



RIVERDALE ECOLOGY

Ecological Impact Assessment

Sheepwash Solar Energy Farm, Marden, Kent

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1 Introduction

1.1 Background to Commission

Riverdale Ecology Ltd were commissioned by Statkraft UK Ltd to undertake an Ecological Impact Assessment of a proposed development site to the west of Marden, Kent, to inform a planning application for a solar energy farm at the site.

1.2 Scope of Report

The purpose of this EclA report is to establish the current biodiversity value of the site, to identify any potential ecological constraints or ecological impacts associated with the proposed development and provide recommendations for additional survey work to further evaluate any impacts that may risk contravention of legislation or policy relating to protected species and nature conservation. Where necessary, avoidance, mitigation/compensation and/or enhancement measures have been recommended to ensure compliance. It is based on the following information sources:

- A desk study of the site and within a 2km surrounding radius.
- A Phase 1 Habitat Survey (JNCC, 2010) of the site boundary and immediate surrounds to map habitats and identify features with potential to support protected or otherwise notable species.
- Bat activity monitoring using remote static detectors.
- Great crested newt environmental eDNA analysis of local ponds.
- Winter bird surveys and breeding bird surveys.
- A badger survey of the site and immediate surrounds up to a distance of at least 30m from the site boundary.

This report has been prepared with reference to best practice as published by the Chartered Institute for Ecology and Environmental Management (CIEEM, 2017 & 2018) and to British Standard 42020:2013 (BSI, 2013). This report provides recommendations for enhancement of the site for biodiversity in line with the National Planning Policy Framework (NPPF) (Department of Communities and Local Government, 2019) and best practice guidelines.

The surveys, assessment and report were coordinated, conducted and written by Danny Thomas CEcol, MCIEEM, Principal Ecologist at Riverdale Ecology Ltd. Danny has over 18 years' experience within ecological consultancy and as such is suitably qualified to undertake habitat surveys and protected species assessments. He is a Chartered Ecologist and has a BSc (Hons) in Ecology with Biology and an MSc in Environmental Sciences from the University of East Anglia. He holds current Natural England survey licences for great crested newts, bats, dormice and water vole and has a Schedule 1 licence for several protected bird species including barn owl and Cetti's warbler.

1.3 Site Description and Context

The Application Site is located in a rural setting to the west of Marden, a village in the borough of Maidstone, approximately 10km south of Maidstone in central Kent.

The Application Site is approximately 75 hectares in area comprising six connected arable fields bounded by hedgerows and trees, belonging to Little Cheveney Farm. The eastern site boundary is demarked by the Lesser Teise, a tributary of the River Beult. The northern boundary of the site is demarked by the Southeastern Railways main line to Dover. The southern and western boundaries are less defined, demarked by field boundaries and in part by Sheephurst Lane.

The Application Site is accessed from Sheephurst Lane to the south via existing farm access tracks.

Plans of the site are included in Appendix 1 and Photographs are included in Appendix 2.

1.4 Project Overview

The development proposal is for the construction of a solar energy farm with ancillary energy storage and electrical infrastructure including substations, internal access roads, security fencing and CCTV.

1.5 Acknowledgements

A desk study was undertaken of baseline data relating to protected species and non-statutory designated sites for wildlife conservation using information purchased from the Kent and Medway Biological Records Centre.

1.6 Relevant Legislation and Planning Policy

The following key pieces of nature conservation legislation are relevant to this appraisal:

- The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (commonly referred to as the Habitats Regulations);
- Wildlife and Countryside Act 1981 (as amended); and
- Natural Environment and Rural Communities (NERC) Act 2006.

The National Planning Policy Framework (DfCLG, 2019) requires local authorities to avoid and minimise impacts on biodiversity and, where possible, to provide net gains in biodiversity when taking planning decisions:

“The planning system should contribute to and enhance the natural and local environment by protecting and enhancing valued landscapes and minimising impacts on biodiversity and providing net gains in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.”

To protect and enhance biodiversity and geodiversity, plans should:

“Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and steppingstones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation”; and,

“Promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.”

When determining planning applications, local planning authorities should apply the following principles:

“If significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused.”

“Development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists”; and,

“Developments whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.”

A summary of relevant legislation and planning policy is provided in Appendix 3.



2 Methodology

2.1 Desk Study

A desk study was carried out to determine if any statutory¹ land designations occur within 2km of the site; these were identified using the Multi-Agency Geographic Information for the Countryside website (www.magic.gov.uk).

Aerial photographs were reviewed to identify any habitats surrounding the site or wildlife corridors connecting the site to other habitats. Ordnance Survey maps, aerial photographs and the MAGIC website were used to identify the presence of water bodies within 250m of the site in order to establish if the land within the site could be used as terrestrial habitat for great crested newts. This species can use suitable terrestrial habitat up to 500m from a breeding pond although Natural England research report ENRR574 suggests that newts are likely to travel no more than 250m from ponds where suitable habitats for foraging, refuge and hibernation exist in immediate proximity (Cresswell, W. & Whitworth, R. 2004). The 250m zone was considered an appropriate distance for this assessment based on the development type, the presence of several ponds within or directly adjacent to the Application Site and the low value of the arable habitat within the site boundary.

Information relating to the location of non-statutory² wildlife sites and records of protected³ or otherwise notable⁴ species was obtained from Kent and Medway Biological Records Centre (KMBRC) within the site and up to 2km from the site boundary.

The status of species is taken directly from the relevant legislation, UK Biodiversity Action Plan (UK BAP, 2009), local (Kent) BAP or the list of Birds of Conservation Concern 4 (Eaton *et al.*, 2015). The red and amber lists of Birds of Conservation Concern refer to bird species of particular conservation concern for a number of reasons. In general terms, red list species are globally threatened showing severe recent declines in population. Amber list species are species either with unfavourable conservation status or those species showing moderate recent declines in population; they may also include particularly localised species.

2.2 Extended Phase 1 Habitat Survey

A habitat survey of the site was carried out including any boundary features of interest. Habitats were described and mapped broadly in accordance with standard Phase 1 Habitat survey methodology (JNCC, 2010). Habitats were also assessed against Habitat of Principal Importance (HPI) criteria as set out by the JNCC (<http://jncc.defra.gov.uk/page-5706>).

Scientific names are given for vascular plant species only, following their first mention, thereafter common names only are used. Nomenclature for vascular plants follows Stace (2010). Incidental records of birds and other fauna noted during the course of the habitat survey were also compiled.

The presence of invasive or injurious plant species as defined by Schedule 9 of the Wildlife and Countryside Act, 1981 (as amended) was also recorded.

2.3 Protected Species

The habitats were assessed for their potential to support legally protected species using a combination of the desk study information and field observations carried out during the habitat survey. The assessment was based on professional judgement and best practice survey guidance methodology for identifying field signs of protected species

¹ **Statutory designations** include Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, National Nature Reserves (NNR), Sites of Special Scientific Interest (SSSI) and Local Nature Reserves (LNR).

² **Non-statutory sites** are designated by local authorities and protected through the planning process (e.g. County Wildlife Sites, Sites of Importance for Nature Conservation or Local Wildlife Sites).

³ **Legally protected species** include those listed in Schedules 1, 5 or 8 of the Wildlife and Countryside Act 1981; Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended); or in the Protection of Badgers Act 1992 (as amended).

⁴ **Notable species** include Species of Principal Importance under the Natural Environment and Rural Communities Act 2006; Local Biodiversity Action Plan (LBAP) species; Birds of Conservation Concern (Eaton *et al.*, 2009); and/or Red Data Book/nationally notable species (JNCC, undated).



including but not limited to: badger (e.g. Roper, 2010); bats (Hundt, L. 2012, Collins, J. (ed) 2016, Mitchell-Jones, A. 2004, Andrews, H. 2018); hazel dormouse (English Nature, 2006); great crested newt (Langton et al, 2001; English Nature, 2001; Cresswell & Whitworth 2004); reptiles (Gent and Gibson, 2003); barn owl (Shawyer, 1998); and UK BAP Mammals (Cresswell et al, 2012). The potential for protected species presence was based on the following criteria:

- **Present** – Confirmed presence through first-hand survey evidence or recent verified records.
- **High Potential** – Local records highlight presence in the local vicinity. The site and immediate surrounds support good quality habitat or good connectivity to such habitat.
- **Moderate Potential** – Habitat within the site provides key elements for any species or species group although may be limited by factors including habitat area, isolation or disturbance. Desk study records highlight presence in proximity to site.
- **Low Potential** – On-site habitat is of low quality for any species or species group, lacking key elements and limited by factors including habitat fragmentation and habitat area. Few or absence of local records but within national distribution and thus cannot be completely discounted.
- **Negligible Potential** – Habitats within the site are very poor quality or completely absent for any species or species group. Desk study records are absent, the site is outside of the normal range of the species or species group and the surrounding habitat is unlikely to support wider populations. Presence cannot be completely ruled out, but it is considered ‘reasonably unlikely’ to support any species or species group.

The findings of this assessment establish any requirement for targeted protected species surveys that may be required to achieve compliance with relevant legislation. Surveys may be required where a site is judged to be of low suitability for a particular species or species group, alternatively it may be more appropriate to ensure compliance with protected species legislation through precautionary measures prior to and during construction.

Specific features within the site with potential to support protected species such as buildings and trees which may support bat roosts, waterbodies which may support water vole, otters and white-clawed crayfish and ponds which may support great crested newts will be superficially assessed to determine potential but further surveys may be required if potential is identified.

2.4 Preliminary (Ground Level) Tree Bat Roost Assessment

A Preliminary Roost Assessment (PRA) survey of any trees within the site boundary was undertaken in accordance with best practice guidelines for assessing roost potential of trees (Collins, J. (ed.) 2016; Hundt, L. 2012, Andrews, H. 2018).

The survey comprised a systematic and detailed inspection of the exterior of the tree from ground level to search for Potential Roost Features (PRFs) which could be utilised by bats for roosting. The survey comprised a description of the physical characteristics of the tree alongside identification of any PRFs or evidence of roosting bats. PRFs found in trees include woodpecker holes; rot holes; vertical or horizontal cracks or splits in limbs; partially detached or loose bark; epicormic growth; enclosed gaps between overlapping stems or branches; and dense ivy with stem diameter in excess of 50mm.

2.5 Bat Activity Surveys – Automated Static Detector Surveys

Remote recording devices (Anabat Express bat detectors) were deployed at various locations within the Application Site in locations which represented the highest value habitat for commuting and/or foraging bats.

The remote detectors were placed at pre-determined locations within the Application Site between June and September 2021, remaining in situ for at least five consecutive nights to record passing bats. The detectors were set out in a period when weather conditions were considered appropriate for bat activity.

Recordings collected during the period of deployment were analysed using AnalookW software and using standard parameters for species identification (Russ, J. 2012).

The static detector locations are shown in Figure 2 in Appendix 1.

2.6 Great Crested Newt Habitat Suitability Index (HSI)

Accessible ponds within 250m of the Application Site were assessed using the Habitat Suitability Index (HSI) methodology (Oldham et al., 2000). The HSI of a pond is determined by calculating a geometric mean of ten variables that are known to have an influence on its suitability as a breeding location for great crested newts (see Table 1), thus:

$$HSI = (SI1 \times SI2 \times SI3 \times SI4 \times SI5 \times SI6 \times SI7 \times SI8 \times SI9 \times SI10)^{1/10}$$

Table 1: HSI parameters.

Parameter	Name	Description
SI1	Geographic Location	Lowland England or upland England, Scotland and Wales
SI2	Pond area	To the nearest 50m ²
SI3	Permanence	Number of years' pond dry out of ten
SI4	Water quality	Measured by invertebrate diversity
SI5	Shade	Percentage shading of pond edge at least 1m from shore
SI6	Fowl	Level of waterfowl use
SI7	Fish	Level of fish population
SI8	Pond count	Number of ponds within 1km ²
SI9	Terrestrial habitat	Quality of surrounding terrestrial habitat
SI10	Macrophytes	Percentage extent of macrophyte cover on pond surface

Once calculated, the HSI score for a waterbody can be categorised as follows (Oldham et al, 2010):

- Excellent (>0.8)
- Good (0.7 – 0.79)
- Average (0.6 – 0.69)
- Below Average (0.5 – 0.59)
- Poor (<0.5)

2.7 Great Crested Newt eDNA Analysis

eDNA is DNA collected from the environment in which an organism lives, rather than directly from the plants or animals themselves. In aquatic environments, animals such as great crested newts shed cellular material into the water via reproduction, saliva, urine, faeces, skin cells, etc. This DNA will persist for several weeks and can be collected through a water sample which is then analysed to determine if the target species of interest have been present in the waterbody.

Water samples were taken from 18 ponds within the Application Site or up to 250m from the site boundary on 23rd June 2021 within the approved period for sampling (15th April to 30th June). Water samples were collected by Danny Thomas, a great crested newt licence holder and an approved eDNA surveyor/trainer. The samples were sent to



NatureMetrics Ltd, one of the accredited laboratories and the samples were tested in accordance with Natural England’s approved protocol (Biggs J., *et al.* 2014).

2.8 Breeding Bird Survey

Breeding bird surveys of the Application Site were undertaken broadly following the standard Common Bird Census (CBC) methodology (Gilbert et al., 1998) which represents the only effective ‘whole site’ census approach available. Five daytime surveys were carried out at regular intervals throughout the breeding period (see Table 2 for details). Surveys commenced within one hour of sunrise in accordance with CBC methodology. The survey area comprised the entire Application Site and land immediately adjacent.

The status of species is taken directly from Birds of Conservation Concern (BoCC) (Eaton et al., 2015). The red and amber lists of Birds of Conservation Concern refer to bird species of particular conservation concern for a number of reasons. In general terms, Red list species are globally threatened showing severe recent declines in population. Amber list species are species either with unfavourable conservation status or those species showing moderate recent declines in population; they may also include particularly localised species.

Surveys were undertaken by Paul Hawkins, an experienced ornithologist with over 20 years’ experience surveying for birds and excellent field identification skills. Surveys were carried out using a range of optical equipment including Swarovski 8 x 32 binoculars and Swarovski ATS HD telescope with 20-60x zoom eyepiece.

Species and their distribution were recorded on large scale Ordnance Survey maps using standard British Trust for Ornithology (BTO) species codes and behaviour codes. Localised movement of birds between areas was noted to avoid recording the same birds. Incidental records of birds observed whilst undertaking other protected species surveys were also included in the bird assemblage for the site.

Data analysis included simple territory mapping for the noteworthy species, including farmland birds such as skylark, to determine the number of breeding territories present within the survey area. Populations of other species were estimated from the peak number of individuals of any species observed during any single survey visit.

The surveys were supplemented by incidental observations of species recorded during other protected species surveys including great crested newt eDNA sampling and placement of static bat detectors.

Table 2: CBC Survey dates, times and weather conditions.

Date	Time (24 hours)	Sunrise Time	Weather Conditions
18 th April 2021	05:40 – 09:35	05:56	Dry, clear and sunny. 1°C - 6 °C. N 0-1.
16 th May 2021	05:30 – 10:00	05:05	Cloudy, occasional showers. 9°C - 16°C. West 0-1.
31 st May 2021	05:20 – 09:35	04:48	Dry, clear and sunny. 9 °C - 18 °C. SW 0-1.
15 th June 2021	04:30 - 08:20	04:41	Dry, cloudy. 17 °C - 18 °C. North 1-2.
26 th June 2021	04:45-09:00	04:43	Dry, cloudy. 11°C - 16 °C. North 0-1.

2.9 Winter Bird Survey

Winter bird surveys of the Application Site were undertaken also broadly following the standard Common Bird Census (CBC) methodology (Gilbert et al., 1998). Three daytime surveys were carried out in February and March (see Table 3 for details). Surveys commenced within one hour of sunrise in accordance with CBC methodology. The survey area comprised the entire Application Site and land immediately adjacent.

Table 3: Winter Bird Survey dates, times and weather conditions.

Date	Time (24 hours)	Sunrise Time	Weather Conditions
5 th February 2021	08:00 – 12:35	07:28	Early fog, 90% cloud. 5°C - 7 °C. SW 0-1.
21 st February 2021	06:30 – 10:00	06:59	Dry, partly cloudy with sunny spells. 10°C - 13°C. South 0-1.
20 th March 2021	05:50 – 09:30	06:00	Dry, cloudy. 2 °C - 6 °C. North 0-1.

Surveys were undertaken by Paul Hawkins and Danny Thomas CEcol MCIEEM, both are experienced ornithologists with excellent field identification skills and over 20 years’ experience surveying wintering and breeding birds. Surveys were carried out using a range of optical equipment including Swarovski 8 x 32 binoculars and Swarovski ATS HD telescope with 20-60x zoom eyepiece.

Species and their distribution were recorded on large scale Ordnance Survey maps using standard British Trust for Ornithology (BTO) species codes and behaviour codes. Localised movement of birds between areas was noted to avoid recording the same birds.

2.10 Badger Survey

A badger survey was undertaken within the proposed development area and incorporated areas within the client landholding to the south and west of the proposed solar farm. The survey method included a search for setts and systematic search for other evidence of badger presence within the survey area including all fence lines, woodland, hedgerows and scrub habitat.

Evidence of badger activity includes:

- Setts, comprising either single isolated holes or a series of holes, likely to be interconnected underground.
- Latrines: badgers usually deposit faeces in characteristic excavated pits, concentrations of which (latrine sites) are typically found at home range boundaries.
- Paths between setts or leading to feeding areas.
- Scratching posts at the base of tree trunks.
- Snuffle holes (small scrapes where badgers have searched for insects, earthworms and plant tubers).
- Day nests (bundles of grass and other vegetation where badgers may sleep above ground).
- Hair traces.
- Footprints.

2.11 Site Evaluation

An evaluation of the site was carried out in general accordance with guidance issued by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2019) which ranks the nature conservation value of a site according



to a geographic scale of reference: International/ European, National, Regional, Metropolitan, County, vice-county or other local authority-wide area, or of value at the Local scale or just within the context of the site.

In evaluating the nature conservation value of the site, the following factors were considered: nature conservation designations, rarity, naturalness, fragility, connectivity and relevant nature conservation aims and objectives for a given area as contained in national and local biodiversity action plans and planning policies.

2.12 Impact Assessment

An assessment of effects was then undertaken broadly following the Chartered Institute of Ecology and Environmental Management (CIEEM) Professional Guidance Series 'Guidelines for Ecological Impact Assessment (EclA) in the UK and Ireland' (CIEEM, 2018).

The assessment of the potential effects of the proposed development needs to take into account both on-site effects and those that may occur to adjacent and more distant ecological features. Effects can be positive or negative. Negative effects can include:

- Direct loss of wildlife habitats;
- Fragmentation and isolation of habitats;
- Disturbance to species from noise, light or other visual stimuli;
- Changes to key habitat features; and/or
- Changes to the local hydrology, water quality and/or air quality.

The assessment identifies those effects which would be 'significant', based on the integrity and the conservation status of the ecological feature. Effects are unlikely to be significant where features of local value or sensitivity are subject to small scale or short-term effects. However, where there are a number of small scale effects that are not significant alone, it may be that, cumulatively, these may result in an overall significant effect.

The integrity of 'defined' sites is described as follows and has been used in this assessment to determine whether the effects of the proposals on a designated site are likely to be significant:

- The integrity of a site is the coherence of the ecological structure and function across its whole area that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified.

The conservation status of habitats and species within a defined geographical area is described as follows and has been used in this assessment to determine whether the effects of the proposals on non-designated habitats and species are likely to be significant:

- For habitats, conservation status is determined by the sum of influences acting on the habitat and its typical species that may affect its long-term distribution, structure and functions as well as the long-term survival of its typical species within a given geographical area.
- For species, conservation status is determined by the sum of influences acting on the species concerned that may affect the long-term distribution and abundance of its population within a given geographical area.

The assessment further examined the potential impacts to protected species inhabiting the site through:

- Identifying the unmitigated impacts of the development (magnitude, spatial extent, duration, timing/frequency, reversibility);
- Providing measures to avoid and mitigate for impacts;
- Assessing the significance of residual impacts after specified mitigation;



- Identifying appropriate compensation measures to offset significant residual effects; and
- Identifying enhancement opportunities to provide a net benefit for biodiversity.

The impacts of the development have been assessed in the absence of mitigation measures unless they have been incorporated into the design and programme for the development or are those required to achieve the minimum standard of established practice.

2.13 Mitigation Hierarchy

The following principles underpin EclA and have been followed, where applicable, in this assessment.

- Avoidance Seek options that avoid harm to ecological features (for example, by locating the proposed development on an alternative site or safeguarding on-site features within the site layout design).
- Mitigation Adverse effects should be avoided or minimised through mitigation measures, either through the design of the project or subsequent measures that can be guaranteed – for example, through a condition or planning obligation.
- Compensation: Where there are significant residual adverse ecological effects despite the mitigation proposed, these should be offset by appropriate compensatory measures.
- Enhancement Seek to provide net benefits for biodiversity over and above requirements for avoidance, mitigation or compensation.

2.14 Survey and Assessment Limitations

The data and conclusions presented here are an evidence-based assessment of the current status of the Application Site. The results of this ecological assessment have allowed an evaluation of the likely ecological impacts to the proposed development and are considered sufficient to inform the need for mitigation measures and/or compensation to reduce the ecological impacts highlighted.

Ecological surveys are limited by factors which affect the presence of plants and animals such as the time of year, migration patterns and behaviour. Therefore, the absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it will not be present in the future.

The winter bird surveys were not commissioned until February and so the usual spread of monthly surveys between December and March could not be achieved in the time allowed. However, the three surveys undertaken in February and March 2021 are considered adequate to accurately establish the baseline conditions within the Application Site and evaluate the likely impacts to wintering bird species.



3 Results

3.1 Desk Study

Statutory Sites for Nature Conservation

There are no statutory sites for nature conservation within 2km of the site.

However, the site is situated within the Impact Risk Zones (IRZ) for two Sites of Special Scientific Interest which are located within 5km of the Application Site: Marden Meadows SSSI (2.9km East) and River Beult SSSI (3.6km North). The IRZ information sheet identifies the types of development which could pose a risk to the favourable conservation objectives of the SSSI and where consultation with Natural England may be required.

Solar farms are not a development type listed as a concern in the IRZ information sheets and as such it is reasonable to rule out impacts to these SSSIs from the proposed development.

Non-Statutory Sites for Nature Conservation

There is one non-statutory site for nature conservation within 2km of the site.

RNR MA10 Haviker Street is a Roadside Nature Reserve designated for its botanical interest. The RNR is located in the village of Collier Street approximately 1.3km north of the Application Site.

Summary

The Application Site is not subject to any statutory or non-statutory nature conservation designations and does not contain equivalent habitat that could be considered as functionally linked to any nature conservation sites.

In addition, the site is not located in proximity to any statutory or non-statutory designated site where the proposed development could result in direct impacts to any designated site. Any impacts resulting from the proposed development are anticipated to be localised and are not expected to extend beyond the redline site boundary.

3.2 Priority Habitats/Habitats of Principal Importance

The site supports hedgerows which are a UK BAP Priority Habitat/Habitat of Principal Importance under the NERC Act. There are no other UK BAP Priority Habitats/HPI within the site; although the fields do support field margins, these do not meet the criteria to qualify as Arable Field Margins priority habitat.

Woodland adjacent to the site on the southern and western boundaries is listed on the Priority Habitats database for Broadleaved Deciduous Woodland and the western woodland is also identified as an Ancient & Semi-natural woodland.

3.3 Habitat Survey

Summary

The habitat survey was carried out on 23rd June 2021 in appropriate weather conditions. Further information was gathered throughout the summer during various site visits to undertake protected species surveys.

The site comprises six large arable fields, separated by hedgerows and hedgerow with trees. The fields were cultivated with either winter wheat (eastern fields 1-4) or broad beans (western fields 5 & 6). The fields support grassland field margins of varying width between two and six metres and the fields are bounded by native species-rich and species-poor hedgerows and hedgerows with trees. The eastern site boundary is demarcated by the Lesser Teise, a tributary of the River Beult which appears to have been straightened or canalised across much of the section adjacent to the Application Site. The northern boundary is demarcated by a major railway line.

There is an area of broadleaved deciduous woodland roughly centrally located which the site surrounds on three sides and a smaller area of broadleaved deciduous woodland on the western edge of the site.



There are a number of ponds within the site or on the boundary of the Application Site.

A Phase 1 Habitat Plan is included in Appendix 1.

Arable

The majority of the Application Site comprises six large arable fields. The fields to the east were cultivated with winter wheat and the western fields with broad bean crops at the time of the survey.

Semi-improved Grassland

Semi-improved field margins are present at varying widths around the arable fields. The grassland is generally species-poor comprising typical coarse grasses with a species mix suggesting artificial seeding and regular management. Species present included Yorkshire fog *Holcus lanatus*, cock's foot *Dactylis glomerata*, perennial ryegrass *Lolium perenne*, upright brome *Bromus erectus*, Timothy *Phleum pratense*, false oat-grass *Arrhenatherum elatius* smooth meadow-grass *Poa pratensis*, common bent *Agrostis capillaris*. Occasional common wild oat *Avena fatua* and smaller cat's tail *Phleum bertolonii* is also present and soft rush *Juncus effusus* is locally frequent in wetter areas.

Flowering forbs are frequent, but the composition varies between the different margins depending on the location and other environmental factors such as overshadowing. The most species diverse margins are those on the eastern edge of the site adjacent to a drainage ditch on the western edge of Field 1. Here flowering forbs include typical arable weed species and tall herbs such as nettles *Urtica dioica*, meadow vetchling *Lathyrus pratensis*, common vetch *Vicia sativa*, black medic *Medicago lupulina*, ragwort *Jacobaea vulgaris*, common field speedwell *Veronica persica*, hedgerow cranesbill *Geranium pyrenaicum*, cut-leaved cranesbill *G. dissectum*, scarlet pimpernel *Anagallis arvensis*, scentless mayweed *Tripleurospermum inodorum*, bristly oxtongue *Helminthotheca echioides*, common knapweed *Centaurea nigra*, shepherds' purse *Capsella bursa-pastoris*, hedge bindweed *Calystegia Sepium*, selfheal *Prunella vulgaris*, common poppy *Papaver Rhoeas*, goat's beard *Tragopogon Dubius*, St john's wort *Hypericum perforatum*, broadleaved dock *Rumex obtusifolius*, hogweed *Heracleum sphondylium*, common mallow *Malva neglecta*, creeping thistle *Cirsium arvense*, spear thistle *C. vulgare* and cleavers *Galium aparine*.

Hedgerows

Hedgerow H1 runs along the entire western edge of Field 1 on the eastern side of the site. The hedgerow varies in composition and structure, with sections of typical hedgerow with semi-mature trees, defunct hedgerow and sections which are considered treelines rather than hedgerow. The hedgerow runs parallel with a flowing ditch which has influenced the species compositions with sections dominated by mature poplar *Populus spp.* trees and with abundant willow *Salix spp.* The central section of the hedgerow is defunct with only a few scattered shrubs and large gaps between the shrubs where bramble scrub and tall herb vegetation is present.

Hedgerow H2 is a species-rich hedgerow forming the edge of the adjacent central area of woodland. The hedgerow comprises hazel *Corylus avellana*, hawthorn *Crataegus monogyna*, field maple *Acer campestre*, blackthorn *Prunus spinosa*, elder *Sambucus nigra* and occasional self-set oak trees. Bramble *Rubus fruticosus agg.*, dog rose *Rosa canina* and ivy *Hedera helix*, dogwood *Cornus sanguinea*, elm *Ulmus spp.*, oak, ash, apple *Malus spp.*

Hedgerow H3 runs north to south between Field 4 and Field 3 and part of Field 2. This is a hedgerow with trees which is typically more akin to a line of trees, dominated by mature broadleaved trees but also has a defined shrub layer. Mature trees are very frequent comprising oak, ash *Fraxinus excelsior*, field maple and cherry *Prunus spp.* The shrub layer is diverse comprising mainly hawthorn with hazel, oak, cherry, willow, elder, blackthorn, dogwood, field maple and dog rose.

Hedgerow H4 is a species poor hedgerow with occasional trees which extends north between Field 4 and Field 5. Adjacent to the hedgerow is a ditch which terminates at the northern end with a pond surrounded by willow scrub. The hedgerow is dominated by hawthorn with occasional oak and willow trees.



Hedgerow H5 is a moderately diverse hedgerow which runs along the southern edge of Field 5 and part of Field 6. The hedgerow is dominated by hawthorn with field maple, blackthorn, oak, dog rose and bramble.

H6 is located between Field 5 and Field 6 and is situated adjacent to a drainage ditch. The hedgerow is largely defunct at the southern half where it is gappy and sparse. The northern section is continuous but species-poor comprising hawthorn, blackthorn, field maple, dog rose and bramble. Occasional oak trees occur in the northern section.

Hedgerow H7 forms the southern end of Field 6 and runs parallel with Sheephurst Lane. The hedgerow is well managed but species poor, comprising blackthorn, hawthorn, hazel and field maple.

Hedgerow H8 forms the western boundary of Field 9 up to the western woodland block. The hedgerow is similar in composition to H7 but supports a greater abundance of mature trees.

Hedgerow H9 forms a dogleg around the northwest corner of the site. The hedgerow is well managed but species poor comprising mostly hawthorn with occasional elder likely established from badger activity.

Dense continuous scrub

There is a strip of bramble scrub which forms the entire northern site boundary with the adjacent railway line.

Ponds

There are four ponds within the Application Site and a further 23 ponds located within 250m of the Application Site boundary.

Drainage ditches

There are two principal drainage ditches within the site running broadly south to north and providing field drainage for the adjacent arable fields. The eastern drainage ditch runs along the entire edge of Field 1. It is approximately 3m deep and 4m wide but is dry for most of the summer months. The western drainage ditch runs between Fields 5 and 6. The ditch is narrower and retains some water for much of the year.

A further drainage ditch is present along the southern edge of the site extending around the woodland block and along the southern edge of Field 5 and part of Field 6 adjacent to Hedgerow 5. This ditch was dry for most of the survey period but may occasionally contain standing water after periods of sustained rainfall.

A temporary drainage channel was dug across the north end of Field 5 to provide drainage of localised flooding around Pond P1 by connecting it with the drainage ditch to the west.

Woodland

There is a small strip of plantation woodland between Field 2 and Field 3. The woodland comprises young and semi-mature ash, oak, field maple and hawthorn.

3.4 Neighbouring Habitat

Woodland

There are two large areas of woodland adjacent to the site:

The southern woodland is a rectangular block of broadleaved deciduous woodland broadly centrally located on the southern edge of the site. The woodland is dominated by mature oak and bounded by hedgerow and a dry ditch. The woodland structure is quite open and in parts resembles open parkland due to the low density of trees. There is very limited shrub layer and ground flora comprises grassland which is grazed by sheep and therefore lacks botanical interest.



The western woodland is approximately 2.1 hectares in area, located on the western edge of the Application Site. The woodland is listed on the Ancient Woodland inventory and comprises broadleaved deciduous woodland dominated by oak and ash with a shrub layer of hawthorn, blackthorn and hazel. Much of the hazel has historical evidence of coppicing with some ash stools present too.

Lesser Teise

The River Lesser Teise forms the eastern boundary of the Application Site. The river is a tributary of the River Beult and has been straightened for much of the section adjacent to the Application Site. The banks are steep and lined by deciduous trees including oak, ash, sycamore, and willow which overhang the channel and in places impede flow. Water levels fluctuate significantly; during the winter bird surveys the water level was high with fast flowing, turbid water but summer flows were much less extreme with clear water and much of the steep riverbank habitat exposed.

3.5 Protected and Noteworthy Species

3.5.1 Bats

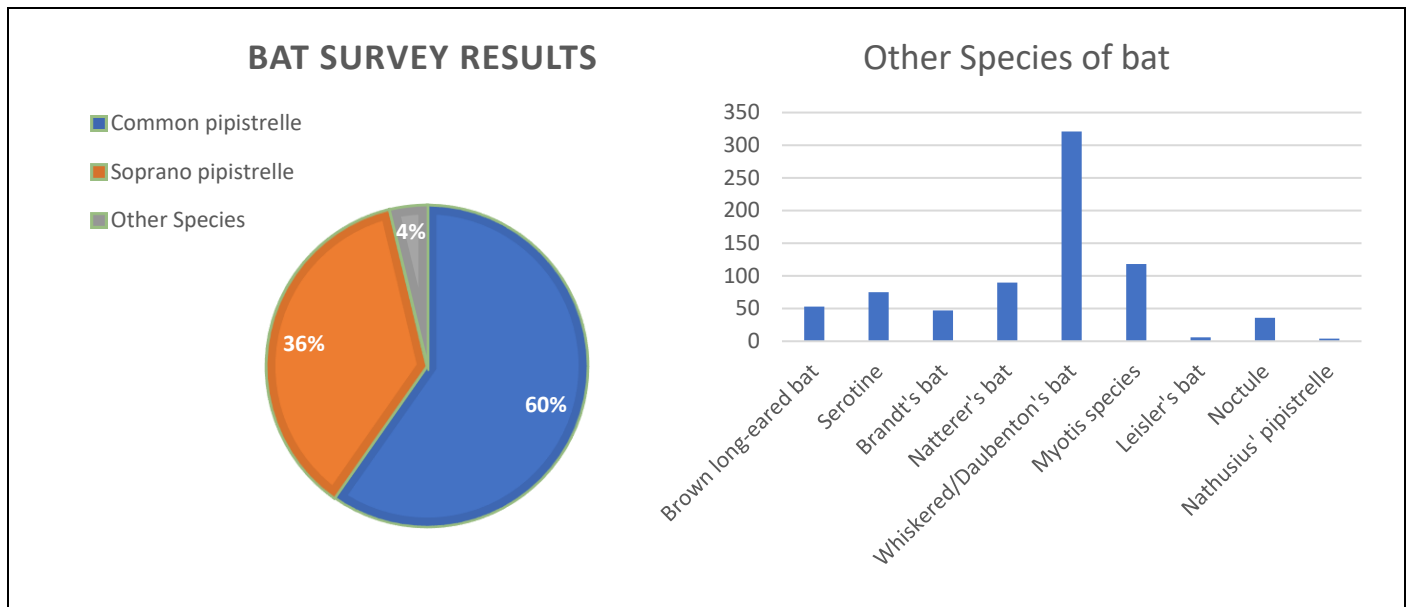
There were 40 individual records comprising seven species of bats within 2km of the site returned in the KMBRC data search. Species recorded include Western barbastelle, Daubenton's bat, Natterer's bat, noctule, soprano pipistrelle, common pipistrelle and brown long-eared bat.

The KMBRC data search also identified 12 confirmed roost sites within 2km of the site boundary, including five maternity roosts. The closest roosts appear to be located in buildings and/or trees within the existing buildings and/or trees at Sheepwash Farm, to the south of the proposed development site.

Static bat monitoring surveys undertaken at the site between June and September 2021 recorded a total of 19,934 individual bat passes of eleven species of bat at specific locations across the site. Approximately 96% of bat activity recorded within the site was attributed to common pipistrelle and soprano pipistrelle (11,910 and 7274 passes respectively), with all other species recorded at very low frequency (750 passes total) and included noctule, Leisler's bat, serotine, Natterer's bat, Daubenton's bat, whiskered bat⁵, Brandt's bat, brown long-eared bat and a single occurrence of Nathusius' pipistrelle. Approximately 20% of Myotis calls could not be identified to the species level and are listed as Myotis species. Key areas of foraging habitat for bat within the site are the adjacent woodland blocks and Lesser Teise and the hedgerows and tree lines forming the field boundaries.

⁵ For the purposes of the analysis the occurrence of Daubenton's bat and whiskered bat are lumped together due to the similarity in the sonogram characteristics and therefore the difficulty in separating the two species confidently. However, it is considered that both species are certainly present within the site as a number of the calls could be confidently attributed to each species based on the slope and other characteristics.

Chart 1: Bat survey data



There are no buildings within the site that have potential to support roosting bats but some of the older farm buildings approximately 150m from the site boundary are known to support roosting bats.

There are mature trees located within the hedgerows and treelines situated on the field edges and the two areas of woodland adjacent to the site support mature trees which exhibit Potential Roost Features capable of supporting roosting bats. The hedgerows and treelines between the fields provide an extensive network of foraging and commuting habitat for bats which connects to the wider landscape.

The majority of the site comprises arable fields which generally have negligible value as habitat for bats. The hedgerows, treelines and mature trees with potential roost features will be largely retained and so there is no anticipated loss of roosting sites for bats resulting from the solar development.

The majority of the internal access road within the site will utilise existing trackways and gaps in field boundaries. However, there are three locations within the site where the layout of the internal access road will require the removal of sections of hedgerow, hedgerow with trees or treelines. The resultant gap in the linear feature is not anticipated to significantly reduce the value for foraging and commuting bats.

The two gaps are located in Hedgerow 1 at TQ 72827 44613 and in Hedgerow 4 at TQ 72410 44552 and in Hedgerow 6 at TQ 72267 44566. At these locations there are no mature trees with PRF which will be lost and as such there will be no direct loss of bat roosts.

3.5.2 Hazel dormouse

There were three records of hazel dormouse returned in the KMBRC data search within 2km of the site. However, the records are from 1967, 1974 and 2004 and are therefore not recent.

There is no woodland within the site and adjacent woodland to the south of the site lacks suitable structure for dormice, and while the western woodland does exhibit a shrub layer with some suitable hazel coppice and other shrub species, the extent of suitable habitat is very limited and therefore considered insufficient to support dormice.

Hedgerows H7, H8 and H9 on the western boundary of the site have some value as auxiliary habitat if there was a core population of dormice nearby. However, there are no nearby woodland sites which could support dormice and



woodland areas adjacent to the site have negligible value for dormice and do not provide the fundamental habitat features for the species to survive.

3.5.3 Great Crested Newts

There were 134 recent records of great crested newt in the last ten years returned in the KMBRC data search within 2km of the site. In addition, there were 33 historical records.

The closest records are located on the outskirts of Marden, approximately 650m to the northeast and east of the Application Site.

There are 28 ponds within 250m of the Application Site, of which 19 were accessible to undertake a Habitat Suitability Index assessment, the calculations are shown in Appendix 4.

eDNA analysis of 18 ponds identified great crested newts in five of the ponds tested: Pond 4, Pond 5, Pond 8, Pond 10 and Pond 12. The ponds are spread across the site with Ponds 4 & 5 located on the western edge, Pond 8 and Pond 10 located centrally and Pond 12 located more towards the eastern side of the site.

A number of inconclusive results were returned for Pond 1, Pond 2, Pond 3, Pond 9 and Pond 11. The inconclusive result is most likely caused by a chemical inhibitor present in the water samples; possibly agricultural chemical runoff or similar which prevents the successful eDNA detection. With the exception of Pond 1, these ponds scored low on the HSI assessment. Pond 2 is very small, and Pond 3 is a poor quality woodland pond. Pond 9 and Pond 11 both contained significant fish populations which is not conducive to supporting great crested newts. As such, it is reasonable to conclude that these ponds probably do not support breeding great crested newts.

Pond 1 will be assumed to be a breeding pond for the purposes of the assessment.

The proposed Solar Energy Farm is exclusively within arable fields which are not considered to be suitable terrestrial habitat for great crested newts. Great crested newts are known to cross arable fields between breeding ponds or where ponds are separated by arable fields from their associated terrestrial habitat. However, arable fields are inhospitable environments for newts, they are regularly ploughed, sprayed with chemicals and have little ground cover beneath the crops. During the summer months they are very dry and lack any refuge opportunities to shelter during the day.

3.5.4 Otter

There were 32 recent records of European otter returned in the KMBRC data search within 2km of the site.

Evidence of otter was found on the banks of the Lesser Teise on the eastern boundary of the Application Site. A small amount of territorial spraint was found on a low hanging branch. However, the development site contains no habitat which is of value to otters. The majority of the site is arable, which has no value as habitat for otters and it is considered likely that otters will remain within the Lesser Teise and immediate bankside habitat adjacent to the site.

3.5.5 Breeding Birds

There were extensive records of bird species returned by KMBRC comprising many common species as well as species of conservation concern and Schedule 1 listed species including barn owl. The data search also provided records for a number of declining species listed on the RSPB Farmland Bird Indicator including corn bunting, yellowhammer, skylark, turtle dove, yellow wagtail, linnets and reed bunting. All these species except for skylark are also Species of Principal Importance (SPI) under the NERC Act.

The breeding bird surveys recorded a total of 53 species within the site including 11 BoCC red listed species and 10 BoCC amber listed species. A number of declining farmland birds listed on the RSPB UK Farmland Bird Indicator were recorded within the site, including skylark, reed bunting, yellowhammer, linnets, turtle dove and kestrel.

A full list of species recorded during the breeding bird surveys are included in Table 4 below:



Table 4: Bird species recorded during breeding bird surveys.

Blackbird	Greenfinch	Mallard	Spotted Flycatcher
Blackcap	Great Spotted Woodpecker	Magpie	Starling
Bullfinch	Great Tit	Moorhen	Sparrowhawk
Blue Tit	Garden Warbler	Mandarin Duck	Swift
Buzzard	House Sparrow	Nuthatch	Swallow
Carrion Crow	Jay	Peregrine	Song Thrush
Chiffchaff	Jackdaw	Pheasant	Treecreeper
Chaffinch	Kestrel	Pied Wagtail	Turtle Dove
Cuckoo	Kingfisher	Robin	Tawny Owl
Dunnock	Linnet	Reed Bunting	Common Whitethroat
Green Woodpecker	Long-tailed Tit	Rook	Wood Pigeon
Green Sandpiper	Lesser Whitethroat	Skylark	Wren
Grey Wagtail	Mistle Thrush	Stock Dove	Yellowhammer
Goldfinch			

BoCC Red List

Cuckoo

A peak count of three singing male cuckoos were recorded within the site on 31st May 2021.

Grey wagtail

Grey wagtails were recorded on each survey visit. The results suggest only a single breeding pair within the Application Site.

House sparrow

House sparrows were recorded in two distinct locations during the surveys. There appear to be colonies of house sparrow around the buildings of Little Cheveney Farm and a separate colony located exists at the southern end of Field 6 near the adjacent cottages.

Linnet

A peak count of five linnets was recorded on 16th May 2021 comprising two confirmed breeding pairs and a lone female. The linnets were generally recorded in the northern part of the Application Site adjacent to the railway where they are assumed to be nesting in the scrub.

Mistle thrush

At least one pair of mistle thrush were recorded breeding within the site.



Spotted flycatcher

A peak count of three spotted flycatchers was recorded within the Application Site. Breeding was confirmed and a nest was located in the strip of plantation woodland between Field 2 and Field 3.

Skylark

Skylarks were recorded in all fields with the exception of Field 2 which is too small and enclosed to be of value. A peak count of ten singing males was recorded on 31st May 2021. This represents a breeding density of 0.15 per hectare which is within the normal breeding density of skylark in lowland farmland (0.1-0.2 per hectare) (Winspear & Davies, 2005).

Starling

A small number of starlings was recorded during the surveys with a peak of eight birds on 31st May 2021. A single pair was recorded nesting within the Application Site in a tree hole on the edge of the southern woodland

Turtle dove

A single singing male turtle dove was recorded on 16th June 2021 in Hedgerow 9 in the northwest corner of the site. It is not considered likely that turtle doves will have nested within the site and were not recorded on subsequent survey visits.

Yellowhammer

Yellowhammers were fairly common within the Application Site with a peak of 12 singing males early in the breeding season, recorded on 18th April 2021. Several family groups were observed, and nesting activity was recorded throughout the breeding season with every hedgerow potentially able to support a breeding pair.

BoCC Amber Listed

Bullfinch

An occasional pair and a small family group of bullfinches was recorded during the surveys within the Application Site. At least one or two pairs of bullfinches are likely to nest in the hedgerows within the site.

Kestrel

Kestrels were recorded regularly within the Application Site. At least one breeding pair is likely to have nested within the site.

Kingfisher

A single pair of kingfishers nested in the riverbank of the Lesser Teise adjacent to the site and successful raised at least one brood. Adult birds were occasionally seen flying across the site likely returning from fishing forays in ponds around Little Cheveney Farm.

Dunnock

Dunnocks were widely distributed across the site, nesting in hedgerows and scrub. Only small numbers were recorded but they were probably under recorded due to their discrete nature.

Reed bunting

A single female reed bunting was recorded on 18th April 2021 near Pond 11, but not recorded in subsequent visits. It's not unreasonable that reed buntings could nest within the Application Site but typical nesting habitat for the species is somewhat lacking, and it is considered most likely that this was a passage bird not a resident breeder.

Stock dove



At least three pairs of stock doves were recorded within the site during the breeding bird surveys and are likely to have bred in tree cavities or buildings adjacent to the Application Site.

Other Amber listed species

Other ambers listed species recorded during the surveys including swift and green sandpiper which were not likely to nest within the Application Site. Tawny owl was recorded in the southern woodland area adjacent to the Application Site.

Mallards were also recorded during the surveys; however, this species is common and widespread and increasing in breeding numbers. The species has recently been moved from the green to the amber list on the strength of this decline in the UK wintering population and not the breeding population.

3.5.6 Winter Birds

The wintering bird surveys recorded a total of 48 species within the site comprising a number of common wintering species alongside farmland birds and other resident species.

A full list of species recorded during the wintering bird surveys are included in Table 5 below:

Table 5: Bird species recorded during winter bird surveys.

Blackbird	Great Crested Grebe	Kestrel	Redwing
Bullfinch	Greylag Goose	Linnet	Rook
Blue Tit	Grey Wagtail	Long-tailed Tit	Skylark
Buzzard	Goldfinch	Mistle Thrush	Stock Dove
Carrion Crow	Greenfinch	Mallard	Starling
Chiffchaff	Great Spotted Woodpecker	Magpie	Sparrowhawk
Collared Dove	Great Tit	Moorhen	Siskin
Chaffinch	Grey Heron	Mandarin Duck	Song Thrush
Duncock	Herring Gull	Meadow Pipit	Treecreeper
Fieldfare	House Sparrow	Pheasant	Wood Pigeon
Green Woodpecker	Jay	Pied Wagtail	Wren
Goldcrest	Jackdaw	Robin	Yellowhammer

The assemblage of wintering birds is fairly typical for the size of the site and the habitats present. No wading birds such as lapwing or golden plover were recorded within the site during the surveys.

A large flock of meadow pipits were present in Field 5 on 5th February 2021 and small numbers of meadow pipits were recorded in both the subsequent winter survey visits which is noteworthy as meadow pipits were not subsequently recorded during any of the breeding bird surveys.

3.5.7 Reptiles

There were 93 individual records of slow worm, common lizard and grass snake returned by KMBRC within 2km of the site.



The arable fields which make up the majority of the Application Site have no value as habitat for reptiles. However, the fields do support rough grassland margins and hedgerows which could support small numbers of common and widespread reptile species. The Lesser Teise and drainage ditches which cross the site provide possible habitat and commuting routes and the railway line on the northern boundary is also likely to provide some habitat connectivity.

It is therefore concluded that common and widespread reptiles could be present in small numbers in the grassland field margins within the Application Site or in habitats immediately adjacent.

3.5.8 Badgers

There are three badger setts located on the western boundary of the Application Site. A main sett is located in the southwest corner of the woodland and outlier setts in Hedgerow 8 and Hedgerow 9.

Badger activity appears to be restricted to the western edge of the site with no evidence of badgers found anywhere else across the site. The arable fields, field margins and boundary hedgerows all have value as foraging habitat for badgers.

3.5.9 Water vole

There were 8 historic records of water voles returned by KMBRC within 2km of the site between 1966 and 1974.

The site itself does not contain any suitable aquatic habitat which could support either of these species. The Lesser Teise adjacent to the site is unlikely to be of value to water voles, the straightening/canalisation of the water course has created a fast flowing stream with highly variable water levels which is not considered optimal conditions for water voles. On balance it is considered reasonably unlikely that they will reside in the Lesser Teise.

3.5.10 NERC Act SPI /Local or National BAP Species

There were 39 records of hedgehog returned in the KMBRC data search. Hedgehogs are likely to be present locally and will utilise the hedgerows and grassland field margins for foraging and refuge. The arable fields across the main part of the Application Site is unlikely to be of value to hedgehogs but may provide some opportunities as foraging habitat at certain times of year.

There were 14 records of brown hare returned in the KMBRC data search. No brown hares were recorded during the site survey; the arable fields are typical habitat for the species, but they have not been recorded within the site on any site visit.



4 Evaluation of Conservation Status and Assessment of Impacts

4.1 Designated Sites

Sites of European Importance

There are no European designated sites within 2km of the site or at a distance which might be affected by the proposed solar farm development.

Sites of National Importance

There are no nationally designated sites within 2km of the site or at a distance which might be affected by the proposed solar farm development.

The Application Site is situated within the Impact Risk Zones (IRZ) for two Sites of Special Scientific Interest: Marden Meadows SSSI (2.9km East) and River Beult SSSI (3.6km North). The IRZ information sheet identifies the types of development which could pose a risk to the favourable conservation objectives of the SSSI and where consultation with Natural England may be required. Solar farms, even industrial scale solar production is not a development type listed as a concern in the IRZ information sheets and as such it is reasonable to rule out impacts to these SSSIs from the proposed development.

Sites of Local Importance

There is only one Roadside Nature Reserve within 2km of the site which is located 1.3km north of the Application Site. At this distance from site, it is considered unlikely that the proposed solar farm development will result in any impacts to this RNR.

4.2 Priority Habitats/Habitats of Principal Importance

The hedgerows, woodland and ponds within and adjacent to the site will be retained and proposed arrangement of the solar panels is not anticipated to be close to any of these habitats. As such it is reasonable to conclude that there will be no detrimental impacts to any Priority Habitats/Habitats of Principal Importance.

4.3 Habitats

The development will result in the loss of arable land exclusively. The layout of the proposed solar farm is within the arable field only and distanced from boundary hedgerows and trees to avoid overshadowing. Arable habitat is common and widespread existing locally in both larger area and higher quality to the site. It has very limited value as habitat for wildlife, but the loss of the habitat would be unlikely to affect the overall assemblage of species or the conservation status of any individual species beyond the context of the site.

The ground beneath the solar panels will be sown with grass seed which is standard practice for solar farms. The conversion of arable farmland to grassland is not considered to be significant and could be managed so as to retain any species which are using the arable fields as habitat.

None of the habitats within the site are considered to have higher ecological value but the hedgerows and treelines within the site and woodland and the Lesser Teise adjacent to the site boundaries contribute to the wider landscape value.

Habitats within the site are assessed as having value at the local scale and the overall impact of the scheme on habitats is considered to be negligible (Neutral) as the loss of habitat is considered to be minimal except for the loss of the arable fields themselves.



4.4 Bats

There are no trees or buildings within the site which will be removed to accommodate the development. Likely roosting sites for bats are restricted to mature trees in the hedgerows and within the adjacent areas of woodland.

Bats utilise natural linear features for commuting and foraging across the landscape. The hedgerows within the site represent high value commuting and foraging habitat for bats and the mature trees within the hedgerows may support bat roosts. Other key foraging or commuting habitat locally is outside of the development footprint and includes the two areas of woodland and the Lesser Teise. The bat surveys undertaken at the site, identified the highest activity in these three areas and also recorded the greatest diversity of bat species. These features have value at the local level as they provide connective habitat across the wider landscape and could be functionally linked to roost sites nearby.

The site is considered to have value for bats at the local scale. Habitat of value for bats within the site is limited to the boundary features where surveys revealed a moderate bat population, but which largely consisted of two very common and widespread species. Although the diversity of species recorded within the site was moderate to high at eleven confirmed species; only 4% of total activity was attributed to species other than common pipistrelle and soprano pipistrelle.

The proposed solar energy farm development will retain all boundary features and utilise existing farm tracks and the majority of existing gaps in the hedgerows. Where new gaps are proposed at three locations, these are situated in sections of the hedgerows or treeline where they will not directly affect any mature trees with Potential Roost Features. As such there will be no direct loss of any roost sites for bats.

The construction methods for the installation of the solar energy farm are low impact, requiring no excavation and therefore very unlikely to affect bats. The solar energy farm will not require external security lighting therefore the dark corridors along the hedgerows will be maintained and there should be no impact on any adjacent mature trees which could support roosting bats.

There is some speculation in reports issued by Natural England that solar farms may pose a collision risk to foraging bats. The Natural England Research Report (number 12) concluded that there is currently no experimental observational or theoretical scientific literature on the effect solar panels may have on bats.

Greif and Siemers (2010) looked at recognition of water bodies by bats under laboratory conditions and concluded that bats have an innate ability to echolocate water by recognising the echo from smooth surfaces, and that bats may therefore perceive all smooth surfaces as water, but there were no conclusions relating to bats colliding with the panels. Further studies undertaken by Greif *et al* (2017) did demonstrate that bats perceive smooth vertical surfaces as open space and these 'acoustic mirrors' can often result in impacts with windows and other flat manmade surfaces. However, the study did not conclude that angled surfaces such as solar panels operate in the same fashion. Furthermore, the angle of the solar panel is likely to soften any potential collisions with glancing blows being likely where collisions did occur, which would be much less likely to injure or kill bats than a full frontal collision with a flat surface.

The panels are also located in open arable fields, which do not tend to be used by low flying bats, and will not be situated across any bat flyways such as the linear hedgerow and trees where bats are abundant and focussed on foraging or commuting. As such, the risk of collision with panels is considered low.

Conversely the physical presence of the arrays may actually result in a positive impact to bats by creating three dimensional linear features across the open arable fields which could be attractive for foraging. Furthermore, solar panels have been shown to retain heat at night, creating a warmer microclimate which could in turn attract invertebrate prey items increasing the density of food for bats.

Based on the available research and conclusions drawn from the established behavioural patterns shown in bats, it is reasonable to conclude that construction or operational impacts associated with solar farms tend not to be significant and as such the solar energy farm is likely to have a **negligible impact** (neutral) on the abundance or distribution of bats locally.



4.5 Great Crested Newts

There are five confirmed breeding ponds for great crested newts within 250m of the site and Pond 1 is assumed to support great crested newts as a precautionary approach to this assessment as the eDNA analysis of the water sample was inconclusive, most likely due to chemical inhibition from agricultural leachates. The presence of breeding ponds for great crested newts is considered to have value at the site level but the majority of the site is arable land with no value as terrestrial habitat for great crested newts and the confirmed breeding ponds for great crested newts are relatively isolated from each other by large open expanses of arable land. As such, it is probably a rare occurrence for crossover of individual newts between the breeding ponds, except where they are directly adjacent; thus Pond 4 and Pond 5 will be the same metapopulation, but geographically isolated from breeding individuals in Pond 8 and in turn Pond 10 and Pond 12. It's not completely unreasonable for newts to traverse the 250m between the ponds, but in the absence of high value connective terrestrial habitat, it is not considered to be more than an incidental event.

The proposed solar development will not result in the loss of any ponds. In addition, the development area is almost entirely confined within the existing arable fields. Arable fields are not considered terrestrial habitat for great crested newts and therefore do not represent a loss of terrestrial habitat. The access roads will generally utilise existing farm access tracks, which are typically rough tracks or within the grass field margins. The field margins are routinely cut and have only very limited value as habitat for great crested newts. A small amount of the grass margins is likely to be lost to install permanent hardstanding access roads and replace the rough farm tracks and there are three locations where new access will be created through hedgerows or treelines, but this will be three small, localised areas of habitat loss with two of the locations also requiring ditch crossings to be installed. However, none of the tracks are located within 50m of a confirmed breeding pond and therefore the habitat is not immediate terrestrial habitat. Furthermore, the loss of this small area of the field margin and or hedgerow is not anticipated to affect the availability of terrestrial habitat for great crested newts and therefore will have no measurable long term affect.

The construction phase of the development is not anticipated to affect great crested newts. The solar farm will be installed using push piles directly into the arable fields. The arable land is not likely to support newts or other amphibians as there is an absence of suitable foraging or refuge habitat for great crested newts.

It is considered unlikely that the solar farm will result in significant impacts to great crested newts; however, a precautionary approach to certain elements of the construction phase will be required to avoid potential offences under The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (commonly referred to as the Habitats Regulations) and the Wildlife and Countryside Act 1981 (as amended).

4.6 Hazel Dormouse

Hazel dormice are unlikely to be present within or adjacent to the Application Site and therefore are not anticipated to be affected by the proposed solar farm development.

It is concluded that the solar farm will have a **negligible impact** (neutral) on hazel dormice.

4.7 Otters

There is no suitable habitat within the Application Site for otters. Otters are known to utilise the adjacent Lesser Teise but impacts from the construction and operation of the solar farm are considered very unlikely to occur. The proposed development will not result in the loss of any habitat which could be used by otters and the panel array will be situated approximately 20m from the riverbank with the new permissive footpath acting as a buffer between the solar farm and the river.

The construction phase may result in some localised temporary and low level disturbance, but this is comparable to existing disturbance events from farming activities in proximity to the river.

It is concluded that the solar farm will have a **negligible impact** (neutral) on otters.



4.8 Breeding Birds

The breeding bird assemblage within the site includes a number of common and widespread species, but also includes several farmland bird species, and small numbers of declining breeding species such as spotted flycatcher and grey wagtail. The diversity of the breeding bird assemblage and presence of small numbers of important species is reflected in the value of the Application Site which is considered to be at the Local or Parish Scale.

The solar energy farm will result in the loss of arable farmland which is likely to be utilised by breeding and wintering farmland birds. However, many of the species are not specifically reliant on the arable crops within the fields and species such as yellowhammer, linnets, reed bunting, and turtle dove are more affiliated with hedgerows, and many of the other declining species recorded in the surveys are reliant on the hedgerows and woodland as habitat; as such, the loss of arable fields will have no discernible impact. In fact, many species will benefit from the solar farm, as there may be some localised benefits from increased invertebrate prey resulting from the cessation of chemical insecticide spraying and the likely relaxed management of the replacement grassland within the site.

The exception to this is skylark which could be affected from the loss of typical nesting habitat within the arable field.

Skylark

Skylarks are ground-nesting birds that typically utilise cereal crops, set-aside and grassland although a wide range of arable crops may be used. They are particularly associated with vegetation 20–50cm high. Semi-natural grasslands can hold high densities of skylarks but, in the case of lowland farms, densities are generally highest on arable farms, intermediate on mixed farms and lowest on pastoral farms (Winspear & Davies 2005).

Vegetation structure and crop type play an important part in determining the density of breeding birds. On arable land, breeding densities are highest in spring-sown crops (except oilseed rape) and set-aside, and lowest in autumn-sown crops (especially oilseed rape).

However, as skylark avoid nesting close to hedges and even isolated structures such as pylons, trees or bushes in order to avoid predation much of the boundary areas up to a distance of 24m and the area close to the row of electrical pylons which runs across the entire site, are likely to be avoided. Based on the breeding bird surveys there was a peak of 12 singing males, which equates to a density of approximately 0.15 territories per hectare

Based on avoidance of boundary hedgerows and infield pylons or bushes it was formerly considered unlikely that skylark would nest within a solar farm. However, there is evidence that skylark will nest within solar arrays where the distance between panels is sufficient to maintain a feeling of openness.

Studies of bird occupation of solar farms carried out at Worcester University indicated that skylark and yellowhammer were within the top ten most commonly recorded species over a period of three years within their study area of nine solar farms. Contrary to expectations, skylarks were present in eight of the solar farms; observed singing and making territory flights from perches on the panels. The conclusions of the study suggest that the management of the solar farm is important to promote use by skylark and other farmland birds and represents an opportunity to create grassland habitat which is becoming increasingly rare within farmland:

‘There is huge potential for solar farms to replace the grassland lost due to the intensification of farming in the later part of the twentieth century. Solar farms have demonstrated their value in the farmed landscape with little evidence to suggest that solar farms are having a negative impact on farmland birds. While it is positive that birds are using solar farms at a similar level to arable, pasture and meadows. Changes to management such as mowing later in the year and leaving margins to set seed where possible would benefit both stakeholders and nature.’ (Shotton, R.; 2000)



Despite the high probability of retaining skylarks within the site, maintaining the current nesting population of skylark for the lifespan of the solar energy farm cannot be guaranteed. It must be assumed that without mitigation there could be a significant impact to the abundance of skylark within the application site. This is considered to be significant at the site level only and is unlikely to affect the distribution of skylark beyond the extent of the fields within the site or the overall population of skylark locally. The neighbouring fields will remain as suitable nesting habitat for skylark and birds are likely to move to neighbouring fields assuming appropriate crops are cultivated.

Skylarks are accustomed to living alongside the dynamic nature of farmland and are regularly displaced from fields between years and sometimes within breeding seasons as the suitability of the crop type changes. This displacement is usually temporary, and fields become suitable for nesting again when the fields are cultivated with appropriate crops. Although the solar farm is a long term/permanent development the panel array is laid out in such a way that a proportion of skylark could be retained within the site, albeit at slightly lower densities.

It is concluded that the proposed solar farm development will have a negligible impact (neutral) on breeding birds, with the exception of skylark where a significant **site level impact** (minor) is expected.

4.9 Wintering Birds

The wintering bird assemblage comprises small numbers of common and widespread species. The total count of 48 species is considered moderate diversity but the individual species are unremarkable and there were no wintering waders and other key species recorded which would indicate the site was important for wintering birds. As such the wintering bird assemblage is considered to have value at the site level only.

The proposed solar farm is not likely to affect the wintering bird assemblage within the site. The species which were recorded are generally associated with the hedgerows and adjacent woodland, exploiting the foraging resources of the winter berries and seeds within the grassland field margins.

It is concluded that the solar farm will have a **negligible impact** (neutral) on the winter bird assemblage within the site.

4.10 Reptiles

The suitable reptile habitat within the Application Site is restricted to the field margins and hedgerows which will be retained. The solar array will be situated with a suitable buffer from the boundary hedgerows to avoid overshadowing and this buffer will coincidentally also protect the areas of potential reptile habitat. As such there will be no loss of reptile habitat. The solar farm will not be a barrier to dispersal and will not prevent passage of reptiles across the fields and therefore there are no impacts resulting from isolation or fragmentation of habitat. In fact, the cessation of farming activities may even result in a slight positive impact to reptiles as the arable fields will no longer be subject to ploughing and ground disturbance or chemical insecticide. The grassland beneath the panels is likely to permit colonisation by prey items which will increase the available forage.

It is concluded that the solar farm will have a **negligible impact** (neutral) on reptiles which may be within the site and could in fact result in a minor positive impact.

4.11 Badgers

There are three badger setts located on the western boundary of the Application Site. The proposed layout of the solar farm site will not directly affect the badger setts. The currently design of the solar array is over 80m from any of the known badger setts and at this distance no impacts to the known setts are anticipated.

However, badgers are likely to roam widely across the site foraging in fields and utilising the abundance of hedgerows to navigate the landscape. The installation of the solar farm, particularly the peripheral security fence is likely to create a barrier to dispersal and exclude badgers from accessing a large proportion of their foraging range. It may also disrupt dispersal between other setts within the territory, but it will not be an impassable barrier. In the absence of any



mitigation to maintain permeability across the site the proposed solar farm could result in a significant impact to badgers at the site level but as connectivity will not be completely severed the impacts are not considered to have significance above the geographic context of the site.

It is concluded that the solar farm will have a **site level impact** (minor) on badgers due to potential exclusion from foraging areas within the security fencing and potential disruption to normal dispersal routes.

4.12 Water vole

Water voles are not considered to be present within the site and habitats adjacent to the site including the Lesser Teise are low value habitat for water voles and have negligible potential to support water voles.

It is concluded that the solar farm will have a **negligible impact** (neutral) on water voles.

4.13 NERC Act SPI/Local or National BAP Species

European hedgehog

The site is considered to have value for hedgehogs at a site level. Hedgehogs are likely to be present locally, utilising the site for foraging and refuge.

The construction and operation of the solar farm is considered to have a **negligible impact** (neutral) on hedgehogs which will continue to utilise the site and the development is unlikely to affect the population or abundance of hedgehogs.

4.14 Cumulative Impacts

There are no anticipated cumulative impacts.



5 Avoidance, Mitigation and Compensation Measures

5.1 No Mitigation Required

There is no mitigation proposed for the following ecological features where no potential impacts have been identified:

- Statutory Sites for Nature Conservation Importance
- Non-statutory Sites for Nature Conservation Importance
- Hazel dormice
- Wintering birds
- Aquatic mammals – water vole and otter
- Invertebrates

5.2 Habitats

Boundary trees and hedgerows should be retained and protected from construction activities on site. A suitable buffer should be implemented adjacent to hedgerow and trees to prevent construction traffic compacting the soil within Root Protection Zones (RPZ).

5.3 Bats

No mature trees with Potential Roost Features capable of supporting bat roosts will require removal to accommodate the solar energy farm or the internal site access. However, if any trees are identified for removal at a later stage of the development process, the trees must undergo a Preliminary Roost Assessment to determine if the tree has potential to support roosting bats. If the tree is determined to have Potential Roost Features (PRF) capable of supporting roosting bats, then further surveys may be required prior to removal of the tree.

Bats are sensitive to artificial lighting, which can disrupt the normal 24-hour pattern of light and dark and is likely to affect the natural behaviour of bats. Bright light may reduce social flight activity or restrict access to foraging areas causing bats to move away from the light area. Studies have shown that in extreme cases continuous lighting can sometimes create barriers which some bat species will not cross. Lighting can be particularly harmful if used near high value foraging and commuting habitat such as woodland edges, hedgerows or rivers.

Artificial lighting is not required at this development, however, if external lighting is required during construction or operation, it will be necessary to utilise directional lighting to avoid illuminating habitat which could be utilised by bats. Of particular importance for this development site is to avoid light spill across the hedgerows, trees, woodland and any water bodies which may occasionally provide opportunities for commuting and foraging bats. External lighting in the vicinity of this area should be managed carefully and designed to avoid excessive light spill which could disrupt bats.

5.4 Great crested newt

No clearance of rough grassland, scrub, hedgerow or woodland or other suitable terrestrial habitat is permitted in proximity to the confirmed great crested newt breeding ponds or ponds where the eDNA result was inconclusive and where presence is assumed for precautionary purposes.

Although the site is very large and there are a large number of ponds within 250m of the site boundary, including some confirmed breeding ponds for great crested newts, the likely impacts from the proposed scheme are small as the solar energy farm development is largely positioned within existing arable fields which are not considered suitable terrestrial habitat for great crested newts. In the long term, the transition of the arable to grassland will improved connectivity across the landscape and the site will no longer be subject to regular disturbance from ploughing and other farming activity. The water quality of the nearby ponds is also anticipated to improve with the cessation of farming and a long term break in the use of agrichemicals.



There will be a very small loss of potential great crested newt terrestrial habitat where there are new internal roads which cross existing hedgerows, ditches or field margins. Due to the small area of suitable habitat to be lost and the distance of these crossing points from any confirmed breeding ponds, it is reasonably unlikely that great crested newts will be affected and as such there is negligible risk of an offence under the Conservation of Habitats and Species Regulations and as such a European Protected Species Mitigation Licence is not required.

Operations that are reasonably likely to result in an offence under the Habitats Regulations can be undertaken under a licence issued by Natural England. Natural England's view is that "if the consultant ecologist, on the basis of survey information and specialist knowledge of the species concerned, considers that on balance the proposed activity is reasonably unlikely to result in an offence under the Habitats Regs then no licence is required (European Protected Species Guidance Note, WML-G12 (11/07), Natural England 2007). However, in these circumstances reasonable precautions need to be taken to minimise the effect on European protected species and to avoid causing offences under the Wildlife and Countryside Act 1981.

At the locations where the internal road system will require new gaps to be formed in hedgerow and tree lines, these clearance works will be carried out under a Precautionary Method of Working (PMW) or Method Statement (MS).

The PMW will include details of the method by which the areas of habitat will be cleared and will include the following requirements:

- Clearance will be supervised by a licenced ecologist or suitably qualified accredited agent operating under a licensed ecologist.
- A detailed hand-search of the works area should be carried out prior to the commencement of clearance.
- Following the hand-search the vegetation should be cleared to approximately 150mm and the arisings removed from the works area.
- Following the initial cut, a second hand-search of the works area will be carried out by the ecologist or ecology representative.
- The vegetation can then be cleared to ground level and roots grubbed out. However, it should be noted that if there are potential hibernation features within the works areas, the ground clearance should only be undertaken between March and November when great crested newts are active. The months of December, January and February should be avoided as this is when great crested newts typically hibernate and are more vulnerable to disturbance.

No further mitigation measures are necessary as the works are limited to the arable habitat which has no value to great crested newts.

5.5 Birds

Any clearance of suitable nesting vegetation, including trees and hedgerows and the arable fields themselves should be undertaken outside of the bird nesting season (from 1st March to the 31st August, inclusive) where appropriate. If this is not possible a detailed inspection for nesting birds should be carried out by a suitably qualified ecologist no more than 48 hours prior to removal of vegetation capable of supporting nesting birds. Any active nests found must be retained with an appropriate buffer until young birds have fledged, and the nest is no longer in use.

Furthermore, the arable fields to be developed should be cleared prior to the commencement of the nesting season and maintained in a condition that is unsuitable for ground nesting species including skylark. The site should be maintained as such throughout the construction period to discourage nesting by skylark or other ground nesting bird species.



To compensate for the potential reduction in breeding skylark numbers it may be necessary to implement offsite measures within the neighbouring farmland. Skylark plots would be the most effective mitigation measure. Skylark plots are bare or uncultivated patches in winter cereal fields designed to help skylarks to forage. These plots are proven to help improve productivity for skylarks and are a simple and highly effective measure.

Plots of at least 16m² are created by leaving areas undrilled or by spraying out the area required. Skylark plots are particularly appropriate for farms where spring crops are not a major feature of rotations. Skylark plots provide easy landing and foraging access but are far enough away from the edge to be less susceptible to predation. They are not strictly aimed to encourage nesting within the patches, but they provide enhanced foraging habitat within the fields which in turn increases productivity within individual nests and increases the number of fledglings. Two plots per hectare in winter cereals can boost the number of skylark chicks by 50%.

The field to the south of the solar farm will continue to be farmed and skylark plots will be included when the crop rotation is suitable. The field is approximately 5ha in area and as such should accommodate 8-10 plots. Appropriate crops for skylark plots include:

- Winter/autumn cereal crops.
- Oil seed rape.

Spring cereal crops and set aside provide the highest value for skylark and should be integrated into the crop rotation on a more regular frequency. Crops such as maize offer no value as habitat for skylark and should be avoided. Sugar beet provides very good winter habitat for skylark as well as leaving winter stubble after cropping of cereals.

Approximately 3.6ha of meadow grassland will be created at the southeast corner of the site and this will be managed appropriately to support skylark.

Assuming the ability to retain skylark within the panel array, the mitigation measures proposed are considered reasonable to mitigate for the site level impacts to skylark and, alongside habitat enhancement measures for other similarly threatened bird species, it is considered on balance that the project impacts can be reduced to a minimal level.

5.6 Badgers

To avoid disturbance to active badger setts, the site layout has been designed to avoid any areas where badger setts are located. However, the security fencing around the solar array is likely to represent a barrier to badger dispersal, impeding badger movement across the site and restricting access to established foraging areas.

To avoid impacts to badgers, badger gates or tunnels must be installed at key locations within the security fencing to allow badgers to move freely across the site between foraging grounds or between the main and outlier setts.

The creation of woodland and wildflower grassland within the biodiversity enhancement zone will increase the extent of foraging habitat for badgers and create suitable habitat for sett creation in the long term.

5.7 Reptiles

Field margins should be mown prior to the commencement of works on site. The field margins represent likely foraging habitat only and as such keeping the sward at a short height during construction will deter reptiles, displacing them outside of the construction areas. On completion of the construction the habitats within the site will be greatly improved for reptiles.

5.8 NERC Act SPI /Local or National BAP Species

Installation of woodpiles, brush piles or hedgehog houses into the hedgerows and adjacent woodland areas would provide secure refuges, enhancing habitats for hedgehogs within the local area. Exact locations should be advised by the supervising ecologist.



6 Ecological Enhancement Measures

6.1 Habitats

Grassland should be established within the solar panel array to provide soil stability and create habitat for wildlife. Low intensity grazing can provide a cost-effective way of managing grassland in solar farms while increasing its conservation value by using grassland seed mixes with high biodiversity and maintaining structural diversity within the sward. Grazing should be low intensity to allow the development of wildflowers to provide nectar and seeds for invertebrates, ground nesting birds and small mammals.

A biodiversity enhancement zone will be created on the eastern side of the site with additional biodiversity enhancement measures along the Lesser Teise corridor to the west of the site. This area is outside of the development area and will be used purely for the creation of habitat for wildlife comprising woodland planting, species-rich wildflower meadow, new ponds and new species-rich hedgerow planting.

Woodland

Approximately 2.2 hectares of new deciduous woodland will be planted across the northern boundary of the site. The woodland will be planted in two blocks either side of the existing woodland area, approximately doubling the total woodland area. The composition of the woodland will aim to replicate the areas of semi-natural woodland adjacent to the site comprising oak, sweet chestnut *Castanea sativa* and beech *Fagus sylvatica* standards with an understorey of hazel, holly, elder, field maple and dogwood. Other species should include hornbeam *Carpinus betulus*, silver birch *Betula pendula* and hawthorn. If ash trees resistant to ash die-back can be sourced commercially then ash should be included in the woodland however, it is likely that ash will self-establish within the canopy.

Additional woodland strips totalling approximately 1.3 hectares will be planted as part of the visual screening measures included in the Landscape and Visual Impact Assessment.

Wildflower grassland

Wildflower grassland will be established across approximately 16 hectares of the site including approximately 4 hectares within the biodiversity enhancement zone, a wide strip on the eastern edge of the site and approximately 3.5 hectares in the southern end of Field 1, to the south of the existing footpath. The grassland should be established using a native meadow grassland seed mix such as Emorsgate EM3 – Special General Purpose Meadow Mixture or equivalent which provides a combination of five wild grass varieties alongside 24 species of appropriate native wildflowers.

Hedgerow Planting

Approximately 2.2km of new species-rich hedgerow will be planted on the site. Key hedgerows include approximately 600m on the boundary between the solar farm and the biodiversity enhancement zone and a further 1.2km along the northern edge of the site between the Solar Farm boundary and the public footpath. Additional hedgerow planting will be included as part of the visual screening measures included in the Landscape and Visual Impact Assessment.

Any new hedgerow planting should include native species only utilising a minimum of five woody species within each 30m section. Species should comprise approximately 65% hawthorn with 35% being a mix of at least six other native hedging plants including field maple, blackthorn, hornbeam, hazel, dogwood, wayfaring tree *Viburnum lantana*, guelder rose *Viburnum opulus*, crab apple *Malus sylvestris*, spindle *Euonymus europaea*, dog rose, field rose *R. arvensis* and elder. Standard trees should be planted within the hedgerow to provide structural diversity and increase the value for biodiversity.

Gappy or defunct sections of hedgerow within the site (Hedgerow H6) should be enhanced through removal and replacement with new species rich hedgerow or alternatively undergo significant management to lay or coppice the existing structure and improve the hedgerow diversity with additional hedging species.



Pond creation

At least two new ponds will be created within the biodiversity enhancement zone with a combined surface area of 250m. The ponds will be created with a varied profile to provide different water levels and ensure water retention through the year. The new ponds will be planted with native aquatic and marginal plants such as brooklime *Veronica beccabunga*, water mint *Mentha aquatica*, water starwort *Callitriche stagnalis*, water forget-me-not *Myosotis scorpiodes*, water crowfoot *Ranunculus aquatilis*, yellow flag iris *Iris pseudacorus*, purple loosestrife *Lythrum salicaria*, marsh marigold *Caltha palustris* and lesser spearwort *Ranunculus flammula*.

Orchard

A small orchard will be planted within the wildflower grassland on the eastern edge of the site. Approximately 170 native fruit trees will be planted comprising native apple *Malus spp.*, pear *Pyrus spp.*, plum *Prunus spp.* and cherry *prunus spp.* varieties with Kentish provenance will be planted and this will increase the value of the grassland for invertebrates through providing early blossom before the peak wildflower emergence and also provide fruit in the late summer and autumn for invertebrates, birds and small mammals.

6.2 DEFRA Biodiversity Net Gain Calculation

The proposed habitat creation and enhancement measures will achieve net biodiversity gain in accordance with NPPF biodiversity policy when calculated using the DEFRA Biodiversity Metric Calculation Tool. The enhancement measures will provide a quantifiable increase of +50.52% habitat units on site (+51.04% including offsite measures) when compared to baseline conditions and an increase of +39.29% of hedgerow units. The full calculation is located in the Biodiversity Net Gain report and the headline summary of the calculation is included in Section 8 of this report.

6.3 Protected Species

6.3.1 Bats

Provision of bat boxes on trees around the site boundary will provide suitable roost sites for a range of bat species present locally. A combination of at least 20 Schwegler woodcrete boxes 1FF, 2F and 2FN or equivalent woodcrete boxes will provide suitable permanent roosting conditions for many of the species recorded in the local area.

In addition, 30 wooden Kent bat boxes will also be installed to provide more natural roost locations, used as temporary roost sites by many woodland species.

The proposed barn sand compound for the battery energy storage system will be enhanced to maximise the potential for bats. The barn will be a large timber structure with slatted timber walls providing internal access and an enclosed structure for pre-emergence flight for brown long-eared bats and myotis species. A number of internal and external bat boxes will be installed into the barn building to provide a variety of roosting conditions suitable for summer and maternity roosts for the species recorded during the surveys. Recommended box type and structures are as follows:

- At least three large colony bat boxes. This large wooden bat box has been specially designed to attract maternity colonies of crevice dwelling bats such as common and soprano pipistrelles. Treated externally with a black non-toxic preservative, the box will absorb and retain heat from the sun which is further retained by the three internal ceramic panels. These panels also divide the internal chamber into three crevices, which provide bats such as pipistrelle bats with the roosting environment that they prefer. A bat ladder at the base of the box provides easy access and the 17mm wide entrance slot is a good size for bats, whilst being small enough to deter birds from entering. Two boxes should be installed internally with the third box installed on the exterior wall of the southern elevation.



- At least four truss boxes will be installed internally alongside a number of bespoke timber boxes creating enclosed roosting voids and/or crevices for roosting. The boxes will provide appropriate roosting conditions for Myotis species and brown long-eared bats.
- At least three hibernation boxes will be installed on trees across the site at key locations to provide secure hibernation sites for a range of different bat species.

6.3.2 Great Crested Newts

Two new ponds will be created within the site at key locations where they are anticipated to be rapidly colonised and provide steppingstones between confirmed or likely newt populations.

New hedgerow, woodland and wildflower meadow will increase the extent and value of terrestrial habitat for great crested newts within the site and improve connectivity thus increasing great crested newt dispersal across the landscape.

Woodpile refuges and hibernacula will be created around the new and existing ponds to provide secure refuge and hibernation habitat directly adjacent to breeding ponds.

6.3.3 Nesting Birds

Provision of nest boxes on trees around the site boundary will provide suitable nesting opportunities for species present locally. A combination of at least 20 Schwegler woodcrete boxes 1FF, 2F and 2FN or equivalent woodcrete boxes will provide suitable permanent roosting conditions for many of the species recorded in the local area.

Approximately 55 general nest boxes should be installed around the site on mature trees surrounding the site. Boxes will include a mix of open-fronted and hole-fronted boxes alongside more specialist boxes for kestrel, barn owl, tawny owl, little owl and nuthatch.

At least 5 spotted flycatcher boxes will be installed at key locations around the site to provide additional nesting habitat in the hedgerow and treelines.

At least two barn owl boxes will be installed within the site; one on the western edge of the site within the biodiversity zone and one on the barn constructed on the eastern edge of the site.

Newly established wildflower grassland within the site will increase the invertebrate prey for all nesting farmland birds and may also support nesting of some species. Strips of grassland at the edges of the solar array should be seeded with wild bird seed mixtures to provide cover and winter forage for finches and buntings.



7 Summary Table

Description of Effects	Value of receptor at the Geographical Scale (CIEEM)	Mitigation/ Compensation Measures	Habitat Creation and Enhancement Measures	Residual Impacts
Impacts to Statutory or non-Statutory designated sites (None present within 940m of the site).	National and locally designated sites. No impacts anticipated.	Not Applicable.	Not Applicable.	No change.
Woodland/Trees/Hedgerows. No loss of woodland, trees or hedgerows.	Local importance.	Protection of root protection zones during construction.	Creation of new broadleaved woodland area to the northwest of the solar farm with a dedicated biodiversity zone. Woodland planting for LVIA screening. New hedgerow planting and enhancements to existing hedgerows.	Net biodiversity gain
Arable. Conversion of low value arable farmland to grassland	Negligible importance.	Conversion of arable land to grassland of equal or greater biodiversity value.	Conversion of arable to grassland comprising a wildflower grassland mix in line with diversity requirements of local policy relating to solar farms. Creation of approximately 11 hectares of species rich meadow grassland comprising General Purpose wildflower grassland and summer flowering butterfly and bee mix.	Net biodiversity gain
Bats No loss of habitat – boundary features retained and potential	Local importance.	No external lighting. No removal of trees with Potential Roost Features.	Installation of bat boxes. Creation of meadow grassland with increased invertebrate prey abundance.	No net loss/ Likely net gain improvement.



Description of Effects	Value of receptor at the Geographical Scale (CIEEM)	Mitigation/ Compensation Measures	Habitat Creation and Enhancement Measures	Residual Impacts
roost sites in boundary trees retained.		Retention of linear foraging features and habitat connectivity.	Potential foraging opportunities along the rows of solar panels. New woodland and hedgerows providing increase in foraging habitat New roost sites within the battery storage barn.	
Hazel Dormouse (unlikely to be present within the site and no loss of suitable habitat)	Local Value.	Not Applicable.	Hedgerow creation and enhancement and woodland planting will enhance habitat suitability for dormouse. But unlikely to ever support dormice due to the distance from any nearby populations where colonisation might credibly originate from.	Not Applicable.
Great crested newt Five ponds within 250m of the site which could support great crested newts. No loss of breeding ponds and absence of suitable terrestrial habitat across much of the site which could support great crested newts.	Site Value.	No clearance of scrub or other suitable terrestrial habitat within 50m of any ponds. Precautionary Method of Working including ecological supervision of clearance of any habitat suitable for great crested newts.	Conversion to grassland will provide higher value habitat within the site for great crested newts. Additional pond creation, wildflower grassland, hedgerows and woodland will increase the value of terrestrial habitat for great crested newts and aid connectivity between ponds. Cessation of farming activities will reduce localised ground disturbance in the fields, aiding great crested newt movement across the landscape.	No Net Loss / likely net gain improvement of terrestrial and breeding habitats.



Description of Effects	Value of receptor at the Geographical Scale (CIEEM)	Mitigation/ Compensation Measures	Habitat Creation and Enhancement Measures	Residual Impacts
			Increased water quality resulting from cessation of agrichemical use on fields.	
<p>Nesting birds (farmland bird assemblage)</p> <p>Loss of arable nesting habitat for skylark.</p>	Local Value	<p>Clearance of nesting vegetation to be avoided during the nesting season (March to August inclusive).</p> <p>Commencement of construction to avoid nesting season when skylark and other farmland birds may be nesting in the Application Site, or a nesting bird check to be undertaken to ensure that active nests are avoided.</p> <p>Creation of offsite skylark plots within adjacent to increase the value of nearby habitat and raise the fecundity of breeding.</p> <p>Conversion to meadow grassland within the solar array and appropriate spacing of panels to retain breeding skylark within the site.</p>	<p>Creation of field margins adjacent to hedgerows seeded with finch and corn bunting wildflower mix.</p> <p>New hedgerow planting and hedgerow enhancement to provide winter habitat for farmland birds.</p> <p>New woodland creation will provide extensive habitat for nesting and foraging.</p> <p>Installation of general nest boxes, five spotted flycatcher nest boxes and two barn owl boxes.</p>	<p>Potential for reduced numbers of skylark within the site, but unlikely to be significant at the local scale.</p> <p>Potential net gain for birds within the site.</p>
<p>Badgers</p> <p>Presence of three active setts in proximity to the Application Site.</p> <p>Loss of foraging habitat only within the arable fields.</p>	Site Value	Avoidance measures including 30m exclusion buffer around all setts to be observed.	Creation of biodiversity zone with new woodland to expand existing woodland in vicinity of badger setts and creation of wildflower meadow grassland.	Increase in the value of foraging habitat for badgers within the Application Site.



Description of Effects	Value of receptor at the Geographical Scale (CIEEM)	Mitigation/ Compensation Measures	Habitat Creation and Enhancement Measures	Residual Impacts
		Retention of hedgerows and boundary features to maintain connectivity between sett locations. Installation of badger gates or tunnels to maintain connectivity across the solar farm site.		
Reptiles No loss of reptile habitat.	Site Value	Not Applicable	Wildflower grassland and grassland within the solar array to provide extensive habitat for reptiles.	Increase in extent of grassland providing net gain in foraging habitat for reptiles.
NERC Act SPI/Local or National BAP Species Loss of arable farmland foraging habitat.	Site Value	Not Applicable	Creation of meadow grassland and protection from ground predators within the solar array.	No Net Loss.



8 DEFRA Biodiversity Metric Results

Sheepwash Solar Farm, Marden, Kent		Return to results menu	
Headline Results			
On-site baseline	<i>Habitat units</i>	160.92	
	<i>Hedgerow units</i>	45.54	
	<i>River units</i>	0.00	
On-site post-intervention <small>(Including habitat retention, creation & enhancement)</small>	<i>Habitat units</i>	242.21	
	<i>Hedgerow units</i>	63.43	
	<i>River units</i>	0.00	
On-site net % change <small>(Including habitat retention, creation & enhancement)</small>	<i>Habitat units</i>	50.52%	
	<i>Hedgerow units</i>	39.29%	
	<i>River units</i>	0.00%	
Off-site baseline	<i>Habitat units</i>	2.26	
	<i>Hedgerow units</i>	0.00	
	<i>River units</i>	0.00	
Off-site post-intervention <small>(Including habitat retention, creation & enhancement)</small>	<i>Habitat units</i>	3.10	
	<i>Hedgerow units</i>	0.00	
	<i>River units</i>	0.00	
Total net unit change <small>(including all on-site & off-site habitat retention, creation & enhancement)</small>	<i>Habitat units</i>	82.13	
	<i>Hedgerow units</i>	17.89	
	<i>River units</i>	0.00	
Total on-site net % change plus off-site surplus <small>(including all on-site & off-site habitat retention, creation & enhancement)</small>	<i>Habitat units</i>	51.04%	
	<i>Hedgerow units</i>	39.29%	
	<i>River units</i>	0.00%	
Trading rules Satisfied?	Yes		

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Appendix 1: Site Plans



Figure 1: Site Location Plan



RIVERDALE ECOLOGY

**Sheepwash Solar Energy Farm,
Marden, Kent**

Site Location Plan

Date: January 2022

Figure 2: Phase 1 Habitat Plan



Figure 3: Bat Detector Static Monitoring Locations



Image © 2021 Maxar Technologies



RIVERDALE ECOLOGY

Sheepwash Solar Energy Farm, Marden, Kent
Bat Detector Static Monitoring Locations

Figure 4: Pond Location Plan

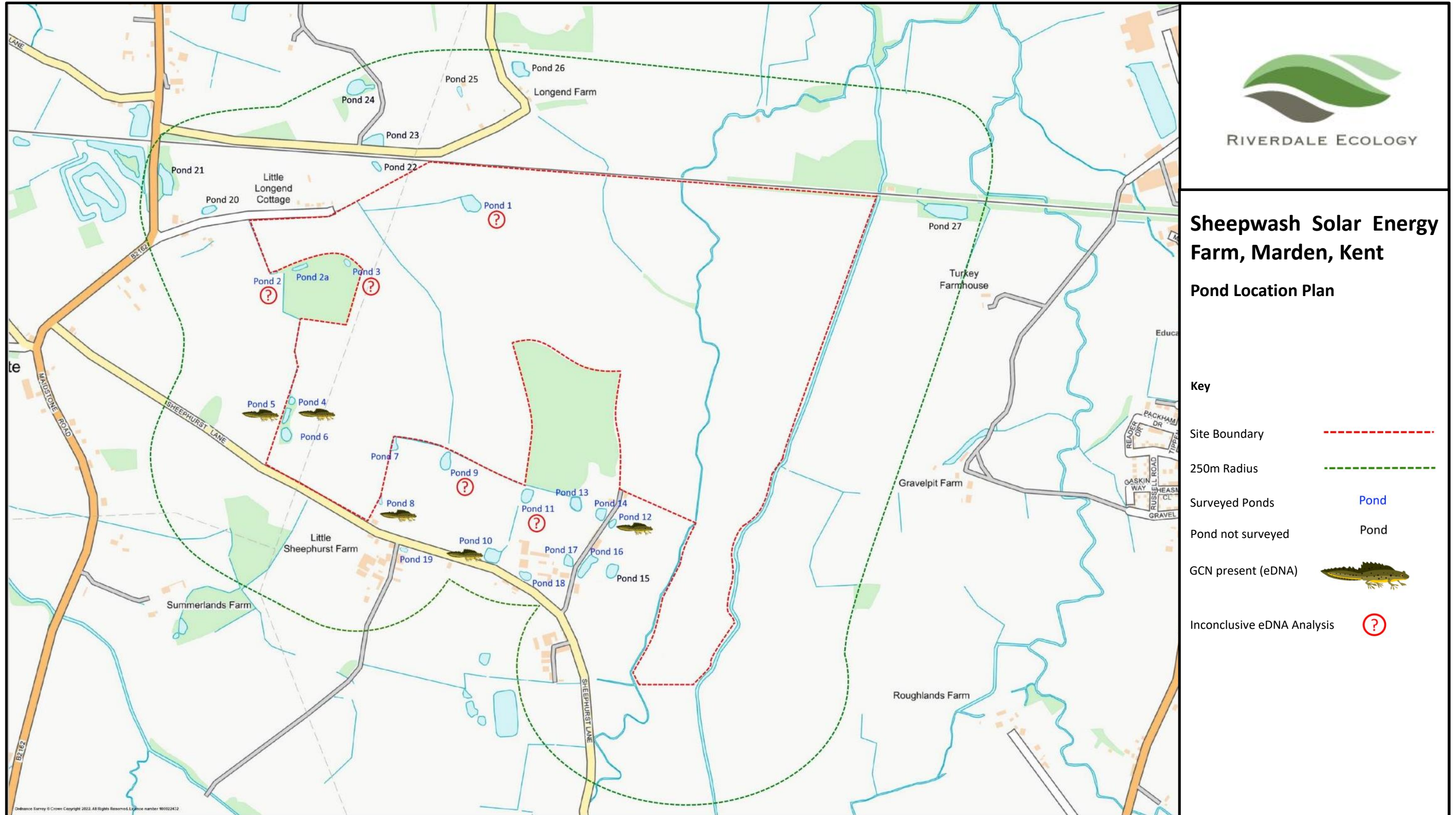
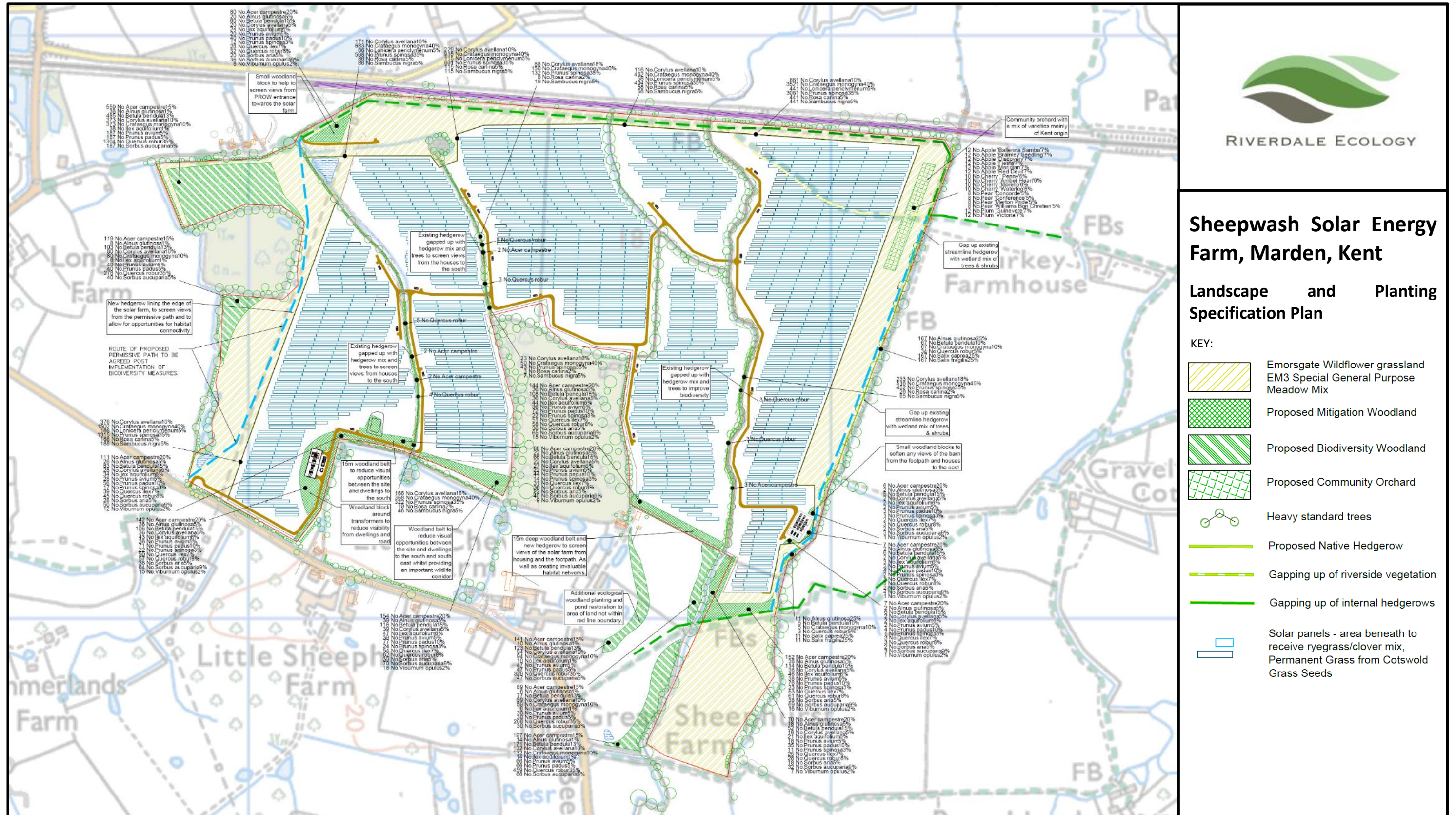


Figure 5: Ecological Mitigation and Biodiversity Enhancement





Figure 6: Landscape Plan and Planting Specification





Appendix 2: Photographs



Photograph 1.
View north across Field 1 (February 2021).



Photograph 2.
View south across Field 1 (September 2021).



Photograph 3.
Northern boundary of Application Site adjacent to railway line.



Photograph 4.
View south across Field 4 towards southern woodland area.



Photograph 5.
Deciduous woodland/Parkland habitat in southern I woodland.



Photograph 6.
Hedgerow H4.



Photograph 7.
View southwest across Field 6 towards western woodland block.



Photograph 8.
Hedgerow with trees (North end of Hedgerow H1).



Photograph 9.
Hedgerow H5.



Photograph 10.
Gappy defunct section of Hedgerow H6



Photograph 11.
View north from southern boundary of Field 6 across the proposed biodiversity zone.



Photograph 12.
Hedgerow H8 along southern boundary of Field 6.

Appendix 3: Legislation

Relevant Legislation

Please note: This section contains key details of legislation and planning policy applicable in England and Wales only (i.e. not including the Isle of Man, Scotland, Northern Ireland, the Republic of Ireland or the Channel Islands) and does not provide full details. It is provided for general guidance only. While every effort has been made to ensure accuracy, this section should not be relied upon as a definitive statement of the law. Further information can be obtained from the relevant authorities.

National Legislation: Species

The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019

The Conservation of Habitats and Species Regulations (Amendment) (EU Exit) Regulations 2019 provides safeguards for European Protected Sites and Species (as listed in the Habitats Directive) and was transferred directly into UK law, thereby continuing the same provision for European protected species, licensing requirements, and protected areas after leaving the European Union.

The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 interpret the Birds Directive and Habitats Directive into English and Welsh law with appropriate amendments introduced following the removal of the UK from the European Union in January 2021.

Explanatory notes relating to species protected under The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (which includes smooth snake, sand lizard, great crested newt and natterjack toad, all bat species, otter, dormouse and some plant species) are given below and consider the case in England only, with Natural England given as the appropriate nature conservation body. **These should be read in conjunction with the relevant species sections that follow.**

- In the legislation, the term ‘deliberate’ is interpreted as being somewhat wider than intentional and may be thought of as including an element of recklessness.
- The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 does not define the act of ‘migration’ and therefore, as a precaution, it is recommended that short distance movement of animals for e.g. foraging, breeding or dispersal purposes, are also considered.
- In order to obtain a European Protected Species Mitigation (EPSM) licence, the application must demonstrate that it meets the following three ‘tests’:
 - (i) the action(s) is(are) necessary for the purpose of preserving public health or safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequence of primary importance for the environment;
 - (ii) that there is no satisfactory alternative; and
 - (iii) that the action authorised will not be detrimental to the maintenance of the species concerned at a favourable conservation status in their natural range.

The Wildlife and Countryside Act 1981 (as amended)

The Wildlife and Countryside Act 1981 (as amended) is a fundamental piece of national legislation which implements the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and implements the species protection obligations of Council Directive 2009/147/EC (formerly 79/409/EEC) on the conservation of wild birds (EC Birds Directive) in Great Britain. Various amendments have been made to the Wildlife & Countryside Act 1981 including the Countryside and Rights of Way (CROW) Act (2000).

Other Legislation

Other legislative Acts affording protection to wildlife and their habitats include:

- Deer Act 1991
- Countryside and Rights of Way (CROW) Act 2000
- Natural Environment & Rural Communities (NERC) Act 2006
- Protection of Badgers Act 1992
- Wild Mammals (Protection) Act 1996.

Species and species groups that are protected or otherwise regulated under the aforementioned domestic and European legislation, and that are most likely to be affected by development activities, include herpetofauna (amphibians and reptiles), badger, bats, birds, dormouse, invasive plant species, otter, plants, red squirrel, water vole and white clawed crayfish.

Wild Mammals (Protection) Act 1996

Under the Wild Mammals (Protection) Act 1996 all wild mammals are protected against intentional acts of cruelty under the above legislation. It is an offence to:

- Mutilate, kick, beat, nail or otherwise impale, stab, burn, stone, crush, drown, drag or asphyxiate any wild mammal with intent to inflict unnecessary suffering.

To avoid possible contravention, due care and attention should be taken when carrying out works (for example, operations near nests or burrows) with the potential to affect any wild mammal in this way, regardless of whether they are legally protected through other conservation legislation or not.

Bats

All species of bat are fully protected under The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 which prohibits:

- Deliberate killing, injuring or capturing of Schedule 2 species (e.g. all bats)
- Deliberate disturbance of bat species as:
 - a) to impair their ability:
 - (i) to survive, breed, or reproduce, or to rear or nurture young;
 - (ii) to hibernate or migrate
 - b) to affect significantly the local distribution or abundance of the species
- Damage or destruction of a breeding site or resting place
- Keeping, transporting, selling, exchanging or offering for sale whether live or dead or of any part thereof.

Bats are also protected under the Wildlife and Countryside Act 1981 (as amended) through their inclusion on Schedule 5. Under this Act, they are additionally protected from:

- Intentional or reckless disturbance (at any level)
- Intentional or reckless obstruction of access to any place of shelter or protection
- Selling, offering or exposing for sale, possession or transporting for purpose of sale.

Implication for development works

For works liable to affect a bat roost or for operations likely to result in a level of disturbance which might impair their ability to undertake those activities mentioned above (e.g. survive, breed, rear young and hibernate), a European Protected Species Mitigation (EPSM) Licence, issued by the relevant countryside agency (e.g. Natural England), will be required. The licence is to allow derogation from the relevant legislation and to enable appropriate mitigation measures to be put in place and their efficacy to be monitored.



Though there is no current case law the legislation may also be interpreted such that, in certain circumstances, important foraging areas and/or commuting routes can be regarded as being afforded de facto protection, for example, where it can be proven that removal of such features may have a major impact to maintaining the viability of a bat roost⁶.

Birds

With certain exceptions, all wild birds, their nests and eggs are protected under Sections 1-8 of the Wildlife and Countryside Act 1981 (as amended). Among other things, this makes it an offence to:

- Intentionally kill, injure or take any wild bird;
- Intentionally take, damage or destroy the nest of any wild bird while it is in use or being built;
- Intentionally take or destroy an egg of any wild bird;
- Sell, offer or expose for sale, have in his possession or transport for the purpose of sale any wild bird (dead or alive) or bird egg or part thereof.

Certain species of bird, for example the barn owl, black redstart, hobby, bittern and kingfisher receive additional special protection under Schedule 1 of the Act and Annex 1 of the European Community Directive on the Conservation of Wild Birds (2009/147/EC). This affords them protection against:

- Intentional or reckless disturbance while it is building a nest or is in, on or near a nest containing eggs or young;
- Intentional or reckless disturbance of dependent young of such a bird.

Implication for development works

Works should be planned to avoid the possibility of killing or injuring any wild bird, or damaging or destroying their nests, in order to avoid breaching the Wildlife and Countryside Act 1981 (as amended). To reduce the likelihood of nest destruction in particular, work should be undertaken outside the main bird breeding season (March to September⁷). Where this is not achievable any areas of habitat suitable for birds must be thoroughly checked for nests prior to vegetation clearance.

Species of bird listed on Schedule 1 are additionally protected against disturbance during the breeding season. It will therefore be necessary to ensure that no potentially disturbing works are undertaken in the vicinity of the nest. The most effective way to avoid disturbance is to postpone works until the young have fledged. If this is not achievable, it may be possible to maintain an appropriate buffer zone or standoff around the nest.

Herpetofauna (Amphibians and Reptiles)

Through their inclusion EPS under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, the sand lizard *Lacerta agilis*, smooth snake *Coronella austriaca*, natterjack toad *Epidalea calamita* and great crested newt *Triturus cristatus* receive full protection. The pool frog *Pelophylax lessonae* is also afforded full protection under the same legislation. Regulation 41 prohibits:

- Deliberate killing, injuring or capturing of species listed on Schedule 2
- Deliberate disturbance of any Schedule 2 species as:
 - a) to impair their ability:
 - (i) to survive, breed, or reproduce, or to rear or nurture young;

6 Garland & Markham (2008) Is important bat foraging and commuting habitat legally protected? Mammal News, No. 150. The Mammal Society, Southampton.

7 It should be noted that this is the main breeding period. Breeding activity may occur out of this period (depending on the particular species and geographical location of the site) and as such due care and attention should be given when undertaking potentially disturbing works at any time of year.

- (ii) in the case of animals of a hibernating or migratory species, to hibernate or migrate
- b) to affect significantly the local distribution or abundance of the species

- Deliberate taking or destroying of the eggs of a Schedule 2 species
- Damage or destruction of a breeding site or resting place
- Keeping, transporting, selling, exchanging or offering for sale whether live or dead or of any part thereof.

With the exception of the pool frog, these species are also currently listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Under this Act, they are additionally protected from:

- Intentional or reckless disturbance (at any level)
- Intentional or reckless obstruction of access to any place of shelter or protection
- Selling, offering or exposing for sale, possession or transporting for purpose of sale.

Other native species of herpetofauna are protected solely under Schedule 5 of the Wildlife & Countryside Act 1981 (as amended). Species such as the adder *Vipera berus*, grass snake *Natrix natrix*, common lizard *Zootoca vivipara* and slow-worm *Anguis fragilis* are listed in respect to Section 9(1) & (5). For these species, it is prohibited to:

- Intentionally (or recklessly in Scotland) kill or injure these species
- Sell, offer or expose for sale, possess or transport for purpose of sale these species, or any part thereof.

Common frog *Rana temporaria*, common toad *Bufo bufo*, smooth newt *Lissotriton vulgaris* and palmate newt *L. helveticus* are listed in respect to Section 9(5) only which affords them protection against:

- Sale, offering or exposing for sale, possession or transport for the purpose of sale.

Implication for development works

A European Protected Species Mitigation (EPSM) Licence issued by the relevant countryside agency (e.g. Natural England) will be required for works liable to affect the breeding sites or resting places of those amphibian and reptile species protected under The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (sand lizard, smooth snake, natterjack toad, great crested newt and pool frog). A licence will also be required for operations liable to result in a level of disturbance which might impair their ability to undertake those activities mentioned above (e.g. survive, breed, rear young and hibernate). The licences are to allow derogation from the relevant legislation but also to enable appropriate mitigation measures to be put in place and their efficacy to be monitored.

Although not licensable, appropriate mitigation measures may also be required to prevent the intentional killing or injury of adder, grass snake, common lizard and slow worm, thus avoiding contravention of the Wildlife and Countryside Act 1981 (as amended).

Badger

Badgers *Meles meles* receive protection under The Protection of Badgers Act 1992 which consolidates the previous Badger Acts of 1973 and 1991. Under the Act it is an offence to:

- Wilfully kill, injure, take, or, in England and Wales only, attempt to kill, injure or take a badger
- Cruelly ill-treat a badger, including use of tongs and digging
- Possess or control a dead badger or any part thereof
- Intentionally or recklessly damage, destroy or obstruct access to a badger sett or any part thereof
- Intentionally or recklessly disturb a badger when it is occupying a badger sett
- Intentionally or recklessly cause a dog to enter a badger sett
- Sell or offers for sale, possesses or has under his control, a live badger

Implication for development works

A Development Licence is required from the relevant countryside agency (e.g. Natural England, Natural Resources Wales or Scottish Natural Heritage) for any development works liable to affect an active badger sett, or to disturb badgers whilst in the sett. In Wales, the Welsh Government is responsible for issuing licences in relation to agricultural and forestry operations or works to maintain or improve any existing watercourse or drainage works, or to construct new works required for the drainage of land, including works of defence against seawater or tidal water.



Depending on the nature of the works and the specifics of the sett and its environment, badgers could be disturbed by work near the sett even if there is no direct interference or damage to the sett itself. The countryside agencies have issued guidelines on what constitutes a licensable activity. N.B. there is no provision in law for the capture of badgers for development purposes and therefore it is not possible to obtain a licence to translocate badgers from one area to another.

Invasive Plant Species

Certain species of plant, including Japanese knotweed *Fallopia japonica*, giant hogweed *Heracleum mantegazzianum* and Himalayan balsam *Impatiens glandulifera* are listed on Part II of Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) in respect to Section 14(2). Such species are generally non-natives whose establishment or spread in the wild may be detrimental to native wildlife. Inclusion on Part II of Schedule 9 therefore makes it an offence to plant or otherwise cause these species to grow in the wild.

Implication for development works

Although it is not an offence to have these plants on your land, it is an offence to cause these species to grow in the wild. Therefore, if they are present on site and development activities (for example movement of spoil, disposal of cut waste or vehicular movements) have the potential to cause the further spread of these species to new areas, it will be necessary to ensure appropriate measures to prevent this prior to the commencement of works.

International and National Legislation: Habitats

Statutory Designations: International

Special Protection Areas (SPAs) and Special Areas of Conservation (SACs)

Special Protection Areas (SPAs), together with Special Areas of Conservation (SACs) form the Natura 2000 network in Europe (National Site Network in the UK). The Government was obliged to identify and classify SPAs under the EC Birds Directive (Council Directive 2009/147/EC (formerly 79/409/EEC)) on the Conservation of Wild Birds) and these sites have been retained within UK law despite the removal of the UK from the European Union via The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019.

- ***Special Protection Areas*** are areas of the most important habitat for rare (listed on Annex I of the Directive) and migratory birds within the UK and Europe. Protection afforded SPAs in terrestrial areas and territorial marine waters out to 12 nautical miles (nm) is given by The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. The Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended) provide a mechanism for the designation and protection of SPAs in UK offshore waters (from 12-200 nautical miles (nm)).
- ***Special Areas of Conservation*** are areas which have been identified as best representing the range and variety of key habitats and rare (non-bird) species listed on Annexes I and II of the Directive. The Government is still obliged to identify and designate SACs under The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 whereby the EC Habitats Directive (Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora) was incorporated fully into the UK legislation despite the removal of the UK from the European Union. SACs in terrestrial areas and territorial marine waters out to 12 nm are protected under The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. The Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended) provide a mechanism for the designation and protection of SACs in UK offshore waters (from 12-200 nm).

Ramsar sites

Ramsar sites are designated under the Convention on Wetlands of International Importance. The Convention provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources, in particular it recognises wetlands as ecosystems that are globally important for biodiversity conservation. Wetlands can include areas of marsh, fen, peatland or water and may be natural or artificial, permanent or temporary. Wetlands may also incorporate riparian and coastal zones adjacent to the wetlands. Ramsar sites are underpinned through prior notification as Sites of Special Scientific Interest (SSSIs) and as such receive statutory protection under the Wildlife & Countryside Act 1981 (as amended) with further protection provided by the Countryside and Rights of Way (CRoW) Act 2000. Policy statements have been issued by the Government

in England and Wales highlighting the special status of Ramsar sites. This effectively extends the level of protection to that afforded to sites which have been designated under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. (e.g. SACs & SPAs).

Statutory Designations: National

Sites of Special Scientific Interest (SSSIs) and National Nature Reserves (NNR)

Sites of Special Scientific Interest are nationally important areas of special scientific interest, designated for their flora, fauna, or geological or physiographical features, under the National Sites and Access to the Countryside Act 1949 and latterly the Wildlife & Countryside Act 1981 (as amended). National Nature Reserves are declared by the countryside agencies under the same legislation. As well as underpinning other national designations the system also provides statutory protection for terrestrial and coastal sites which are important within a European context (National Site Network) and globally (such as Wetlands of International Importance). See subsequent sections for details of these designations. Improved provisions for the protection and management of SSSIs have been introduced by the Countryside and Rights of Way Act 2000 (in England and Wales).

Statutory Designations: County

Local Nature Reserves (LNRs)

LNRs are statutory sites of lower conservation value designated under national legislation. LNR designation is declared for sites holding special wildlife or geological interest at a local level and are managed for nature conservation and provide opportunities for research and education and enjoyment of nature.

Non-Statutory Designations

Non-statutory sites designated under local legislation are areas considered to be of local conservation interest. These may be designated by local authorities as **Local Wildlife Sites (LWS)**, also known as **County Wildlife Sites (CWS)**, **Local Nature Conservation Sites (LNCS)**, **Sites of Biological Importance (SBIs)** or **Sites of Importance for Nature Conservation (SINCs)**. May vary between counties.

Together with the statutory designations, these are defined in local and structure plans under the Town and Country Planning system and are a material consideration when planning applications are being determined. The criteria for designation and the level of protection afforded to these sites through local planning policies and development frameworks may vary between counties.

National Planning Policy

The National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) replaced Planning Policy Statement (PPS9) in April 2012 as the key national planning policy concerning nature conservation. The NPPF emphasises the need for suitable development and specifies the need for protection of designated sites and priority habitats and priority species. An emphasis is also made for the need for ecological networks via preservation, restoration and re-creation. The protection and recovery of priority species – those listed as UK Biodiversity Action Plan priority species – is also listed as a requirement of planning policy. The NPPF was updated in February 2019 and now includes a presumption in favour of providing a **net gain** in biodiversity as opposed to a 'no net loss' as was previously the policy.

In determining a planning application, planning authorities should aim to conserve and enhance biodiversity by ensuring that:

- Designated sites are protected from adverse harm;
- Planning permission is refused where significant harm from a development cannot be avoided, adequately mitigated, or, as a last resort, compensated for;
- Opportunities to incorporate biodiversity in and around developments are required and a net gain in biodiversity through enhancement during development is now expected;
- Planning permission is refused for development resulting in the loss or deterioration of irreplaceable habitats including aged or veteran trees and also ancient woodland; and



- Protection should be given to biodiversity within areas designated for their landscape value to include National Parks, the Broads and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to landscape and scenic beauty.

The Natural Environment and Rural Communities (NERC) Act 2006, (as amended)

The Natural Environment and Rural Communities (NERC) Act came into force on 1st October 2006. Section 40 of the Act requires all public bodies to have regard to biodiversity conservation when carrying out their functions. The Act includes a list of habitats and species of 'principal importance for the conservation of biodiversity' in England. They are referred to in this report as **Species of Principal Importance and Habitats** or **Principal Importance**. Local Authorities are required to consider the needs of these habitats and species when making decisions such as on planning application a developer must show that their protection has been adequately addressed within a development proposal.

Local Planning Authority's planning policy

The Local Planning Authority has policies relating to biodiversity conservation. For details, please see the planning website for the relevant authority.

Regional and Local BAPs

Many local authorities in the UK have also produced a local Biodiversity Action Plan (LBAP) at the County or District level. For details, please see the planning website for the relevant authority.

The Hedgerow Regulations 1997

The Hedgerow Regulations 1997 are intended to protect 'important' countryside hedgerows from destruction or damage by controlling their removal through a system of notification. A hedgerow is considered important if it:

- has existed for 30 years or more; and
- satisfies at least one of the criteria listed in Part II of Schedule 1 of the Regulations.

Schedule 1 criteria are related to the presence of protected plants and animals, or a high diversity of woody species and other qualifying features, e.g. connectivity to other hedgerows, woodlands or ponds, and the presence of standard trees.

Under the Regulations, it is a criminal offence to remove or destroy certain hedgerows without permission from the local planning authority. Countryside hedgerows are defined as those on or adjoining:

- common land;
- village greens;
- SSSIs (including all NNRs, SPAs and SACs);
- LNRs, and;
- land used for agriculture, forestry or the breeding or keeping of horses, ponies or donkeys are covered by these regulations.

Garden hedgerows, e.g. within or marking the boundary of the curtilage of a dwelling-house, are exempt from The Hedgerow Regulations.



Appendix 4: GCN HSI Results



Great crested newt HSI results.

Criteria	Pond 1	Pond 2	2a	Pond 3	Pond 4	Pond 5	Pond 6	Pond 7	Pond 8	Pond 9
Location	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Pond Area	0.93 (1100m ²)	0.14 (70m ²)	0.33 (165m ²)	0.42 (210m ²)	0.39 (195m ²)	0.66 (330m ²)	1.00 (550m ²)	0.76 (380m ²)	0.41 (205m ²)	0.99 (730m ²)
Pond Drying	1.00 (Rarely)	0.50 (Sometimes)	0.10 (Frequently)	0.10 (Frequently)	1.00 (Rarely)	0.50 (Sometimes)	1.00 (Rarely)	0.90 (Never)	0.90 (Never)	0.90 (Never)
Water Quality	0.67 (Moderate)	0.67 (Moderate)	0.33 (Poor)	0.67 (Moderate)	0.67 (Moderate)	0.67 (Moderate)	0.67 (Moderate)	1.00 (Good)	1.00 (Good)	0.67 (Moderate)
Overshading	0.20 (100%)	0.20 (100%)	0.20 (100%)	0.20 (100%)	0.20 (100%)	0.20 (100%)	0.20 (100%)	1.00 (50%)	1.00 (20%)	0.60 (80%)
Presence of Wildfowl	1.00 (Absent)	1.00 (Absent)	1.00 (Absent)	1.00 (Absent)	0.67 (Minor)	0.67 (Minor)	0.67 (Minor)	0.67 (Minor)	1.00 (Absent)	0.67 (Minor)
Presence of Fish	1.00 (Absent)	1.00 (Absent)	1.00 (Absent)	1.00 (Absent)	1.00 (Absent)	1.00 (Absent)	1.00 (Absent)	0.67 (Possible)	1.00 (Absent)	0.01 (Major)
Pond Network	1.00 (≥3)	1.00 (≥3)	1.00 (≥3)	1.00 (≥3)	1.00 (≥3)	1.00 (≥3)	1.00 (≥3)	1.00 (≥3)	1.00 (≥3)	1.00 (≥3)
Quality of Terrestrial Habitat	0.67 (Moderate)	1.00 (Good)	1.00 (Good)	1.00 (Good)	1.00 (Good)	1.00 (Good)	1.00 (Good)	1.00 (Good)	1.00 (Good)	1.00 (Good)
Macrophyte cover for egg laying	0.90 (90%)	0.51 (20%)	0.31 (0%)	0.31 (0%)	0.31 (0%)	0.31 (0%)	0.31 (0%)	0.41 (10%)	0.91 (60%)	0.31 (0%)
HSI Score	0.78	0.59	0.48	0.53	0.64	0.67	0.70	0.76	0.89	0.49
Categorisation of Habitat Suitability	Good	Below Average	Poor	Below Average	Average	Average	Good	Good	Excellent	Poor

Criteria	Pond 10	Pond 11	Pond 12	Pond 13	Pond 14	Pond 15	Pond 16	Pond 17	Pond 18	Pond 19
Location	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Pond Area	0.97 (900m ²)	1.00 (600m ²)	0.47 (235m ²)	1.00 (650m ²)	1.00 (500m ²)	0.99 (750m ²)	0.98 (800m ²)	0.92 (460m ²)	0.72 (360m ²)	0.05 (25m ²)
Pond Drying	0.90 (Never)	0.90 (Never)	1.00 (Rarely)	1.00 (Rarely)	1.00 (Rarely)	0.90 (Never)	0.90 (Never)	0.90 (Never)	0.90 (Never)	1.00 (Rarely)
Water Quality	1.00 (Good)	0.67 (Moderate)	1.00 (Good)	1.00 (Good)	1.00 (Good)	0.67 (Moderate)	0.67 (Moderate)	0.67 (Moderate)	0.67 (Moderate)	1.00 (Good)
Overshading	0.80 (70%)	1.00 (60%)	1.00 (40%)	1.00 (30%)	1.00 (50%)	1.00 (20%)	0.80 (70%)	1.00 (60%)	0.20 (100%)	0.20 (100%)
Presence of Wildfowl	0.67 (Minor)	0.67 (Minor)	1.00 (Absent)	1.00 (Absent)	0.67 (Minor)	0.01 (Major)	0.67 (Minor)	0.01 (Major)	1.00 (Absent)	1.00 (Absent)
Presence of Fish	1.00 (Absent)	0.01 (Major)	1.00 (Absent)	1.00 (Absent)	1.00 (Absent)	0.67 (Possible)	0.01 (Major)	0.01 (Major)	0.67 (Possible)	1.00 (Absent)
Pond Network	1.00 (≥3)	1.00 (≥3)	1.00 (≥3)	1.00 (≥3)	1.00 (≥3)	1.00 (≥3)	1.00 (≥3)	1.00 (≥3)	1.00 (≥3)	1.00 (≥3)
Quality of Terrestrial Habitat	1.00 (Good)	1.00 (Good)	0.67 (Moderate)	1.00 (Good)	1.00 (Good)	0.67 (Moderate)	1.00 (Good)	1.00 (Good)	0.67 (Moderate)	1.00 (Good)
Macrophyte cover for egg laying	0.71 (70%)	0.51 (20%)	0.91 (60%)	0.61 (30%)	0.91 (60%)	0.31 (0%)	0.31 (0%)	0.31 (0%)	0.51 (20%)	1.00 (70%)
HSI Score	0.88	0.54	0.87	0.93	0.95	0.49	0.50	0.33	0.68	0.63
Categorisation of Habitat Suitability	Excellent	Average	Excellent	Excellent	Excellent	Poor	Below Average	Poor	Average	Average