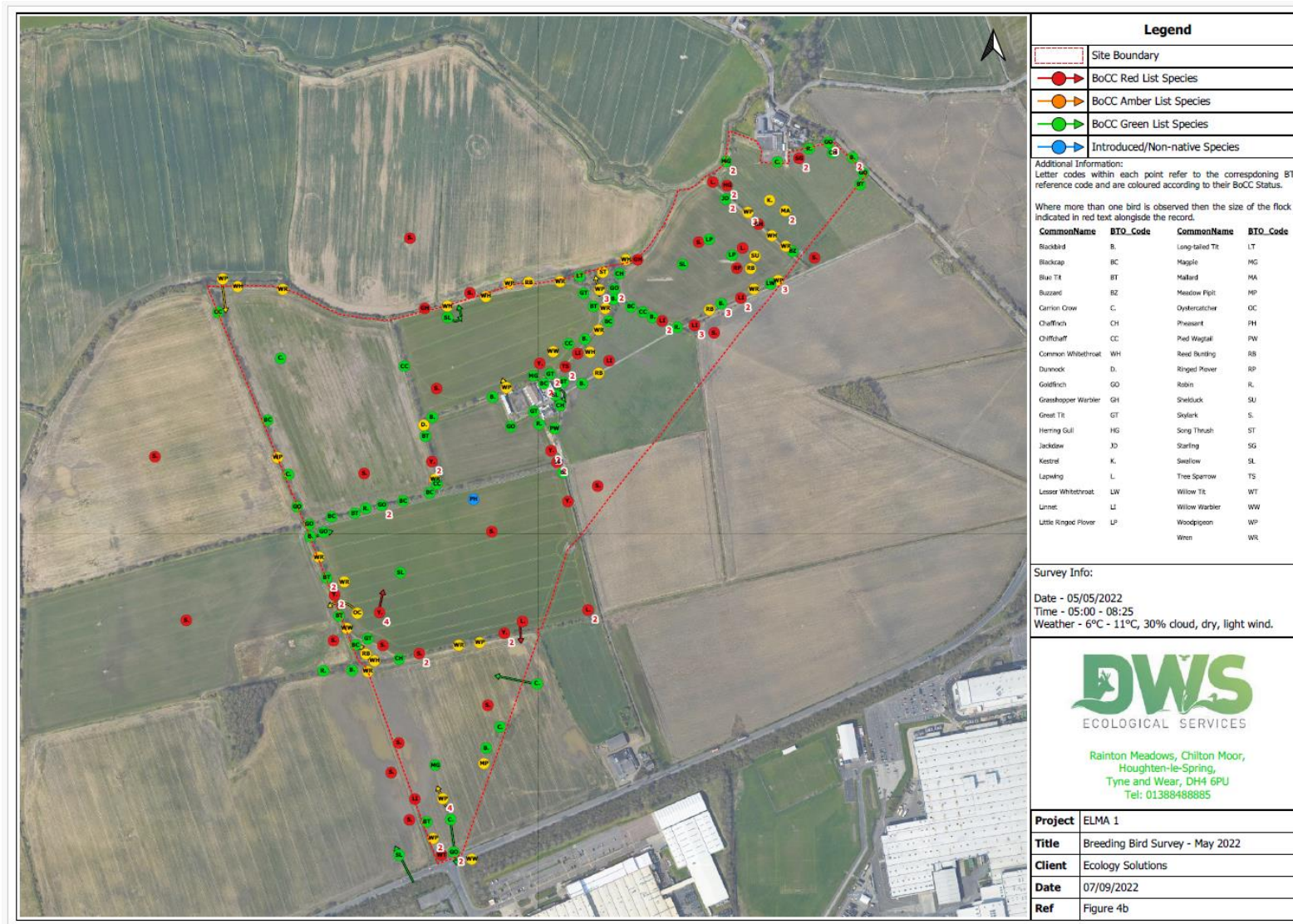


Plate 3: An image of the breeding bird survey results from May 2022.

- 3.1.4 The number of skylark territories identified during the 2021 surveys were as follows; April – nine territories, May – five territories, June – four territories. The peak number of skylark territories on the AESC Plant 2 was nine territories, from the April survey results (see Plate 2).
- 3.1.5 The breeding bird surveys for AESC Plant 3 (Ecology Solutions, 2022) recorded 68 bird species, with 25 confirmed breeding, 8 probable breeding, 12 possible breeding, and 21 non-breeding species within the survey area.
- 3.1.6 The number of skylark territories identified during the 2022 surveys were as follows; April – eight, May – eleven, June (nocturnal 1) – none, June – three, June (nocturnal 2) – none, July – four. The peak number of skylark territories on the AESC Plant 3 was eleven territories, from the May survey results (see Plate 3).

3.2 Data Analysis

AESC Plant 2

- 3.2.1 For AESC Plant 2, the peak number of singing skylarks from three breeding bird surveys conducted in 2021 (Ecology Solutions, 2021) has been used to calculate the number of skylark territories on site. The equation ($\text{Area} = \text{Territories} / \text{Territories per ha}$) has been used to calculate the size of the receptor site needed to compensate for nine territories, if the receptor site is intensive winter cereal converted to spring cereals.
- 3.2.2 The net change in territory density from the conversion of the receptor site from intensive winter cereal (average territory density of 0.15 per ha) to spring cereals (average territory density of 0.46 per ha) is **0.31 territories per hectares**.
- 3.2.3 Therefore $9/0.31 = \mathbf{29.03ha}$. So 29.03 hectares of intensive winter cereal, converted to spring cereals, is needed to compensate for the nine skylark territories on the AESC Plant 2 site.

The territory density for AESC Plant 2 is 0.34 territories per hectare ($9/26.15\text{Ha}$ territories = 0.34 territories/Ha).

AESC Plant 3

- 3.2.4 For AESC Plant 3, the peak number of singing skylarks from six breeding bird surveys conducted in 2022 (Ecology Solutions, 2022) has been used to calculate the number of skylark territories on site. The equation ($\text{Area} = \text{Territories} / \text{Territories per ha}$) has

been used to calculate the size of the receptor site needed to compensate for eleven territories, if the receptor site is intensive winter cereal converted to spring cereals.

3.2.5 The net change in territory density from the conversion of the receptor site from intensive winter cereal (average territory density of 0.15 per ha) to spring cereals (average territory density of 0.46 per ha) is **0.31 territories per hectares**.

3.2.6 Therefore $11/0.31=35.48\text{ha}$. So 35.48 hectares of intensive winter cereal, converted to spring cereals, is needed to compensate for the eleven skylark territories on the AESC Plant 3 site.

The territory density for AESC Plant 3 is 0.31 territories per hectare ($11/35.48\text{Ha}$ territories = 0.31 territories/Ha).

4 CONCLUSIONS

- 4.1 In conclusion, 29.03 hectares are needed to compensate for the nine skylark territories on the AESC Plant 2 site, and 35.48 hectares are needed to compensate for eleven skylark territories on the AESC Plant 3 site. These figures are derived from empirical survey data (Ecology Solutions 2021, Ecology Solutions 2022) and partly from extrapolation of expected territories from published research on skylark breeding density within various crop/habitat types.
- 4.2 Therefore a **c.64.51 hectare** receptor site of intensive winter cereal, which will be converted to spring cereal, is needed to compensate for the skylark territories. This calculation assumes that the compensation land will be farmed for winter wheat and that this habitat will be enhanced to a more favourable crop/management (spring sown wheat/barley) in order to accommodate the necessary uplift in breeding density. It should also be noted that skylark provisions need to be within large arable fields of >2Ha. This is necessary as skylark tend to avoid land within 100m of hedgerows and woodland presumably due to the 'predator shadow' effect caused by nest predation from corvids and mammals.
- 4.3 It should be noted the area of compensation land is highly dependent upon crop or habitat type prior to enhancements, as the existing breeding population of skylark on such land needs to be taken into account. If the land is currently farmed for silage for example which is an unfavoured habitat for breeding skylark, the degree of uplift/enhancement available would be much greater and hence the required land area would be less.
- 4.4 Furthermore, it should be noted that this calculation does not consider the specific requirements of other farmland birds which would be displaced by the development. Some of these species, for example hedgerow nesting birds can be accommodated within the general arable landscape if appropriately managed hedgerows and buffer strips are also present. Others may have requirements which are mutually exclusive to the habitat requirements of skylark and hence their compensation needs to be considered in addition to that set out in this report. Such species include wading birds in particular curlew and lapwing which in general terms require damp, lightly grazed pasture. The habitat requirements of barn owl also need to be considered which includes tall unmanaged grassland which is rich in small mammals – this may be included within a specific hedgerow and buffer management regime whereby buffers

of unmanaged/lightly managed grassland are retained as an 'ecotone' adjacent to the field boundary hedges.

- 4.5 In reality it is anticipated that a mosaic of habitats will be provided for farmland birds with a mixture of extremely high value skylark breeding habitats such as organic set-aside, and spring sown cereals, set within other habitats including game cover/buffer strips and lightly grazed pasture. The RSPB Hope Farm³ is a demonstration project to illustrate and research how the adaptation of farming practices can result in significant benefits to farmland birds, it is recommended that such examples of good practice are considered when developing habitat management prescriptions for the compensation area. In particular, crop height/type and application of nutrient/pesticides will require careful consideration as these are significant factors in skylark breeding productivity.

³ [Hope Farm | How it's Grown - The RSPB](#)

5 REFERENCES

Butcher, B., Carey, P., Edmonds, R., Norton, L. and Treweek, J. (2023). *The UK Habitat Classification User Manual Version 2.0* at <http://www.ukhab.org/> .

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