



ARCUS

ECOLOGICAL IMPACT ASSESSMENT REPORT

SWEETBRIAR SOLAR FARM



LIGHTROCKPOWER

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1 SUMMARY

Arcus Consultancy Services Ltd was commissioned by Lightrock Power Ltd to undertake an Extended Phase 1 Habitat Survey and subsequent ecological surveys of land known as 'Sweetbriar Farm', approximately 6 km north west of Immingham, North East Lincolnshire (the Site) as it was identified that the Site had the potential to support a range of important ecological features that may be sensitive to development.

Following the completion of the Extended Phase 1 Habitat survey, it was considered that other than the recommended great crested newt (GCN) surveys, no further surveys were required to provide the necessary information to inform an Ecological Impact Assessment (EcIA). This report therefore presents the methods and results of the Extended Phase 1 Habitat survey and the findings of the EcIA.

No significant adverse ecological impacts are predicted in the absence of mitigation. However, to reduce ecological effects and the likelihood of legal offences, species-specific and general mitigation have been recommended. Habitat creation and enhancement proposed as part of the Development will provide significant benefits to a range of ecological features and increase the biodiversity value of the Site. This includes the installation of bat boxes and mammal gates (specifically for mammals such as brown hare, otters and badgers to utilise) alongside new wildflower planting and hedgerow enhancement.

2 INTRODUCTION AND BACKGROUND

Arcus Consultancy Services Limited (Arcus) were instructed by Lightrock Power Ltd to undertake an Extended Phase 1 Habitat Survey of an area of land known as 'Sweetbriar Farm', approximately 6 km north west of Immingham, North East Lincolnshire, DN39 6TR (henceforth referred to as the 'Site'), centred on National Grid Reference TA 11023 16739.

On completion of the survey and following finalisation of the proposed site layout, an Ecological Impact Assessment (EcIA) was prepared in support of a planning application for a proposed ground mounted solar photovoltaic ('PV') farm and associated infrastructure (the Development).

This report describes the methods and results of the Extended Phase 1 Habitat Survey and assesses the associated potential ecological impacts. It also provides recommendations to avoid or reduce such impacts, as well as measures for ecological enhancements.

2.1 Structure of Report

The report is supported by the following appendices:

- Appendix A – Planning Policy and Legislation;
- Appendix B – Figure 1 Phase 1 Habitat Survey Map;
- Appendix C – Plant Species List;
- Appendix D – Photographs;
- Appendix E – Great Crested Newt Detailed Survey Results; and
- Appendix F – Bat Box Recommendations.

2.2 Planning Policy and Legislation

Relevant legislation and policies referred to throughout the report are summarised and referenced in Appendix A.

3 METHODS

3.1 Desk Study

Natural England's Multi Agency Geographic Information for the Countryside¹ (MAGIC) website was consulted to obtain information about local and national statutory designated sites such as Local Nature Reserves (LNR) and Sites of Special Scientific Interest (SSSI) within 2 km of the Site. A search for designated sites in the National Sites Network, including Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites, within 5 km of the Site was also undertaken. MAGIC was also consulted for information about important habitats, such as ancient woodland and priority habitats, as well as the presence of European Protected Species (EPS) mitigation licences.

Lincolnshire Environmental Records Centre (LERC) was consulted for local records of features of ecological interest within 2 km of the Site including non-statutory designated Local Wildlife Sites (LWS) and notable and protected species.

A review of historic aerial satellite imagery² was undertaken for the Site to gain an understanding of past land-use.

3.2 Extended Phase 1 Habitat Survey

An Extended Phase 1 Habitat Survey was conducted on 15th and 16th March 2021 and the 4th June 2021 by a suitably experienced Ecologist. The surveys covered the entirety of the

¹ Multi Agency Geographic Information for Countryside (MAGIC) [Online] Available at: <https://magic.defra.gov.uk/home.htm> [Accessed August 2021]

² Google LLC (2020) *Google Earth*. Available from: <https://earth.google.com/web/> [Accessed August 2021]

Site (shown on Figure 1, Appendix B). The aim of the surveys was to classify and map habitats according to standard methods³ and to assess their potential to support notable and protected species. The survey was carried out following the Guidelines for Preliminary Ecological Appraisal⁴. Target Notes (TN) were recorded of features of particular ecological interest.

3.3 Great Crested Newt Survey

3.3.1 Habitat Suitability Index Assessment

During the Extended Phase 1 Habitat survey, a Habitat Suitability Index (HSI) assessment⁵ was carried out on waterbodies (where access was possible) within 250 m of the Site. The HSI assessment considers a range of features that affect the suitability of ponds to support great crested newts (*Triturus cristatus*; GCN); e.g., size of pond, extent of shading, abundance of aquatic plants, presence of fish and quality of surrounding habitat. The assessment results in a score that helps to determine the suitability of ponds and the need for further, more detailed surveys. In general, ponds with a high HSI score are more likely to support GCN than those with lower scores.

The HSI scores are inserted into a table to calculate a score for each pond, with pond suitability for GCN assessed on the scale shown in Table 3.1.

Table 3.1 Categorisation of HSI Scores

| HSI score | Pond suitability |
|------------|------------------|
| < 0.5 | Poor |
| 0.5 – 0.59 | Below average |
| 0.6 – 0.69 | Average |
| 0.7 – 0.79 | Good |
| > 0.8 | Excellent |

Following this assessment, waterbodies that had previously been surveyed or were deemed suitable for GCN when out in the field were recommended to be selected for eDNA testing.

3.3.2 Environmental DNA Surveys

Following the HSI Assessment, an eDNA survey was undertaken on all waterbodies that were deemed suitable to support GCN to determine presence/ likely absence. All ponds assessed as 'Below Average' and above were scoped in for further survey.

In June 2021, an eDNA survey was undertaken on the following ponds: P1, P2, and P3 of all the waterbodies within 250 m buffer of the Site are shown in Figure 1, Appendix B.

Water samples were collected following technical guidance⁶ approved by Natural England. The eDNA kits were then sent to a laboratory for analysis. A positive result is indicative of

³ JNCC (2010) *Handbook for Phase 1 habitat survey: a technique for environmental audit*. Nature Conservancy Council.

⁴ CIEEM (2017) *Guidelines for Preliminary Ecological Appraisal, 2nd Edition*. Chartered Institute of Ecology and Environmental Management, Winchester.

⁵ Oldham R.S, et al. (2000) *Evaluating the suitability of habitat for the Great Crested Newt (Triturus cristatus)*. Herpetological Journal 10 (4), 143-155.

⁶ Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F 2014. *Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA*. Freshwater Habitats Trust, Oxford.

GCN presence at the time of sampling. A negative result suggests there are no GCN within the sample area. For inconclusive results, it is recommended that analysis is repeated.

Where eDNA testing confirmed the positive presence of GCN in accessible ponds within 250 m of the Site, further GCN population surveys of these ponds (along with the prerequisite presence/absence surveys) were undertaken between March and June 2021. Ponds lacking GCN eDNA were scoped out of the need for further surveys.

3.3.1 Presence/Absence Surveys

Presence/absence surveys were undertaken in accordance with guidance^{7,8}, and under licence from Natural England, as well as adhering to ARG-UK guidance⁹ on minimising the risk of spreading disease (particularly *Chytridiomycosis*) among amphibian populations.

During the surveys a mixture of at least three of the approved surveying techniques from the options below were adopted during each survey visit of each pond:

- *Torchlight survey* – The perimeter of the pond was walked after dark whilst illuminating the water's edge with a powerful torch¹⁰. This method is only used when visibility in the water column is not impaired by rain, wind, turbidity or vegetation. Note that distinguishing between female smooth and palmate newts under torchlight is extremely difficult and so females of these species are classified as 'unidentified small female' during these surveys;
- *Bottle trapping* – Bottle traps were set within the margin of each pond at an approximate density of one trap per two metres. The traps were set at, or just before, dusk and left overnight, with the number of newts in each trap recorded and released the following morning;
- *Netting* – The perimeter of the pond was sampled with a long-handled dip net with care taken not to disturb the macrophyte community; and
- *Egg searching* – The vegetation within each pond was inspected for the presence of eggs. If eggs are found (and breeding therefore confirmed), no further searches are conducted.

The physical condition of the waterbody (depth, size, turbidity, vegetation, access etc.) determined which survey methods were appropriate. Health and Safety risks were also considered when selecting the survey methods.

The results of the presence/absence surveys informed the requirement for further population surveys. Details of the survey dates and weather conditions are provided in Table E.1 in Appendix E.

3.3.2 GCN Population Size Class

The maximum adult count recorded from a waterbody on a single night using a single survey technique is used to estimate the population size class. The different classes are defined in Table 3.2.

⁷ English Nature (2001) *Great crested newt mitigation guidelines*. Peterborough: English Nature.

⁸ Griffiths, R.A and Langton, T. (2003) *Herpetofauna Workers' Manual, Chapter 3 Catching and Handling* [Online] Available at: <http://jncc.defra.gov.uk/page-3325> (09/07/21)

⁹ ARG UK (2017). *ARG UK Advice Note 4: Amphibian Disease Precautions: A Guide for UK Fieldworkers*. Amphibian and Reptile Groups of the United Kingdom.

¹⁰ Clulite Clubman Deluxe (CB2), 1 million candle power

Table 3.2: GCN Population Size Classes

| Population Size Class | Peak Adult Count |
|-----------------------|--------------------|
| Small | ≤10 individuals |
| Medium | 11-100 individuals |
| Large | >100 individuals |

3.4 Bat Survey

3.4.1 Bat Roost Assessment

During the Extended Phase 1 Habitat Survey, a preliminary assessment of the potential of features within the Site to support bat roosts and/or provide suitable commuting or foraging habitat was conducted. The bat assessment work and recommendations followed guidelines produced by the Bat Conservation Trust (BCT)¹¹. This initial bat assessment informs whether or not further surveys are required to assess the potential effects of the Development on bats.

3.4.2 Roosts

A ground-level inspection of trees was undertaken to identify Potential Roost Features (PRFs) suitable for roosting bats such as woodpecker holes, spilt limbs and peeling bark. Based on these observations, trees are assigned a level of suitability (negligible, low, moderate or high). Should evidence of bats be recorded or the features assessed to provide suitability for bats, then further surveys may be required.

3.4.3 Habitats

A visual assessment of habitats to determine their potential to support commuting, foraging or swarming bats was completed. This determined the presence of suitable habitat for bats, along with habitat connectivity and linear features. Based on these observations, the Site was assigned a level of suitability.

3.5 Badger Survey

As part of the Extended Phase 1 Habitat Survey, a thorough inspection of the Site and surrounding habitat (where accessible) was carried out. Particular attention was paid to dense areas of vegetation to check for badger setts and evidence of badger activity, including:

- Presence of holes with evidence of badger, such as prints, discarded bedding etc.;
- Presence of dung pits and latrines;
- Presence of well-used runs with evidence of badger activity; and
- Presence of other indications of badger activity, such as signs of foraging and prints.

3.6 Ornithological Walkover

A walkover of the Site and adjacent habitats (where accessible) was carried out at the same time as the Extended Phase 1 Habitat Survey. The aim of this survey was to determine the potential of the Site and surrounding areas to support breeding or wintering birds of conservation concern (for example birds listed in Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and Annex I of the EC Birds Directive).

¹¹ Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd ed.). The Bat Conservation Trust, London.

3.7 Limitations and Assumptions

The surveys were undertaken within a suitable time of year during good weather conditions by a suitably experienced ecologist who is an associate member of the Chartered Institute of Ecology and Environmental Management (CIEEM).

4 RESULTS

4.1 Desk Study

4.1.1 Designated Sites

4.1.1.1 Statutory

There are no nationally designated sites within 2 km of the Site and no National Site Network (NSN) designations within 5 km of the Site.

4.1.1.2 Non-Statutory

There are two non-statutory designated sites within 2 km of the Site; South Cloister Covert LWS and Abbot's Lodge Grassland LWS. A summary of these sites is provided in Table 4.1.

Table 4.1: Designated sites and their proximity to the Site.

| Site | Status | Minimum Distance and Direction (km) from the Site | Description/Reason for Designation |
|---------------------------------------|--------|---|---|
| Non-statutory designated sites | | | |
| South Cloister Covert | LWS | 1.8 km north, north-east | Broadleaved woodland with scrub species with East Beck drains along the eastern boundary. The site is an important breeding site for grey heron, whereby 40-45 nests were recorded each year between 2004 and 2007. |
| Abbot's Lodge Grassland | LWS | 2 km north-east | An area of unimproved neutral grassland with seasonally wet areas and an embankment along the northern boundary which is presumed to be ancient earthworks. |

4.1.2 Protected Species

Species records dated from 2011 onwards which are relevant to the habitats present and the proposed Development are summarised in Table 4.2. The species are protected under UK legislation and/or are listed under the NERC Act 2006 as species of principal importance.

There are no European Protected Species (EPS) mitigation licence applications within 2 km of the Site; however, a GCN survey licence recorded six waterbodies in 2014 located approximately 2.2 km south of the Site, with a result of '6 Fig present' indicating that GCN were present. There are no EPS mitigation licence applications within 2 km of the Site.

Table 4.2: Protected and Priority Species within 2 km of the Site.

| Taxonomic group | Species | Number of records | Date of most recent record | Distance and direction of most recent record from the Site |
|----------------------------|--|-------------------|----------------------------|--|
| Amphibians | Great crested newt (<i>Triturus cristatus</i>) | 3 | 2012 | 1.9 km east |
| | Palmate newt (<i>Lissotriton helveticus</i>) | 17 | 2012 | 2.0 km east |
| | Common toad (<i>Bufo bufo</i>) | 16 | 2012 | 2.0 km east |
| | Common frog (<i>Rana temporaria</i>) | 18 | 2012 | 2.0 km east |
| Bats | Natterer's bat (<i>Myotis nattereri</i>) | 1 | 2012 | 0.5 km north |
| | Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>) | 1 | 2012 | 0.5 km north |
| | Common pipistrelle (<i>Pipistrellus pipistrellus</i>) | 3 | 2012 | 0.5 km north |
| Terrestrial Mammals | Eurasian badger (<i>Meles meles</i>) | 4 | 2016 | 1 km north |
| | European water vole (<i>Arvicola amphibius</i>) | 1 | 2012 | 1.3 km east |

Bird records are excluded from Table 4.2, as these are reviewed in the Ornithological Impact Assessment, and are not considered further herein.

4.1.3 Priority Habitats

No priority habitat was identified on-site. An area of grassland immediately adjacent to the Site boundary is listed under the NERC Act 2006 as a priority habitat for lowland meadow, with deciduous woodland priority habitat identified at 0.25 km to the east. A further 12 more areas of deciduous woodland habitat are found within 2 km of the Site.

Other priority habitats that can be found within 2 km of the Site include a traditional orchard at 1.1 km to the south of the Site and coastal floodplain and grazing marsh 1 km north east of the Site.

4.1.4 Site History

Satellite imagery shows the majority of the Site has remained the same since 2003, with the exception of the construction of two long agricultural barns in the north of the Site in

2015 and 2017. Aerial photographs from 2003, 2007, 2008, 2015, 2017 and 2019 were available for the Site and used in drawing this conclusion.

4.1.5 Site Description

The Site is situated to the north of Ulceby, a village in the North Lincolnshire Unitary Authority area. The Site comprised mostly of arable fields with improved grassland, poor semi-improved grassland, species-poor hedgerows and hedgerows with trees surrounding the field margins. The Site borders Carr Lane to the east, and a drain to the north and west boundaries. The nearest river is the Skitter Beck, which is located approximately 0.3 km east. In the wider landscape lies a mixture of arable and pasture lands, with small settlements, a disused airfield, and occasional broadleaved woodland and drainage ditches. An agricultural reservoir lies approximately 0.03 km north of the Site. The A180 dual carriageway is approximately 2.6 km south of the Site, whilst the Humber estuary is 6 km to the north east.

4.2 Extended Phase 1 Habitats

For the purposes of this report, scientific names are excluded from plant species names in the following sections and only the common names are used. A full list of plant species, including scientific names, is provided in Appendix C.

4.2.1 Arable Fields

This is the largest habitat by area within the development boundary and only Rapeseed *Brassica napus* was present. There was no ground flora.

4.2.2 Dry Ditch

A dry ditch was recorded to the north west boundary of the Site (Ditch 2).

4.2.3 Fence

A stock proof electric wire fence was found within the west of the Site believed to retain chickens.

4.2.4 Hardstanding

The Site entrance off Carr Lane constituted the hardstanding within the Site boundary, which was tarmacked and was found adjacent to the Site in the North. Two existing road cross the Site and provide access to farm properties.

4.2.5 Hedge with trees – species-poor

To the northern edge of the Site, a hedgerow comprised of hawthorn, oak, ash, blackthorn, ivy and bramble, with occasional mature oak and ash trees and other young trees present. One of these ash trees was found to be decaying, with splits and holes present (Tree 1, Appendix D, Photograph 8).

4.2.6 Intact hedge – species-poor

This habitat separates the road from the arable field on the eastern boundary. It has been classified as a species poor hedgerow.

Common hawthorn is dominant. Other species include hazel and elder. The field layer is dominated by tall ruderal vegetation only. Species include common nettle, cleavers, cow parsley, cow parsnip, creeping thistle and broad-leaved dock.

4.2.7 Improved Grassland

A short sward white clover rich and perennial rye grassland containing occasional thistle was found in the western side of the Site.

4.2.8 Scattered Trees

With the exception of an ash tree on the northern boundary (Tree 1, Appendix D, Photograph 8), ash and oak trees were found to be in good condition and were identified within hedgerow habitats on-site.

4.2.9 Poor Semi-improved neutral grassland (Arable fields margins)

This habitat is found in the margins of the arable field in the south of the Site.

Grass species included cocksfoot and bristly oxtongue. Herbaceous species included common nettle, creeping buttercup, dandelion and red dead nettle.

4.2.10 Running Water

Areas of running water were found to the perimeter of the Site on the north boundary (Ditch 1), and along the south west boundary (Ditch 3).

Ditch 1

This ditch contained shallow water and was devoid of in channel vegetation, but with lesser celandine found to the banksides, which were steep and deep (*circa* 4 m). This ditch bordered a species poor hedge with trees. The ditch was culverted to the east boundary at Carr Lane.

Ditch 3

A V-shaped flowing water channel, with no emergent or in-channel vegetation and banksides of short tussocky semi-improved grassland.

4.2.11 Standing water

Standing water habitats were not found on-site, but three ponds were found within 250 m of the Site (Ponds 1, 2 and 3).

Pond 1

Ephemeral in appearance, this pond contained common reed, but showed signs of succession with willow trees growing within the centre of the pond. Rushes were found to the perimeter.

Pond 2

A field pond that was found to be grazed by horses to the perimeter such that there were limited terrestrial habitats. Submerged plants were identified with potential for use by egg laying amphibians. Shallow, but unlikely to dry.

Pond 3

This pond was found within a wooded area comprised of willow, and was devoid of submerged plants; however, floating sweet grass was identified in abundance on the surface of the pond, and yellow flag iris was present in the emergent plants.

4.3 Protected Species

4.3.1 Badger

The desk study returned four records for badgers within 2 km of the Site, with the nearest record identified at 1.0 km distance from the Site in 2016. No signs of badgers, field signs or their setts were recorded within the Site or within 30 m of it.

4.3.2 Bats

The desk study returned five records for bats within 2 km of the Site, with three genera identified. This included: A Natterer's bat; soprano pipistrelle; and common pipistrelle. The nearest record related to all three species, recorded approximately 0.5 km north of the Site boundary in 2021.

4.3.2.1 Trees

There are several mature trees on Site which are present along the field margins. With the exception of an ash tree with a moderate bat roost potential (Tree 1 – splits, cracks and decay, Appendix D, Photograph 8) to the northern boundary, all these other trees were assessed as having negligible potential to support roosting bats due to their lack of features, age and size.

4.3.2.2 Habitats

Most of the Site comprised of open arable fields or amenity grassland, with thin linear features of wet ditches and species poor hedgerow with trees to the boundaries of these fields. The arable and amenity grassland habitats offer limited foraging and commuting value to bats. Within the Site, there are several hedgerows and wet ditches that provide suitable foraging and commuting habitat for bats. Although not strong features, these boundaries provide connectivity to more favourable habitats in the wider landscape. The Site itself does not experience any light disturbance and is therefore suitably dark for foraging and commuting bats. On this basis and following the BCT guidelines¹¹, the Site was classed as having an overall 'Low' suitability for foraging and commuting bats.

4.3.3 Birds

The hedgerow with trees, arable and grassland field margins habitat within the Site provide good foraging and nesting habitats for birds. Bird species recorded included: pheasant (*Phasianus colchicus*), robin (*Erithacus rubecula*), house sparrow (*Passer domesticus*), blue tit (*Cyanistes caeruleus*), great tit (*Parus major*), wood pigeon (*Columba palumbus*), blackbird (*Turdus merula*) and buzzard (*Buteo buteo*). Skylark (*Alauda arvensis*) territories were identified within the Site. Many nests were identified within the hedgerows on site.

The desk study returned over 1200 records of bird species within 2 km of the Site, with details on these records provided in the Ornithology Impact Assessment Report¹².

4.3.4 Great crested newt

The desk study returned 3 records for GCN within 2 km of the Site, with the most recent recorded in 2012 at 1.9 km east of the Site. There were six waterbodies (three ponds and three drainage ditches) within 250 m of the Site boundary (Figure 1, Appendix B). At the time of the walkover survey, access was granted to all three ponds; P1, P2, and P3. Although sluggish, ditches D1 and D3 contained running water with potential to contain fish, and therefore were scoped out due to their unsuitability. A further ditch (D2) was dry. No other suitable waterbodies were identified within 250 m of the Site boundary.

¹² Arcus (2021) *Ornithological Impact Assessment: Sweetbriar Solar Farm*.

4.3.4.1 Habitat Suitability Index (HSI) Assessment

A Habitat suitability Index (HSI) was carried out on three ponds within 250m of the Site boundary. The results of which are provided in Table 4.3 below.

Table 4.3 HSI Result for Waterbodies

| HSI Parameter | HSI Scores | | |
|------------------------|-----------------------------|-----------------------|-----------------------|
| | P1 | P2 | P3 |
| Location | 1.00 | 1.00 | 1.00 |
| Pond Area | 0.20 | 0.30 | 0.80 |
| Pond Drying | 0.50 | 0.90 | 1.00 |
| Water Quality | 0.33 | 0.67 | 0.33 |
| Shade | 1.00 | 1.00 | 0.3 |
| Fowl | 1.00 | 0.67 | 0.67 |
| Fish | 0.67 | 0.67 | 0.67 |
| Ponds | 0.75 | 0.65 | 0.70 |
| Terrestrial | 0.33 | 0.33 | 0.67 |
| Macrophytes | 0.90 | 0.60 | 0.50 |
| Total HSI Score | 0.59 (Below Average) | 0.63 (Average) | 0.62 (Average) |

4.3.4.2 Environmental DNA (eDNA) Surveys

The eDNA sampling was undertaken on Ponds P1, P2 and P3. eDNA surveys confirmed GCN presence in Pond 2, with absence recorded in Ponds P1 and P3.

4.3.4.3 Population Surveys

Further GCN population surveys were carried out for Pond 2 between April to June 2021.

A medium sized GCN population class was recorded in P2, as per Table 3.3 this equates to 11-100 individuals. This pond represents a GCN meta-population, and in the absence of barriers to dispersal, GCN found in terrestrial habitats in close proximity to this pond are likely to be associated with this meta-population. The full results of the presence/ absence and subsequent population surveys are present in Table E.2, Appendix E.

Smooth newt (*Lissotriton vulgaris*) was also recorded in P2, with a medium population count (11-100 individuals).

4.3.5 Invertebrates

The improved grassland, species poor hedgerows with trees, scattered trees, and standing water habitats within the Site are likely to support a range of commonly occurring invertebrate species. The relatively undisturbed character of some field margins may support a more diverse assemblage of invertebrates than might be recorded in the surrounding agricultural landscape.

4.3.6 Otter

Results from the desk study did not identify the presence of otter within 2 km of the Site boundary. No field signs of otters were detected during the Extended Phase 1 Habitat survey and the drains and ditches were not considered likely to support otters, as the drains lacked depth and likely fish populations that could support a viable prey source. However, there is the potential that otter may occasionally use the drains as a commuting route from off-site habitats.

4.3.7 Reptiles

No reptiles or evidence of reptiles was recorded during the Extended Phase 1 Habitat survey. Habitats with the potential to support basking, foraging and sheltering reptiles were present on Site within the thin grassland margins of arable fields and hedgerows, however the arable fields themselves provided negligible potential for reptiles. This included hedgerow habitats and on-site wet ditches. The desk study returned no records for reptiles within 2 km of the Site boundary.

4.3.8 Water Vole

No evidence of water vole such as burrows or any other field signs (latrines, footprints, feeding remains) were identified on Site during the Extended Phase 1 Habitat survey. Three ditches were recorded to the perimeter of the Site, with one dry (Ditch 2) and two very shallow (Ditch 1 and 3). Ditch 1 was also subject to shading, which will have reduced some plant growth needed for cover by foraging water voles. Overall, ditches were considered unsuitable to support this species, with lack aquatic habitats and foraging opportunities suitable for use by water vole. The desk study returned one record for water vole within 2 km of the Site, located 1.3 km east.

4.3.9 Other Species

Whilst not observed on-site during the Extended Phase 1 Habitat survey, two brown hares, two roe deer and evidence of rabbits were recorded beyond the site boundary as incidental records.

5 EVALUATION, FURTHER SURVEY REQUIREMENTS AND MITIGATION

5.1 Impact of Development

A solar farm development could have the potential to cause the following broad ecological impacts:

- Habitat loss/change during construction and operation;
- Direct harm to, or disturbance of, individuals of species during construction and operations; and
- Legal offences during construction.

The potential ecological effects of these impacts, and the associated mitigation and enhancements, are discussed for each important ecological feature in turn. Where necessary, additional surveys have been recommended to provide further information to help assess the potential ecological effects of the Development and to inform mitigation.

In order to increase the Development's biodiversity value, and to adhere to Government guidance set out in the National Planning Policy Framework 2021 (NPPF), a range of enhancement measures are provided below.

5.2 Designated Sites

There are no local or national statutory designated Sites within 2 km or National Site Network designations within 5 km of the Site.

There are two non-statutory sites within 2 km of the Site boundary; South Cloister Covert LWS is located 1.8 km north north-east and Abbots Lodge Grassland LWS located at 2 km north-east of the Site.

Due to the distance of the non-statutory designated sites from the Site and the nature of the proposed Development, it is considered that the LWSs will not be subjected to any direct or indirect impacts during the proposed Development, and therefore further assessment or mitigation is not deemed necessary.

5.3 Habitats

Habitats within the Site are impoverished and are of low or negligible value that are likely to support predominantly commonly occurring species. No priority habitats were located within the Site and no non-native invasive species were identified at the time of the survey; however, habitats of value (i.e., trees, hedgerows, grassland field margins) will be retained that could be impacted by the Development during construction in the absence of mitigation. Mitigation measures have therefore been proposed in the following section.

5.3.1 Mitigation and Enhancements

Construction works will maintain a minimum of 5 m separation from wet ditches and no works will be undertaken within the root protection zone of the scattered trees and hedgerows.

Details of the habitat enhancement and creation within and outside of the Site is provided in a Landscape Mitigation Plan (LMP)¹³ to benefit wildflowers and wildlife. Specifically, the arable and improved grassland fields on which the panels will be sited will be planted with native species grass and meadow mix underneath and around the solar panels. Extensive areas of native species hedgerow and wildflower meadow mix will be created around the Site. These newly created and enhanced habitats may also provide supporting value to nearby features of conservation interest, by increasing the local populations of sensitive species, such as GCN, and providing additional areas into which these and other sensitive species can disperse, both of which will make the species and the designated areas more robust to future changes (e.g., climate change).

In the unlikely event that non-native invasive species are encountered during the Development, works will need to stop and an ecologist consulted.

The Development will have a long-term positive impact on habitats and wildflowers.

5.3.2 Biodiversity Net Gain Assessment

A biodiversity net gain assessment has been undertaken using the DEFRA Biodiversity Metric 3.0 Calculation Tool Beta Test¹⁴ (republished July 2021) to produce a quantifiable amount of biodiversity units produced post-construction and compare them to the baseline biodiversity unit's pre-construction to determine if the Development will result in a net gain or net loss in biodiversity.

This report is provided separately as part of the planning submission¹⁵ and in summary through habitat creation and enhancement the metric has shown there to be a **167.7% net gain** in biodiversity onsite. The number of habitat units onsite has increased from 88.53 to 236.99. There is also a 341.33% net gain in hedgerow units within the Site, which represents an increase from 4.58 to 20.21 units.

5.4 Species

5.4.1 Badger

No badger or signs of badgers were identified on the Site or within 30 m of it, and therefore there is unlikely to be any direct impact to badgers from the Development at the construction or operational stage. Nevertheless, precautionary mitigation is recommended to ensure foraging or commuting badgers or any other large mammals are not indirectly impacted by the Development at the construction and operational stage.

¹³ Arcus (2021) *Landscape Mitigation Plan: Sweetbriar Farm, Lincolnshire* (DRAWING NO.: 4157-DR-LAN-101)

¹⁴ Available at <http://publications.naturalengland.org.uk/publication/5850908674228224>

¹⁵ Arcus (2021) *Biodiversity Metrics Assessment – Sweetbriar Solar Farm*

5.4.1.1 *Mitigation and enhancements*

Fence under-passes or small openings (of approximately 150 millimetres (mm) diameter) will be installed in the perimeter fence to enable badger and other mammals (e.g., hedgehog and brown hare) to retain their current resources once the Development is operational.

Mitigation will include, but not be limited to:

- Where possible, excavations will be covered overnight to prevent animals falling into them, and excavations will be inspected daily for the presence of animals before recommencing work on them;
- Any deep excavations that need to be left open overnight will include a means of escape for any animals that may fall in;
- End caps will be added to cable or drainage tubes that are left on-site, to avoid badgers becoming trapped overnight;
- If work is to be undertaken outside of daylight hours, lighting will be used focused on works areas only and shall not to be allowed to spill onto neighbouring habitats of value to badgers and other wildlife. Any lighting required during works will be shielded or fitted with hoods to reduce light spill. Quieter construction activities at this time would be undertaken to reduce disturbance;
- The creation of large stock piles of earth will be avoided as these may be attractive for badgers and other animals;
- Store building materials above ground on pallets; and
- Should any new mammal burrows be identified, works in the area will need to stop and a suitably experienced ecologist contacted for advice.

Arable land is presently found over much of the Site, which, along with a cessation in inputs of chemicals associated with arable land management, will be replaced by native species rich grazing grassland. This change in land use will provide an enhancement to biodiversity that will include increased forage opportunities for badger and other mammals.

5.4.2 **Bats**

Trees within the Site are expected to be retained and the proposed Development will not have an impact upon existing trees. Therefore, no further surveys of trees for bats are required.

The habitats have been classified as having a 'low' habitat suitability for foraging and commuting bats. However, no further surveys are recommended due to the low impacts of the Development and retention of habitats of value to foraging and commuting bats. Nonetheless, bats are active in most habitats and so it is reasonable to consider potential impacts to them and thus a range of good practice mitigation measures are proposed.

The long-term, operational effects of the Development on bats are likely to be positive because habitat quality and availability will be increased and the panels will create sheltered areas in which bats can forage.

5.4.2.1 *Mitigation and Enhancements*

Mitigation will include, but not be limited to:

- Ensuring all site operatives are made aware of current legislation protecting bats via a Toolbox Talk or site induction materials;
- A minimum of four bat boxes (e.g., Schwegler or similar hardwearing woodcrete-type models) will be installed to scattered trees to provide enhanced roosting opportunities. Installation needs to be in accordance with good practice guidelines¹⁶,

¹⁶ Bat Conservation Trust (2019) *Bat Boxes: Putting up your box* [Online] Available at: http://www.bats.org.uk/pages/bat_boxes.html [Accessed August 2021]

examples of which are provided in Appendix F. Indicative locations of bat boxes are shown on the LMP¹³.

5.4.2.2 Lighting and Disturbance

Lighting can adversely affect invertebrates and bats (as well as other animal species). New lighting should be designed in line with good practice¹⁷ to ensure the Site is able to provide continued undisturbed foraging and commuting habitats for bats. Construction activities will take place during daylight hours. Should lighting be required during the operational phase, the following measures are recommended:

- Motion-sensitive security lighting and avoidance of floodlighting;
- Avoidance of lighting with ultra-violet (UV) components in areas where lighting is required for public safety purposes. UV light is particularly disruptive to bat behaviour^{18,19};
- Use of flat-glass protectors on luminaires to help reduce light spill above angles greater than 70° from the vertical plane; and
- Avoiding light spill on to surrounding habitats by using accessories such as shields, louvres, hoods and cowls.

5.4.3 Birds

The Site supports or has the potential to support a range of nesting birds, including some species of conservation concern, such as skylark. The Development has the potential to affect birds through loss/change of habitats, and through disturbance during construction. It was therefore identified that breeding bird surveys (BBS) during March to June 2021 would be required to inform the Development design. The BBS has subsequently been completed, the results of which - along with an assessment of impacts at the construction and operational phase of the Development - are included within a separate bird report²⁰.

5.4.4 Great Crested Newt

There are no waterbodies present within the Site boundary suitable for GCN. There are three ponds (Pond 1 (P1), Pond 2 (P2) and Pond (P3) and two wet ditches (Ditch 1 and 3) present within a 250 m buffer of the Site boundary. A Further assessment of the wet ditches was scoped out, as a slow flow was registered within the ditches and there was the potential for fish to be present, so these were also scoped out of further assessment.

As Ponds P1, P2 and P3 all registered a 'below average' or 'average score' for GCN suitability following the HSI assessments, a further eDNA assessment was completed. The eDNA assessment confirmed Ponds P1 and P3 were 'negative' for GCN presence, whilst Pond 2 returned a 'positive' presence. Ponds 1 and 3 were scoped out of further assessment and are considered unlikely to be affected by the Development.

A population survey of Pond P2 was completed that confirmed the presence of a 'medium' population of GCN, which would have necessitated the requirement for completing the construction of the Development under a European Protected Species (EPS) mitigation licence from Natural England. However, in view of these findings, and following a review of the Site boundary, the extent was revised to encompass a smaller Site area, which meant Pond P2 is now located at a distance of 250 m from the Site boundary. Furthermore, the

¹⁷ Bat Conservation Trust (2014) *Artificial Lighting and Wildlife: Interim Guidance: Recommendations to help minimise the impact artificial lighting* [Online] Available at:

https://cdn.bats.org.uk/pdf/BCT_Interim_Guidance_Artificial_Lighting_June_2014.pdf?mtime=20181101151319 [Accessed August 2021]

¹⁸ Fure, A. (2006) *Bats and Lighting*. The London Naturalist, No. 85.

¹⁹ Emery, M. (2008) *Effect of Street Lighting on Bats*. Urbis Lighting Ltd.

²⁰ Arcus 2021. Ornithological Impact Assessment

Development has been designed to be located predominantly within terrestrial habitats of very low or negligible value to GCN (e.g., arable fields).

Research suggests that GCN are rarely found greater than 100 m²¹ from breeding ponds and in terms of distance travelled by GCN between breeding ponds, research has found them to be at their highest densities within terrestrial habitats of up to 200 m and many studies have concluded a migratory range of approximately 250 m^{22,23,24}. It is therefore considered highly unlikely that GCN are present within the Site given the distances involved.

Given the distance Pond P2 is from the Site boundary and proposed construction of solar panel infrastructure, and that habitat of value to GCN and other amphibians are being avoided and retained, it is considered unlikely that GCN will be impacted at the construction and operational stage of the Development. However, due to the presence of GCN in the wider landscape, impacts cannot be completely ruled out, and therefore precautionary mitigation for herptiles (including GCN) has been provided in the following section.

5.4.4.1 Mitigation Requirements

In accordance with a precautionary approach, RAMs will be carried out during any site clearance works within or close to habitats of value to GCN (e.g., field margins), whilst high value habitats are avoided (e.g., hedgerows). This precautionary approach will be in conjunction with mitigation measures for other protected species on site, and in accordance with the following outline methodology:

- All works will be directly supervised by a suitably experienced ecologist;
- Clearance works will only be carried out when all species of herptiles (amphibians and reptiles) are active (above 9c and dry). Although activity is weather and temperature dependent, reptiles are fully active from April to October, inclusive;
- However, to minimise the risk of nesting bird presence, clearance is recommended to be completed in either April (temperature-dependant) or August/September as the risk of nesting bird presence will be reduced;
- A hand search of the works area will be carried out, with any natural or artificial refugia (e.g., logs and refuse) inspected for sheltering reptiles and amphibians (excluding GCN) that would then be removed from the Site into nearby suitable habitat;
- After the ecologist is satisfied with the preparatory works, they will supervise a destructive search of the area. This will involve the removal of all remaining ground vegetation leaving only bare earth. An excavator with a toothed bucket will be used for this purpose, with the turf/topsoil being placed carefully to one side. Particular care will be required during this exercise, which will be closely monitored by the ecologist;
- In the unlikely event that GCN are found during the works, works will stop immediately and an Ecologist contacted for further advice; and
- In the unlikely event that high numbers of reptiles are present then all works will stop and the Council's ecologist and Natural England consulted to agree appropriate action.

In addition to the mitigation proposed above, habitat prescriptions as part of the LMP¹³ are proposed that will benefit commuting, foraging and sheltering amphibians (including GCN) to provide an extensive terrestrial enhancement in the landscape. This includes the creation

²¹ Cresswell and Whitworth (2004). An assessment of the efficiency of capture techniques and the value of different habitats for great crested newt *Triturus cristatus*. English Nature Research Reports No. 576.

²² Franklin, P. S. (1993). The migratory ecology and terrestrial habitat preferences of great crested newt *Triturus cristatus* at Little Wittenham Nature Reserve. M. Phil Thesis. De Montfort University. Dept. Applied Biology and Biotechnology.

²³ Oldham, R. S. and Nicholson, M. (1986). Status and Ecology of Warty Newt *Triturus cristatus*, Final Report. Report by Leicester Polytechnic under contract to Nature Conservancy Council, Contract No. HF 3/05/123 Year 3.

²⁴ Jehle, R (2000). The terrestrial Summer Habitat of Radio-Tracked Great Crested Newts (*T. cristatus*) and Marbled Newts (*T. marmoratus*). *Herpetological Journal*: 10(4): c137-142

of hedgerows providing connectivity for commuting amphibians, and wildflower grassland to benefit foraging amphibians within what is currently very low value arable habitat.

5.4.5 Invertebrates

It is considered unlikely that the Development will significantly encroach upon, nor impact the connectivity of, habitats of high value to invertebrates, and therefore no further surveys or specific mitigation is recommended. In the long term, the proposed Development is likely to have a positive impact on invertebrates if the swards of grassland beneath the solar panels are left to flourish.

5.4.6 Otter

No evidence of otter was recorded during the walkover survey. However, there is the potential that otters may use the boundary drains as a commuting routes and may be active in the local landscape. In the absence of mitigation, there is potential that the Development will cause harm or disturbance to otters during the construction stage of the Development. Aquatic habitats are being avoided as part of the Development design at the operational phase, and therefore no further surveys for otter are required; however, precautionary mitigation to protect otters commuting across land onsite has been provided.

5.4.6.1 Mitigation Requirements

In order to prevent harm to otters using the Site, the following controls are to be implemented during the construction phase:

- Works within 10 m of aquatic or riparian habitats ideally needs to be avoided²⁵, and in the limited areas where this is not possible, limited to the hours from dawn to one hour before sunset;
- Cover excavations overnight to prevent animals falling into them. Inspect excavations daily for the presence of animals before recommencing work on them;
- Any deep excavations that are to be left open overnight should include a means of escape for any animals that may fall in;
- Store building materials above ground on pallets, with any pipework materials capped; and
- Should any new mammal burrows (e.g., holts) be identified, works in the area will need to stop and a suitably experienced ecologist contacted for advice.

Mitigation for otters at the operational phase of the Development will need to include the installation of mammal gates to allow otters continued access throughout the Site.

5.4.7 Reptiles

The Site has the potential to support basking, foraging and sheltering reptiles, particularly along the field margins and where hedgerows are present. Areas where solar panels will be installed will avoid higher value reptile habitat (i.e., use of arable field habitat), so adverse impacts to reptiles during construction or at the operational phase are considered to be low to negligible. However, should works impact habitats of higher value to reptile, then it is recommended that any clearance works on Site are carried out using Reasonable Avoidance Measures (RAMs) following the precautionary approached detailed in Section 5.4.4.1.

²⁵ <https://cieem.net/wp-content/uploads/2019/07/natural-information-otters-and-development-2011.pdf> [Accessed October 2021]

5.4.8 Water Vole

Although no evidence of water vole was found at the time of the survey or from the desk study results, the ditches on-site and within close proximity to the Site were considered to be suitable to support water vole and there was potential for the proposed Development to have an impact upon water vole during the construction and operational phases of the Development in the absence of mitigation. To avoid impacts to water vole precautionary mitigation through avoidance is proposed.

5.4.8.1 Mitigation Requirements

- A precautionary distance of at least 5 m is proposed between the ditch tops and the Development to avoid any likelihood of impacts to water vole; and
- Use of existing crossing points for transporting materials, machinery and personnel or through low-quality habitat not separated by wet ditch habitat.

With a suitable Development design and the precautionary mitigation above in place, no further surveys for water vole are recommended.

5.4.9 Other Species

Rabbits and their burrows were observed offsite, along with sightings of brown hare and Roe deer during the Site walkover survey.

5.4.9.1 Mitigation Requirements

Although brown hare, rabbit and roe deer do not have the same level of legal protection as some other species (e.g., badger), with the exception of badger setts, if any burrows/warrens are subsequently identified on-site and are due to be lost then the following measure needs to be implemented for mammals:

- Excavation of the burrows/warren under full ecological supervision is completed to ensure no entombment of animals present. This process would need to be undertaken slowly and in stages.

6 CONCLUSION

No significant adverse ecological impacts are predicted in the absence of mitigation during construction and operation of the Development. However, to reduce ecological effects and the likelihood of legal offences, species-specific and general mitigation have been recommended. The LMP¹³ provides the location for a range of habitat creation and enhancements that will provide significant benefits to the ecological features addressed in this report, which following completion of the Biodiversity Net Gain assessment, constitutes a **net gain of 167.7%** in biodiversity onsite under the NPPF.

APPENDIX A – PLANNING POLICY AND LEGISLATION

The Wildlife & Countryside Act 1981

The Wildlife and Countryside Act 1981²⁶, as amended by the Countryside and Rights of Way Act (CROW) 2000²⁷ and the Natural Environment and Rural Communities Act (NERC) 2006²⁸, consolidates and amends existing national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and Council Directive 79/409/EEC on the Conservation of Wild Birds (Birds Directive)²⁹, making it an offence to:

- Intentionally kill, injure or take any wild bird or their eggs or nests (with certain exceptions) and disturb any bird species listed under Schedule 1 to the Act, or its dependent young while it is nesting;
- Intentionally kill, injure or take any wild animal listed under Schedule 5 to the Act; intentionally or recklessly damage, destroy or obstruct any place used for shelter or protection by any wild animal listed under Schedule 5 to the Act; intentionally or recklessly disturb certain Schedule 5 animal species while they occupy a place used for shelter or protection; and
- Pick or uproot any wild plant listed under Schedule 8 of the Act. Schedule 9, Part II of the Act also lists many species for which it is an offence to plant, or otherwise cause to grow, in the wild. Any material containing Japanese knotweed is also identified as controlled waste under the Environment Protection Act 1990 and must be disposed of properly at licenced landfill according to the Environmental Protection Act (Duty of Care) Regulations 1991.

Habitat Regulations 2017

The Conservation of Habitats and Species Regulations 2017³⁰ (the 'Habitat Regulations'), as amended by the Conservation of Habitats and Species and Planning (Amendment) (EU Exit) Regulations 2019³¹, are the principal means by which Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna (the 'Habitats Directive') is transposed into law in England and Wales. The objective of the Habitats Directive is to protect biodiversity through the conservation of natural habitats and species of wild fauna and flora. The Directive lays down rules for the protection, management and exploitation of such habitats and species and makes it an offence to deliberately capture, kill or disturb wild animals protected under the Habitat Regulations. It is also an offence to damage or destroy a breeding site or resting place of such an animal (even if the animal is not present at the time).

Natural Environment & Rural Communities (NERC) Act 2006

The NERC Act 2006²⁸ places a duty on local planning authorities to have due regard for biodiversity and nature conservation during the course of their operations, and thus ensures that biodiversity is a key consideration in the planning process.

²⁶ Legislation.gov.uk *Wildlife and Countryside Act 1981 (as amended)* [online] Available at: <http://www.legislation.gov.uk/ukpga/1981/69> [Accessed August 2021]

²⁷ Legislation.gov.uk *The Countryside and Rights of Way Act 2000* [online] Available at: <http://www.legislation.gov.uk/ukpga/2000/37/contents> [Accessed August 2021]

²⁸ Legislation.gov.uk *Natural Environment and Rural Communities Act 2006* [online] Available at: <https://www.legislation.gov.uk/ukpga/2006/16/contents> [Accessed August 2021]

²⁹ EUR Lex: Access to European Law *Birds Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds* [online] Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009L0147> [Accessed August 2021]

³⁰ Legislation.gov.uk *The Conservation of Habitats and Species Regulations 2017* [online] Available at: <https://www.legislation.gov.uk/uksi/2017/1012/contents/made> [Accessed August 2021]

³¹ Legislation.gov.uk *The Conservation of Habitats and Species and Planning (Amendment) (EU Exit) Regulations 2019* [online] Available at: <http://www.legislation.gov.uk/ukdsi/2019/9780111176573> [Accessed August 2021]

Protection of Badgers Act 1992

Badgers receive strict protection under the Protection of Badgers Act 1992³², which prohibits the taking, injuring, selling, possessing or killing of badgers and makes it an offence to ill-treat any badger, damage, destroy, disturb or cause a dog to enter a badger sett. The 1992 Act defines a badger sett as *"any structure or place, which displays signs indicating current use by a badger"*.

The Hedgerow Regulations 1997

The Hedgerow Regulations 1997³³ (as amended by the Hedgerow [Amendment] [England] Regulations 2002; hereafter collectively called the Hedgerow Regulations) were made under Section 97 of the Environment Act in 1995 providing the necessary legislation for the protection of certain hedgerows. The overall aim of the Hedgerow Regulations is to secure the retention of important countryside hedgerows, principally ancient and species-rich hedges. The Hedgerow Regulations also introduced new arrangements for planning authorities in England and Wales to protect important hedgerows in the countryside by controlling their removal through a system of notification.

National Planning Policy Framework 2021

The National Planning Policy Framework (NPPF) 2021³⁴ sets out the Government's requirement for the planning system in England and in doing so establishes framework within which local planning authorities can develop their own planning policies. The NPPF explicitly addresses the conservation and enhancement of the natural environment, including biodiversity, through paragraphs 174–182.

Biodiversity Action Plans

The UK Biodiversity Action Plan (UKBAP) was developed to fulfil the Rio Convention on Biological Diversity in 1992, to which the UK is a signatory. The UK Post-2010 Biodiversity Framework' now (as of July 2012) succeeds the UKBAP, although the UKBAP priority species and habitats are retained through the NERC Act. Regional and local BAPs have also been organised to develop plans for species/habitats of nature conservation importance at regional and local levels.

The Environment Act 2021

The Act provides for the establishment of the Office for Environmental Protection (OEP). It also provides a framework for improving environmental management to include: waste and resources, water quality, nature and biodiversity and air quality. It aims to deliver long-term targets to improve environmental conditions and reduce pollution.

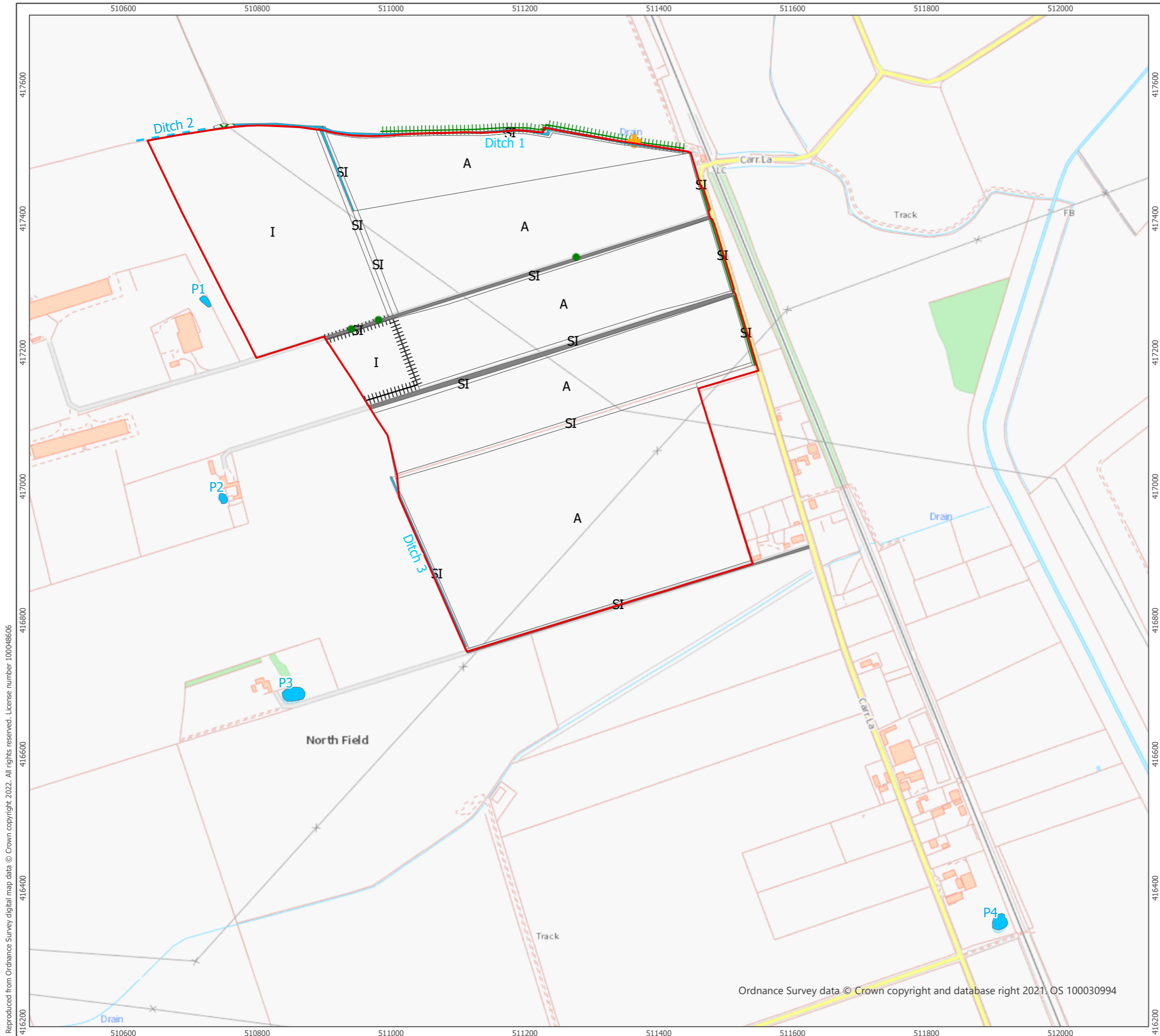
The Act addresses nature conservation with strengthened obligations on developers to ensure Biodiversity Net Gain (BNG) is achieved for developments, together with establishing routes for strengthening woodland protection and Local Nature Recovery Strategies (LNRSs). A Natural England administered public register will be set up where sites have been committed for BNG and such sites will need to be managed for at least 30 years.

³² Legislation.gov.uk *Protection of Badgers Act 1992* [Online] Available at: <https://www.legislation.gov.uk/ukpga/1992/51/contents> [Accessed August 2021]

³³ Legislation.gov.uk *The Hedgerow Regulations 1997* [Online] Available at: <http://www.legislation.gov.uk/uksi/1997/1160/contents/made> [Accessed August 2021]

³⁴ Gov.UK *National Policy Planning Framework 2021* [Online] Available from: <https://www.gov.uk/government/publications/national-planning-policy-framework-2> [Accessed August 2021]

APPENDIX B – FIGURE 1 Phase 1 Habitat Survey Map

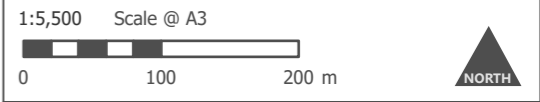


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- Hardstanding
- A Cultivated/disturbed land - arable
- I Improved grassland
- SI Poor semi-improved grassland
- Scrub - dense/continuous
- Standing water
- Intact hedge - species-poor
- Hedge with trees - species-poor
- Fence
- Dry ditch
- Bat Roost Assessment**
- Moderate
- Broadleaved parkland/scattered trees



| | |
|------------------------|-------------------|
| Produced By: MS/JMO/BL | Ref: 4157-REP-032 |
| Checked By: DH | Date: 13/12/2021 |

Phase 1 Habitat Survey Map
Figure 1

Sweetbriar Solar Farm
EcIA








APPENDIX C – PLANT SPECIES LIST

List of plant species recorded

| Common name | Latin name |
|----------------------|---------------------------------|
| Ash | <i>Fraxinus excelsior</i> |
| Blackthorn | <i>Prunus spinosa</i> |
| Bramble | <i>Rubus fruticosus</i> agg. |
| Bristly oxtongue | <i>Helminthotheca echioides</i> |
| Broad-leaved dock | <i>Rumex obtusifolius</i> |
| Cleavers | <i>Galium aparine</i> |
| Cocks foot | <i>Dactylis glomerata</i> |
| Common ivy | <i>Hedera helix</i> |
| Common nettle | <i>Urtica dioica</i> |
| Cow parsley | <i>Anthriscus sylvestris</i> |
| Cow parsnip | <i>Heracleum maximum</i> |
| Creeping buttercup | <i>Ranunculus repens</i> |
| Creeping thistle | <i>Cirsium arvense</i> |
| Dandelion | <i>Taraxacum officinale</i> agg |
| Elder | <i>Sambucus nigra</i> |
| Floating sweet-grass | <i>Glyceria fluitans</i> |
| Hawthorn | <i>Crataegus monogyna</i> |
| Hazel | <i>Corylus avellana</i> |
| Lesser celandine | <i>Ficaria verna</i> |
| Oak | <i>Quercus robur</i> |
| Perennial rye grass | <i>Lolium perenne</i> |
| Red dead nettle | <i>Lamium purpureum</i> |
| White clover | <i>Trifolium repens</i> |
| Yellow flag-iris | <i>Iris pseudacorus</i> |

APPENDIX D - PHOTOGRAPHS

Photographs taken during the Extended Phase 1 Habitat Survey

| | |
|---|--|
|  |  |
| <p>Photograph 1: Pond P1</p> | <p>Photograph 2: Pond P2</p> |
|  | |
| <p>Photograph 3: Pond P3</p> | |
|  |  |
| <p>Photograph 4: Improved grassland</p> | <p>Photograph 5: Species poor hedgerow and agricultural crop</p> |
|  |  |
| <p>Photograph 6: Disused birds' nest</p> | <p>Photograph 7: Ditch 3 on the west boundary</p> |



Photograph 8: Ash tree with moderate bat roost potential (Tree 1)



Photograph 9: Semi-improved grassland margins to arable crop

APPENDIX E – GREAT CRESTED NEWT DETAILED SURVEY RESULTS
Table E.1 Great Crested Newt survey dates and weather conditions

| Visit | Date | Weather Conditions | Temperatures |
|-------|------------|---|---|
| 1 | 30.04.21 | Precipitation: 1 Wind (Beaufort Scale): 0 Cloud Cover: 100% | Temperature: 7°C Overnight low: 5°C |
| | 01.05.21 | Precipitation: 0 Wind (Beaufort Scale): 0 Cloud Cover: 100% | Temperature: 6°C |
| 2 | 07.05.21 | Precipitation: 1 Wind (Beaufort Scale): 0 Cloud Cover: 100% | Temperature: 8°C Overnight low: 5 °C |
| | 08.05.21 | Precipitation: 0 Wind (Beaufort Scale): 0 Cloud Cover: 100% | Temperature: 10°C |
| 3 | 14.05.2021 | Precipitation: 1 Wind (Beaufort Scale): 0 Cloud Cover: 100% | Temperature: 8°C Overnight low: 7°C |
| | 15.05.2021 | Precipitation: 0 Wind (Beaufort Scale): 1 Cloud Cover: 0% | Temperature: 10°C |
| 4 | 21.05.2021 | Precipitation: 2 Wind (Beaufort Scale): 0 Cloud Cover: 100% | Temperature: 10°C Overnight low: 8°C |
| | 22.05.2021 | Precipitation: 2 Wind (Beaufort Scale): 0 Cloud Cover: 100% | Temperature: 8°C |
| 5 | 28.05.2021 | Precipitation: 1 Wind (Beaufort Scale): 0 Cloud Cover: 100% | Temperature: 13°C Overnight low: 10°C |
| | 29.05.2021 | Precipitation: 0 Wind (Beaufort Scale): 0 Cloud Cover: 0% | Temperature: 10°C |
| 6 | 04.06.2021 | Precipitation: 0 Wind (Beaufort Scale): 0 Cloud Cover: 0% | Temperature: 13°C Overnight low: 10 °C |
| | 05.06.2021 | Precipitation: 1 Wind (Beaufort Scale): 0 Cloud Cover: 100% | Temperature: 12°C |

Table E.2 Results of Presence/Absence and Population Surveys

| Key | | | | |
|--------------------------|---|--|-----------------------|------------------------------|
| GCN = Great crested newt | | m – Male | p = Pregnant | t = Tadpoles |
| SN = Smooth newt | | f – Female | CF = Common frog | fs = Frog spawn |
| PN = Palmate newt | | u – Unknown | CT = Common toad | ts = Toad spawn |
| Visit Number: 1 | Survey Method | | | Peak GCN³⁵ |
| Waterbody | Torching | Bottle Traps | Egg Search | |
| P2 | No amphibians recorded | 1 x GCN m, 2 x GCN f, 3 x SN m, 2 x SN f | No Eggs found | 3 |
| Visit Number: 2 | Survey Method | | | Peak GCN |
| Waterbody | Torching | Bottle Traps | Egg Search | |
| P2 | No amphibians recorded | 1 x GCN m, 3 x GCN f, 11 x SN m, 4 x SN f | No eggs found | 4 |
| Visit Number: 3 | Survey Method | | | Peak GCN |
| Waterbody | Torching | Bottle Traps | Egg Search | |
| P2 | 1 x SN m, 1 x SN f | 3 x GCN m, 1 x GCN f, 5 x SN m, 1 x SN f | SN and GCN eggs found | 4 |
| Visit Number: 4 | Survey Method | | | Peak GCN |
| Waterbody | Torching | Bottle Traps | Egg Search | |
| P2 | No amphibians recorded | 1 x GCN m, 3 x SN m, 3 x SN f | No eggs found | 1 |
| Visit Number: 5 | Survey Method | | | Peak GCN |
| Waterbody | Torching | Bottle Traps | Egg Search | |
| P2 | 2 x GCN m, 2 x SN m, 10 x SN f, 1 x SN im | 3 x GCN m, 3 x GCN f, 9 x SN m, 2 x SN f | No eggs found | 6 |
| Visit Number 6: | Survey Method | | | Peak GCN |
| Waterbody | Torching | Bottle Traps | Egg Search | |
| P2 | 3 x SN m, 12 x SN f | 9 x GCN m, 6 x GCN f, 5 x SN m, 7 x SN f, 4 x SN im | No eggs found | 15 |

³⁵ Peak count is highest number recorded over all survey methods.

APPENDIX F – BAT BOX RECOMMENDATIONS

Table F.1 – Table of recommended bat boxes

| | |
|---|--|
|  |  |
| <p>2F Schwegler Bat Box</p> | <p>Schwegler 1FF Bat Box</p> |