



OAKLANDS FARM SOLAR PARK

Applicant: Oaklands Farm Solar Ltd

Environmental Statement

Appendix 6.3 – Preliminary Ecological Appraisal (Arcus)

January 2024

Document Ref: EN010122/APP/6.1/Appx 6.3

Revision: -

Planning Act 2008

Infrastructure Planning (Application: Prescribed Forms and Procedure) Regulations 2009 - 5(2)(a)



Oaklands Farm Solar Park - Environmental Statement Volume 3

Appendix 6.3: Arcus Preliminary Ecological Appraisal

Final report

Prepared by LUC

January 2024



ARCUS

**PRELIMINARY ECOLOGICAL APPRAISAL REPORT
OAKLANDS SOLAR FARM & GRID CONNECTION ROUTE**

BAYWA. RE UK LTD.

3719 AND VERSION 1

JULY 2020



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1 SUMMARY

This report has been produced for Baywa.re UK Ltd. prior to the construction of the solar farm and grid connection route.

A desk-based study was carried out using MAGIC to determine designated European sites within 5 km and national designated sites with 2 km. The local records centre was contacted for results of protected/ notable species within 2 km of the Site. A phase 1 walkover survey was carried out on 6th, 7th, 11th May and 16th June 2020 to identify any ecological constraints to the inform the planning process. This included an assessment of habitat suitability for protected species, including mammals, nesting birds and herptiles (amphibians and reptiles).

The Site has suitable habitats for protected species and these habitats have the potential to be directly and indirectly impacted by the Development. Therefore, further protected species surveys have been recommended for birds and Great Crested Newt (GCN), with the subsequent surveys carried out and results recorded separately in order to inform the assessment of impacts, mitigation, and Development design.

Further mitigation and enhancement measures have been provided for a range of protected species which includes bats, badger, otter and invertebrates. This is provided in further detail in Section 5. Should they be adopted in the Development design, the proposed mitigation and enhancements will increase the Development's biodiversity value, which adheres to Government guidance set out in the NPPF²⁶.

The final Development design layout is not yet confirmed. Therefore, it is currently unknown whether suitable reptile habitats (hedgerows and field margins) will be affected by the proposed Development. Should these habitats are to be affected, reptile surveys will need to be carried out to confirm presence/absence of reptiles on Site; and to inform appropriate mitigation and enhancement measures.

2 INTRODUCTION

Arcus Consultancy Services Limited (Arcus) were instructed by Baywa.re UK Ltd. to undertake a Preliminary Ecological Appraisal (PEA) at Coton Road, Walton-upon-Trent, South Derbyshire, East Midlands, DE12 8LP (henceforth referred to as the 'Site'). The PEA was undertaken in the form of an Extended Phase 1 Habitat Assessment and is therefore referenced as such, within this Preliminary Ecological Appraisal Report (PEAR).

This report is submitted to support the design and layout of a proposed solar farm with grid connection route; however, the full design and layout is not yet available (henceforth referred to as the 'Development').

This report details ecological baseline conditions and potential ecological impacts from the Development, taking into account relevant planning policy and legislation. Further surveys and mitigation have been recommended, where applicable, in order to provide additional information for assessing impacts and to inform recommendations to avoid or reduce potential ecological impacts.

2.1 Planning Policy and Legislation

All relevant legislation and policy discussed in the report are further detailed 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 any local or national statutory designated sites such as Sites of Special Scientific Interest (SSSI) within 2 km of the Site. A search of European statutory designated sites such as Special Areas of Conservation (SAC), Special Protection Areas (SPA) or Ramsar sites² within 5 km of the Site was also undertaken.

Local records of features of ecological interest within 2 km of the Site, such as Local Wildlife Sites (LWSs) and notable and protected species, were requested from Derbyshire Biological Records Centre (DBRC).

A review of historic aerial satellite imagery³ 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 Survey⁴ was conducted on 6th, 7th, 11th May and 16th June 2020 by a suitably experienced ecologist. The survey included all land within the Site (Figure 1, Appendix B). The aim of this survey was to identify potential ecological constraints to inform the design and planning process. The survey was carried out following the Guidelines for Preliminary Ecological Appraisal⁵, with an assessment of habitat suitability for protected species, including mammals, nesting birds and herptiles (amphibians and reptiles).

¹ Multi Agency Geographic Information for Countryside (MAGIC). Available at <https://magic.defra.gov.uk/home.htm> [Accessed 18.06.2020]

² Ramsar site is a wetland site designated to be of international importance under the Ramsar Convention. Available at <https://data.gov.uk/dataset/acc63c60-0850-49a9-afce-88d58cd1a1b2/ramsar-sites> [Accessed 18.06.2020]

³ Google LLC (2020) *Google Earth*. Available from: <https://earth.google.com/web/> [Accessed 18.06.2020]

⁴ JNCC (2010) *Handbook for Phase 1 habitat survey: a technique for environmental audit*. Nature Conservancy Council

⁵ CIEEM (2017), *Guidelines for Preliminary Ecological Appraisal, 2nd Edition*. Chartered Institute of Ecology and Environmental Management, Winchester.

3.3 Bat Roost Assessment

During the Extended Phase 1 Habitat Survey, a preliminary assessment of the potential of on-site features 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)⁶. This initial bat assessment informs whether or not further surveys are required to assess the potential impact of the Development on bats. Features subject to assessment included the adjacent habitats, the grassland and individual trees. The individual trees were classified according to their 'Roost Suitability'. Should evidence of bats be recorded or the features assessed to provide suitability for bats, then further surveys may be required.

3.4 Great Crested Newt Surveys

3.4.1 Habitat Suitability Index (HSI) Assessment

During the ecological walkover survey, a Habitat Suitability Index (HSI) assessment was carried out on waterbodies (where accessible) within 500 m of the Site. This followed a method based on Oldham R.S *et al*/2000⁷. It is used by surveyors to demonstrate whether a pond is suitable for great crested newts (*Triturus cristatus*) (GCN) and requires detailed survey. The HSI considers all the features which are valued by newts; e.g., the size of the pond, the extent of shading, the abundance of aquatic plants, the presence of fish and the quality of surrounding habitat. 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 the pond (See HSI results in Appendix E), with pond suitability for GCN assessed on the scale shown in Table 3.2.

Table 3.2 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.

3.5 Badger Survey

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

- Presence of holes with evidence of badger, such as footprints, discarded hair, etc.;
- Presence of dung pits and latrines;
- Presence of well-used runs with subsidiary evidence of badger activity; and

⁶ Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd ed.). The Bat Conservation Trust, London.

⁷ Oldham R.S, et al. (2000). *Evaluating the suitability of habitat for the Great Crested Newt (Triturus cristatus)*. Herpetological Journal 10 (4), 143-155.

- Presence of other indications of badger activity, such as signs of foraging and footprints.

Badger setts are classified in accordance with the following scheme⁸:

- **Main** – normally the focal sett for a badger social group. Generally occupied continuously, main setts usually have several active holes with radiating tracks, latrines and other signs of activity. The actual number of holes can vary greatly, depending on social group size and soil conditions.
- **Annexe** – a secondary sett, close to the main sett. It will normally be connected to the main sett with very obvious tracks. Annexes may not be occupied constantly, even when the main sett is very active.
- **Subsidiary** – occurring at a greater distance from the main sett and not as clearly linked to it as an annexe. These setts will fall clearly within the territory of a social group and may be seasonally used by badgers.
- **Outlier** – less frequently used, these setts may be colonised by other species when not in use by badgers. Outliers may represent a temporary sett, or a habitation for migrating individuals, or those excluded from a social group.

In addition to classifying each sett, the number of holes was counted and their status recorded using the following criteria:

- **Well-used** – being clear of any debris or vegetation, are obviously in regular use and may or may not have been excavated recently.
- **Partially-used** – not in regular use and have debris such as leaves and twigs in the entrance, or have moss and/or other plants growing in or around the entrance. Partially-used holes could be in regular use after a minimal amount of clearance.
- **Disused** – not been in use for some time, are partially or completely blocked and could not be used without a considerable amount of clearance. If the hole has been disused for some time, all that may be visible is a depression in the ground where the hole used to be and the remains of the spoil heap, which may be covered in moss or other vegetation.

3.6 Ornithological Walkover

A walkover of the study area and adjacent habitats (where access was possible) 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 area to support breeding or wintering birds of conservation concern (for example birds listed in Schedule 1 of the Wildlife and Countryside Act 1981¹⁷ (as amended) and Annex I of the EC Birds Directive).

3.7 Limitations and Assumptions

The survey was undertaken in dry weather by a suitably experienced ecologist who is a Graduate member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and holds a Natural England Licence for bats. Therefore, there were no limitations to the survey with the potential to affect its efficacy.

There were no citations available for the Local Wildlife Sites provided by the data centre.

Letters were issued to all landowners who had ponds located on their land within 250 m of the Site. At the time of the survey, no access was granted prior to survey them and this is therefore a limitation.

⁸ Harris, S., Cresswell, P. and Jefferies, D. (1991) *Surveying Badgers*, The Mammal Society, London.

4 BASELINE RESULTS

4.1 Desk Study

4.1.1 Designated Sites

4.1.1.1 Statutory

There is one European designated site within 5 km; River Mease Special Area of Conservation (SAC) is approximately 4.4 km south of the Site, which is also designated as a Site of Special Scientific Interest (SSSI). There are no national or local statutory designated sites within 2km of the Site.

4.1.1.2 Non-Statutory

There are 13 non-statutory designated Sites within 2 km of the Site, all are Local Wildlife Sites (LWSs) and the closest LWS is Walton Hall which is approximately 0.6 km north-west from the Site.

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

Site	Status	Minimum Distance and Direction (km) from Site boundary	Description/Reason for Designation
Statutory designated sites			
River Mease	SSSI SAC	4.4 km south	The River Mease is a small tributary of the River Trent, containing spined loach (<i>Cobitis taenia</i>) and bullhead (<i>Cottus gobio</i>). It is known to support populations of white clawed-crayfish (<i>Austropotamobitus pallipes</i>) and otter (<i>Lutra lutra</i>).
Non-statutory designated sites			
Walton Hall	LWS	0.6 km north-west	Wood pasture and parkland.
Church Farm Pond	LWS	0.8 km south	Site contains Derbyshire Red Plant Book (DRDB) plant species.
Walton Wood	LWS	0.8 km west	Ancient semi-natural oak woodland -mixed.
The Dumps	LWS	0.8 km north-west	Secondary broad-leaved woodland.
Church Street Grassland	LWS	0.9 km south	Unimproved neutral grassland.
Rosliston Forestry Centre – Meadow Pond	LWS	0.9 km east	Standing open water.
Hill Close Wood Pond	LWS	1 km south	Standing open water.
Borough Hill Wetland	LWS	1.2 km north-west	Lowland swamp.
New Ozier Bed Pond	LWS	1.4 km north-west	Standing open water.

Site	Status	Minimum Distance and Direction (km) from Site boundary	Description/Reason for Designation
Rosliston Forestry Centre Hedge	LWS	1.5 km east	Reason for site designation unknown.
Homestall Wood	LWS	1.6 km south-west	Relatively large area of secondary broadleaved woodland.
Grove Wood	LWS	1.65 km north	Ancient semi-natural oak woodland.
Brick Kiln Pits	LWS	2 km south-west	Secondary broad-leaved woodland.

4.1.2 Protected Species

A total of 15 protected species records were returned that were within 2 km of the Site and are dated from 2010 onwards, which were relevant to the habitats present and the Development. The species are protected under UK legislation (see Appendix A) and/or are listed under the Natural Environment and Rural Communities (NERC) Act 2006¹⁹ as species of principal importance, and detailed further in Table 4.2.

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

Taxonomic group	Species	Number of records	Distance and direction of closest record from Site (Year)
Bats	Common Pipistrelle	6	0.8 km north-east (2002)
	Pipistrelle sp.	2	0.3 km east (2012)
	Noctule	2	0.7 km north-east (2001)
	Unidentified bat	1	0.4 km north-east (2008)
	Brown long-eared	2	1.3 km north-west (2014)
Mammals	Otter	1	1.7 km north (2000)
	Water Vole	6	1.8 km south (2001)
	Hedgehog	1	0.4 km north-east (2015)
	Brown Hare	1	0.7 km south-east (2005)
Birds	Yellowhammer	2	0.7 km east (2000)
	House Sparrow	1	0.4 km north-east (2015)
Reptiles	Adder	1	0.9 km north-east (2002)
	Grass snake	8	0.2 km north-east (2002)
	Common lizard	1	0.8 km north-east (2002)
Amphibians	Great Crested Newt	3	0.8 km south-east (2003)

4.1.3 Site History

Satellite imagery shows the majority of the Site has remained the same since 2000. Aerial photos recorded from 2019, 2018, 2016, 2010, 2007, 2005, 2003 and 2000 were available for the site and used in drawing this conclusion.

4.1.4 Site Description

The Site for the proposed Solar Development is approximately 177 hectares (ha) and the grid connect route is approximately 4.2 km. The Site is situated approximately 0.9 km to the south of the village of Walton-on-Trent and approximately 6 km to the south of Burton-on-Trent. The National Grid Reference for the approximate centre point is SK 23043 16695.

The majority of the Site comprised of arable crops, improved grassland, semi-improved neutral grassland, bare ground, tall ruderal, species-rich and species poor hedgerows with trees, standing water, running water, dry ditch and scattered trees.

No non-native invasive species were recorded at the time of the survey within the Site and study area.

4.2 Extended Phase 1 Habitats

For the purposes of this report, Latin names are excluded from plant species names in the following sections and only the common names are used. A botanical list of species can be found in Appendix C.

4.2.1 Arable land

The majority of the fields consist of arable crops at various stages of growth.

4.2.2 Bare ground

Some of the fields at the time of the walkover survey were bare soil. Further access tracks were noted throughout the Site leading from Coton road to the south. In addition, the grid connection route runs along Coton road, Main Street (within the village of Walton-on-Trent) and Walton road.

Some fly tipping of tyres was noted to the southern boundary (Target Note 3, Figure 1, Appendix B).

4.2.3 Improved Grassland

There were several fields which were improved grassland, although only one of which was being grazed by cattle at the time of the walkover survey (Target Note 9-10, Figure 1, Appendix B). All the other improved grassland fields sward was relatively tall with perennial rye-grass dominant with occasional white clover, dandelion and Yorkshire fog.

4.2.4 Semi-improved neutral grassland/tall ruderal habitat mosaic

There were some fields to the north of the Site which consisted of semi-improved neutral grassland, species in the sward include: perennial ryegrass, pineapple weed, red campion, herb-robert, false oat-grass, forget-me-not, daisy, creeping buttercup, cow's parsley and red fescue.

The majority of the field boundaries throughout the Site comprised of semi-improved neutral grassland. Grass species typical of semi-improved neutral grassland, such as Yorkshire fog and cocksfoot were found in this habitat, along with common dandelion, common nettle, cleavers, thistle, speedwell sp., common hogweed and broad-leaved dock.

A tall ruderal/grassland mosaic habitat was present along some of the field margins.

Further tall ruderal species were found in the understorey of the woodland to the north of the Site and within a field to the east. Species include common nettle, Yorkshire fog, ribwort plantain and creeping buttercup was found occasionally.

4.2.5 Scattered trees

Several fields have scattered trees present within the centre of the field; oak and ash were mostly dominant throughout the Site with occasional sycamore and beech present. All trees were assessed for their potential to support roosting bats and tree ID is shown on Figure 1, Appendix B; with further information provided in Section 4.3.2.

4.2.6 Species-rich hedgerow with trees

Most hedgerows on the Site were well managed and this included hedgerows with trees. Whilst these hedgerows were slightly more diverse than the species poor hedgerows, species diversity was still limited with blackthorn and hawthorn. Species present in the understorey, consisted of common ivy, dock, cow's parsley, hedge mustard, petty surge, red dead nettle, spear thistle and Shepherd's purse.

Further species-rich hedgerows with trees were present along the grid connection route on both sides of the road.

4.2.7 Broadleaved woodland

There were two pockets of small broad-leaved woodland to the north-east and south-eastern boundary of the Site. The woodland area to the north-east was very dense with a slow flowing ditch running through the centre.

4.2.8 Dense scrub

There were dense areas of scrub present to the north of the site within the understorey of the broadleaved woodland and further areas of dense scrub scattered throughout the Site. Species mainly consisted of bramble and hawthorn.

4.2.9 Scattered scrub

There was hawthorn, blackthorn, dogs rose scrub present within the centre of a field to the south-east of the Site.

4.2.10 Dry ditch

Dry ditches were present throughout the Site, some appeared to have been dry for a long period with tall ruderal and scrub vegetation present.

4.2.11 Standing water

Aerial imagery shows 9 ponds to be present within the Site boundary, however during the walkover survey only 3 of these ponds had standing water. The remaining 6 ponds were completely dry with some tall ruderal and scrub vegetation scattered throughout. Pond locations (P1-P9) are shown on Figure 1, Appendix B.

4.2.12 Fence

Barbed wire fencing and post and rail fencing were present surrounding the majority of the fields throughout the Site.

4.2.13 Species-poor hedgerows

Almost all of the species poor hedgerows recorded within the study area had been planted or regularly managed in recent decades. The hedgerows were not very diverse, and appeared to be dominated by either hawthorn or blackthorn, with occasional dog rose., and hornbeam found rarely. The hedgerows were immediately joined by semi-improved neutral grassland habitats or ditch systems.

4.2.14 Running Water

A slow flowing ditch was present to the north to the Site which flowed to the east within the understorey of the broadleaved woodland block and to the south adjacent to a public right of way access track.

4.2.15 Grid Connection Route

The proposed grid connection route mainly consisted of the Coton road, Main Street (within the village of Walton-on-Trent) and Walton road. Scattered scrub, trees, ornamental shrubs, residential properties and a small area of amenity grassland was present adjacent to both sides of the road. Species present in the sward included: willow herb, wild privet, common mallow, rose, perennial ryegrass, common dandelion, daisy and common nettle.

4.3 Protected Species

4.3.1 Badger

The woodland, grassland and scrub habitats on Site provided suitable habitat for badgers and the gently sloping ground and suitable soil offered opportunities for sett creation. Six badger setts were identified during the site visit, these are not shown on any figures due to their confidential nature. A separate confidential plan can be provided to the client for incorporation within the design of the Development if requested.

Several areas had a dense ground flora providing shelter and foraging for badgers, particularly the scrub habitat surrounding the field margins and within the centre of some of the arable fields.

Due to confidentiality reasons badger records were not included within the desk study results.

4.3.2 Bats

4.3.2.1 Trees

33 mature trees within the Site and three mature trees within the Grid connection route were identified as having varying levels of potential to support roosting or hibernating bats. Table 4.3 below provides further details of each tree, its location, roost potential, and Potential Roost Features (PRFs) such as rot holes, split limbs, and lifted bark. The locations of these trees are shown in Figure 1 Appendix B and photos are shown in Appendix D.

Table 4.3 Descriptions of Trees with Potential Roosting Features

Tree No	Species and Location	Bat Roost Potential	Potential Roost Features
1	Ash (SK 23046 16909)	High	Woodpecker hole, knot hole, horizontal spilt, gap under branches
2	Oak (SK 23096 16882)	Low	Gap under branches, knot hole, horizontal crack in bark
3	Ash (SK 23498 17350)	Moderate	Horizontal spilt, dense covering of ivy
4	Ash (SK 23472 17141)	Low	Horizontal spilt, dense covering of ivy
5	Ash (SK 23446 17131)	Low	Dense covering of ivy, knot hole
6	Ash (SK 23437 17087)	Low	Knot hole, horizontal crack in bark
7	Ash (SK 23454 16960)	Moderate	Dense covering of ivy, knot hole
8	Ash (SK 23468 16952)	Moderate	Horizontal spilt, cavity

9	Oak (SK 22812 16226)	Moderate	Knot hole, horizontal spilt, cavity
10	Horse Chestnut (SK 23308 16394)	Low	Horizontal spilt, cavity
11	Oak (SK 23334 16336)	Low	Horizontal crack/spilt, missing limbs
12	Oak (SK 23353 16249)	Low	Horizontal crack/spilt
13	Oak (SK 23645 16375)	Low	Gap under branches, knot hole
14	Ash (SK 23675 16393)	Moderate	Knot hole, dense covering of ivy
15	Ash (SK 23776 16445)	Moderate	Knot hole, cavities, large gap at base of the tree
16	Oak (SK 23889 16437)	Low	Dense covering of ivy
17	Oak (SK 23906 16459)	Moderate	Horizontal spilt, cavities
18	Oak (SK 23881 16423)	Low	Gap under branches
19	Oak (SK 23884 16638)	Low	Gap under branches
20	Oak (SK 23837 16630)	Moderate	Horizontal crack/spilt, knot hole
21	Oak (SK 23754 16615)	Moderate	Knot hole, horizontal spilt, missing limbs
22	Oak (SK 22828 16687)	Moderate	Several gaps at base, horizontal crack/spilt
23	Ash (SK 22694 16897)	Low	Knot hole, horizontal spilt
24	Oak (SK 22767 16941)	Moderate	Horizontal crack/spilt, knot hole, gaps under branches
25	Ash (SK 22721 17002)	Low	Dense covering of ivy, knot hole
26	Oak (SK 22700 17076)	Low	Gap under branches
27	Oak (SK 22535 17136)	Low	Gap under branches
28	Oak (SK 22471 17022)	Low	Gap under branches
29	Oak (SK 22483 16886)	Moderate	Gap under branches, knot hole
30	Oak (SK 22557 16930)	Low	Gap under branches
31	Oak (SK 22096 16918)	Low	Missing limbs
32	Oak (SK 22119 16842)	Low	Gap under branches
33	Oak (SK 22127 16834)	Low	Gap under branches
34	Sycamore (SK 21781 18301)	Low	Dense covering of ivy
35	Oak (SK 22501 18958)	Moderate	Horizontal spilt, cavities
36	Oak SK 22421 18929	Moderate	Horizontal spilt, cavities

The desk study returned 5 records of bat within 2 km of the Site, including recent records of common pipistrelle, noctule and brown long-eared bat species, with records dating up to 2014. The closest records to the study area were of common pipistrelle, 0.8 km to the north-east in 2002.

4.3.2.2 Habitats

The mosaic of habitats such as the species-rich hedgerows with trees, small areas of woodland and running ditches have the potential to support foraging and commuting bats.

These features were connected to suitable habitats in the wider area by further areas of hedgerows and areas of woodland.

As the Site itself does not experience any light levels and therefore is suitably dark for foraging and commuting bats. There is the possibility, however, of disturbance to foraging and commuting bats during the construction and operation phases of the Development. In order to minimise the potential disturbance, it is recommended that a night-time lighting strategy is employed during both stages of the proposed Development, as described in further detail in Section 5.4.2.2.

4.3.3 Birds

The broadleaved trees and species-rich hedgerows within the Site provide good foraging and nesting habitats for birds. The agricultural habitats present on Site also provide good foraging and ground nesting habitats for birds such as lapwing or skylark. Species of birds observed during the site visit included buzzard (*Buteo buteo*), carrion crow (*Corvus corone*) and blackbird (*Turdus merula*).

4.3.4 Amphibians

Habitats within the Site offered good foraging and sheltering opportunities for GCN and other amphibians. The woodland was damp in places and there were various log piles and brash piles present offering suitable hibernacula opportunities. In addition, the onsite ponds with water present had good quality vegetation which was deemed suitable for amphibians.

There are nine ponds shown to be present on Site, as shown on the aerial imagery, however during the walkover surveys only three ponds had water present and all other onsite ponds were dry.

A GCN habitat suitability index (HSI) test⁹ was carried out on the three ponds within the Site, which contained standing water and were accessible. This test assessed the habitats' features for GCN suitability, such as location, area and surrounding terrestrial habitat. Full results of the HSI assessment are located in Appendix E, with a summary of the results in Table 4.4

Table 4.4 Pond descriptions and HSI results

Pond No.	Grid Reference	HSI Score	Description
1	SK 2258 1715	N/A	Dry Pond
2	SK 2263 1676	N/A	Dry Pond
3	SK 2303 1670	N/A	Dry Pond
4	SK 2346 1695	0.72	Small pond situated within corner of arable field.
5	SK 2375 1687	N/A	Dry Pond
6	SK 2354 1647	N/A	Dry Pond
7	SK 2394 1652	0.44	Pond of the east of the Site boundary.
8	SK 2353 1630	0.61	Small pond within margin of arable field.

⁹ Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. (2000). *Evaluating the suitability of habitat for the Great Crested Newt (Triturus cristatus)*. Herpetological Journal 10 (4), 143-155.

9	SK 2320 1622	N/A	Dry Pond
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Pond 7 (as shown on Figure 1, Appendix B) was calculated during the HSI assessment to have poor suitability for GCN and was scoped out for needing further assessment. However, Ponds 4 and 8 were calculated to have a good and average suitability for GCN respectively, and were considered of sufficient quality to support GCN.

A further 15 ponds were located offsite within 250 m of the Site boundary; however, these ponds were situated on private land and were not accessible at the time of the walkover survey.

Three records of GCN found within 2 km of the Site, the closest record was located approximately 0.8 km south-east and recorded in 2003.

4.3.5 Reptiles

The mixture of scrub, bare ground and grassland habitats found on Site provided suitable habitat for basking, foraging and sheltering reptiles. Log piles that were found adjacent to this area provided hibernacula potential for reptiles. The Site also has good connectivity to the wider landscape by hedgerows and areas of woodland.

No reptiles or evidence of reptiles was recorded, although habitats with potential to support foraging and sheltering reptiles, such as rough grassland, were present within the study area and along the field margins. Wet ditches provided good habitat for foraging grass snake, whilst the scrub habitat within the Site offered opportunities for hibernating or sheltering reptiles.

The desk study returned three records for reptile species; one for adder, one for common lizards and eight individual records for grass snake. The closest record to the Site is for adder, found approximately 0.9 km north-east in 2002.

4.3.6 Otter

No evidence of otter was recorded in any of the waterbodies. There were no habitats that were considered suitable to support foraging or resting otter. The desk study returned a single record for otter, recorded in 2000, approximately 1.7 km north of the Site.

4.3.7 Water Vole

No evidence of water vole was recorded at the time of the survey. Due to the small size of the onsite ditches and disconnected ditch habitats throughout much of the Site, both quantities of habitat and habitat connectivity suitable for water vole is likely to be limited to the boundaries and those areas just beyond.

The desk study returned six records for water vole within 2 km of the Site, the nearest record is approximately 1.8 km south recorded in 2001.

4.3.8 Other Species

Several brown hare (NERC Act 2006¹⁹) were observed during the walkover survey (see Target Note 6-8, Figure 1, Appendix B). Rabbits and roe deer were also observed on Site. It is considered that brown hare and deer are likely to be present at reasonable densities within the Site and surrounding landscape.

Mammal runs were also identified throughout the Site (Target Note 1-2, Figure 1, Appendix B).

5 DISCUSSION, FURTHER SURVEY REQUIREMENTS AND MITIGATION

5.1 Impact of Development

The Site has suitable habitats for protected species and these habitats have the potential to be directly and indirectly impacted by the Development. Where this is the case, additional ecology surveys are recommended to provide further information to help assess the potential ecological impacts 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 (NPPF) 2019²⁶, a range of enhancement measures are provided below.

5.2 Designated Sites

There is one European statutory designated site within 2 km of the proposed Site boundary; River Mease SSSI, SAC which is 4.4 km south from the Site. The River Mease is separated by distance and major roads, it is therefore thought that the Development will not adversely affect this or any other statutory designated sites or conservation features for which the sites have been designated.

There are 13 non-statutory Local Wildlife Sites (LWS) within 2 km of the Site boundary, the closest of which is Walton Hall which is approximately 0.6 km north-west from the Site boundary.

5.2.1.1 Mitigation Requirement

Given the distance from the proposed Development, it is unlikely that any statutory or non-statutory designated sites will be adversely affected by the Development and as such no further mitigation is required with respect to designated sites.

5.3 Habitats

Although the final layout design is not yet confirmed, it is considered likely the proposed Development will result in the permanent loss of arable habitat, small amount of semi-improved neutral grassland and bare ground.

It is expected that the hedgerow habitats and trees will be retained on the Site, and it is not envisaged that there will be any impact to this habitat from the Development. Further recommendations for mitigation and enhancement of habitats are detailed in Section 5.3.1.1.

5.3.1.1 Mitigation Requirement

The retention and improvement of grassland will be achieved through controlled management aimed at improving the sward structure and diversity through enhancement measures to be put in place. This change in use is likely to result in the development of a grassland habitat of greater species diversity and greater value to wildlife. The Development of a landscape plan and Landscape & Biodiversity Management Plan (LBMP) would seek to ensure the creation of ecological features and habitats that will complement and augment those already existing within the Site, such that there will be a substantial net habitat gain as a result of the Development.

Bird boxes and bat boxes have also been recommended to be installed in retained habitat within the Development, with reference to example prescriptions found in Appendix G.

5.4 Species

The mix of habitats on site have the potential to support a wide range of common species. The impacts on these species are highlighted in the following sections along with recommendations for mitigation and enhancement details.

5.4.1 Badger

Several badger setts were recorded on the Site and along the Site boundary. The suitable habitats on Site and within the wider landscape mean it is likely that badgers are active in the local area.

In the absence of mitigation, there is potential that the Development will cause harm or disturbance to badgers during both the construction and operational phases of the Development. The Development design will seek to avoid sett entrances by ensuring a sufficient buffer of at least 30 m is applied within the Development design. If this cannot be avoided, further surveys will be required before construction works take place to provide up-to-date information about the status and distribution (confirm active, non-active setts) of badgers so that they can be properly considered.

5.4.1.1 Mitigation Requirements

To minimise the risk of harm to badgers, excavations must not be undertaken within 30 m of the identified badger setts. If excavations are required within this distance then an ecologist should first be contacted to provide advice on depth/distance appropriateness and any requirement for further mitigation and/or licencing. An ecologist must also be consulted in choosing the positions of the Development to ensure no adverse impact on badgers or their setts.

In order to prevent harm to badgers using the Site, the following controls should be implemented during the works, if possible:

- 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;
- Where possible, works should be limited to the hours from dawn to one hour before sunset;
- The creation of large stock piles of earth should 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.

5.4.2 Bats

Trees

Where trees have been identified as having bat roost potential may be affected by the Development, there is the potential for the Development to harm or disturb bats, and to damage, destroy or obstruct access to their place of rest and shelter. Therefore, it is advised that the design of the Development avoid trees that have been identified as having bat roost potential.

However, if for any reason there is a requirement to prune or fell trees with bat roost potential, it is recommended that a tree climbing inspection of each impacted tree is undertaken by a bat licenced ecologist using a pair of binoculars, endoscope and high powered torch to look for signs of bats such as droppings, scratch marks, and staining, or

determine the presence or otherwise of roosting bats. The findings of these surveys will inform the requirement for further surveys, or type and level of mitigation.

Habitats

Access to the existing grassland, hedgerows, trees and scrub habitats for use by foraging and commuting bats will be maintained throughout the Site, with no flight line obstruction to these habitats from the Development envisaged. Therefore, it is considered that there is no need for further surveys for foraging or commuting bats.

There is the possibility; however, of disturbance to foraging or commuting bats during both construction and operation of the Development. In order to minimise this potential disturbance, it is recommended that a night-time lighting strategy appropriate to a rural location (if installed during construction or operation) is employed.

5.4.2.1 Mitigation Requirements

It is not anticipated that the Development will cause foraging habitats to be lost or severed, which would result in habitat fragmentation. However, it is possible that there may be an impact caused by lighting, during construction and after the works are complete.

The final mitigation requirements for bats will depend on the results of further recommended survey work and Development design. However, mitigation is likely to include, but not be limited to:

- Ensuring all site operatives are made aware of current legislation protecting bats via a Toolbox Talk;
- In the event that any bats are encountered then works will cease and Natural England will be contacted to agree appropriate measures;
- Development design needs to ensure that the rest of the woodland and surrounding areas remains unlit; and
- A minimum of four bat boxes will be incorporated within the woodland to provide enhanced roosting opportunities. Installation needs to be in accordance with good practice guidelines¹⁰, with examples of suitable bat box types provided in Appendix G.

5.4.2.2 Lighting and disturbance

The impacts of lighting on plants and animals are difficult to assess but it is known that lighting can adversely affect invertebrates and bats (as well as other species). To carefully manage light levels within the Development and to ensure the Site is able to provide continued undisturbed bat foraging and commuting habitat for bats, any new lighting should be designed in line with good practice¹¹, such as minimising light spill and directing it away from boundaries and retained mature habitats.

Should lighting be required during the construction and operational phase, the following controls would need to be applied:

- 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^{12, 13};
- Use of flat-glass protectors on luminaires to help reduce light spill above angles greater than 70° from the vertical plane; and

¹⁰ Bat Conservation Trust (2019) *Bat Boxes: Putting up your box*, Available from: http://www.bats.org.uk/pages/bat_boxes.html [Accessed 03.07.2020]

¹¹ Bat Conservation Trust/ILP (2018), (*Guidance Note 08/18 Bats and artificial lighting in the UK: Bats and the Built Environment series*. London, UK

¹² Fure, A. (2006) Bats and Lighting. *The London Naturalist*, No. 85.

¹³ Emery, M. (2008) Effect of Street Lighting on Bats. *Urbis Lighting Ltd*.

- Avoiding light spill by using accessories such as shields, louvres, hoods and cowls.

The provision of bat boxes suitable for roosting and hibernating bats are also proposed to be installed on retained trees within the Development. Example bat box designs and further information on installation can be found in Appendix G.

5.4.3 Birds

Without mitigation, and depending on the time of year that works are carried out, it is possible that during the construction phase, the Development will adversely impact breeding birds and further breeding bird surveys have been recommended. Further breeding bird surveys have been carried out and the results and more detailed mitigation are provided in a separate, standalone report¹⁴. However, simple mitigation and enhancements with respect to nesting birds are provided below.

5.4.3.1 Mitigation Requirements

To ensure compliance with the Wildlife and Countryside Act 1981¹⁷ (as amended), any work involving vegetation clearance during the peak bird nesting season (March to September inclusive, or earlier/later if weather conditions are particularly mild) must be avoided.

If any clearance works to nesting habitats are required during the nesting season, then pre-construction checks for nesting birds would need to be carried out by a suitably experienced ecologist no more than 48 hours prior to the works commencing.

If any nesting birds are found to be present, an appropriate buffer zone would be implemented, within which works are excluded for the duration of the breeding attempt. Any active nests will need to be left *in situ* until a suitably experienced ecologist confirms that birds have stopped using them.

In the unlikely event that any birds listed under Schedule 1 of the Wildlife and Countryside Act 1981¹⁷ (as amended), are found to be nesting on Site, an ecologist will need to be contacted for further advice (see also legislation in Appendix A).

It is recommended that bird boxes be installed within the woodland areas to provide enhanced nesting opportunities for a number of different bird species. A minimum of three bird boxes will need to be installed within suitable locations, and all boxes must be installed in accordance with good practice guidelines¹⁵. Examples of suitable bird box types provided in Appendix G.

5.4.4 Amphibians

Following HSI assessments of onsite ponds, the assessment identified two ponds, which were of average and good suitability for supporting GCN, it was recommended that a further presence/absence survey in the form of eDNA survey be completed. These surveys have been completed, with reporting provided in full to support the planning submission once the design has been finalised. For expediency, the raw results are provided in Appendix F.

As no ponds were recorded as either being suitable for GCN following the HSI assessments or absent of GCN, it is considered unlikely that GCN are present on site and are unlikely to be a constraint to the Development design.

However, in the unlikely event that GCN are identified on the Site during works, it is recommended that works stop immediately and a suitably experienced ecologist is contacted for advice.

¹⁴ 2020 Breeding Bird Report: *Oaklands Solar Farm*. Baywa-re UK LTD. (June 2020) Arcus Consultancy Services Ltd.

¹⁵ Royal Society for the Protection of Birds (nd) *Nestboxes: Find out how to provide, or make, nestboxes for birds in your garden*, Available from: www.rspb.org.uk/advice/helpingbirds/nestboxes [Accessed 03.07.2020]

No further specific mitigation with respect to GCNs are required; however, the avoidance of higher value terrestrial habitats for GCN and the application of Reasonable Avoidance Measures (RAMs) will ensure that GCN and other amphibian species are protected from injury or harm.

5.4.4.1 Mitigation Requirements

RAMs will be adopted during the works. In accordance with this precautionary approach, where required, a supervised clearance exercise will be carried out for the vegetation on site. The works will be supervised by an ecologist and completed during the appropriate time of year when amphibians are fully active (usually from April through to September, although this is weather and temperature dependent). This will be carried out in conjunction with the methods for other species on site, if possible.

5.4.5 Reptiles

Suitable habitat (hedgerows and field margins) to support foraging, basking and sheltering reptiles were recorded on Site. If these habitats are to be affected by the proposed Development, it is recommended that presence/absence surveys take place during an appropriate time of the year (April to September inclusive) and following standard methodology¹⁶ to inform appropriate mitigation/enhancement measures.

5.4.5.1 Mitigation Requirements

Mitigation measures will be provided once the full extent of the Development design is known.

5.4.6 Otters

No evidence of otter was recorded at the time of survey. The ditch networks present on Site were very shallow at the time of the walkover and unlikely to support foraging otter.

5.4.6.1 Mitigation Requirements

In order to prevent harm in the unlikely event that otters are using the Site, the following precautionary controls should be implemented during the works, if possible:

- 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;
- Where possible, works should be limited to the hours from dawn to one hour before sunset;
- The creation of large stock piles of earth should be avoided as these may be attractive for 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.

5.4.7 Water Voles

The Development will not encroach upon, nor impact the connectivity of, any habitat which could potentially be used by water vole, and therefore no further survey or specific mitigation is recommended with respect to these species and they are not considered further within this report.

¹⁶ Froglife (1999) Reptile Survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10. Froglife, Halseworth.

5.4.8 Invertebrates

The Development will not significantly encroach upon, nor impact the connectivity of habitat which could potentially be used by invertebrates, and therefore no further survey or specific mitigation is recommended with respect to invertebrates. However, some general habitat enhancement provisions that will benefit invertebrates can be found below.

5.4.8.1 Mitigation Requirements

It is recommended that some of the cuttings from the vegetation clearance be retained and created into log piles to provide shelter and food for the insects on site.

6 CONCLUSIONS

Several protected species have the potential to be adversely affected by the Development in the absence of mitigation and a final design. As detailed above, this includes bats, birds, reptiles, and GCN (amphibians).

Further survey work, as described Section 5, has been recommended, and for breeding birds and great crested newts this has been carried out to inform the assessment of impacts and mitigation. In order to increase the Development's biodiversity value, and to adhere to Government guidance set out in the NPPF²⁶, a range of enhancement measures have also been provided.

Further mitigation and enhancement measures have been provided for a range of protected species which includes bats, badger, reptile, otter and invertebrates.

APPENDIX A – PLANNING POLICY AND LEGISLATION ENGLAND

The Wildlife & Countryside Act 1981 (as amended)

The Wildlife and Countryside Act 1981¹⁷, as amended by the Countryside and Rights of Way Act (CROW) 2000¹⁸ and the Natural Environment and Rural Communities Act (NERC) 2006¹⁹, 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)²⁰, 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 1990²¹ and must be disposed of properly at licenced landfill according to the Environmental Protection Act (Duty of Care) Regulations 1991²².

Conservation of Habitat and Species Regulations (Amendment) (EU Exit) 2019

The Conservation of Habitats and Species Regulations (Amendment) (EU Exit) 2019²³ (the 'Habitat Regulations') 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 Regulations²³. 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).

¹⁷ Legislation.gov.uk *Wildlife and Countryside Act 1981 (as amended)* [online] Available from: https://www.legislation.gov.uk/ukpga/1981/69/pdfs/ukpga_19810069_en.pdf [Accessed 03.07.2020]

¹⁸ Legislation.gov.uk *The Countryside and Rights of Way Act 2000* [online] Available from: <http://www.legislation.gov.uk/ukpga/2000/37/contents> [Accessed 03.07.2020]

¹⁹ Legislation.gov.uk *Natural Environment and Rural Communities Act 2006*. [online] Available from: <https://www.legislation.gov.uk/ukpga/2006/16/contents> [Accessed 03.07.2020]

²⁰ 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 from: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009L0147> [Accessed 03.07.2020]

²¹ Legislation.gov.uk *Environmental Protection Act 1990*, [online] Available from: <http://www.legislation.gov.uk/ukpga/1990/43/contents> [Accessed 03.07.2020]

²² Legislation.gov.uk *Environmental Protection Act 1991* [online] Available from: <http://www.legislation.gov.uk/ukpga/1991/2839/made> [Accessed 03.07.2020]

²³ Legislation.gov.uk *The Conservation of Habitats and Species (Amendment) (EU Exit) Regulation 2019 drafted* [online] Available at: <https://www.legislation.gov.uk/ukdsi/2019/9780111176573/contents> [Accessed 09.07.2020]

Natural Environment & Rural Communities (NERC) Act 2006

The NERC Act 2006¹⁹ 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.

Protection of Badgers Act 1992

Badgers receive strict protection under the Protection of Badgers Act 1992²⁴, 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 1997²⁵ (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 2019

The National Planning Policy Framework (NPPF) 2019²⁶ 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 174–177.

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.

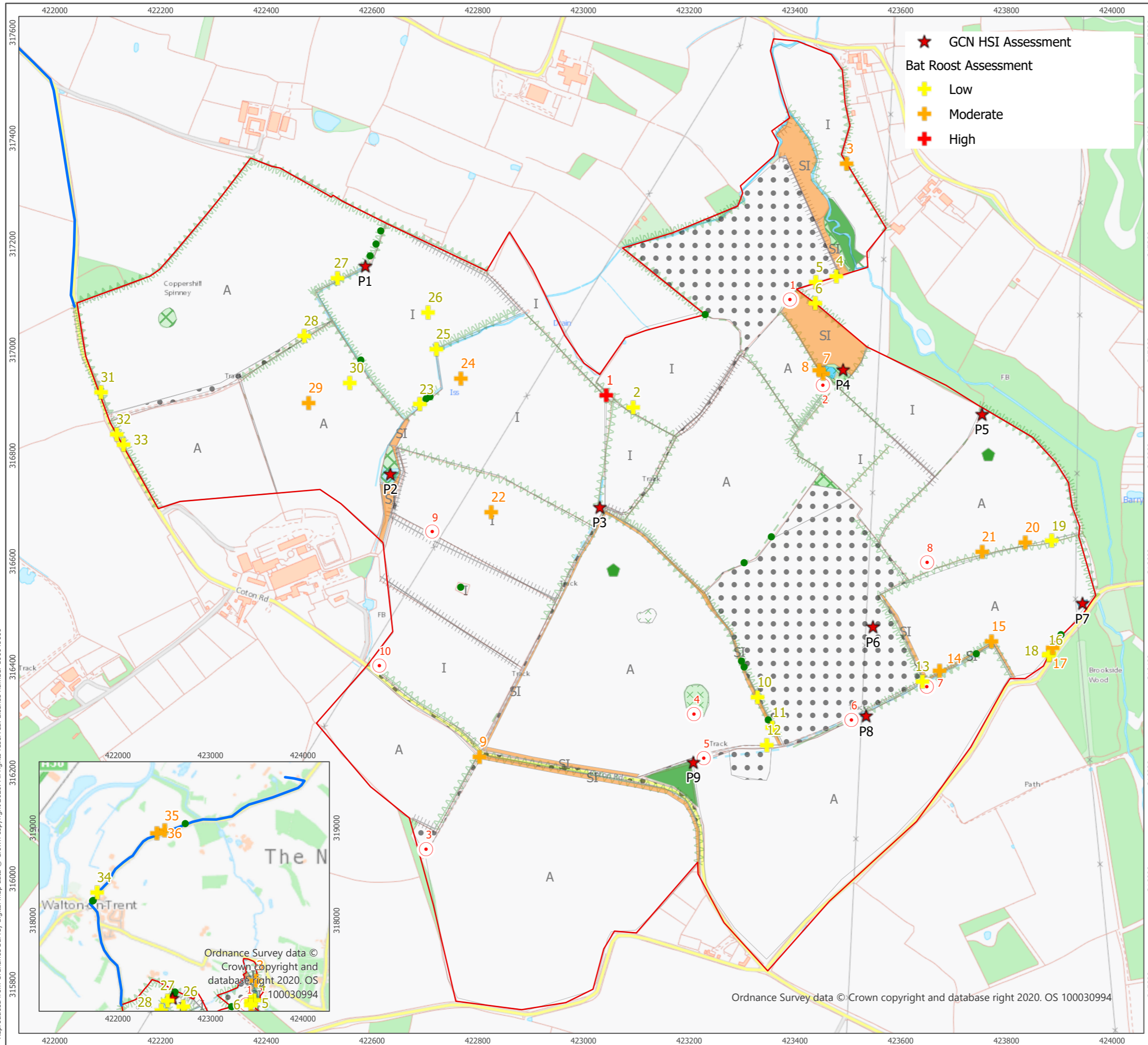
²⁴ Legislation.gov.uk *Protection of Badgers Act 1992* [online] Available from: <https://www.legislation.gov.uk/ukpga/1992/51/contents> [Accessed 03.07.2020]

²⁵ Legislation.gov.uk *The Hedgerow Regulations 1997* [online] Available from: <http://www.legislation.gov.uk/uksi/1997/1160/contents/made> [Accessed 03.07.2020]

²⁶ Gov.uk *National Policy Planning Framework 2019* [online] Available from: <https://www.gov.uk/government/publications/national-planning-policy-framework-2> [Accessed 03.07.2020]

APPENDIX B - FIGURES

Figure 1: Extended Phase 1 Habitat Map



★ GCN HSI Assessment

Bat Roost Assessment

✚ Low

✚ Moderate

✚ High

- Site Boundary
- Proposed Grid Route
- Broadleaved woodland - semi-natural
- Scrub - dense/continuous
- Scrub - scattered
- Other tall herb and fern - ruderal
- SI Neutral grassland - semi-improved
- I Improved grassland
- A Cultivated/disturbed land - arable
- Bare ground
- Standing water
- Running water
- Intact hedge - native species-rich
- Defunct hedge - species-poor
- Intact hedge - species-poor
- Defunct hedge - native species-rich
- Hedge with trees - native species-rich
- Fence
- Dry ditch
- Target Note
- Broadleaved parkland/scattered trees
- Bird

1:7,000 Scale @ A3

0 140 280 m

NORTH

Produced By: CW	Ref: 3719-REP-001
Checked By: SC	Date: 09/07/2020

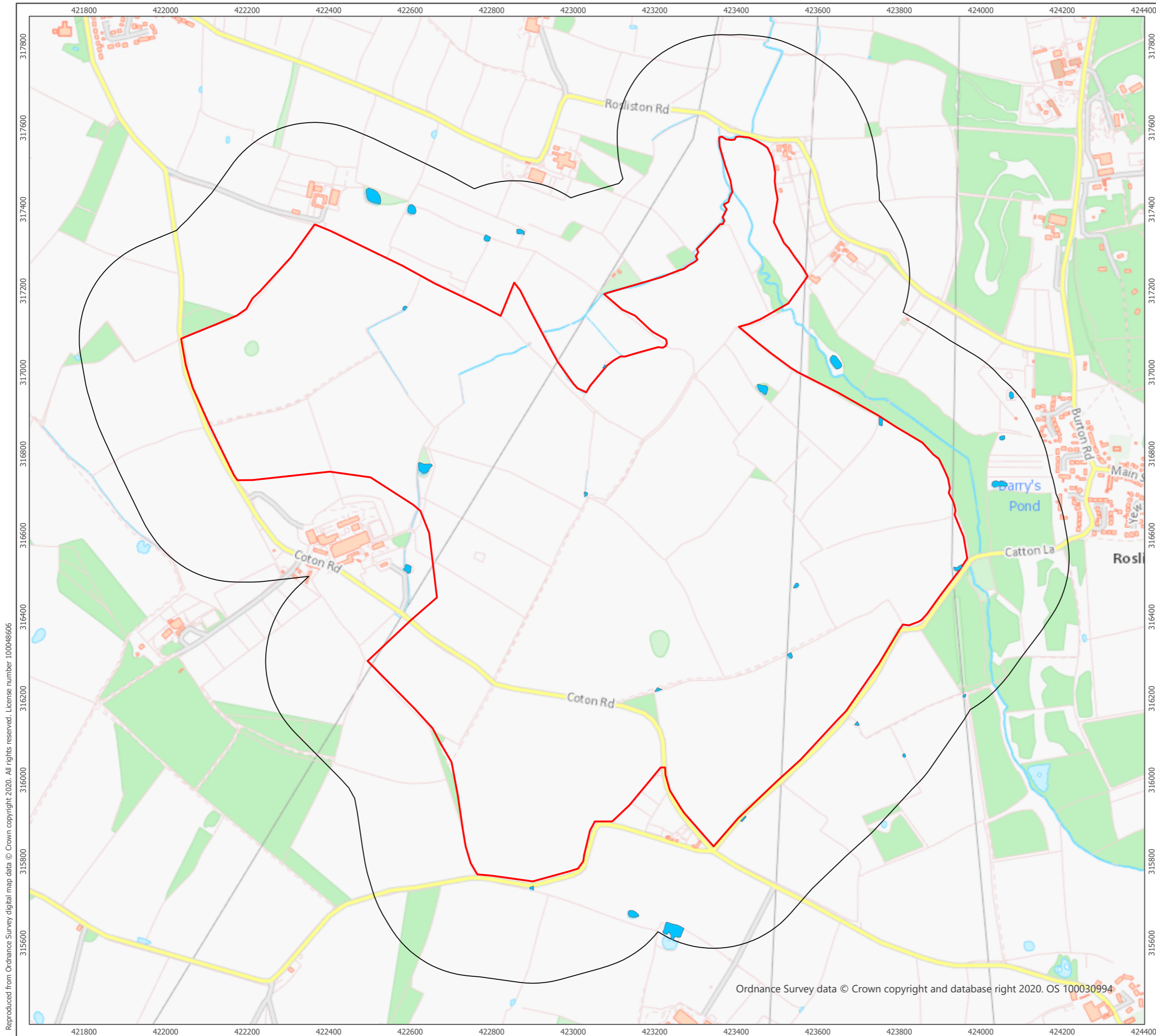
Phase 1 Habitat Survey
Figure 1

Preliminary Ecological Appraisal Report
Oaklands Solar Farm

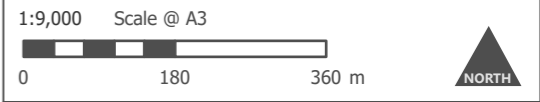
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- Site Boundary
- 250 m Buffer of Site Boundary
- Pond Location



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Checked By: SC	Date: 03/06/2020

Pond Locations within 250 m
Figure 1

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APPENDIX C – PLANT SPECIES LIST
Table C.1 – List of plant species recorded during the Extended Phase 1 Habitat Survey





Common name	Latin name
Ash	<i>Fraxinus excelsior</i>
Annual meadow grass	<i>Poa annua</i>
Beech	<i>Fagus sylvatica</i>
Bitter dock	<i>Rumex obtusifolius</i>
Blackthorn	<i>Prunus spinosa</i>
Bramble	<i>Rubus saxatilis</i>
Broad leaved dock	<i>Rumex obtusifolius</i>
Cleavers	<i>Galium aparine</i>
Chickweed	<i>Stellaria media</i>
Cocksfoot	<i>Dactylis glomerata</i>
Common hogweed	<i>Heracleum sphondylium</i>
Common ivy	<i>Hedera helix</i>
Common nettle	<i>Urtica dioica</i>
Common nipplewort	<i>Lapsana communis</i>
Cow's parsley	<i>Anthriscus sylvestris</i>
Creeping buttercup	<i>Ranunculus repens</i>
Creeping thistle	<i>Cirsium arvense</i>
Daisy	<i>Bellis perennis</i>
Dandelion	<i>Taraxacum</i> agg.
Dock	<i>Rumex</i> sp.
Dog's rose	<i>Rosa canina</i>
False oat grass	<i>Arrhenatherum elatius</i>
Forget-me-not	<i>Myosotis sylvatica</i>
Gorse	<i>Ulex europaeus</i>
Hawthorn	<i>Crataegus monogyna</i>
Hedge parsley	<i>Torilis arvensis</i>
Hedge mustard	<i>Sisymbrium officinale</i>
Herb-Robert	<i>Geranium robertianum</i>
Horse chestnut	<i>Aesculus hippocastanum</i>
Mouse-ear chickweed	<i>Cerastium vulgatum</i>
Oak	<i>Quercus robur</i>
Perennial ryegrass	<i>Lolium perenne</i>
Petty surge	<i>Euphorbia peplus</i>
Pineapple weed	<i>Matricaria discoidea</i>
Red campion	<i>Silene dioica</i>
Red dead nettle	<i>Lamium purpureum</i>

Red fescue	<i>Festuca rubra</i>
Rose	<i>Rosa</i> sp.
Spear thistle	<i>Cirsium vulgare</i>
Shepard's purse	<i>Capsella bursa-pastoris</i>
Sycamore	<i>Acer psedoplatanus</i>
Thistle	<i>Cirsium</i> sp.
Water hemlock	<i>Cicuta virosa</i>
White dead nettle	<i>Lamium album</i>
Wild chervil	<i>Anthriscus sylvestris</i>
Wild privet	<i>Ligustrum vulgare</i>
Willow	<i>Salix</i> sp.
Willowherb	<i>Epilobium</i> sp.
Yorkshire fog	<i>Holcus lanatus</i>

APPENDIX D - PHOTOGRAPHS

Table D.1 – Table of photographs taken during the Extended Phase 1 Habitat Survey

	
<p>Photograph 1: Semi-improved grassland field.</p>	<p>Photograph 2: Recently ploughed field with scrub and tall ruderal species, facing south.</p>
	
<p>Photograph 3: Species-rich hedgerow with trees.</p>	<p>Photograph 4: Semi-improved grassland with native species-rich hedgerows surrounding the margins of the field.</p>
	
<p>Photograph 5: Running water/ditch to the north of the Site.</p>	<p>Photograph 6: Scrub and scattered trees to the north of the Site.</p>

	
<p>Photograph 7: Tree with bat roost potential.</p>	<p>Photograph 8: Badger Sett entrance.</p>
	
<p>Photograph 9: Grassland access tracks were present throughout the Site.</p>	<p>Photograph 10: Part of the grid connection route, facing north.</p>

APPENDIX E – HSI RESULTS TABLE

Table E.1 Great Crested Newt HSI results

Pond 4

HSI Parameter	HSI Number	HSI Score
Location	S1	1
Pond Area	S2	0.8
Pond Drying	S3	0.5
Water Quality	S4	0.67
Shade	S5	0.4
Fowl	S6	1
Fish	S7	0.67
Ponds	S8	1
Terrestrial	S9	1
Macrophytes	S10	0.5
Total HSI Score		0.72

Pond 7

HSI Parameter	HSI Number	HSI Score
Location	S1	1
Pond Area	S2	0.1
Pond Drying	S3	0.1
Water Quality	S4	0.67
Shade	S5	0.2
Fowl	S6	0.67
Fish	S7	0.67
Ponds	S8	1
Terrestrial	S9	0.67
Macrophytes	S10	0.7
Total HSI Score		0.44

Pond 8

HSI Parameter	HSI Number	HSI Score
Location	S1	1
Pond Area	S2	0.2
Pond Drying	S3	0.5
Water Quality	S4	0.33
Shade	S5	1
Fowl	S6	1
Fish	S7	1
Ponds	S8	1
Terrestrial	S9	0.67
Macrophytes	S10	0.3
Total HSI Score		0.61

APPENDIX F – eDNA SURVEY RESULTS

Folio No: E7914
Report No: 1
Purchase Order: 3719
Client: ARCUS CONSULTANCY
SERVICES LTD
Contact: Charlotte Wade

TECHNICAL REPORT

ANALYSIS OF ENVIRONMENTAL DNA IN POND WATER FOR THE DETECTION OF GREAT CRESTED NEWTS (*TRITURUS CRISTATUS*)

SUMMARY

When great crested newts (GCN), *Triturus cristatus*, inhabit a pond, they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm GCN habitation or establish GCN absence.

RESULTS

Date sample received at Laboratory: 22/06/2020
Date Reported: 27/06/2020
Matters Affecting Results: None

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
4452	P4, Oaklands	SK 23473 16971	Pass	Pass	Pass	Negative	0
4453	P8, Oaklands	SK 23524 16319	Pass	Pass	Pass	Negative	0

If you have any questions regarding results, please contact us: ForensicEcology@surescreen.com

Reported by: Sarah Evans

Approved by: Chris Troth



APPENDIX G - BAT AND BIRD BOX RECOMMENDATIONS

Table G.1 – Table of recommended bat and bird boxes

	
<p>2F Schwegler Bat Box</p>	<p>Schwegler 1FF Bat Box</p>
	
<p>1B Schwegler Bird Box</p>	<p>Large Wooden Bird Box</p>