TAIYO
POWER AND STORAGE

Parc Solar Caenewydd, Swansea

Ecological Appraisal

Development of National Significance in the Renewable Energy Sector
Application Submission

On behalf of **Taiyo Power & Storage Limited**

December 2023 | P21-2998

Parc Solar Caenewydd

Ecological Appraisal

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Executive Summary

This Ecological Appraisal has been prepared by Devon Wildlife Consultants on behalf of Taiyo Power & Storage Limited to supporting a planning application for the construction, operation, management and subsequent decommissioning of a co-located solar farm and battery storage facility on land at Gowerton, Swansea.

The wider survey area comprises approximately 145ha of mixed farmland, watercourse and woodland habitats. Of this area, the revised layout redline boundary area is approximately 83ha. Green infrastructure comprises 51.54ha, including 6.24ha of lowland meadows, 6.8ha of rhos pasture enhancement, 5.51ha of floodplain habitats, 3.56ha of targeted mitigation for species, approximately 1.9ha of tree planting, and approximately 3km of hedgerow creation.

A Preliminary Walkover Survey was undertaken to assess the current ecological value of the wider survey area. Survey methodology followed the Phase 1 Survey Handbook (JNCC, 2010) with additional emphasis on searching for protected species and their field signs or identifying habitat which may support protected species. The survey report also considers ecological records obtained from LERC Wales Aderyn relating to the site and its surrounding area.

Following completion of the walkover survey, a number of further ecological surveys were undertaken until November 2022. Surveys included: badger; bat activity; further botanical assessment; breeding bird; wintering bird; great crested newt; invertebrate; reptile; potential bat roosting assessment and watercourse assessment. The survey information has informed ecological assessment and detailed habitat designs, which complement the landscape and surface water management strategies and plans to integrate the Green Infrastructure design for the facility. In particular, as per Section 3.2.2 of this report, the proposals include significant enhancements to the current limited diversity of the extensive grasslands once the land has recovered from the pressure from cattle grazing. Survey has been undertaken in line with the DECCA and Stepwise approach, with ecology surveys commissioned prior to any other disciplines, iteratively informing the extent of layout to be considered.

In compliance with Future Wales Policy 18, there are considered to be no significant adverse impacts on internationally or nationally statutory designated sites for nature conservation. It is considered that the development will not result in a likely significant adverse effect on the integrity of the Camarthen Bay and Estuaries SAC, and this has been confirmed by NRW. Construction compliance measures have been provided in order to protect protected sites and habitats, in addition to populations of birds, badger, bats, otter and reptiles during the works. These are laid out in an outline CEMP.

Mitigation and enhancement recommendations are provided to indicate how a net biodiversity gain can be achieved for the site. This includes retention, enhancement and buffering of existing woodland, hedgerows and riparian habitat. Further grassland habitats with existing ecological value have also been removed from the solar infrastructure layout and will be enhanced as part of the proposed works, including restoration of priority habitats. A summary of residual impacts is presented in the table below. As detailed in Section 2.5 of this report, consultation with the planning ecologists at Swansea Council and Natural Resources Wales was undertaken to agree ecological survey effort, findings and the mitigation approach.

Ecological Receptor	Geographical scale of impact	Residual impacts
Habitats	Local	Minor Positive
Designated Sites	District	Minor Positive
Badger	Site	Minor Positive
Roosting Bats	Site	Minor Positive
Bat Activity	District	Minor Positive
Nesting Birds	Site	Minor Positive
Foraging Birds	Site	Neutral
Reptiles	Site	Minor Positive

Design has been undertaken in line with the DECCA and Stepwise approach, to build and sustain resilient ecological networks to avoid, mitigate, compensate and secure enhancement to deliver a net benefit for biodiversity and ecosystem resilience. Design was undertaken to avoid, mitigate, compensate and secure enhancement to deliver a net benefit for biodiversity and ecosystem resilience. In compliance with Future Wales Policy 18, the proposals will meet the requirements for on-site biodiversity net gain, with a predicted gain of at least 26.25%. It is furthermore considered that the creation of habitat corridor linkages and the restoration of grassland to priority habitat standard, with benefits to wildlife associated with these habitats, will provide ecological benefit additional to that indicated by the calculations.

New and enhanced habitat corridors will be provided across the site for badgers, bats, birds, dormice and reptiles. Planting of native hedge and scrub species, and creation of wild bird cover plots will aim to extend the habitat mosaic and enhance habitat value for a range of species including bats and farmland bird species. Enhancement of rhos pasture and creation of butterfly banks will enhance habitat and connectivity for butterfly species.

DEVON WILDLIFE CONSULTANTS

Contents

1 Introduction

1.1 Introduction

This Ecological Appraisal has been prepared by Devon Wildlife Consultants (DWC) on behalf of Taiyo Power & Storage Limited (herein referred to as "the applicant") and forms part of a suite of documents supporting a planning application for Development of National Significance for the construction, operation, management and subsequent decommissioning of a co-located solar farm and battery storage facility on land fronting the A484 and Swansea Road (B4560) at Gowerton, Swansea ("the application site").

The development is known as 'Parc Solar Caenewydd'.

The wider survey area comprises approximately 145ha of mixed farmland, watercourse and woodland habitats.

The purpose of the appraisal is to use available background data and results of field surveys to describe and evaluate the ecological resources present within the survey area. Consideration is also given to any potential impacts of the proposed works to protected sites within a 10km radius of the site. The appraisal includes an assessment of the potential ecological constraints and opportunities which are likely to deliver the green infrastructure outcomes of the facility. Mitigation and enhancement proposals for the 38% of the development site covered by the solar arrays are included together with construction compliance recommendations to ensure the development conforms with relevant policy and legislation. The appraisal follows the steps set out by the mitigation hierarchy: avoid, minimise, restore and compensate.

1.2 Background

The wider survey area was subject to a preliminary walkover survey on 20th April 2021, which was followed by detailed botanical surveys of areas of habitat identified with higher potential value. Further protected species surveys were also undertaken across the survey area until November 2022, including wintering bird surveys. The results of the surveys informed development of the concept layout and landscaping.

This Ecological Appraisal (revised October and December 2023) was published to accompany a second phase of statutory pre-application consultation carried out under Articles 8 and 9 of the Development of National Significance (Procedure) (Wales) Order 2016. The first phase of statutory consultation was carried out between June and August 2023. The outcome of consultation responses pertaining to Ecology were incorporated into this updated report. A full re-consultation was undertaken in light of the changes introduced to the planning application boundary and development description.

1.3 Development Proposals

It is proposed to create extensive green infrastructure across the majority of the proposed development site with a ground mounted solar and battery storage facility and associated infrastructure. An operational lifespan of 40 years is sought for the proposed solar power

element of the scheme. It should be noted that the potential array layout forms a smaller proportion of the total area of the wider survey area. The layout excludes woodland, scrub, watercourses and other high value habitats or features identified during the survey period.

Ecological input was sought from an early stage of design and findings used to inform the layout in order to avoid and minimise potential ecological impacts in line with the mitigation hierarchy; the redline boundary includes the majority of the site area which will be utilised for habitat creation and enhancement. This design process has included consideration of alternative layouts and design elements which were considered to result in greater ecological impacts and therefore discounted or redesigned.

1.3.1 Cable Route options

An additional walkover survey was undertaken to inform three cable routing options, which would all traverse agricultural fields and local highways to the south of the river Afon Llan. Two routing options related to the alignment of the cable run from the proposed customer substation to the existing pylon located off Ystrad Road, Fforestfach. The third option was for the potential of a direct wire to an adjoining industrial user but this is no longer a suitable option.

The Applicant is now proposing to reroute the cable trench along the existing local highways (namely Swansea Road, Carmarthen Road, Ystrad Road and Denver Road). In addition, a second point of connection option is being introduced to the scheme and this is located to the north off Carmarthen Road. The planning application boundary has been altered and extended to accommodate these changes.

1.4 Future Wales Policy

The Welsh Government has recently published Future Wales - the National Plan 2040. Policy 9 deals with Resilient Ecological Networks and Green Infrastructure and states:

To ensure the enhancement of biodiversity, the resilience of ecosystems and the provision of green infrastructure, the Welsh Government will work with key partners to:

- *Identify areas which should be safeguarded and created as ecological networks for their importance for adaptation to climate change, for habitat protection, restoration or creation, to protect species, or which provide key ecosystems services, to ensure they are not unduly compromised by future development; and*

- *Identify opportunities where existing and potential green infrastructure could be maximised as part of placemaking, requiring the use of nature-based solutions as a key mechanism for securing sustainable growth, ecological connectivity, social equality and well-being*

Planning authorities should include these areas and/or opportunities in their development plan strategies and policies in order to promote and safeguard the functions and opportunities they provide. In all cases, action towards securing the maintenance and enhancement of biodiversity (to provide a net benefit), the resilience of ecosystems and green infrastructure assets must be

demonstrated as part of development proposals through innovative, nature-based approaches to site planning and the design of the built environment.

Ecology surveys were commissioned prior to any other disciplines, identifying key areas of green infrastructure and informing the extent of layout. This includes a focus on the uplifting in condition of priority habitats and habitat connectivity along the river corridor network.

Future Wales Policy 17 states that:

"*The Welsh Government strongly supports the principle of developing renewable and low carbon energy from all technologies and at all scales to meet our future energy needs*" and "*…all proposals should demonstrate that they will not have an unacceptable adverse impact on the environment. Proposals should describe the net benefits the scheme will bring in terms of social, economic, environmental and cultural improvements to local communities.*"

Future Wales Policy 18 states that:

"Proposals for renewable and low carbon energy projects (including repowering) qualifying as Developments of National Significance will be permitted subject to policy 17 and the following criteria:"

"…3. there are no adverse effects on the integrity of Internationally designated sites (including National Site Network sites and Ramsar sites) and the features for which they have been designated (unless there are no alternative solutions, Imperative Reasons of Overriding Public Interest (IROPI) and appropriate compensatory measures have been secured);

4. there are no unacceptable adverse impacts on national statutory designated sites for nature conservation (and the features for which they have been designated), protected habitats and species;

5. the proposal includes biodiversity enhancement measures to provide a net benefit for biodiversity"

There are considered to be no significant adverse impacts on internationally and nationally statutory designated sites for nature conservation. The proposals are likely to meet the requirements for on-site biodiversity net gain, with a predicted gain of at least 26.25%, including restoration of priority habitat and wider benefits for wildlife associated with these habitats.

1.5 Biodiversity and Development Supplementary Planning Guidance

The work carried out at the site is in line with the Swansea Council DECCA and Stepwise approach laid out in the Biodiversity and Development Supplementary Planning Guidance (SPG), with ecology surveys commissioned prior to any other disciplines, providing an iterative ECOP and informing the extent of layout to be considered. Design was then undertaken to avoid, mitigate, compensate and secure enhancement to deliver a net benefit for biodiversity and ecosystem resilience.

Consultation was undertaken with Kathryn Jones, Planning Ecologist at Swansea Council on 26th July 2021 to confirm the ongoing and proposed survey effort, findings to date and the mitigation approach; the ecological survey findings informed continual adjustments to the layout and extent of the arrays from the early stages of design. Further consultation is summarised in Section 2.5.

2 Survey Methodology

2.1 Baseline Surveys

2.1.1 Extended Phase 1 Habitat Survey

The wider survey area was subject to a preliminary walkover survey on 20th April 2021 by Li-Li Williams MEnvSci. (Hons) MCIEEM (Consultancy Manager), Kitty Straghan BSc. (Hons) MCIEEM (Principal Ecologist), Alex Parr MRes. (Assistant Ecologist) and James Woodin BSc. (Hons) (Assistant Ecologist).

The Extended Phase 1 Habitat Survey consisted of a walkover assessment of the survey area using Phase 1 Habitat Survey methodology (JNCC, 2010) to classify and map habitats. All areas within the survey area were surveyed and assessed for indicators of ecological value, including the presence or signs of any protected or rare species. A desk-based assessment to identify protected species and habitats present within a 1km radius of the site was also undertaken.

Lle (https://lle.gov.wales) was consulted in order to assess whether the site is present within a 10km radius of any statutory designated sites or SSSI Risk Zones.

2.1.2 Desk Survey

Searches undertaken for the desk study are summarised in Table 2.1:

Source	Information sought
LERC Wales Aderyn	A standard search area consisting of a 1km radius of the site from a central grid reference was requested from LERC Wales Aderyn. Details of statutory and non-statutory sites designated for nature conservation or interest, together with records pertaining to protected species and/or species of conservation concern were obtained.
Lle (https://lle.gov.wales)	Information regarding the presence of statutory designated sites within a 2km radius of the site. The search was extended to 10km for Natura 2000 sites (Special Areas of Conservation (SAC) and Special Protection Areas (SPA)).
Open source 1:25,000 Ordnance Survey mapping	Any mapped water bodies within a 500m of the site.

Table 2.1 Summary of Desk Study Search Methodology

2.2 Further Surveys

Further to the PEA, the following further surveys were undertaken. The survey approach was agreed with Swansea Council and NRW as detailed in Section 2.5:

Survey	Area	Timing
Badger	Whole site	April 2021
Bat Activity - general	Whole site	April to October 2021 (monthly)
Bat - Tree roost assessment	Trees	April 2021
Botanical	Areas of interest	May and June 2021
Breeding Birds	Whole site	May and June 2021
Great Crested Newt	Hedgerows	April 2021
Reptile	Grassland and ruderal habitat	August and September 2021
Otter, Water Vole and Kingfisher	Watercourse	May and July 2021
Invertebrate Scoping	Representative habitats	July and September 2021
Wintering Birds	Whole site	October 2021 to March 2022 (monthly)
Additional Walkover Survey	Cable Route	November 2022

Table 2.2 Further Surveys Undertaken

2.2.1 Badger Survey

The survey area was inspected for the presence of badger activity concurrently with the preliminary walkover survey. Badger survey findings are provided within a supplementary confidential document.

2.2.2 Bat Activity Survey

Habitat suitability for bats determines the number of bat activity surveys recommended to achieve a reasonable survey effort. The survey area is considered to have high habitat suitability for bats, therefore a total of ten survey visits were undertaken between April and October 2021 (noting that Field 16 was added at a later date in June). In line with BCT guidance, this included a dusk and dawn activity survey within the same 24 hour period.

The transect routes were identified during daylight hours in order to locate any potential risks associated with the routes and to identify points within the survey area which may be utilised by foraging/commuting bats. The transect routes, with listening points, were continuously walked throughout the survey visits.

Transects were conducted for a period of 2 hours either from sunset or prior to sunrise. Stops were made at identified listening points. These listening points were held for approximately 3 minutes. All bat activity was recorded using Peersonic RPA3 full spectrum bat detectors or a Batbox Duet bat detector, recording to digital recorder. To aid species identification all recordings are analysed using Kaleidoscope Pro computer software.

In addition, automated detectors (SM2BAT, Peersonic RPA3 and SM4 Mini) were deployed for a minimum of 5 consecutive nights per month. All recordings were analysed using Kaleidoscope Pro computer software. In order to standardise the data, a bat activity index was calculated using the number of bat passes per night, where a 'bat pass' is defined as a sequence of two or more bat calls.

2.2.3 Bat Tree Roost Assessment

All trees present within the development site footprint were subject to a preliminary ground level roost assessment to confirm suitability for roosting bats based on the Bat Survey Guidelines (BCT, 2016). Trees were searched for potential roost features such as rot holes, splits and cavities. The assessment was carried out concurrently with the preliminary walkover survey.

2.2.4 Botanical Survey

The preliminary walkover survey identified a number of areas of habitat with higher potential value, including areas with potential to be classified as priority habitat. Further botanical surveys comprised DAFOR species lists for each site, with further analysis to identify fields which support priority habitat. The further surveys were carried out by Kitty Straghan BSc. (Hons) MCIEEM on 17th May, 21st June and 22nd June 2021.

2.2.5 Breeding Bird Survey

Further to the findings of the initial walkover survey, the Breeding Bird Survey comprised two survey visits undertaken on the mornings of 17th May 2021 and 22nd June 2021, to confirm presence/absence of nesting bird species, particularly ground-nesting birds within the fields. Due to the low number of ground-nesting birds identified during these surveys, further survey visits to identify and map territories were not required, in agreement with the planning ecologists at Swansea Council and Natural Resources Wales (Section 2.5).

Transect routes were walked around the survey area and passed within close proximity of all key habitats present within the site, focusing on grassland and arable habitats within the solar array layout. Hedges, scrub and woodland were excluded as these habitats will be retained, buffered and protected. All bird species heard/observed within the site and their associated behaviour was recorded. Surveys were undertaken by experienced bird surveyors; Li-Li Williams (MEnvSci) Hons MCIEEM, Alexander Parr MRes. and Kitty Straghan BSc. (Hons) MCIEEM.

Incidental bird recordings have been made throughout all further survey visits to the site.

2.2.6 Great Crested Newt

Two ponds/areas of standing water were identified within the wider survey area which have the potential to support great crested newts *Triturus cristatus*. The presence or absence of great crested newts can be determined by analysing traces of environmental DNA (eDNA) in pond water. Samples were taken from each of the waterbodies on 21st April 2021 and were analysed for traces of eDNA by SureScreen Scientifics Ltd. Water samples were taken by Alexander Parr MRes (Merit) and Li-Li Williams (MEnvSci) Hons MCIEEM (GCN Licence Holder 002106).

2.2.7 Reptile Survey

An artificial refugia survey was undertaken, with artificial refugia introduced throughout all areas of the survey area which have been identified as having the potential to support species of reptile. The refugia were checked for the presence of basking or sheltering reptiles. The artificial refugia comprised bitumen (roof felt) sheets, corrugated bitumen (Coroline) sheets and corrugated iron sheets, approximately 500mm x 500mm in size. Refugia were laid at a density of at least 50 per hectare of suitable habitat. Approximately 60 artificial refugia were laid out in locations deemed to have high potential for basking reptiles. Natural refugia, such as logs or stones, were also inspected during the survey visits for the presence of reptiles.

The refugia were set out on 19th August 2021 and allowed to bed in for a period of at least seven days prior to the checks commencing, thus allowing any reptiles within the site to become accustomed to using them. Following this period seven survey visits were undertaken throughout the 2021 activity season during suitable weather conditions as detailed by Gent & Gibson (1998).

2.2.8 Watercourse Survey

A watercourse survey of the watercourse present within the survey area was undertaken on 17th May 2021 and 14th July 2021. Survey effort focused on key riparian species including otter *Lutra lutra*, water vole *Arvicola amphibius*, sand martin *Riparia riparia* and kingfisher *Alcedo atthis*.

2.2.9 Invertebrate Scoping Survey

An initial invertebrate survey was undertaken to indicate relative value of the habitats in the survey area, including consideration of the following key invertebrate groups:

- Araneae (spiders)
- Coleoptera (beetles)
- Diptera (flies)
- Hemiptera (true bugs)
- Hymenoptera (bees, wasps and ants)
- Lepidoptera (butterflies and moths)

A sampling survey visit was undertaken on 13th June 2021 and repeated on 3rd September 2021. All surveys were undertaken by an ecologist experienced in invertebrate survey and identification including Invertebrate Species-habitat Information System (ISIS).

In order to maximise the number of species collected the surveys were carried out on dry, sunny days. To ensure survey effort was evenly distributed across the survey area, the survey area was divided into indicative habitat types and an equal amount of time was allocated to each area. Standardised sweep netting of suitable vegetation, spot sweeping from flowers, beating and ground searching including fingertip searching of rocks and dung was undertaken for each area.

The areas were assessed to allow survey information to be related to structural habitat so that key areas for invertebrates could be identified, including the need for further detailed survey of particular habitats/species.

Where possible, species were collected in trays and sample pots for identification on site using suitable ID guides. For some of the less readily identifiable species, specimens and/or high-resolution photos were taken for later analysis and identification. It should be noted that no laboratory dissection of samples was undertaken for the invertebrate scoping survey.

Specific transects for marsh fritillary adults and webs were walked on 14th July 2021 and searches for larval webs were undertaken on 3rd September 2021.

Surveys were carried out by Tom Williams and Li-Li Williams MEnvSci. (Hons) MCIEEM.

2.2.10 Wintering Bird Survey

The Wintering Bird Survey comprised monthly survey visits undertaken in the mornings between 28th October 2021 and 29th March 2022. This is considered to meet current survey guidelines pertaining to survey effort (https://birdsurveyguidelines.org/non-breeding-walkover-survey/). Raw data and weather conditions are presented in Appendix 5. A map of the transect routes and Vantage Points is presented in Appendix 6. Transect routes were walked around the survey area and pass within close proximity of all key habitats present within the survey area, focusing on grassland and arable habitats within the solar array layout. Hedges, scrub and woodland were excluded as these habitats will be retained, buffered and protected.

All bird species heard/observed within the survey area and their associated behaviour was recorded. Observation was undertaken from Vantage Points located across the site offering views over the site or key habitats, utilising a telescope and binoculars. Surveys were undertaken in suitable weather conditions (low wind, dry or light rain) and to correspond with a range of tidal conditions. The surveys commenced approximately 30 minutes after sunrise in order to identify any potential night roosts. Surveys were undertaken by Li-Li Williams (MEnvSci) Hons MCIEEM and Alexander Parr MRes (Merit) who are experienced bird surveyors including experience of volunteer WeBS surveys, and 12 years of experience of wintering and wetland bird surveys of European sites including the Humber Estuary, Exe Estuary and Taw-Torridge.

It should be noted that these surveys are considered to be valid and up to date for the purposes of the current submission. However, due to the survey window for updated Wintering Bird Surveys in combination with the current proposed project timescales, an updated survey is

currently being undertaken from October 2023 to March 2024. There have been no significant changes to the previous survey findings to date.

2.2.11 Additional Walkover Survey

The additional land associated with a cable route to connect the proposed Parc Solar Caenewydd to the National Grid was surveyed on 7th November 2022 by Alexander Parr MRes, in addition to a brief verification walkover of the wider survey area. The survey findings are presented in Appendix 8. It should be noted that the cable route has now been rerouted along the existing highway.

2.3 Limitations

In general, it is possible that some species may have been overlooked in the field or were not recorded because they were not evident at the time of survey; no account can be taken for the presence or absence of a species on any particular day. However, survey effort has been designed to identify reasonable likelihood of presence/absence of the targeted species, including consideration of more cryptic species such as snipe.

Additional parcels of land were added to the survey area following the commencement of survey. Survey effort for these parcels will therefore not comprise a complete season of survey effort, for example for bat activity. However, the information is considered likely to be sufficient to inform impact assessment for the site as a whole, with further targeted surveys undertaken in future years as required. Furthermore, these additional parcels were later removed from the current scheme layout. The only additional parcel of land which remains in the scheme layout comprises the two northern fields (Field 16 and adjoining remnant of woodland).

It is not possible to distinguish between the calls of different bat species of the genera *Plecotus*, and is often difficult to determine different species of Myotis either in the field or during analysis. As such these species were identified to genus level and not species, unless key visual identification features were noted within the field therefore confirming a specific identification.

Remote detector equipment failures in Spring led to some gaps in the data, however additional survey effort was included in late Summer and Autumn to compensate for any gaps. Remote detector survey effort pertains to boundary features which will be retained and buffered, and it is considered that sufficient data was obtained to create a picture of bat activity across the survey area.

2.4 Survey Validity

Ecological walkover surveys undertaken in November 2022 and November 2023 indicated that site conditions have not changed significantly and therefore the current ecological survey findings are likely to remain valid and representative. The need for updated ecological survey should be reviewed again prior to 2024.

As detailed in Section 2.2.10, it should be noted that the Wintering Bird surveys are considered to be valid and up to date for the purposes of the current submission. However, due to the survey

window for updated Wintering Bird Surveys in combination with the current proposed project timescales, an updated survey is currently being undertaken from October 2023 to March 2024.

2.5 Personnel

Personnel undertaking each survey are detailed within the relevant methodology. DWC staff are professional ecologists and follow the code of conduct of the Chartered Institute of Ecology and Environmental Management (CIEEM). This survey work has been undertaken following the CIEEM Guidelines for Preliminary Ecological Appraisal (CIEEM, 2013).

2.6 Consultation

Consultee	Date	Summary
Kathryn Jones, Planning Ecologist at Swansea Council	26/07/2021 05/10/2021	Agreement of ecological survey effort, survey findings to date and initial mitigation approach. The scope of surveys was agreed.
Rhian Jardine, Natural Resources Wales	17/06/2022 – 26/07/2022	Discussion pertaining to EIA Screening, confirming the information submitted has satisfied concerns regarding ground nesting birds. "*I have spoken with our Ornithologist and the information submitted has satisfied our concerns regarding ground nesting birds. We have no further comments regarding this matter*".
Adeline Wilcox, Planning Officer PEDW	28/07/2022	Letter to PEDW to confirm that Natural Resources Wales have concluded that the further information submitted on 8th July 2022 has satisfied their concerns regarding ground nesting birds.
Hannah Roberts, Natural Resources Wales	17/08/2023	Pre-Application Consultation response requesting further information pertaining to non-avian ecology, ornithology and protected sites. This information has been included in the updated report.

3 Survey Results

Site survey plans are presented in Appendix 1 and desk study data pertaining to designated sites is presented in Appendix 2. Full desk study data can be provided on request. All relevant legislation is provided in Appendix 3. Photographs of the main habitat types are provided in Appendix 4.

3.1 Designated Sites

3.1.1 On Site

Part of the site lies within Penyfodau Fawr To Llewitha, a 73ha Site of Importance for Nature Conservation (SINC), designated for a number of habitats including native woodland, scrub, lowland meadow, neutral grassland, lowland fen, purple moor grass and rush pasture, and watercourse with exposure/erosion features. The western extent of the site lies within Alcoa Wet Meadows SINC, designated for wet woodland, scrub, neutral grassland, purple moor grass and rush pasture, linear vegetation and watercourse. These habitats are considered further in Section 3.2. A map of the extent of the SINCs is presented in Appendix 2.

3.1.2 Off Site

When considering the Zone of Influence for designated sites within a 10km radius, it should be noted that the site lies within 1.7km of Penplas Grasslands Site of Special Scientific Interest (SSSI), Burry Inlet Ramsar Site, SPA and SSSI and Camarthen Bay and Estuaries Special Areas of Conservation (SAC).

The Afon Llan river on site is connected to the SAC, creating a potential pathway connecting to the proposed green infrastructure and solar facility. This site and its associated interest features are therefore considered further in this assessment. The SAC is designated for its habitats including sandbanks, estuaries, mudflats and sandbanks, large shallow inlets and bays, Salicornia saltmarsh and Atlantic salt meadows. It is also designated for the Annex II species twaite shad, sea lamprey, river lamprey, allis shad and otter.

Burry Inlet Ramsar Site, SPA and SSSI is a large estuarine complex supporting the largest continuous area of saltmarsh in Wales, and large numbers of wildfowl and waders. It has recorded peak counts of 41,655 waterfowl in winter. There is potential for wildfowl and waders to use the habitats within the survey area therefore this site has been considered further in this assessment.

Penplas Grasslands SSSI is located 1.7km to the north east of the survey area and is designated for its low lying pastures. There are no identified pathways to this site, and it is not anticipated that the Penplas Grasslands SSSI will be affected by the proposed works. Therefore, this site will not be considered further within the current assessment.

The northern extent of the site lies adjacent to Stafford Common SINC. There is potential for indirect impacts during construction activities, therefore this site has been considered further in this assessment.

Further statutory or non-statutory designated sites within a 2km radius of the survey area are presented in Appendix 2. These habitats are considered unlikely to be affected by the nature and location of the works.

3.2 Habitats

The survey area comprises approximately 145ha of mixed farmland, watercourse and woodland habitats, although the potential array layout forms a smaller proportion of this area, excluding woodland, scrub, watercourse and other high value habitats. This layout was informed by the ecological surveys.

The additional land surveyed to inform a cable route to connect the proposed Parc Solar Caenewydd to the National Grid comprises approximately 60ha of grazed farmland, watercourse and woodland habitats. However, the cable route will now be located along the local highway.

The fields are dominated by arable crops, pasture utilised for cattle grazing and improved grassland which are managed on rotation. The surrounding landscape has features of high ecological value including woodland, hedgerows, mature trees and watercourse.

3.2.1 Arable

The arable fields are primarily utilised for growing pumpkins, and lay fallow over winter. There are no field margins present within the fields.

3.2.2 Grassland

The botanical survey indicated a number of fields with potential and confirmed rhos pasture priority habitat. Intensive grazing appears to have limited the botanical diversity and presence of indicator species such as whorled caraway *Carum verticillatum* in a number of fields. These fields predominantly comprised marshy grasslands containing a greater than 25% cover of *Juncus* species. Species compositions vary across the fields with soft rush *Juncus effusus* and common bent *Agrostis capillaris,* being dominant or abundant across the surveyed area. Locally dominant and abundant species included creeping buttercup *Ranunculus repens*, Yorkshire fog *Holcus lanatus,* marsh thistle *Cirsium palustre,* fleabane *Pulicaria dysenterica,* water pepper *Persicaria hydropiper,* common sorrel *Rumex acetosa,* marsh ragwort *Senecio congestus,* crested dogstail *Cynosurus cristatu,* black knapweed *Centaurea nigra,* floating sweet grass *Glyceria fluitans,* bog stitchwort *Stellaria alsine,* carnation sedge *Carex panicea,* meadow foxtail *Alopecurus pratensi,* creeping bent *Agrostis stolonifera,* greater birds foot trefoil *Lotus uliginosus*, compact rush *Juncus conglomeratus*, and sharp flowered rush *Juncus acutiflorus.* The fields generally show signs of improvement being heavily grazed by cattle resulting in extensive poaching. The rushes are cut for animal bedding annually.

There are also a number of improved/ poor semi-improved grassland fields present, although small areas of rush are present in wetter areas of these fields. These fields were dominated by a mixture of species including perennial rye grass *Lolium perenne,* Yorkshire fog, rough meadow grass *Poa trivialis,* common bent, sweet vernal grass *Anthoxanthum odoratum,* marsh

foxtail *Alopecurus geniculatus* and creeping buttercup. These fields were grazed by cattle resulting in heavy poaching.

3.2.3 Hedgerows

The hedgerow network present throughout the survey area is mature and supports a diversity of species, likely to provide habitat corridors for wildlife, although a number of hedgerows in the centre of the site were in poor condition with sections missing and would benefit from replanting. The hedgerows were generally of high ecological value. They were not subject to targeted survey as no hedgerow removal will be required to facilitate the scheme; construction will utilise existing gateways.

The hedgerow network will be retained, buffered and enhanced and therefore potential impacts of the proposed solar facility on the hedgerow network will not be considered further.

3.2.3 Trees and Woodland

The Arboricultural Impact Assessment (Barton Hyett Associates, 2022) indicates that there are 113 groups of trees, of which 2 are of high arboricultural quality, and 48 trees of which 1 is of high arboricultural quality, all of which will be retained and protected during the works.
Areas of broadleaved semi-natural woodland are present across the survey area, including habitat which forms part of the SINC designation. However, this woodland will be retained, buffered and enhanced, and therefore potential impacts to this habitat will not be considered further in this assessment.

3.2.4 Watercourse

The Afon Llan runs east-west across the site and is dominated by woodland, scrub, wet grassland and the invasive species Japanese Knotweed *Fallopia japonica* and Himalayan balsam *Impatiens glandulifera.*

3.2.5 Invasive Plant Species

LERC holds 127 records of invasive plant species within the desk study search area, including 36 records of Japanese Knotweed and 17 records of Himalayan balsam. Japanese Knotweed and Himalayan balsam cover extensive areas of the survey area, particularly along the river corridor and in a number of field boundaries. No further invasive plant species were recorded during the site survey.

3.3 Species

3.3.1 Badgers

Badger survey findings are provided within a confidential supplementary report.

3.3.2 Bats

LERC identified 46 records of bat within the desk study search area, including common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, noctule *Nyctalus noctula*, Natterer's bat *Myotis nattereri*, greater horseshoe bat *Rhinolophus ferrumequinum*,

lesser horseshoe bat *Rhinolophus hipposideros*, unidentified Myotid species *Myotis* sp. and unidentified bat species.

3.3.2.1 Roosting Bats

A number of trees present within the hedgerow network were identified as having the potential to support roosting bats. The Arboricultural Impact Assessment (Barton Hyett Associates, 2022) indicates that Tree 26 has a hazard beam feature suitable for roosting bats, and a number of other trees have dense ivy cover that could provide or conceal potential bat roosting features. However, the hedgerow network will be retained, buffered and enhanced during the proposed works, therefore these trees and their potential roosts will not be directly affected by the proposed works.

3.3.2.2 Bat Activity

The survey area provides a range of habitat features which may be utilised by bats. The woodland areas, grassland and riparian habitat provide suitable foraging habitat. In addition the hedgerows, river and woodland edge provide flightlines which bats utilise for commuting to and from roosts or foraging areas.

At least seven bat species were recorded in the survey area, including high levels of common pipistrelle and soprano pipistrelle foraging activity. Other species recorded include noctule *a*, serotine *Eptesicus serotinus*, Myotis and occasional lesser horseshoe bat.

Foraging is primarily associated with features such as riparian habitat corridor, woodland edge, higher quality rush pasture, wet field corners and treelines. These habitats will be retained, buffered and enhanced as part of the proposed scheme.

3.3.3 Birds

Breeding Birds

The extensive areas of hedgerows, woodland and dense scrub within the survey area are considered likely to support a diverse assemblage of nesting bird species, potentially including species of conservation concern. The dense sward of the grassland is considered to be of potential value to ground-nesting birds such as skylark *Alauda arvensis*.

The breeding bird survey results combined with incidental sightings have confirmed the presence of breeding skylark in the grassland fields, and breeding lapwing *Vanellus vanellus* in the arable fields.

LERC hold eight records of skylark and four records of lapwing within a 1km radius of the site; the closest of these is a record of lapwing located within arable fields to the west of the farm.

A total of three pairs of lapwing were recorded in two of the arable fields. A likely lapwing egg which had been predated was located in the southern extent of a third arable field.

A total of five singing skylarks were recorded in four of the grassland fields located around the farmyard during the initial walkover survey. However, no evidence of breeding skylark was

recorded during the subsequent breeding bird surveys. This may be due to stock rotation of cattle and cutting of grassland affecting the habitat suitability of these fields.

No further ground-nesting birds were recorded during the surveys. NRW confirmed that they have no further comments or concerns regarding ground nesting birds (by email dated 26th July 2022).

Wintering Birds

Due to the proximity of Burry Inlet Ramsar Site, SPA and SSSI and variety of habitats on site, there is potential that the survey area may be utilised for high tide roosting by wading and wintering bird species. Winter bird surveys were therefore undertaken on a monthly basis over 2021/2022, comprising walkover transects of all suitable habitats and visual searches from vantage points.

LERC hold records of wintering bird species including records of lapwing within the survey area and herring gull *Larus argentatus* adjacent to the survey area.

No significant wading bird species have been recorded utilising the survey area during the surveys. Low numbers of snipe *Gallinago gallinago* and wintering flocks of mixed finch species, meadow pipit *Anthus pratensis* and reed bunting *Emberiza schoeniclus* have been recorded during each survey, indicative of the foraging value of the arable fields. Small flocks of geese and duck species have been recorded flying over the site, following the line of the river. Survey data are presented in Appendix 5 and survey maps presented in Appendix 6.

It is considered unlikely that the survey area is utilised regularly by wading birds and waterfowl, although there is potential for the arable or wet grassland fields to be used on occasion.

It should be noted that these survey findings are considered to be valid and up to date for the purposes of the current submission. However, due to the survey window for updated Wintering Bird Surveys in combination with the current proposed project timescales, an updated survey is currently being undertaken from October 2023 to March 2024. There have been no significant changes to the previous survey findings to date. Low numbers of snipe and smaller wintering flocks of finch species and reed bunting have been recorded.

3.3.4 Dormice

The woodland and hedgerows present within the survey area represent a habitat with high potential to support dormice *Muscardinus avellanarius*, particularly as they are generally dense and species-rich, and would therefore provide shelter, nesting habitat and a supply of food items throughout the year. Furthermore, the hedgerows are well connected to additional habitat in the surrounding landscape which is suitable for dormice. However, woodland habitat and the hedgerow network will be retained, buffered and enhanced during the proposed works, therefore the potential for use of the survey area by dormice will not be directly affected by the proposed works. The access track through the woodland in the eastern extent of the site will utilise the existing farm access track and the layout of the battery energy storage system has been altered to ensure this is possible. Vegetation removal is limited to sparse scrub/sapling clearance to allow vehicular access and is considered unlikely to affect the favourable

conservation status of dormice. LERC hold no records of dormouse within a 1km radius of the site.

3.3.5 Great Crested Newts

Great crested newt *Triturus cristatus* eDNA samples were taken from two ponds and areas of standing water within the survey area and returned a negative result. Desk study information indicates a negative result was also returned for the industrial estate ponds on land to the south of the river. LERC hold no records of great crested newt within a 1km radius of the site. Great crested newts will not be considered further within the current assessment.

3.3.6 Invertebrates

The higher quality grassland habitats present within the wider survey area provide potential habitat for a diversity of invertebrates, totalling approximately 6.7ha. The invertebrate scoping survey indicated that invertebrate interest broadly aligns with botanical interest across the survey area, with a diverse invertebrate assemblage associated with even small areas of the higher quality rhos pasture habitats. The areas of lowest invertebrate diversity were the improved pasture and improved grassland. Habitats which have been identified as valuable for a diversity of invertebrates have been removed from the proposed solar facility layout and are subject to retention and enhancement.

3.3.7 Otters

LERC holds 46 records of otter within the desk study area, including records within the wider survey area. The watercourses present within the survey area provide potential otter breeding and foraging habitat. Otter presence within the survey area has been confirmed through the identification of spraint on features within the river. No holts were recorded during the survey, although it is possible features may be concealed in areas of dense scrub. It is considered likely that the survey area is utilised by otters for foraging and commuting through the landscape.

3.3.8 Reptiles

LERC holds 36 records of reptiles including grass snake *Natrix helvetica*, adder *Vipera berus*, slowworm *Anguis fragilis* and common lizard *Zootoca vivipara* within a 1km radius of the survey area. Approximately 3.7ha of semi-improved and unimproved grassland habitats on the margins of fields within the survey area are considered to represent higher potential foraging and basking habitat for reptile species, and the hedgebanks may provide shelter and dispersal corridors, with rabbit burrows and tree roots providing suitable hibernation sites.

Low numbers of reptiles were recorded during the surveys, including incidental recordings of common lizard in field margins within the survey area, in particular an area of suitable habitat in the north of the site. All identified high quality reptile habitat has been removed from the proposed array layout and the area of suitable habitat in the north of the site will be retained, enhanced and managed for reptiles.

3.3.9 Water vole

LERC holds a single record of water vole *Arvicola amphibius* within the desk study area. A survey of the watercourses present within the survey area confirmed that water voles are not

currently present within the survey area. All habitat with potential to support water voles will be retained, enhanced and buffered as part of the proposed scheme. Water voles will therefore not be considered further within the current assessment.

4 Impacts and Recommendations

The following recommendations are based on current UK wildlife legislation and national and local planning policy. The recommendations must be followed to ensure this legislation is not contravened by the proposed development or any site investigation or vegetation clearance works.

4.1 Further Survey

The proposed solar arrays will be located within fields which have been identified as supporting low quality habitat. Fields with higher botanical value have been removed from the scheme or included within the scheme as part of the Green Infrastructure areas. All woodland, riparian and hedgerow habitat present within the site will be retained, buffered and enhanced as part of the proposed works.

No further survey is recommended at this design stage.

4.2 Further Planning Requirements

The following aspects will require further action during or following the planning process:

Receptor	Area	Timing	Requirement
Designated Sites	Camarthen Bay and Estuaries SAC, Burry Inlet Ramsar Site, SPA and SSSI, Penyfodau Fawr To Llewitha, Alcoa Wet Meadows, Stafford Common	Planning	Detailed Construction Ecological Management Plan to be approved
Proposed development area	Whole site	Planning Condition	Landscape and Ecological Management Plan
Badger	Whole site	Two months prior to construction	Pre-construction survey to assess the level of usage of the site
Otter	Watercourse	Two months prior to construction	Pre-construction survey to assess the level of usage of the site

Table 4.2 Further Planning Requirements

4.3 Construction Compliance

It should be noted that these recommendations must be followed to ensure the legislation is not contravened, including during any initial site investigation or vegetation clearance works.

4.3.1 Designated Sites

During construction there is the potential for sediment runoff and pollution as a result of construction activity which could affect the designated sites within the Zone of Influence of the project. It is considered that potential impacts can be mitigated through adequate construction control and runoff design measures, set out in a robust and detailed Construction Environmental Management Plan (CEMP). An Outline CEMP has been provided at this stage.

4.3.2 Woodland, Hedgerows & Riparian habitats

All woodland, hedgerows and riparian habitat will be retained, buffered and enhanced as part of the proposed works. The access track through the woodland in the eastern extent of the site will utilise the existing farm access track and the layout of the battery energy storage system has been altered to ensure this is possible. Vegetation removal will be limited to cutting back a swept path for vehicular access through an existing gateway and access track, which will not affect habitat connectivity or function.

This will ensure that there are no direct impacts from the scheme to populations of dormice, otters and roosting/commuting/foraging bats which may/have been confirmed to utilise these features.

No lighting will be required within the site following completion of the proposed solar facility. During the construction phase of the development, some artificial lighting maybe required to facilitate safe working environment during the working hours. Any artificial lighting would be limited to the winter to reflect the shorter daylight hours.

Restrictions are to be applied during the bat activity season which is from April to October (inclusive). All site works will be limited to daylight hours, at least 15 minutes after sunrise and no later than 15 minutes before sunset, thus ensuring that there will be no requirement for artificial lighting. Key habitat corridors for bats, including hedgerows and woodland edge, will remain unlit. This will eliminate any potential for light spillage into woodland, hedgerow and riparian habitats which have the potential to be utilised by a range of protected species.

4.3.3 Badger

As a precautionary measure, a sloping plank or ramp will be left in any excavations deeper than 1m which are to remain open overnight, to avoid trapping any badgers that may access the excavation. Alternatively, excavations will be covered or fenced overnight.

4.3.4 Bats

Depending on the time of year, some artificial lighting maybe required to facilitate safe working environment during the working hours. Any artificial lighting would be limited to the winter to reflect the shorter daylight hours. Key habitat corridors for bats, including hedgerows and woodland edge, will remain unlit. These restrictions are to be applied during the bat activity season which is from April to October (inclusive).

4.3.5 Birds

The removal of any vegetation suitable for nesting birds should be undertaken outside of the main bird nesting season of March to August (inclusive). This would minimise the risk of potential delays to site clearance works. It should be noted that nesting may extend outside this period; this is often dependent on weather conditions and species.

If such works cannot be undertaken outside of the nesting season, a nesting bird check should be undertaken by an ecologist immediately before the vegetation removal works. The construction schedule should allow for potential delays in this case as any active nests must remain undisturbed until all the young have fledged naturally, which may take several months.

4.3.6 Otters

As a precautionary measure, a sloping plank or ramp will be left in any excavations deeper than 1m, which are to remain open overnight, to avoid trapping any otters that may potentially access the excavation. Construction works within 100m of the watercourse will not take place at night as this is likely to unduly disturb any foraging/dispersing otters.

4.3.7 Reptiles

All areas of high quality reptile habitat have been removed from the scheme layout, informed by survey results. However, margins of fields have the potential to support low number of reptiles which are likely to be utilised infrequently.

In order to protect the low number of reptiles which may be present, prior to construction vegetation around the limited field margins will be carefully strimmed or cut to ground level to enable any reptiles present to relocate into an area of safety. These works will be undertaken during periods of warm, sunny weather from April to September (inclusive).

4.3.8 Invasive Plant Species

It is anticipated that Japanese knotweed and Himalayan balsam will have been treated prior to occupation of the site. Treatment of Japanese Knotweed within the redline boundary has been undertaken by a specialist contractor in October and November 2022, as part of an Invasive Species Remedial Strategy for the site. This strategy includes methods of containment or removal in order to avoid the spread of these species. Japanese Knotweed will be treated in line with the Knotweed Code of Practice (Environment Agency, 2006). Himalayan balsam will be remediated prior to flowering by either hand pulling, strimming or utilising a glyphosate based weed killer.

4.4 Site Design

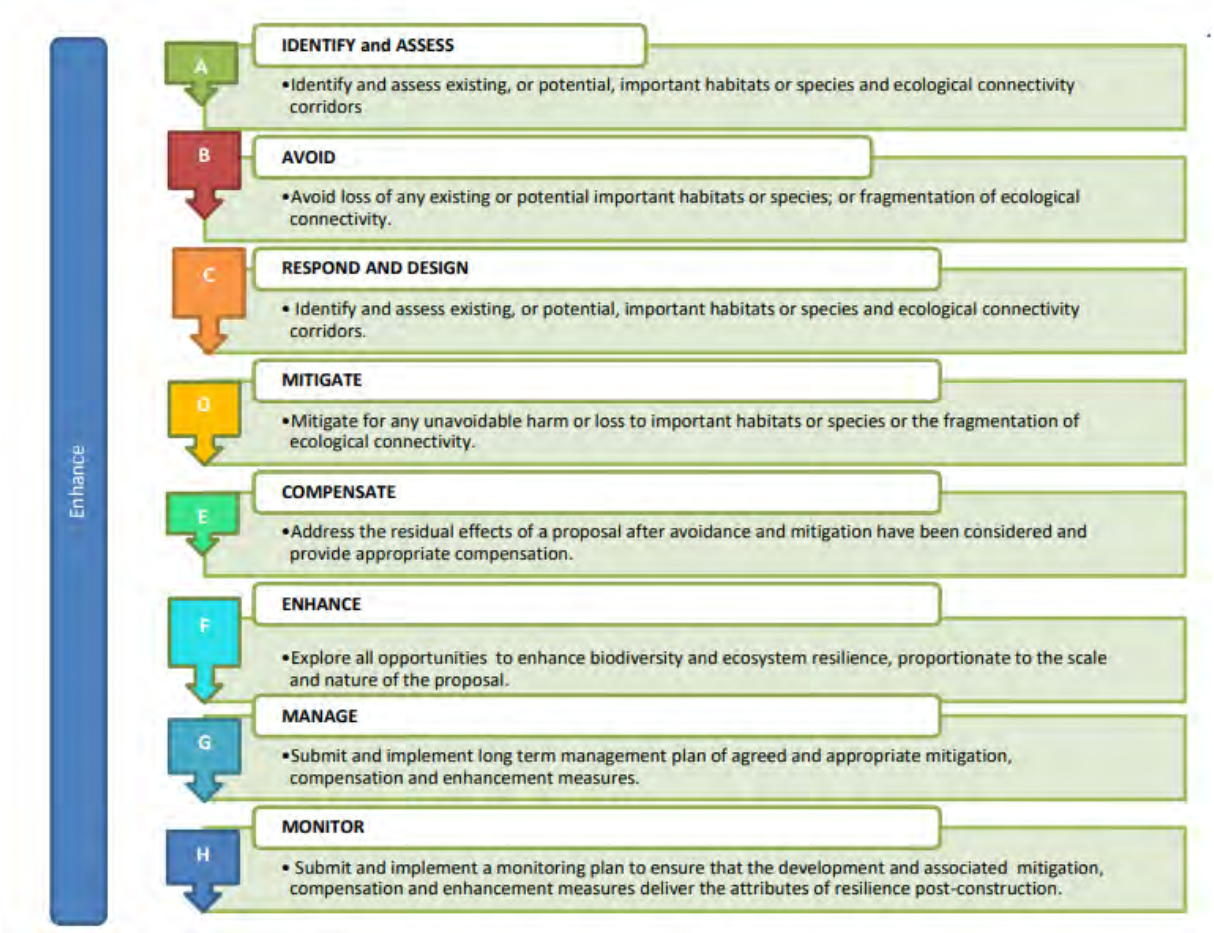
The work carried out at the site is in line with the Swansea Council DECCA and Stepwise approach laid out in the Biodiversity and Development Supplementary Planning Guidance (SPG), with ecology surveys commissioned prior to any other disciplines, providing an iterative ECOP and informing the extent of layout to be considered. Design was then undertaken to avoid, mitigate, compensate and secure enhancement to deliver a net benefit for biodiversity and ecosystem resilience. The ecological survey findings have informed continual adjustments

to the layout and extent of the arrays. From the early stages of design, features such as woodland edge, scrub, riparian habitats and treelines were identified for retention. Mitigation and enhancement measures are detailed in Section 4.5.

4.4.1 DECCA

DECCA, or Diversity, Extent, Condition, Connectivity and other Aspect of ecosystem resilience, is used as an acronym to refer to this framework of ecosystem resilience. In order to enhance the biodiversity and ecosystem resilience of species and habitats within the 2km radius of the site, a number of wider enhancements have been designed. The river corridor and adjacent SINC are considered to be key components of the mitigation approach; a continuous wide corridor of habitat creation and enhancement and buffer zones will be created along the river corridor within the redline boundary, extending and linking valuable habitats as an ecological network. Open riparian habitats will be retained as part of the mosaic, but with a wider buffer zone than at present. An area of farmland bird mitigation will also be created adjacent to the river. The proposals also include restoration of a significant area of the SINC grassland which currently does not meet priority habitat condition.

4.4.2 Stepwise



The work carried out at the site is in line with the Stepwise approach laid out in the Biodiversity and Development Supplementary Planning Guidance (SPG). The Sequential Site Selection

Report (Low Carbon Alliance, 2023) outlines how alternative sites were considered and eliminated. A 2.5km search radius was established around the potential Point of Connections identified. Due to the higher cost of cables, their installation and connection infrastructure associated with a higher voltage network of 132kV, the Applicant considered that any distance greater than 2.5km search area would be unviable. Three potential alternative sites were identified, but none represented an improvement when compared to the application site, given similar or higher quality environmental habitats that would be potentially harmed by the proposals.

Ecology surveys commissioned prior to any other disciplines, providing an iterative ECOP and informing the extent of layout to be considered. Design was undertaken to avoid, mitigate, compensate and secure enhancement to deliver a net benefit for biodiversity and ecosystem resilience, including the removal of significant areas of SINC habitat from the layout, with subsequent proposals for enhancement and restoration of these areas.

The proposals are likely to meet the requirements for on-site biodiversity net gain, with a predicted gain of at least 26.25%, including restoration of priority habitat. It is furthermore considered that the creation of habitat corridor linkages and the restoration of grassland to priority habitat standard, with benefits to wildlife associated with these habitats, will provide ecological benefit additional to that indicated by the calculations. Management and monitoring under the detailed LEMP will be provided.

4.5 Mitigation & Enhancement

The survey results have informed measures which have been specifically designed to mitigate and compensate for the ecological impacts of the development, in order to provide a gain in biodiversity at the site post-development.

Green infrastructure provision will include the creation and enhancement of 6.24ha of lowland meadows, 6.8ha of rhos pasture enhancement, 5.51ha of floodplain habitats, 3.56ha of targeted mitigation for species, approximately 1.9ha of tree planting, and approximately 3km of hedgerow creation.

An Outline Landscape and Ecological Mitigation Plan (LEMP) is presented in Appendix 7. A detailed Landscape and Ecological Management Plan will be produced for the site, to accompany the application submission and will be available for the formal consultation.

4.5.1 Retention of Existing Habitats

Confirmed priority habitat fields have been removed from the scheme layout following the results of the botanical surveys. These fields are included in the proposed green infrastructure areas.

Furthermore, a number of areas that do not currently meet priority habitat standard including three entire large fields, totalling an extensive area approximately 9.36ha in size, have been removed from the solar facility layout yet remain within the site boundary as part of the green infrastructure. These fields lie within the SINC designation but do not currently meet priority

habitat standard. Therefore, it is proposed that these fields are restored by altering the management regime and additional seeding where necessary.

This will also provide a large area of habitat for ground-nesting birds and invertebrates.

A significant area of farmland bird mitigation on fields adjacent to the river will also be retained and enhanced.

Elements of the development, such as the cable, will need to run through the SINC area however, impacts will be limited to limited and temporary habitat loss, with avoidance measures utilised in design including trenchless installation beneath the woodland. The proposals for the cable route to connect the proposed Parc Solar Caenewydd to the National Grid have been redesigned be primarily located within the existing highway, except for a short stretch between the highway and point of connection, and therefore no habitat loss is anticipated. The District Network Operator (DNO) access track has been designed to follow the alignment of an existing field track within the SINC, avoiding impacts on the habitat.

4.5.2 Habitat Creation & Enhancement

It is noted that potential impacts include the loss or alteration of grassland habitat beneath the solar arrays, particularly within the footprint of the SINCs, and the loss of open habitat for ground-nesting birds. The enhancement measures carried out within the large mitigation field and farmland bird mitigation area will mitigate these impacts, as will the proposed sympathetic grassland management within and around the solar arrays.

Habitat retention, creation and enhancement measures are designed to increase the extent and quality of habitat on key corridors within and through the site. These measures will strengthen habitat connectivity through the site, including creation of buffer zones. This will include native wildflower seeding/green hay from a donor site (likely to be from retained habitat to the south) and alteration of grassland management to extend and enhance priority habitat.

Planting of native hedge, tree and scrub, and creation of wild bird cover plots will aim to extend the habitat mosaic and enhance habitat value for a range of species including bats and farmland bird species. Enhancement of rhos pasture and creation of butterfly banks will enhance habitat and connectivity for butterfly species.

A wildlife corridor will be created along the public right of way linking the site from north to south. This will comprise a habitat mosaic of grassland, scrub and hedgerow planting. Additional woodland and hedgerow creation and infill planting will also strengthen habitat connectivity across the wider site. Treatment and removal of extensive Japanese Knotweed will also provide habitat enhancement.

In order to enhance the biodiversity and ecosystem resilience of species and habitats within the 2km radius of the site, a number of wider enhancements have been designed. The river corridor and adjacent SINC are considered to be a key component of the mitigation approach; a continuous wide corridor of habitat creation and enhancement will be created along the river corridor within the redline boundary, extending and linking valuable habitats as an ecological network. Open riparian habitats will be retained as part of the mosaic, but with a wider buffer

zone than at present. An area of farmland bird mitigation will also be created adjacent to the river.

It is proposed to provide a series of enhancements such as swales, basins, leaky dams and filter trenches along arrays rows and in existing drainage ditches, as part of a SuDS betterment which will provide additional wetland habitat diversity. The additional hedgerows and the Rhos grassland field provide flood betterment once the cattle poaching has stopped, and the meadow grasses recover.

It is anticipated that net biodiversity gain can be achieved at the site, particularly with regards to the uplifting condition of priority habitats, and habitat connectivity along the river valley corridor. These proposals for green infrastructure, ecological connectivity and enhancement have been designed to meet Policy 9 of Future Wales, Resilient Ecological Networks and Green Infrastructure.

An Outline Landscape and Ecological Management Plan (LEMP) that will inform a detailed LEMP is presented in Appendix 7. A detailed LEMP will be produced on completion of the finalised scheme design and detailed landscaping design. In accordance with BS 42020:2013 it will include planting and maintenance prescriptions, ensuring that all new and existing habitats present within the site will be managed during the lifetime of the development.

4.5.3 Additional Habitat Features

A minimum of 20 bat boxes and 20 bird boxes will be installed on retained mature trees across the site to provide new roosting and nesting opportunities for these species. Bird boxes will be suitable for a range of woodland bird species.

Any brash, log or grass arisings resulting from vegetation management will be utilised to create habitat piles, providing potential habitat and over-wintering sites for invertebrates, amphibians, reptiles and small mammals. At least 10 habitat piles of approximately $1m^3$ in size will be located within relatively undisturbed locations at the edge of the grassland on site, including within the reptile mitigation area.

4.6 Biodiversity Net Gain (BNG)

The emerging NRW Biodiversity toolkit is not yet available at the time of this assessment, therefore the Defra Statutory Biodiversity Metric has been used to provide a quantitative preliminary indication of whether net gain can be achieved at the site. It should be noted that the metric is not implemented by NRW and is therefore only utilised for the purposes of this site as a non-statutory tool to indicate biodiversity net gain in a quantitative manner.

Preliminary calculations for habitat areas have been made using the Defra metric to ascertain whether the development proposals are likely to result in a net gain for biodiversity post-development. A breakdown of changes in each habitat group is presented in Table 4.3 and the headline BNG results are summarised in Table 4.4.

	Baseline (prior to development)		Post development		Onsite Change	
Habitat Group	**Existing Area**	**Existing Value**	**Proposed Area**	**Proposed Value**	**Area Change**	**Onsite Unit Change**
Cropland	12.23	24.46	0.00	0.00	-12.23	-24.46
Grassland	81.36	550.12	86.92	652.93	+5.56	+102.81
Heathland and shrub	0.18	1.44	0.18	1.44	+0.00	+0.00
Urban	3.64	0.00	3.64	0.00	+0.00	+0.00
Wetland	0.00	0.00	6.67	73.23	+6.67	+73.23
Woodland and forest	3.31	30.45	3.31	30.45	+0.00	+0.00

Table 4.3 Habitat summary table for Biodiversity Net Gain Assessment

Habitat Units	Baseline units (prior to development)	Post Development Units	Post development gain/loss%	Off-site area required to achieve net gain (Yes/No)
Habitat	606.47	758.05	**+ 26.25%**	No

Table 4.4 Summary table for Biodiversity Net Gain Assessment

Based on improvement of the habitat distinctiveness of improved grassland habitats, conversion of arable habitats to grassland, and enhancement of grassland in ecological buffer areas, the development proposals are currently likely to result in a net gain in biodiversity on the site.

It is furthermore considered that the creation of habitat corridor linkages and the restoration of grassland to priority habitat standard, with benefits to wildlife associated with these habitats,

will provide ecological benefit additional to that indicated by the metric calculations. As detailed in Section 4.4 the DECCA attributes have been utilised to maintain and enhance biodiversity and the resilience of ecosystems at the site.

4.7 Assessment of Impact

4.7.1 Camarthen Bay and Estuaries SAC

Shadow Habitats Regulations Assessment (HRA) statement

The Afon Llan is connected to the Camarthen Bay and Estuaries SAC approximately 1.8km downstream, creating a potential pathway connecting to the proposed solar array. During the construction phase there is the potential for temporary impacts of sediment runoff or pollution as a result of construction activity. In the absence of mitigation, it is considered that there would be a dilution effect as a result of the volume of the water associated with river inputs to the estuary. The amount of sediment that would be in suspension in the water column during the works will likely be negligible in comparison to any existing natural occurrence. Any additional sediment which deposits and covers the mudflat habitats associated with the SAC is likely to be very thin and is therefore unlikely to result in a change in the nature and extent of the habitat available, particularly in consideration of the likely current sediment runoff associated with the existing 13ha of arable fields which are ploughed up-and-down the contour lines (compared to contour ploughing, which reduces soil erosion and runoff). The NRW Pre-Application Advice Request (10th January 2023) states that "*Due to the direct hydrological link between the development site and protected sites above (all but the Penplas Grasslands SSSI), there is the potential for a pollution pathway. However due to the distance between the sites, we advise the development may not result in an adverse effect on the sites' integrity if a robust Construction Environmental Management Plan (CEMP) is implemented.*"

During the operational phase of the scheme, it is considered that sediment runoff and nutrient load will be reduced due to the change to grassland from ploughed arable land, particularly for the fields adjacent and uphill of the river. Therefore, there will be no significant impact during operation.

No projects that would result in a cumulative impact of sediment runoff and pollution during the construction phase have been identified.

Therefore, a Habitats Regulations Assessment (HRA) is considered to be not required as there are no identified likely significant impacts upon this designated site or its key designated habitats and species.

As detailed by NRW and as a precautionary measure and standard good practice, any potential impacts will be avoided and mitigated through appropriate construction control and runoff design measures, set out in a detailed, robust Construction Environmental Management Plan (CEMP) to accompany planning submission. This will include details of roles, responsibilities, checks and monitoring. The outline trenchless crossing, pollution prevention and water management control measures in Sections 5 and 6 of the outline Construction Environmental Management Plan (January 2023) have been designed to avoid and minimise this risk to the downstream SAC.

The works are likely to have **no likely significant impact** on the SAC. In compliance with Future Wales Policy 18, there are considered to be no significant adverse impacts on nationally statutory designated sites for nature conservation.

4.7.2 Burry Inlet Ramsar Site, SPA and SSSI

No significant wading bird species have been recorded utilising the site during the targeted bird surveys. It is considered unlikely that the site is utilised regularly by wading birds and waterfowl. Therefore, there are considered to be no significant impacts on the waterfowl assemblage associated with Burry Inlet Ramsar Site, SPA and SSSI. The works are likely to have **no likely significant impact** on the Ramsar Site, SPA and SSSI.

In compliance with Future Wales Policy 18, there are considered to be no significant adverse impacts on nationally statutory designated sites for nature conservation.

4.7.3 Penyfodau Fawr To Llewitha and Alcoa Wet Meadows SINCs

The site lies within two SINCs and adjacent to Stafford Common SINC. Elements of the development, such as the cable, will need to run through the SINC area however, impacts will be limited to limited and temporary habitat loss, with avoidance measures utilised in design. The proposals for the cable route to connect the proposed Parc Solar Caenewydd to the National Grid have been redesigned be primarily located within the existing highway, except for a short stretch between the highway and point of connection, and therefore no habitat loss is anticipated. The District Network Operator (DNO) access track has been designed to follow the alignment of an existing field track within the SINC, avoiding impacts on the habitat.

During construction there is the potential for sediment runoff and pollution as a result of construction activity. Potential impacts can be mitigated through adequate construction control and runoff design measures, including designated Ecological Protection Zones, to be set out in a detailed Construction Environmental Management Plan (CEMP).

Habitat retention/creation/management as detailed in Section 4.5 has been specifically designed to maintain and enhances priority habitat associated with these SINCs, from the current suboptimal habitat condition. The works are considered likely to have a **Minor Positive impact at a District level**.

4.7.4 Badger

Habitat retention/creation/management as detailed in Section 4.5 maintains and enhances habitat available for commuting and foraging badgers. The works are considered likely to have a **Minor Positive impact at a Site level**.

4.7.5 Roosting Bats

Numerous mature trees present on the site boundaries have been identified as having the potential to support roosting bats. Design of the site layout has aimed to retain and buffer these boundary trees, and protective tree fencing will be utilised during construction. Additional tree planting will provide additional roosting opportunities in the longer term.

The installation of bat boxes on retained trees will provide additional roosting provision for bats across the site. The works are therefore considered likely to have a **Minor Positive impact at a Site level.**

4.7.6 Bat Activity

The survey results have indicated that the hedgerow boundaries are utilised by commuting and foraging bats. Habitat retention and management as detailed in Section 4.5 aims to protect and buffer the retained site boundaries, improving connectivity and foraging value. In particular, the hedgerow and woodland planting across the site will improve habitat connectivity.

The works are considered likely to have a **Minor Positive impact at a District level.**

4.7.7 Birds

4.7.7.1 Nesting birds

The hedgebank and scrub habitat present within the site supports a wide range of nesting birds, however these habitats will be retained, buffered and enhanced.

The grassland and arable fields provide habitat for ground-nesting birds, including up to three lapwing and five skylark territories. The enhancement measures carried out within the large mitigation field and farmland bird mitigation area will mitigate these impacts, as will the proposed sympathetic grassland management within and around the solar arrays.

The mitigation adjacent to the river is an open area of grazed floodplain rush pasture which will be heavily grazed/cut over winter to create suitable sward height and habitat for at least three pairs of breeding lapwing.

Habitat retention and management as detailed in Section 4.5 maintains and enhances habitat available for nesting birds within the site boundaries and in the creation of open areas of wet grassland. Although there will be a net loss of arable habitat, suitable alternative lapwing nesting habitat will be provided through grassland enhancement, creation and management.

The works are considered likely to have a **Minor Positive impact at a Site level.**

4.7.7.2 Foraging birds

Habitat retention and management as detailed in Section 4.5 maintains and enhances habitat available for foraging birds within the site boundaries and in the creation of open areas of wet grassland. Although there will be a net loss of arable habitat, wild bird cover crops will mitigate for the loss of this habitat as a feeding resource.

The works are considered likely to have a **Neutral impact at a Site level.**

4.7.8 Invertebrates

Habitat retention/creation/management as detailed in Section 4.5 maintains and enhances habitat available for invertebrates. Habitats which have been identified as valuable for a diversity of invertebrates have been removed from the proposed solar layout and are subject to retention and enhancement.

The works are considered likely to have a **Minor Positive impact at a Site level.**

4.7.9 Reptiles

Habitat retention/creation/management as detailed in Section 4.5 maintains and enhances habitat available for commuting/foraging reptiles within the site. The provision of additional grassland habitat provides additional habitat suitable for species of reptile, while the creation of habitat piles in the reptile mitigation area will provide potential breeding/hibernation sites for a diversity of reptiles.

The works are considered likely to have a **Minor Positive impact at a Site level.**

5. Conclusion

The proposed green infrastructure, solar farm and battery storage facility has been designed to comply with both Future Wales Policy 9 "Resilient Ecological Networks and Green Infrastructure" and the Swansea Council Biodiversity and Development Supplementary Planning Guidance.

The proposed extensive green infrastructure works designed across the majority of the site will result in habitat retention and management, including restoration of priority habitat associated with the SINCs. This will enhance retained commuting/foraging habitat for badgers, bats, birds, dormice and reptiles, and provide enhancement measures for new roosting/nesting opportunities for bats and birds. The areas of infrastructure associated with the solar arrays will cause some loss of low-quality habitats of value to foraging badgers, bats, birds and reptiles.

New and enhanced habitat corridors will be provided across the site for these species. Planting of native hedge and scrub species, and creation of wild bird cover plots will aim to extend the habitat mosaic and enhance habitat value for a range of species including bats and farmland bird species. Enhancement of rhos pasture and creation of butterfly banks will enhance habitat and connectivity for butterfly species. Planting and management prescriptions will be set out in a detailed LEMP.

It is considered that the development will not result in a likely significant adverse effect on the integrity of the Camarthen Bay and Estuaries SAC, and this has been confirmed by NRW. Precautionary timing and suitable control measures will be adhered to in order to minimise potential impacts during vegetation removal and construction, in line with a detailed CEMP. This will include precautionary measures with regards to designated sites, notable habitats and protected species. It is therefore considered that there are unlikely to be any significant adverse ecological impacts from the proposed works.

In compliance with Future Wales Policy 18, there are considered to be no significant adverse impacts on internationally or nationally statutory designated sites for nature conservation. Survey and design have been undertaken in line with the DECCA and Stepwise approach, to build and sustain resilient ecological networks to avoid, mitigate, compensate and secure enhancement to deliver a net benefit for biodiversity and ecosystem resilience. Design was undertaken to avoid, mitigate, compensate and secure enhancement to deliver a net benefit for biodiversity and ecosystem resilience. The proposals are likely to meet the requirements for on-site biodiversity net gain, with a predicted gain of at least 26.25%, including restoration of priority habitat. It is furthermore considered that the creation of habitat corridor linkages and the restoration of grassland to priority habitat standard, with benefits to wildlife associated with these habitats, will provide ecological benefit additional to that indicated by the calculations.

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Appendices

Appendix 1: Ecological Survey Plans

Appendix 2: Desk Study Search Data

Appendix 3: Legislation

Appendix 4: Site Photographs

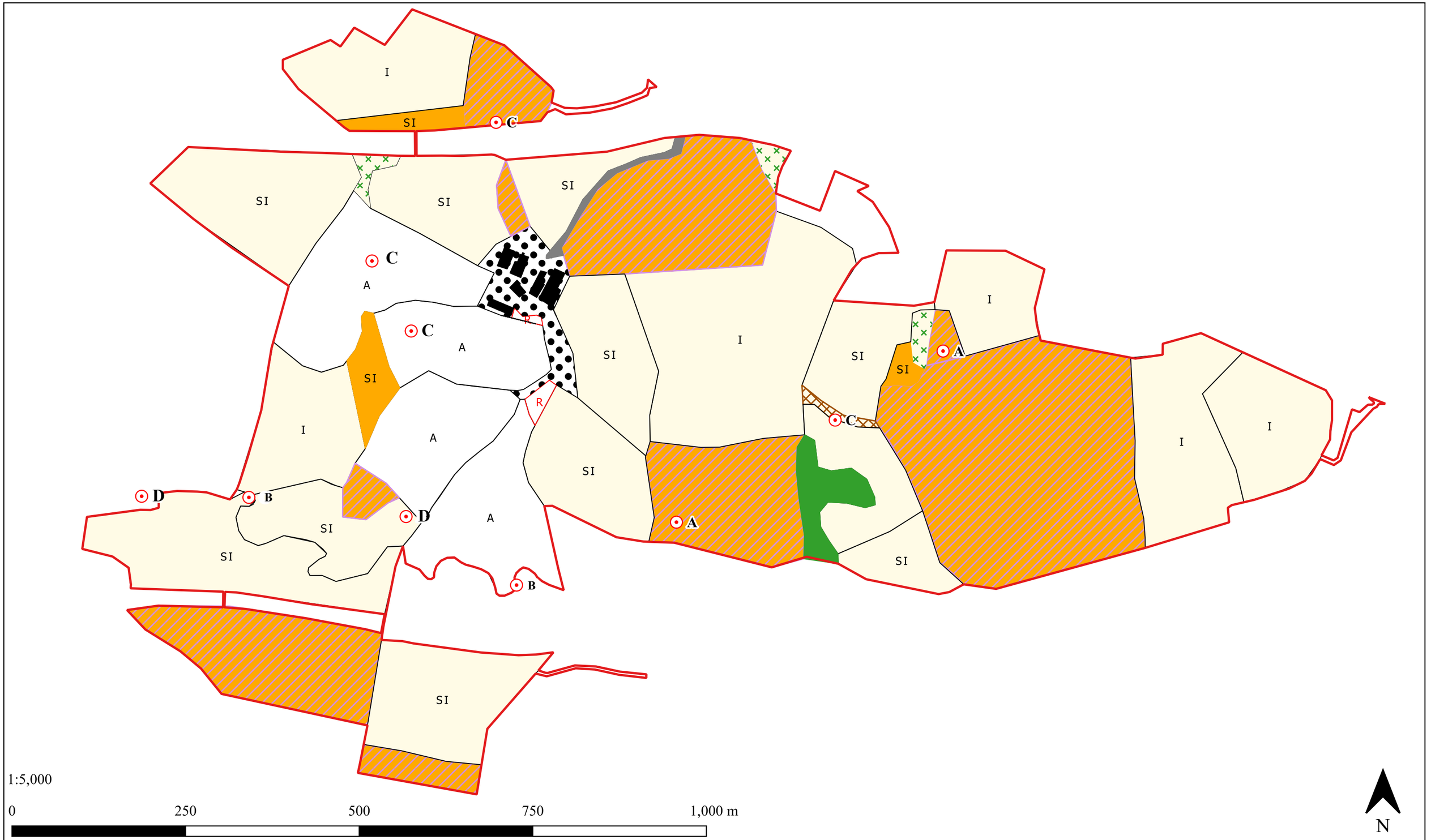
Appendix 5: Raw Survey Data

Appendix 6: Further Survey Plans

Appendix 7: Outline Landscape and Ecological Mitigation Plan

Appendix 8: Ecological Walkover Survey of Cable Route

Appendix 1 – Ecological Survey Plans



Legend

- Target note
- Gowerton RLB
- SI Semi improved Neutral grassland
- Marshy grassland
- I Improved grassland
- SI Poor semi-improved grassland
- Broadleaved woodland
- Scattered scrub
- Introduced scub
- R Refuse-tip
- Bare gound
- A Arable
- Hard standing
- Buildings

Target Notes

A- Areas identified with potential to support keyreptile populations
B- Areas with dominant Japanese knotweed
C- Fields with evidence of breeding lapwings
D- Areas with high levels of bat activity

Title: Extended Phase 1 Map
Site: Parc Solar Caenewydd
Client: Parc Solar Caenewydd
Date: June 2022

Drawn by: AP Checked by: LW

DEVON WILDLIFE CONSULTANTS

Appendix 2 – Designated Sites

Site Name	Designation	Category	Distance from Site Boundary
Burry Inlet	Ramsar	International	1700m
Burry Inlet	SPA	International	1700m
Gower Commons	SAC	International	3300m
Gower Ash Woods	SAC	International	7400m
Camarthen Bay and Estuaries	SPA	International	1700m
Crymlyn Bog	SAC	International	7800m
Crymlyn Bog	Ramsar	International	7800m
Limestone Coast of South West Wales	SAC	International	9800m
Burry Inlet and Loughor Estuary	SSSI	National	1700m
Penplas Grasslands	SSSI	National	1700m
Penllergear Railway Cutting	SSSI	National	3200m
Barland Common Stream Section	SSSI	National	3300m
Nant-Y-Crimp	SSSI	National	3700m
Cadel Heath	Local Nature Reserve	Local	1297m
Cwmllwyd	Local Nature Reserve	Local	1757m
Stafford Common	SINC	Local – Non statutory	0m
Alcoa Wet Meadows	SINC	Local – Non statutory	On Site
Penyfodau Fawr To Llewitha	SINC	Local – Non statutory	On Site
Mynydd Garn goch Common	SINC	Local – Non statutory	9m
Waungron to Gowerton Railway line	SINC	Local – Non statutory	142m
Main Swansea - Fishguard Railway Line	SINC	Local – Non statutory	238m
Gowerton Mart Woods	SINC	Local – Non statutory	278m
Lower Lliw Corridor & Llan Confluence	SINC	Local – Non statutory	462 m

Dunvant Brickworks	SINC	Local – Non statutory	679 m
Mynydd Bach-Y-Glo	SINC	Local – Non statutory	730 m
Valley Wood	SINC	Local – Non statutory	972 m
Portmead Common	SINC	Local – Non statutory	1009m
West Gowerton Woods	SINC	Local – Non statutory	1041m
Bishwell Common	SINC	Local – Non statutory	1094m
Upper Mynydd Garn goch Common	SINC	Local – Non statutory	1096m
Gowerton saltmarsh	SINC	Local – Non statutory	1379m
Marbled White Butterfly Meadow	SINC	Local – Non statutory	1527m
Cwmmawr Woods	SINC	Local – Non statutory	1916m
Nant Llwyd Valley	SINC	Local – Non statutory	1984m
B-Line	B-Line	Local – Non statutory	1700m

Within 2km of the site boundary there are a further 65 Ancient Semi Natural Woodland Sites, Restored Ancient Woodland Sites, Plantation on Ancient Woodland site, and Ancient Woodland Sites of Unknow Category. These are all unnamed.

Within 2km of the site boundary there are a further 65 Ancient Semi Natural Woodland Sites, Restored Ancient Woodland Sites, Plantation on Ancient Woodland site, and Ancient Woodland Sites of Unknow Category. These are all unnamed.

A2.1 Designated Sites within Zone of Influence of the Works

A2.2 Extent of SINC Designations

Appendix 3 – Legislation

Special Areas of Conservation (SACs)
As statutory designated sites, SACs are protected by the Conservation of Habitats and Species Amendment (EU Exit) Regulations 2019 which maintains protection of European sites. SACs are designated as areas of high conservation importance, which make a significant contribution to conserving habitats and species threatened in Europe as a whole.

Such statutory designated sites are legally protected and the local planning authority and Natural England may strictly control any proposed development works which have the potential to impact upon such sites. It is important to note that development does not need to be actually located within such a designated area to potentially present an adverse impact.

If it cannot be demonstrated that a development will not have a significant effect on a statutory designated site, a further "Appropriate Assessment" may be requested to further consider any perceived impacts in combined consideration with any other proposals.

The Local Planning Authority and Natural England can only agree to the plan or project if:

- It will not '*adversely affect the integrity of the site concerned* (Article 6 (3)). '*Integrity*' is defined as the '*coherence of ecological structure and function, across a site's whole area, that enables it to sustain the complex of habitats and/or the levels of populations of a species for which it was classified*';
- There is no alternative solution and there are '*imperative reasons of overriding public interest, including those of social or economic nature*' (Article 6 (3)). In such cases, compensatory measures must be taken to ensure the overall coherence of the Natura 2000 network.

Ramsar Site
A Ramsar Site is designated to be of international importance for its wetland, under the Ramsar Convention. Ramsar identifies wetlands of international importance, especially those providing waterfowl habitat.

The Convention on Wetlands, known as the Ramsar Convention, is an intergovernmental environmental treaty established in 1971 by UNESCO, and coming into force in 1975. It provides for national action and international cooperation regarding the conservation of wetlands, and wise sustainable use of their resources.

Ramsar sites are recorded on the List of Ramsar wetlands of international importance.

Sites of Special Scientific Interest (SSSIs)
As statutory designated sites, SSSIs are afforded protection under the Wildlife & Countryside Act 1981 (as amended) and the CRoW Act 2000 and are designated as areas of high conservation importance which aim to maintain the present diversity of British fauna and flora.

The local planning authority and Natural England may impose strict controls on any proposed development works which have the potential to impact upon such sites. It is important to note

that development does not need to be located within such a designated area to potentially present an adverse impact.

If it cannot be demonstrated that a development will not have a significant effect on a statutory designated site, further assessment may be requested to consider any perceived impacts. Consent will be required from Natural England for any operations that may have a damaging effect on the SSSI.

Site of Importance for Nature Conservation (SINC)
SINCs are wildlife rich areas, identified and selected for their local biodiversity value. Selection takes into consideration important, distinctive and threatened habitats and species. SINCs vary in size, shape and habitat type and can include wildlife rich ponds, heaths, wetlands and ancient woodlands and grasslands.

Local Planning Policy
Biodiversity and Development Supplementary Planning Guidance produced by Swansea Council provides guidance to augment polices set out within the Local Development Plan, providing clarity on the interpretation of those policies, in order to ensure development within Swansea maintains and enhances the County's biodiversity and delivers long term ecosystem resilience. This aligns with the Council's duties s6 under the Environment (Wales) Act 2016 and the Resilient Wales Goal of the Well Being of Future Generations Act 2015 and is consistent with National Development Plan (Future Wales) Policy.

Habitats of Principal Importance
In order to comply with Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006, it is necessary to demonstrate that Habitats of Principal Importance have been adequately considered through the planning process.

Hedgerows
'Important' hedgerows which meet specific wildlife and landscape criteria of the Hedgerow Regulations 1997 (as amended) are protected under this legislation. A Hedgerow Removal Notice must be submitted to the Local Planning Authority in order to obtain permission to damage or remove important hedgerows. It should be noted that planning approval also qualifies as permission.

Plants
The Wildlife & Countryside Act 1981 (as amended) makes it an offence to plant or cause Himalayan balsam to grow in the wild, which due to the proliferate seed and long viability of the seeds of this species, can be caused by relatively low levels of disturbance.

The Wildlife & Countryside Act 1981 (as amended) makes it an offence to plant or cause Japanese knotweed to grow in the wild, which due to the rooting extent and vegetative nature of this species, can be caused by relatively low levels of disturbance. This can include moving contaminated soil from one place to another, or incorrectly handling and transporting contaminated material and plant cuttings.

Badgers
Badgers are protected by the Protection of Badgers Act 1992 and the Wildlife and Countryside Act 1981 (as amended), Schedule 6. Under the Wildlife and Countryside Act it is illegal to intentionally kill, capture, injure or ill-treat any badger. Under the Protection of Badgers Act it is an offence to obstruct, destroy or damage a badger sett or disturb badgers within a sett, with any works which will contravene this legislation requiring prior licensing from Natural England.

Bat Roosts
All British bats and their roosts are afforded strict protection under the Wildlife and Countryside Act 1981 (as amended), as well as the Conservation of Habitats and Species Amendment (EU Exit) Regulations 2019. In combination, these pieces of legislation give substantial protection to bats and their roost sites, and make it an offence for any person to carry out the following acts:

- Intentionally or recklessly kill, injure or take a bat.
- Damage, destroy or obstruct access to any place that a bat uses for shelter or protection. This is taken to mean all bat roosts whether bats are present or not.
- Intentionally or recklessly disturb a bat while it is occupying a structure or place that it uses for shelter or protection.

Proposed developments which affect bats or their roosts are likely to require a European Protected Species Licence (EPSL) from Natural England.

Bat Flight Lines & Foraging Habitat
As a signatory to the Bonn Convention (Agreement on the Conservation of Bats in Europe) the UK is committed to protecting bat habitats, which necessitates the identification and protection from damage or disturbance of important feeding areas and commuting routes. In order to comply with the Natural Environment and Rural Communities Act 2006, it is necessary to demonstrate that foraging bat species have been adequately considered through the planning process.

The lesser/greater horseshoe bat is listed under several international directives including Appendix II of The Bonn Convention, Appendix II of the Bern Convention. Protection of lesser/greater horseshoe bats is also covered under the Conservation of Habitats and Species Regulations 2017 which maintains protection of European sites through the Conservation of Habitats and Species Amendment (EU Exit) Regulations 2019

Under the EC Habitats Directive 1992, core areas of habitat for Annex II species must be protected and the sites managed in accordance with the ecological requirements of the species.

Birds
All birds, their nests and eggs are protected under the Wildlife and Countryside Act 1981 (as amended). Nesting is determined as being from when birds first initiate nest building up until the point when fledglings stop returning to the nest. It is an offence to:

- Intentionally kill, injure or take any wild bird.
- Intentionally take, damage or destroy the nest of any wild bird.

- Intentionally take or destroy the egg of any wild bird.

King fishers are afforded special protection under Schedule 1 of the Wildlife and Countryside Act 1981, for which there are additional offences of disturbing these birds at, near, or while building their nests, or disturbing their dependent young.

Dormice
Dormice are afforded strict protection under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Amendment (EU Exit) Regulations 2019. This makes it illegal to intentionally kill, injure, take, possess, sell or disturb dormice. The legislation also makes it illegal to intentionally or recklessly damage, destroy or obstruct their place of shelter or protection.

Reptiles
Reptiles are protected against intentional killing and injury, sale and transport for sale under the Wildlife and Countryside Act 1981 (as amended). Natural England states that activities such as site investigations, site clearance and movements of machinery may breach this legislation by causing death or injury to reptiles (English Nature, 2004).

Great Crested Newts
Great crested newts are afforded strict protection under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Amendment (EU Exit) Regulations 2019. This makes it illegal to intentionally kill, injure, take, possess, sell or disturb great crested newts. The legislation also makes it illegal to intentionally or recklessly damage, destroy or obstruct their place of shelter or protection. Proposed developments which affect great crested newts or their place of shelter are likely to require a European Protected Species Licence (EPSL) from Natural England.

Otters
Otters are afforded strict protection under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Amendment (EU Exit) Regulations 2019. This makes it illegal to intentionally kill, injure, take, possess, sell or disturb otters. The legislation also makes it illegal to intentionally or recklessly damage, destroy or obstruct their place of shelter or protection. Proposed developments which affect otters or their place of shelter are likely to require a European Protected Species Licence (EPSL) from Natural England.

Water Voles
Water voles and their habitat are protected under the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to: intentionally kill, injure or take water voles; damage, destroy or obstruct access to any place used by a water vole for shelter or protection, or to intentionally or recklessly disturb a water vole whilst occupying a structure or place.

Appendix 4 – Site Photographs

	**Plate 1.** Arable Habitat
	**Plate 2.** Improved Grassland

	**Plate 3.** High quality rush pasture
	**Plate 4.** Lower diversity rush pasture

	**Plate 5.** Grazed improved pasture
	**Plate 6.** River corridor habitat and Japanese Knotweed stems

Table A4.1 Site Photographs

Appendix 5 – Raw Survey Data

Folio No: E9574
Report No: 1
Purchase Order: 196
Client: DEVON WILDLIFE CONSULTANTS
Contact: Alex Parr

TECHNICAL REPORT

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

SUMMARY

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

RESULTS

Date sample received at Laboratory: 22/04/2021
Date Reported: 25/04/2021
Matters Affecting Results: None

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
0868	GOWERTON POND	SS 600 967	Pass	Pass	Pass	Negative	0
0869	GOWERTON POND	SS 600 970	Pass	Pass	Pass	Negative	0

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

Reported by: Chris Troth **Approved by:** Chris Troth

METHODOLOGY

The samples detailed above have been analysed for the presence of GCN eDNA following the protocol stated in DEFRA WC1067 'Analytical and methodological development for improved surveillance of the Great Crested Newt, Appendix 5.' (Biggs et al. 2014). Each of the 6 sub-sample tubes are first centrifuged and pooled together into a single sample which then undergoes DNA extraction. The extracted sample is then analysed using real time PCR (qPCR), which uses species-specific molecular markers to amplify GCN DNA within a sample. These markers are unique to GCN DNA, meaning that there should be no detection of closely related species.

If GCN DNA is present, the DNA is amplified up to a detectable level, resulting in positive species detection. If GCN DNA is not present then amplification does not occur, and a negative result is recorded.

Analysis of eDNA requires scrupulous attention to detail to prevent risk of contamination. True positive controls, negative controls and spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared and reported. Stages of the DNA analysis are also conducted in different buildings at our premises for added security.

SureScreen Scientifics Ltd is ISO9001 accredited and participate in Natural England's proficiency testing scheme for GCN eDNA testing. We also carry out regular inter-laboratory checks on accuracy of results as part of our quality control procedures.

INTERPRETATION OF RESULTS

SIC: **Sample Integrity Check** [Pass/Fail]
When samples are received in the laboratory, they are inspected for any tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to inconclusive results.

DC: **Degradation Check** [Pass/Fail]
Analysis of the spiked DNA marker to see if there has been degradation of the kit or sample between the date it was made to the date of analysis. Degradation of the spiked DNA marker may lead indicate a risk of false negative results.

IC: **Inhibition Check** [Pass/Fail]
The presence of inhibitors within a sample are assessed using a DNA marker. If inhibition is detected, samples are purified and re-analysed. Inhibitors cannot always be removed, if the inhibition check fails, the sample should be re-collected.

Result: **Presence of GCN eDNA** [Positive/Negative/Inconclusive]
Positive: GCN DNA was identified within the sample, indicative of GCN presence within the sampling location at the time the sample was taken or within the recent past at the sampling location.
Positive Replicates: Number of positive qPCR replicates out of a series of 12. If one or more of these are found to be positive the pond is declared positive for GCN presence. It may be assumed that small fractions of positive analyses suggest low level presence, but this cannot currently be used for population studies. In accordance with Natural England protocol, even a score of 1/12 is declared positive. 0/12 indicates negative GCN presence.
Negative: GCN eDNA was not detected or is below the threshold detection level and the test result should be considered as evidence of GCN absence, however, does not exclude the potential for GCN presence below the limit of detection.

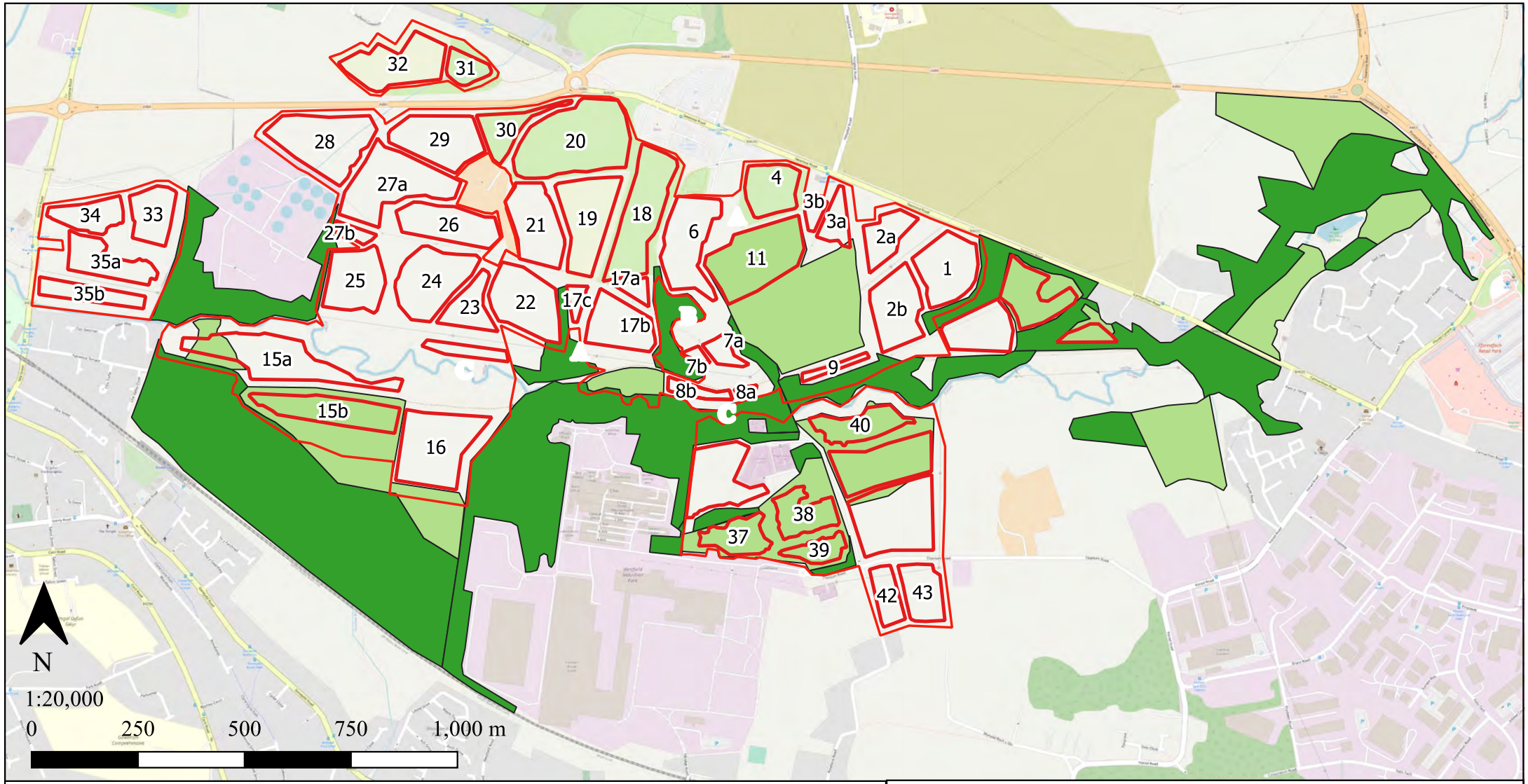
Species list for List 4922 [2021-09-03 - Gorseinon]

Pantheon report generated from database version 3.7.6 on 06/09/2021.

More columns are available to view by clicking on the '+' sign.

Species	Family	Order	Conservation status	Broad biotope	Habitat	Associations
first prev 1 next last						Showing records 1 to 63 of 63
						Download this report
Agalenatea redii	Araneidae	Araneae		open habitats		
Araneus quadratus	Araneidae	Araneae				
Clubiona	Clubionidae	Araneae				
Pardosa agricola	Lycosidae	Araneae		wetland	running water	
Pardosa nigriceps	Lycosidae	Araneae		open habitats	tall sward & scrub	Arthropoda
Metellina	Tetragnathidae	Araneae				
Tetragnatha	Tetragnathidae	Araneae				
Xysticus cristatus	Thomisidae	Araneae				
Gastrophysa viridula	Chrysomelidae	Coleoptera		open habitats	tall sward & scrub	Asteraceae
Phyllotreta exclamationis	Chrysomelidae	Coleoptera		open habitats	tall sward & scrub	Cardamine, Rorippa
Coccinella septempunctata	Coccinellidae	Coleoptera				
Paederus riparius	Staphylinidae	Coleoptera		wetland	peatland	Arthropoda
Lucilia	Calliphoridae	Diptera				
Sitodiplosis mosellana	Cecidomyiidae	Diptera				
Dolichopus	Dolichopodidae	Diptera				
Phylidorea ferruginea	Limoniidae	Diptera		wetland	marshland; peatland	
Neomyia cornicina	Muscidae	Diptera				
Opomyza germinationis	Opomyzidae	Diptera		open habitats	tall sward & scrub	Brachypodium, Poaceae
Psychodidae	Psychodidae	Diptera				
Scathophaga	Scathophagidae	Diptera				
Scathophaga stercoraria	Scathophagidae	Diptera		open habitats	tall sward & scrub	Bos, Diptera
Ilione lineata	Sciomyzidae	Diptera		wetland	peatland	Pisidium
Pherbina coryleti	Sciomyzidae	Diptera		wetland	marshland	Asteraceae, Discus
Sargus	Stratiomyidae	Diptera				
Sargus bipunctatus	Stratiomyidae	Diptera		tree-associated	shaded woodland floor	Fagales, Fungi, Plantae
Episyrphus balteatus	Syrphidae	Diptera		open habitats	tall sward & scrub	Aphididae
Eristalis nemorum	Syrphidae	Diptera		wetland	peatland	
Eristalis tenax	Syrphidae	Diptera		wetland	rich flower resource	
Helophilus pendulus	Syrphidae	Diptera		wetland	peatland	
Rhingia campestris	Syrphidae	Diptera		open habitats	tall sward & scrub	
Sphaerophoria scripta	Syrphidae	Diptera		open habitats	tall sward & scrub	Aphididae

Syritta pipiens	Syrphidae	Diptera	open habitats	tall sward & scrub	
Syrphus	Syrphidae	Diptera			
Xylota segnis	Syrphidae	Diptera	tree-associated	decaying wood	Fagales
Tachinidae	Tachinidae	Diptera			
Tipula	Tipulidae	Diptera			
Anthocoris nemorum	Anthocoridae	Hemiptera			
Neophilaenus lineatus	Aphrophoridae	Hemiptera	open habitats	tall sward & scrub	Poaceae
Philaenus spumarius	Aphrophoridae	Hemiptera			
Berytinus (Berytinus) minor	Berytidae	Hemiptera	open habitats	short sward & bare ground	Ononis repens
Cicadella viridis	Cicadellidae	Hemiptera	wetland		Juncus
Errastunus ocellaris	Cicadellidae	Hemiptera	open habitats	tall sward & scrub	
Macrosteles	Cicadellidae	Hemiptera			
Javesella	Delphacidae	Hemiptera			
Cymus melanocephalus	Lygaeidae	Hemiptera	open habitats	tall sward & scrub	Juncus, Lythrum salicaria, Trifolium
Lygus rugulipennis	Miridae	Hemiptera	open habitats	tall sward & scrub	Chenopodium album, Rumex, Urtica
Megaloceroea recticornis	Miridae	Hemiptera	open habitats	tall sward & scrub	Poaceae
Notostira elongata	Miridae	Hemiptera	open habitats	tall sward & scrub	Poaceae
Orthotylus (Melanotrichus) flavosparsus	Miridae	Hemiptera	coastal; open habitats	sandy beach; short sward & bare ground; tall sward & scrub	Amaranthaceae
Palomena prasina	Pentatomidae	Hemiptera	open habitats	tall sward & scrub	Corylus, Fagales
Bombus pascuorum	Apidae	Hymenoptera	open habitats	tall sward & scrub	Asteraceae
Diplazon laetatorius	Ichneumonidae	Hymenoptera			
Ichneumon	Ichneumonidae	Hymenoptera			
Selandria serva	Tenthredinidae	Hymenoptera			
Torymidae	Torymidae	Hymenoptera			
Porcellio scaber	Porcellionidae	Isopoda			
Anthophila fabriciana	Choreutidae	Lepidoptera	open habitats	tall sward & scrub	Urtica dioica
Rivula sericealis	Erebidae	Lepidoptera	open habitats	tall sward & scrub	
Pararge aegeria	Nymphalidae	Lepidoptera	open habitats	tall sward & scrub	Brachypodium sylvaticum, Dactylis glomerata, Elytrigia repens, Holcus lanatus
Cordulegaster boltonii	Cordulegastridae	Odonata	wetland	running water	Arthropoda
Leiobunum rotundum	Phalangiidae	Opiliones	tree-associated	arboreal	Aphididae, Coccidae, Fagales
Chorthippus parallelus	Acrididae	Orthoptera	open habitats	tall sward & scrub	
Conocephalus fuscus	Conocephalidae	Orthoptera	open habitats	tall sward & scrub	



Map of Field Numbers referenced in Winter Bird Surveys

Please note that field numbers and site boundaries have been superseded

Legend

- Proposed solar farm installation (superseded)
- SINC -H.1.3.3 Semi natural woodland
- SINC - H9.3.3 Moderately rich purple moor grass and rush pasture

Date	Start time	End time	Temp	Wind	Cloud	Rain	High tide	Low tide	Surveyors	Field no.	Findings	Comments
28/10/2021	08:15	11:50	15C	F4	90	None	11:27	06:22	LW & AP	9	1 BZ	
										11	1 SN	
										14 & 23	5 MT, 15 RB	
										15a	100 CH, 1 SN, 2 MA, 1 GS	Foraging flock of finches
										16	2 RB, 1 KT	
										15b	2 SC	
										18 & 19	2 MG, 2 S.	
										20	4 S., 2 SN	
										22	10 WP, 5 MP	
										23	20 RB	
										24	45 WP, 2 MA, 1 SC	
										26	5 CH	
										27	75 CH/finches, 2 MT, 7 HG, 5 BH	Flock of 140 HG/BH over Sewage works (off site)
15/11/2021	08:20	11:20	3C	F0	5	None	03:24	10:46	LW & AP	15A	1GS, 75CH	
										20	2 SN	
										21	1 SC	
										22	5 MP	
										23	4 SC, 12 MP, 20 RB, 100 CH/finch flock	Finch flocks dominated by CH
										24	2 ST	
										26	2 MP, 2 B., 1 LI & 100 CH/finch flock	
										27	100 WP	Foraging in arable field
14/12/2021	08:20	11:20	11C	F2	100%	Drizzle	09:33	04:29	LW & AP	2B	1 BZ	
										11	1 SN	
										15A	50 CH	
										15B	2 GO 1 SC	
										18 & 19	1 MP	
										20	2 SN	
										23	30 RB, 1 WR, 1 SN, 2 MP	Flock of geese (CG) flying along river corridor
										24	1 GS	
										26	12 MP	
										27	45 WP, 1 BZ, 1 LT, 1 RB, B. 200 CH/finches	Flock of 100 HG/BH over Sewage works (off site)
										32	25 WP	

Date	Start time		Temp	Wind	Cloud	Rain			Surveyors	Field no.	Findings	Comments
26/01/2022	08:30	11:45	6C	F1	10%	None	04:26	12:04	LW & AP	15A	100 CH, 1 MA	
										16	1 KT	
										20	1 SN	
										21	100 SG	On field boundary
										22/23	350 CH/finch flcok	Finch flocks dominated by CH
										26	15 CH, 1 BZ, 28 MP	
										27	95 FP	Foraging in arable field
										32	1 SN	
24/02/2022	08:40	11:45	6C	F1	60%	None	11:24	06:20	LW & AP	15A	30 CH	
										18	1 SN, 1 MP	
										23	30 RB	
										26	3 RB, 8 MP	
										27	80 FP, 100 CH/finch flock	Finch flocks dominated by CH
										31	7 SL	
29/03/2022	08:10	11:30	7C	F1	60%	None	08:27	03:46	LW & AP	9	4 T.	Teal at river corridor
										15A	20 CH	
										15B	2 SC	
										18 & 19	2 S.	
										20	2 SN	
										23	7 HG	
										26	1 MG, 60 CH/finch, 2 D., 4 HS	
										27	30 FP, 10 CH	

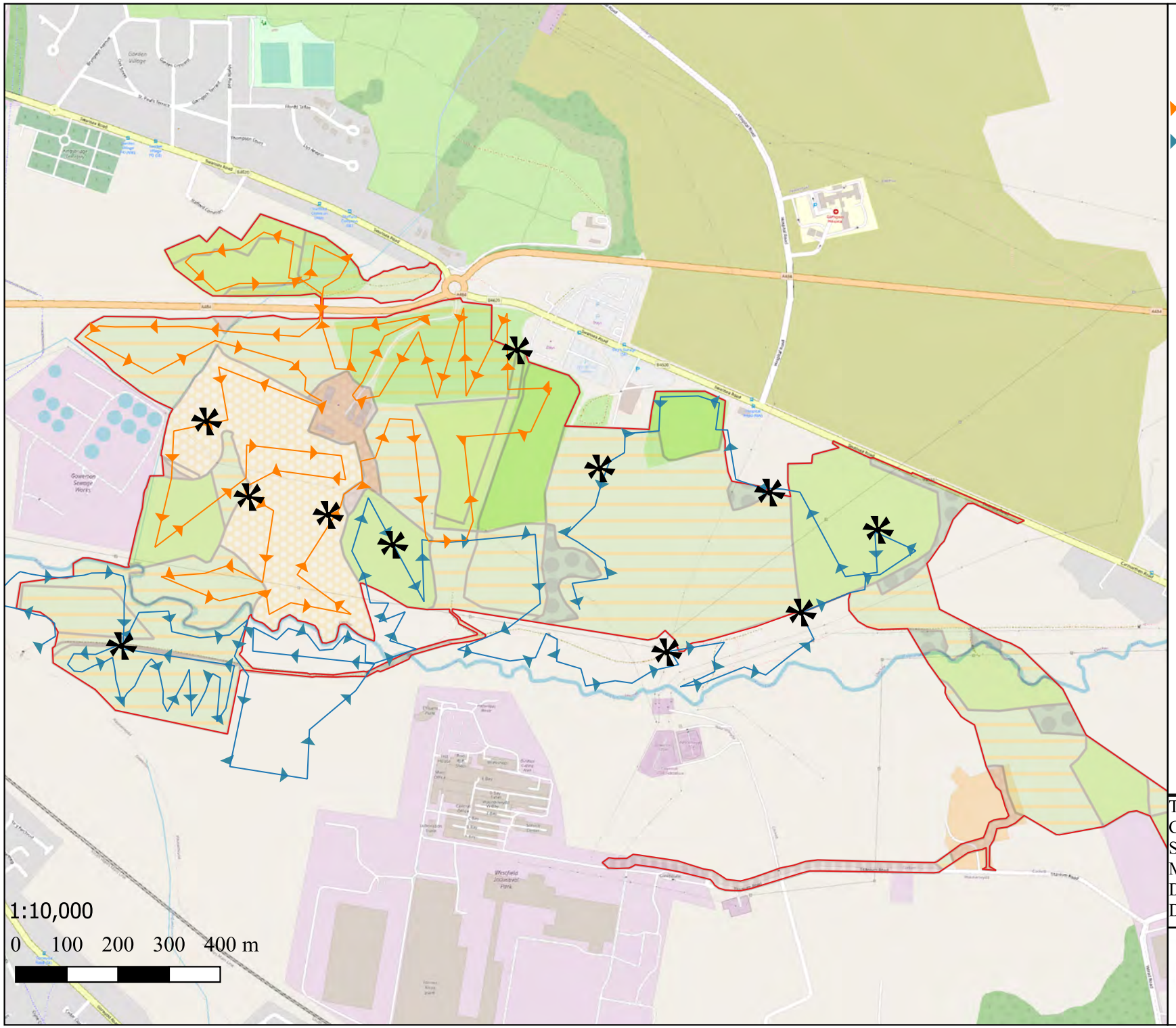
Table 5. Winter Bird Survey data

Wintering Bird Species List		
Code	**Species**	**Max count**
B.	Blackbird	2
BH	Black-headed gull	5
BZ	Buzzard	1
CH	Chaffinch	350
D.	Dunnock	2
FP	Feral pigeon	95
GO	Goldfinch	2
GS	Great spotted woodpecker	1
HG	Herring gull	7
HS	House sparrow	4
JD	Jackdaw	1
LI	Linnet	10
LT	Long-tailed tit	1
MG	Magpie	2
MA	Mallard	4
MP	Meadow pipit	28
MT	Mistle thrush	7
KT	Red kite	1
RE	Redwing	17
RB	Reed bunting	37
R.	Robin	1
S.	Skylark	6
SN	Snipe	3
ST	Song thrush	2
SG	Starling	100
SC	Stonechat	5
T.	Teal	4
WP	Woodpigeon	100
WR	Wren	1

Staff	Date	Time	Temp (°C)	Wind	Cloud (%)	Additional Comments	Common lizard		
							♀	♂	J
LW	3/9/21	11:00:00	17	F1	100	No Reptiles	0	0	0
LH	20/9/21	11:15:00	17	F2	10	No Reptiles	0	0	0
LH	22/9/21	14:00:00	17	F2	80		0	0	1
LH	24/9/21	14:30:00	17	F2	100	No Reptiles	0	0	0
LH	27/9/21	12:00:00	15	F6	50	-	0	0	1
LH	29/9/21	12:00:00	12	F3	0	No Reptiles	0	0	0
LH	6/10/21	17:00:00	16	F2	100	No Reptiles	0	0	0

Table 5.1 Reptile Survey results

Appendix 6 – Further Survey Plans



Legend

- Vantage points
- Transect route 1
- Transect route 2
- Red line boundary

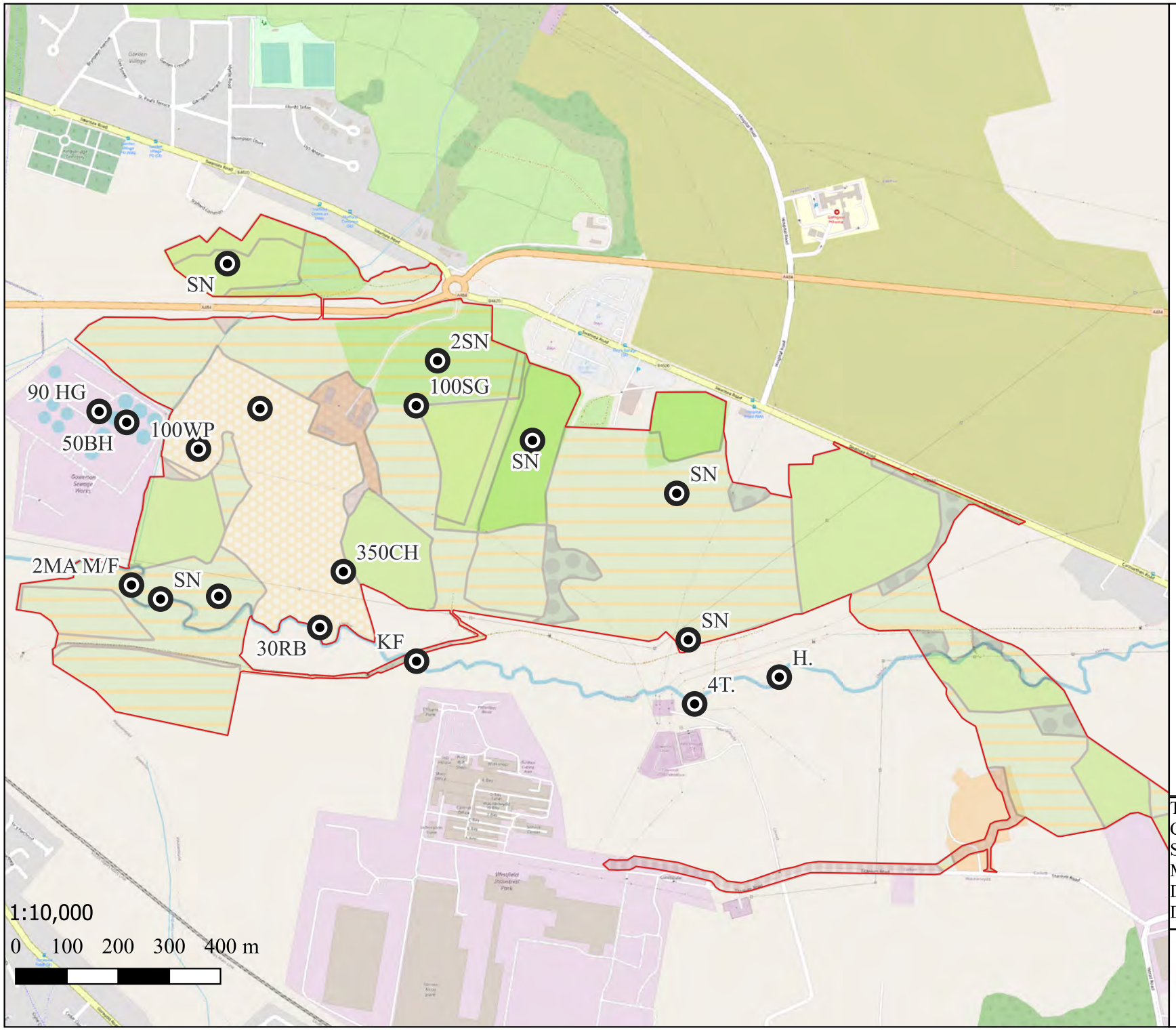
Baseline Habitats

- Other neutral grassland
- Modified grassland
- Other woodland broadleaved
- Mixed scrub
- Non-cereal crops
- Developed land. sealed surface
- Artificial unvegetated unsealed surface

Basemap from open street map

Title: Wintering Bird Survey Transects
Client: Taiyo Power & Storage Ltd.
Site: Parc Solar Caenewydd
Map No: 21/3752.01-09
Date September 2023
Drawn by: AP Checked by: LW

DEVON WILDLIFE CONSULTANTS



Legend

- Bird registrations
- Red line boundary

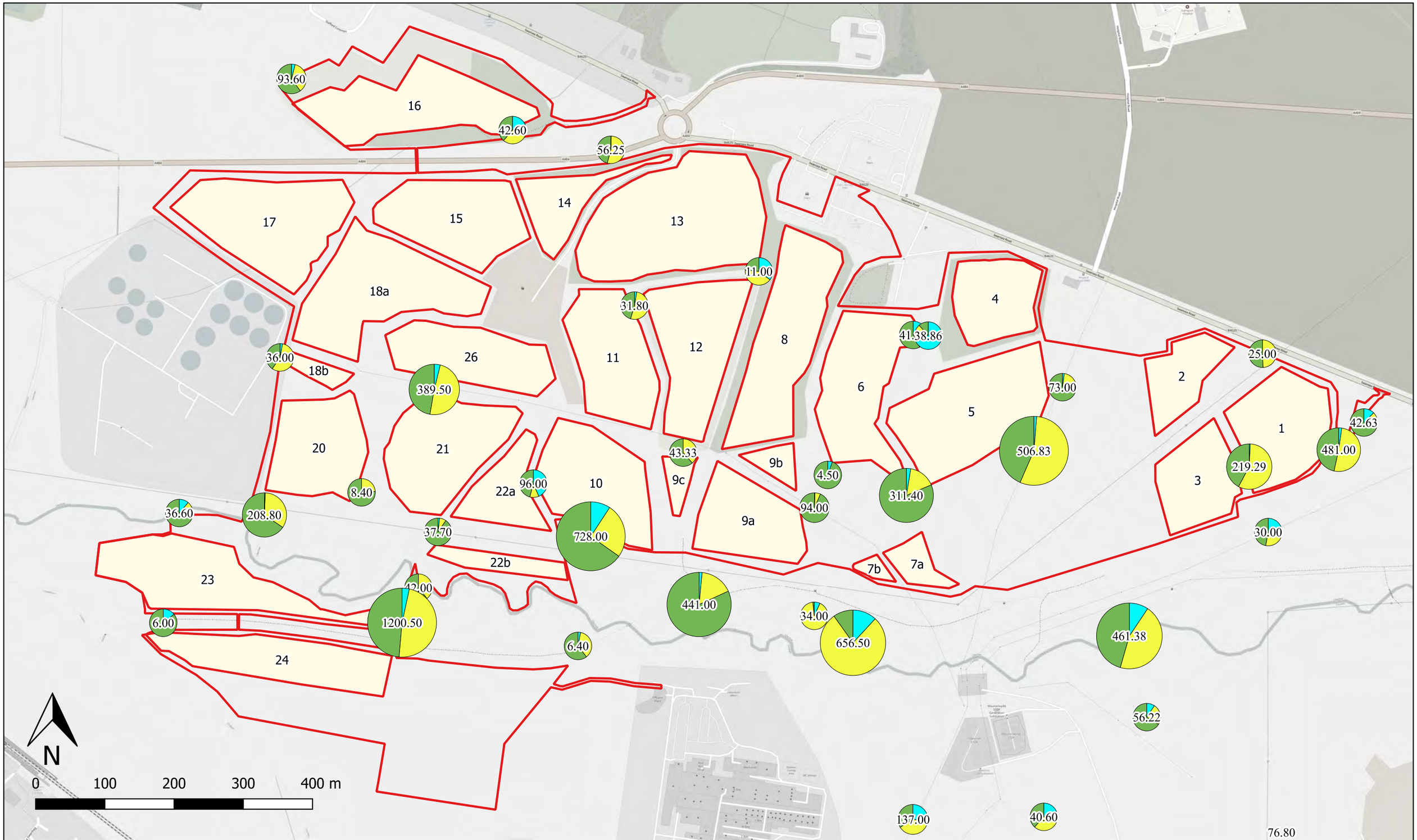
Baseline Habitats

- Other neutral grassland
- Modified grassland
- Other woodland broadleaved
- Mixed scrub
- Non-cereal crops
- Developed land. sealed surface
- Artificial unvegetated unsealed surface

Basemap from open street map

Title: Wintering Bird Survey Results
Client: Taiyo Power & Storage Ltd.
Site: Parc Solar Caenewydd
Map No: 21/3752.01-10
Date September 2023
Drawn by: AP Checked by: LW

DEVON WILDLIFE CONSULTANTS



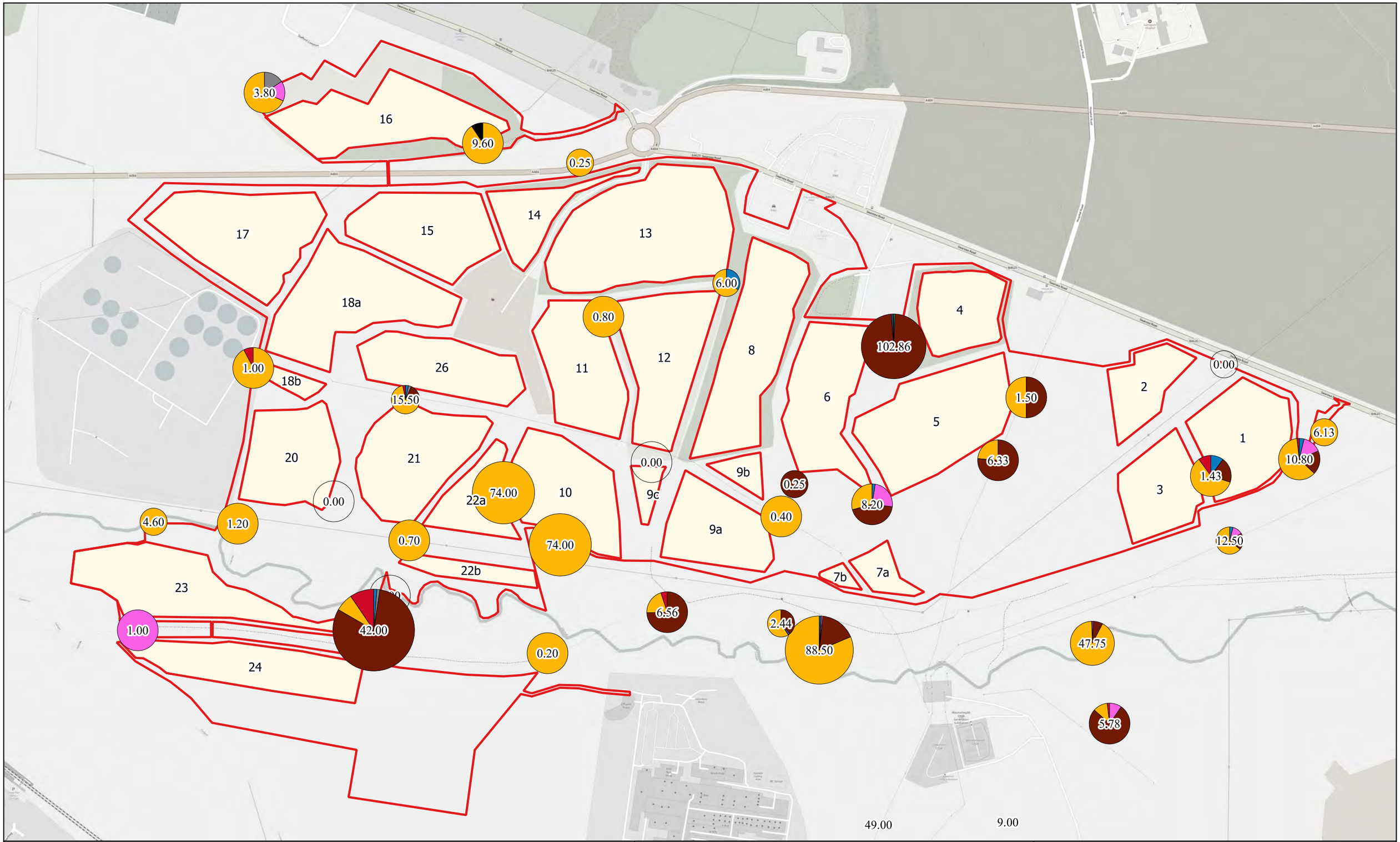
Legend

- Common pipistrelle
- Soprano pipistrelle
- Rest

Remote detector results for common and soprano pipistrelle during the Spring, Summer and Autumn deployments. The Scale of the pie chart and the corresponding label indicates the average number of bat passes per night at the remote detector location.

Title: Remote detector results for common & soprano pipistrelle across the spring, summer and autumn surveys
Drawing No:.21/3752.01-07
Site: Caenewydd Solar Farm
Client: LCA/Kajima
Date: Febuary 2022 Drawn by: JW Checked by: CI

DEVON WILDLIFE CONSULTANTS



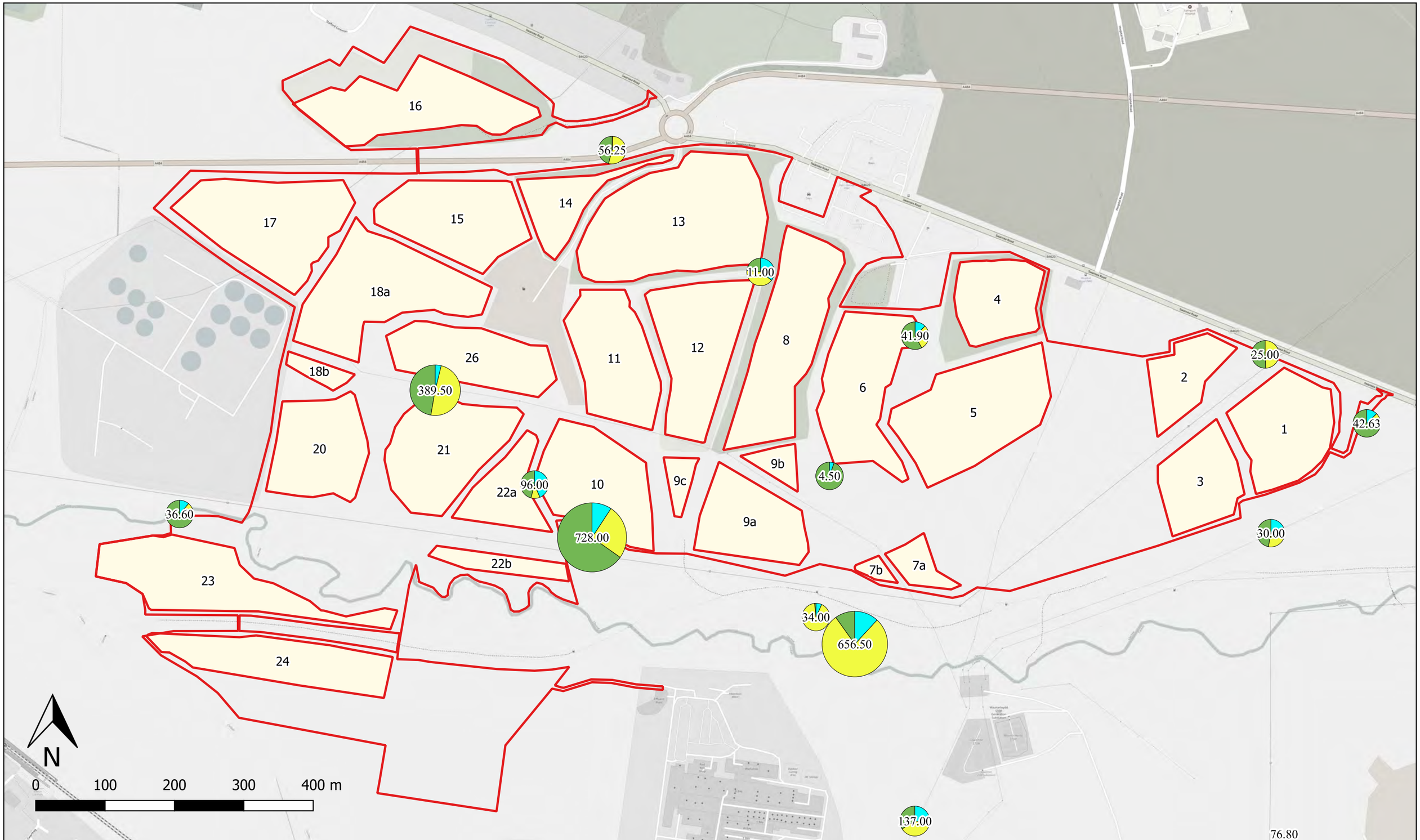
Legend

- Serotine
- Myotis
- Noctule
- Greater horseshoe
- Lesser horseshoe
- Long-eared species
- Leisler's
- Nathusius pipistrelle

Remote detector results for all species excluding common and soprano pipistrelle during the Spring, Summer and Autumn deployments. The Scale of the pie chart and the corresponding label indicates the average number of bat passes per night at the remote detector location.

Title: Remote detector results for all species exlcuding common & soprano pipistrelle during the Spring, Summer and Autumn.
Drawing No:.21/3752.01-08
Site: Caenewydd Solar Farm
Client: LCA/Kajima
Date: March 2022 Drawn by: JW Checked by: LW

DEVON WILDLIFE CONSULTANTS



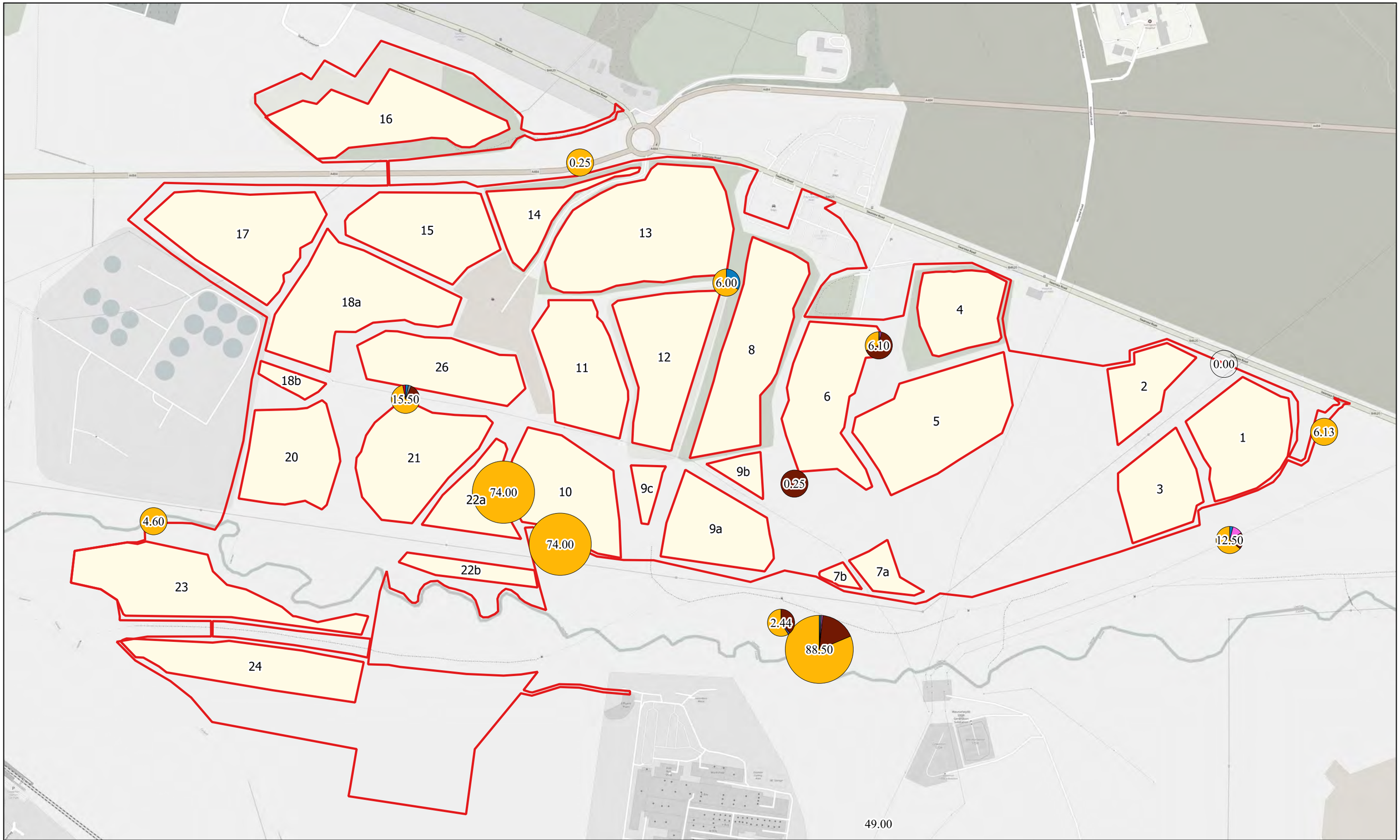
Legend

- Common pipistrelle
- Soprano pipistrelle
- Rest

Remote detector results for common and soprano pipistrelle during the Autumn deployments. The Scale of the pie chart and the corresponding label indicates the average number of bat passes per night at the remote detector location.

Title: Remote detector results for common & soprano pipistrelle in Autumn
Drawing No:.21/3752.01-05
Site: Caenewydd Solar Farm
Client: LCA/Kajima
Date: Febuary 2022 Drawn by: JW Checked by: CI

DEVON WILDLIFE CONSULTANTS



Legend

- Serotine
- Myotis
- Noctule
- Greater horseshoe
- Lesser horseshoe
- Long-eared species
- Leisler's

Remote detector results for all species excluding common and soprano pipistrelle during the Autumn deployments. The Scale of the pie chart and the corresponding label indicates the average number of bat passes per night at the remote detector location.

Title: Remote detector results for all species exlcuding common & soprano pipistrelle in Autumn.
Drawing No:.21/3752.01-06
Site: Caenewydd Solar Farm
Client: LCA/Kajima
Date: March 2022 Drawn by: JW Checked by: LW

DEVON WILDLIFE CONSULTANTS

Legend

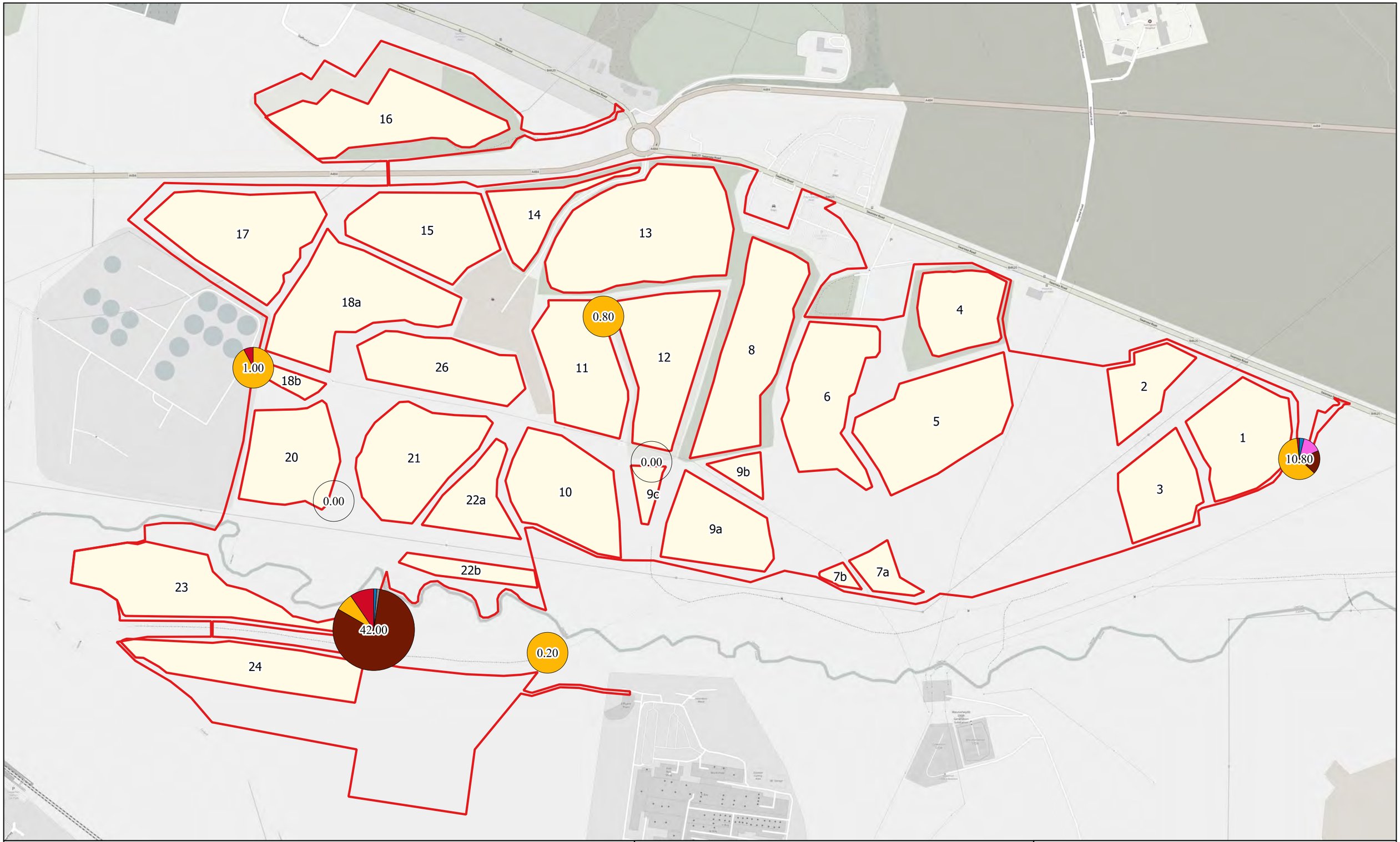
- Common pipistrelle
- Soprano pipistrelle
- Rest

Remote detector results for common and soprano pipistrelle during the spring deployments. The Scale of the pie chart and the corresponding label indicates the average number of bat passes per night at the remote detector location.

Title: Remote detector results for common & soprano pipistrelle in Spring.

Drawing No:.21/3752.01-01
Site: Caenewydd Solar Farm
Client: LCA/Kajima
Date: Febuary 2022 Drawn by: JW Checked by: CI

DEVON WILDLIFE CONSULTANTS



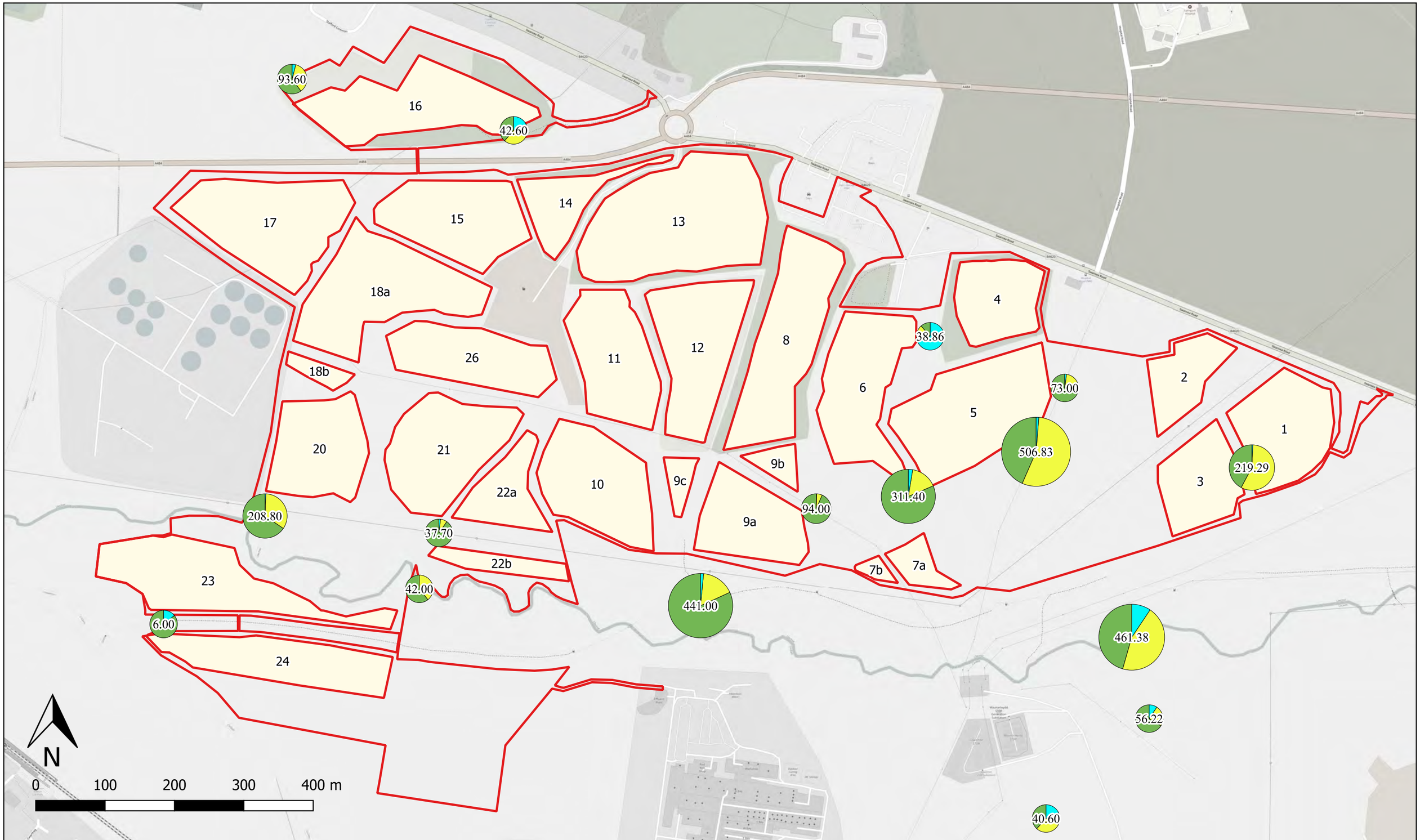
Legend

- Serotine
- Myotis
- Noctule
- Greater horseshoe
- Lesser horseshoe
- Long-eared species

Remote detector results for all species excluding common and soprano pipistrelle during the spring deployments. The Scale of the pie chart and the corresponding label indicates the average number of bat passes per night at the remote detector location.

Title: Remote detector results for all species exlcuding common & soprano pipistrelle in Spring.
Drawing No:.21/3752.01-02
Site: Caenewydd Solar Farm
Client: LCA/Kajima
Date: March 2022 Drawn by: JW Checked by: LW

DEVON WILDLIFE CONSULTANTS



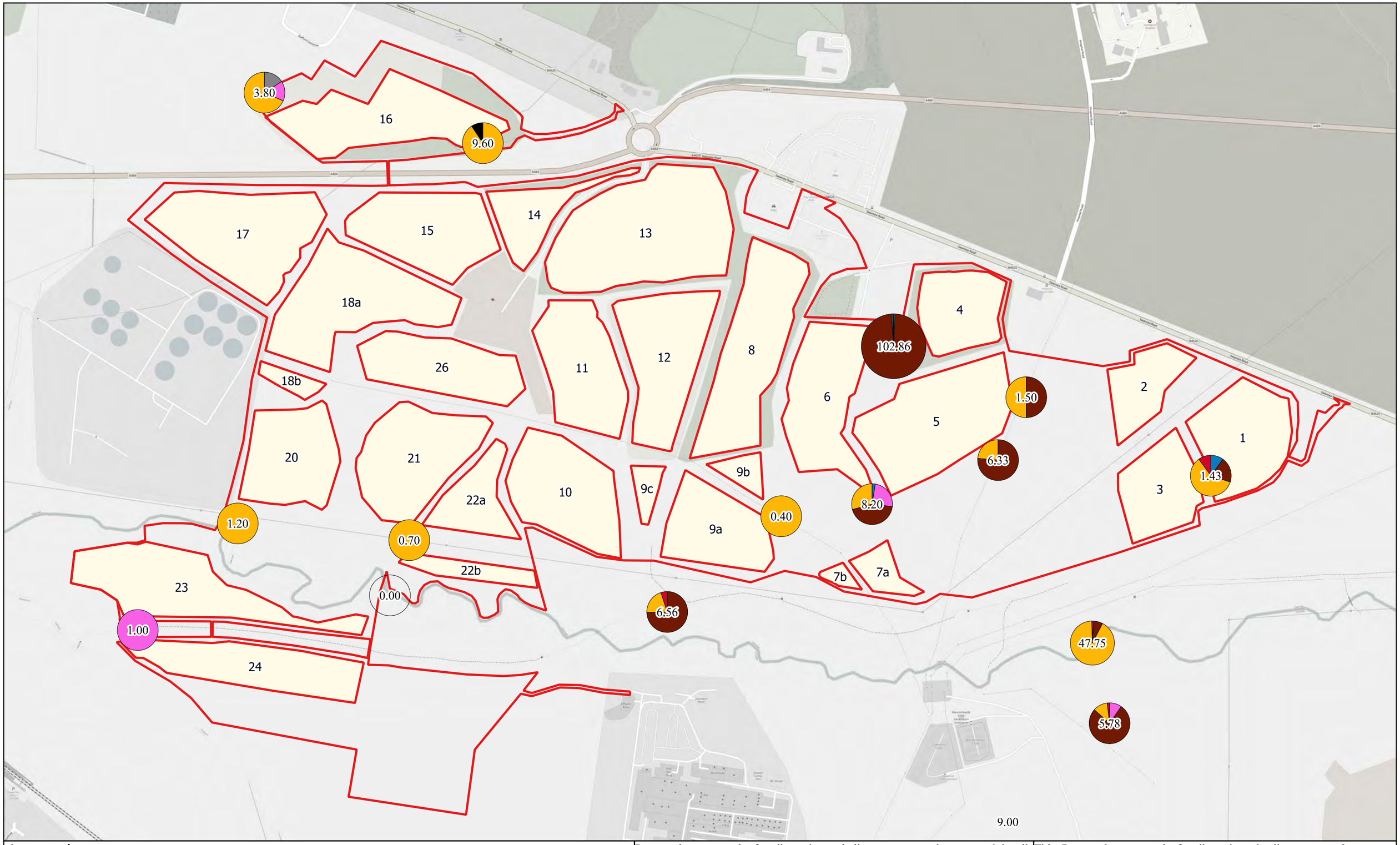
Legend

- Common pipistrelle
- Soprano pipistrelle
- Rest

Remote detector results for common and soprano pipistrelle during the Summer deployments. The Scale of the pie chart and the corresponding label indicates the average number of bat passes per night at the remote detector location.

Title: Remote detector results for common & soprano pipistrelle in Summer.
Drawing No:.21/3752.01-03
Site: Caenewydd Solar Farm
Client: LCA/Kajima
Date: Febuary 2022 Drawn by: JW Checked by: CI

DEVON WILDLIFE CONSULTANTS



Legend

- Serotine
- Myotis
- Noctule
- Greater horseshoe
- Lesser horseshoe
- Long-eared species
- Leisler's
- Nathusius pipistrelle

Remote detector results for all species excluding common and soprano pipistrelle during the Summer deployments. The Scale of the pie chart and the corresponding label indicates the average number of bat passes per night at the remote detector location.

Title: Remote detector results for all species exlcuding common & soprano pipistrelle in Summer
Drawing No:.21/3752.01-04
Site: Caenewydd Solar Farm
Client: LCA/Kajima
Date: March 2022 Drawn by: JW Checked by: LW

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Appendix 7 – Outline Landscape and Ecological Mitigation Plan

Outline Landscape and Ecological Management Plan

Aims and Structure of LEMP

This outline LEMP sets out how processes will be detailed to manage and monitor the site, and its operations, both during and after development, to protect and enhance the biodiversity and ecology of the site. A Detailed LEMP will be produced upon completion of the finalised scheme design and detailed landscaping design.

In accordance with BS 42020:2013, it will also include the following:

a) Description and evaluation of features to be managed.
b) Ecological trends and constraints on site that might influence management.
c) Aims and objectives of management.
d) Appropriate management options for achieving aims and objectives.
e) Prescriptions for management actions.
f) A work schedule (including an annual work plan capable of being rolled forward over a five-year period).
g) Details of the body or organisation responsible for implementation of the plan.
h) Ongoing monitoring and remedial measures.
i) Details of the legal and funding mechanisms by which the long-term implementation of the plan will be secured by the developer.

Protection of Site Biodiversity

The document will include a description of ecological baseline and the habitats and features to be managed as presented in the Ecological Appraisal. It will include precautionary methods of working with regards to: bats, nesting birds, badger, dormouse, otter, reptiles, amphibians and hedgehogs, in line with the Ecological Appraisal construction compliance recommendations.

Toolbox talks will be undertaken prior to commencement of the development, and protective measures and timings and other mitigation measures will be detailed. The LEMP will ensure that the biodiversity of the site can be maintained and protected, and to facilitate the increase in the biodiversity value of the site through habitat creation and management once the works are complete.

Aims and Objectives of Management and Prescriptions

Habitat aims and objectives will be produced for the key habitats shown on the accompanying Outline LEMP drawing and listed below. Outline planting specifications, establishment and general maintenance actions are detailed in the Landscape Strategy (Pegasus Design Drawing No. P21-2998-12 Rev N).

- Hedgerow Planting
- Hedgerow/Woodland Enhancement
- Woodland/Shrub Planting
- Landscape Tree Planting
- Grassland Enhancement within array areas

- Meadow Grassland
- SINC Grassland Enhancement and Restoration
- Tussocky Grassland
- Reptile Habitat Mitigation Enhancement
- Arable Bird Mitigation
- Bird and Bat Boxes
- Leaky Dams

Post-Construction Management and Monitoring

As part of the landscaping contract, all trees, shrubs and hedge planting will be inspected annually for the first five years; failed plants will be replaced with the same species. All tree/shrub guards, ties, stakes and mulch mats (if used) will be removed at the end of five years.

Ecological monitoring will be undertaken annually for the first five years and every five years thereafter. This will comprise habitat conditions assessments and targeted surveys for key species to ensure that habitat creation is established successfully and the management prescriptions are resulting in the proposed target conditions for each habitat. Recommendations for additional or updated remedial management actions will be made if required.

Responsible Body and Long-Term Implementation

Details of the legal and funding mechanisms by which the long-term implementation of the plan will be secured by the developer with the management bodies responsible for its delivery.

The site owners and operators are responsible for the implementation of the LEMP and have allowed for funding associated with management and monitoring works for the lifetime of the scheme. This will comprise instruction of a landscaping company for the habitat creation and agreement with tenant farmer/contractor for ongoing management.

Habitat mosaic including tree and shrub planting and wildflower meadow

Strong habitat corridor across site comprising meadow grassland grading into scrub and hedgerow mosaic

Enhancement and extension of habitat for reptiles including common lizard and slowworm

Leaky dams to be installed along existing ditches to create wetland habitat diversity for associated freshwater plants, invertebrates and amphibians

Arable bird mitigation providing foraging habitat and shelter including for snipe, meadow pipit and finch species

A wide corridor of habitat creation and enhancement along the river, extending and linking valuable habitats as an ecological network including for species such as kingfisher, otter and bat species. To include tussocky grassland and scattered tree planting, in additon to hedgerow links and enhancement

Restoration of an area of priority SINC habitat with associated plants, invertebrates, bats and birds including lapwing

Mynydd Carn-goch

SWANSEA ROAD

Westfield Industrial Park

Legend

- Hedgerow planting
- Ancient woodland (current extent)
- Meadow grassland mosaic
- Habitat mosaic
- Hedge/wood enhancement & buffering
- Landscape tree planting
- Grassland enhancement within array areas
- SINC grassland enhancement
- Reptile habitat enhancement
- Tussocky grassland seeding
- Arable bird mitigation

1:25,000

0 0.5 1 1.5 2 km

N

Title: Outline Landscape & Ecological Management Plan

Client: Taiyo Power & Storage Ltd.

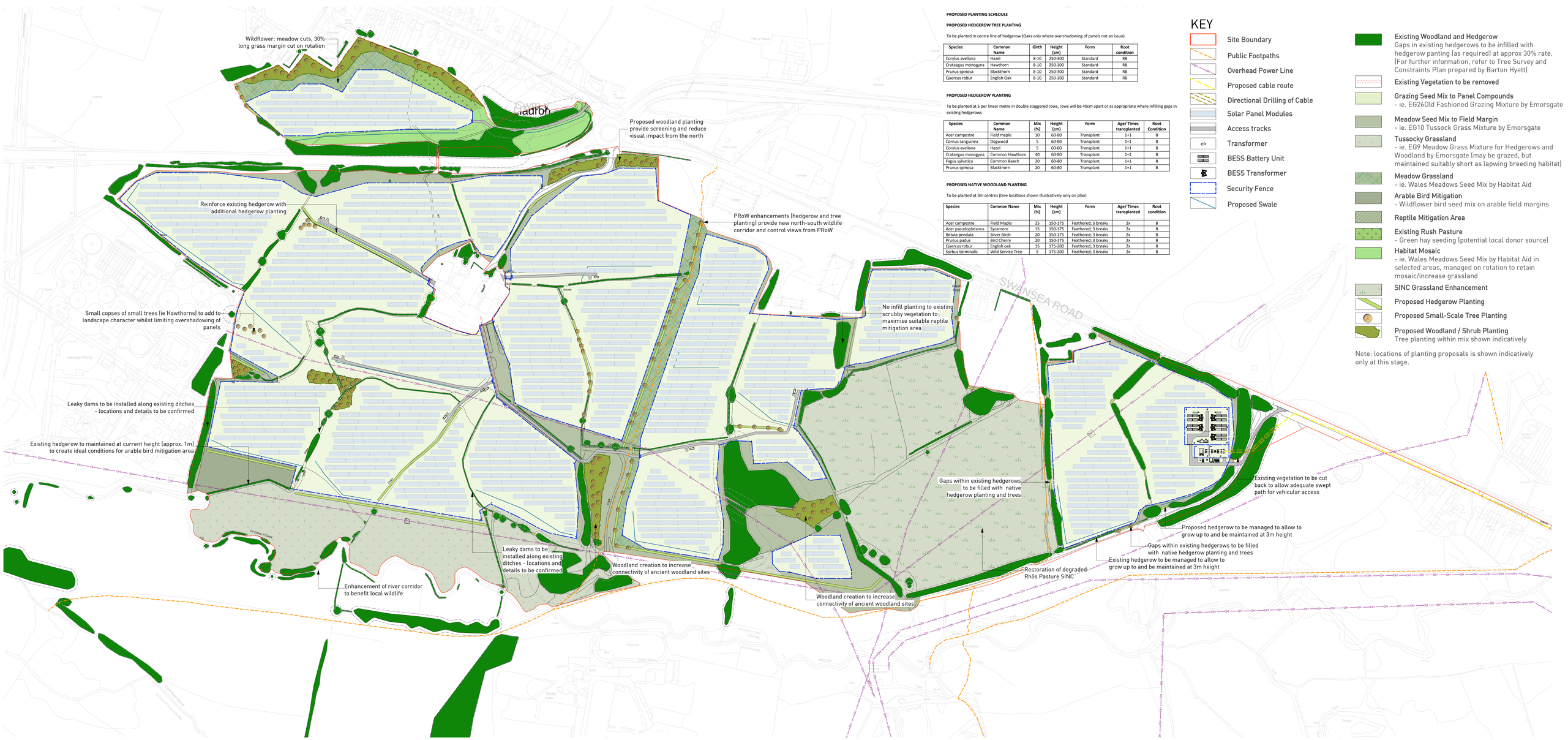
Site: Parc Solar Caenewydd

Date: December 2023

Drawn By: AP

Checked by: LW

DEVON WILDLIFE CONSULTANTS



PROPOSED PLANTING SCHEDULE

PROPOSED HEDGEROW TREE PLANTING

To be planted in centre line of hedgerow (Oaks only where overshadowing of panels not an issue)

Species	Common Name	Girth	Height (cm)	Form	Root condition
Corylus avellana	Hazel	8-10	250-300	Standard	RB
Crataegus monogyna	Hawthorn	8-10	250-300	Standard	RB
Prunus spinosa	Blackthorn	8-10	250-300	Standard	RB
Quercus robur	English Oak	8-10	250-300	Standard	RB

PROPOSED HEDGEROW PLANTING

To be planted at 5 per linear metre in double staggered rows, rows will be 40cm apart or as appropriate where infilling gaps in existing hedgerows

Species	Common Name	Mix (%)	Height (cm)	Form	Age/ Times transplanted	Root Condition
Acer campestre	Field maple	10	60-80	Transplant	1+1	B
Cornus sanguinea	Dogwood	5	60-80	Transplant	1+1	B
Corylus avellana	Hazel	5	60-80	Transplant	1+1	B
Crataegus monogyna	Common Hawthorn	40	60-80	Transplant	1+1	B
Fagus sylvatica	Common Beech	20	60-80	Transplant	1+1	B
Prunus spinosa	Blackthorn	20	60-80	Transplant	1+1	B

PROPOSED NATIVE WOODLAND PLANTING

To be planted at 3m centres (tree locations shown illustratively only on plan)

Species	Common Name	Mix (%)	Height (cm)	Form	Age/ Times transplanted	Root condition
Acer campestre	Field Maple	25	150-175	Feathered; 3 breaks	2x	B
Acer pseudoplatanus	Sycamore	15	150-175	Feathered; 3 breaks	2x	B
Betula pendula	Silver Birch	20	150-175	Feathered; 3 breaks	2x	B
Prunus padus	Bird Cherry	20	150-175	Feathered; 3 breaks	2x	B
Quercus robur	English oak	15	175-200	Feathered; 3 breaks	2x	B
Sorbus torminalis	Wild Service Tree	5	175-200	Feathered; 3 breaks	2x	B

KEY

- Site Boundary
- Public Footpaths
- Overhead Power Line
- Proposed cable route
- Directional Drilling of Cable
- Solar Panel Modules
- Access tracks
- Transformer
- BESS Battery Unit
- BESS Transformer
- Security Fence
- Proposed Swale

- **Existing Woodland and Hedgerow** — Gaps in existing hedgerows to be infilled with hedgerow panting (as required) at approx 30% rate. (For further information, refer to Tree Survey and Constraints Plan prepared by Barton Hyett)
- Existing Vegetation to be removed
- **Grazing Seed Mix to Panel Compounds** - ie. EG26Old Fashioned Grazing Mixture by Emorsgate
- **Meadow Seed Mix to Field Margin** - ie. EG10 Tussock Grass Mixture by Emorsgate
- **Tussocky Grassland** - ie. EG9 Meadow Grass Mixture for Hedgerows and Woodland by Emorsgate (may be grazed, but maintained suitably short as lapwing breeding habitat)
- **Meadow Grassland** - ie. Wales Meadows Seed Mix by Habitat Aid
- **Arable Bird Mitigation** - Wildflower bird seed mix on arable field margins
- Reptile Mitigation Area
- **Existing Rush Pasture** - Green hay seeding (potential local donor source)
- **Habitat Mosaic** - ie. Wales Meadows Seed Mix by Habitat Aid in selected areas, managed on rotation to retain mosaic/increase grassland
- SINC Grassland Enhancement
- Proposed Hedgerow Planting
- Proposed Small-Scale Tree Planting
- **Proposed Woodland / Shrub Planting** Tree planting within mix shown indicatively

Note: locations of planting proposals is shown indicatively only at this stage.

PLANTING SPECIFICATION

These implementation and maintenance guidelines are for planning purposes only to indicate the level of workmanship to be specified and do not constitute a detailed specification.

1. GENERAL

1.1. All landscape operatives will be appropriately trained, certified and qualified to undertake the tasks required. When required, the relevant certificates will be made available for inspection. All work is to be carried out in accordance with the relevant British Standards, Codes of Practice and Legislation.

1.2. All plants shall conform to BS 3936 Nursery Stock Specification for Trees and Shrubs and be in accordance with the National Plant Specification. Supplying nurseries shall be registered under the HTA Nursery Certification Scheme. All plants shall be packed and transported in accordance with the Code of Practice for Plant Handling as produced by CPSE.

1.3. Planting shall not be carried out when the ground is waterlogged, frost bound or during periods of cold drying winds. All bareroot planting stock will be kept covered until actually planted in order to minimise water-loss and prevent the roots from drying out. Tree handling, storage and planting shall be in accordance with BS 8545 Trees: From nursery to independence in the landscape, Chapters 9 to10 and Annexes E to F.

1.4. The landscape contractor shall maintain all areas of new planting for a period of 12 months following practical completion. All stock deemed to be dead, dying or diseased within the defects period shall be replaced by the contractor at his own cost.

1.5. A minimum intervention approach will be used in terms of weed control. In areas of transplant tree/shrub or ornamental shrub planting this is to be achieved by using mulch mats. Weed killer and other chemicals will be used as little as possible on site. Spot removal of weeds will be carried out by hand removal as necessary.

2. TREE PLANTING

Ground Preparation and Tree Pit Excavation

2.1. Where necessary remove existing weeds by hand. Chemical removal using a glyphosate based herbicide (and/ or other suitable alternative) will be avoided unless large areas need clearing – following which allow a suitable period to elapse, as recommended by the manufacturer, for the herbicide to take effect.

2.2. Tree pits of at least 75mm diameter greater than the root system and no deeper than the rootball / container depth are to be excavated and the sides well scarified to prevent smearing. All extraneous matter such as plastic, wood, metal and stones greater than 50mm in any dimension shall be removed from site.

2.3. During excavation of the pit, the soil dug should be placed to one side separating topsoil and subsoil as far as is practical.

Tree Planting

2.4. Trees shall be planted as per the planting arrangement as set out on the planting plan and plant schedule.

2.5. The typical rooting depth for trees is 900mm. The first 300mm shall be made up of topsoil; it shall be ensured that a suitable subsoil provides the remainder of the minimum rooting depth.

2.6. The root system of the tree should be wetted prior to planting. The tree should be planted at the correct depth taking into account the position of the root flare and the finished level - the rootball or root stem transition should be level with the existing host soil or surface. The base of the rootball should typically sit on subsoil, for larger rootballs the subsoil will sit around the lower portion of the rootball.

2.7. Tree pits should be backfilled with the excavated topsoil, if the original topsoil is not available or deemed unsuitable, a multi-purpose topsoil should be used. Any subsoil excavated should be discarded and the subsoil depth (beyond 300mm deep) backfilled with a high sand content subsoil. Backfill should be added gradually, in layers of 150mm to 230mm depth, ensuring the tree is held upright at each stage the fill should be firmed in to eliminate all air pockets under and around the root system, but with care being taken not to excessively compact the soil. The final layer should not be consolidated.

2.8. General-purpose slow release fertiliser (at the rate of 75gm/m2) and Tree Planting and Mulching Compost at the rate of [20litres/m2] are to be incorporated into the top 150mm of topsoil during final cultivations.

2.9. Selected standard trees will be protected from rabbit and deer damage by fitting appropriate tree guards.

2.10. Heavy Standard trees are to be single staked with 75mm dia stakes. Stakes should be driven at least 300mm into undisturbed ground before planting the tree, taking care to avoid underground services and cables etc. and should typically be one third the height of the tree stem above ground.

2.11. Staked trees shall be secured to stakes with suitable proprietary rubber tree ties and spacers.

2.12. Immediately after planting, but before applying the below bark mulch, all trees should be saturated to field capacity.

2.13. Ornamental composted bark mulch will be spread to a depth of 50mm across a 1m dia circle around individual trees, ensuring that the root flare and base of the stem, along with any ground cover plants, are not buried.

3. NATIVE HEDGEROW PLANTING

Ground Preparation

3.1. Where necessary existing weeds will be treated with a glyphosate-based herbicide (and/ or other suitable alternative) and a suitable period allowed to elapse, as recommended by the manufacturer, for the herbicide to take effect.

3.2. All extraneous matter such as plastic, wood, metal and stones greater than 50mm diameter shall be removed from site.

Planting

3.3. The planting arrangement shall be as set out in the plant schedule on the relevant planting plan.

3.4. Bare-root hedge plants shall be notch planted in a double staggered row at the rate of 5 plants per linear metre (using L- shaped notches) using spades of a design suitable for this purpose. The notches must be vertical and deep enough for the roots to hang freely, with the transplant being planted so that the root collar is exactly level with the ground surface. The notch must then be closed and the soil will be well firmed round the roots in line with the guidelines as set out in BS 4428 (1989).

3.5. All bare-root hedge planting stock will be protected from rabbit damage using approved proprietary 600mm clear plastic spiral guards, supported with 0.9m 12/14lb canes as advised by the manufacturer.

Maintenance during first growing season

3.6. All dead, dying or diseased hedge plants will be replaced with plants of similar size and species. If the failure of the plant is due to disease and the disease is considered likely to re-occur then an alternative species may be used as replacement if agreed with the LPA.

3.7. The planting area will be kept weed free throughout the maintenance period by manually removing [or using approved herbicides where necessary in April, June and August].

4. NATIVE HEDGEROW SUPPLEMENTARY INFILL PLANTING

Ground Preparation

4.1. Where necessary existing weeds will be treated with a glyphosate-based herbicide (and/ or other suitable alternative) and a suitable period allowed to elapse, as recommended by the manufacturer, for the herbicide to take effect.

4.2. All extraneous matter such as plastic, wood, metal and stones greater than 50mm diameter will be removed from site to a registered waste disposal facility.

Planting

4.3. The planting arrangement shall be as set out in the plant schedule on the relevant planting plan.

4.4. Bare-root hedge plants shall be notch planted in a double staggered row at the rate of 5 plants per linear metre (using L-shaped notches) using spades of a design suitable for this purpose. The notches must be vertical and deep enough for the roots to hang freely, with the transplant being planted so that the root collar is exactly level with the ground surface. The notch must then be closed and the soil will be well firmed round the roots in line with the guidelines as set out in BS 4428 (1989).

4.5. All container-grown planting stock will be protected from rabbit damage using approved proprietary 600mm plastic shrub shelters, supported with 0.9m x 32mm x 32mm softwood stakes as advised by the manufacturer.

4.6. All bare-root hedge planting stock will be protected from rabbit damage using approved proprietary 600mm clear plastic spiral guards, supported with 0.9m 12/14lb canes as advised by the manufacturer.

Maintenance during first growing season

4.7. All dead, dying or diseased hedge plants will be replaced with plants of similar size and species. If the failure of the plant is due to disease and the disease is considered likely to re-occur, then an alternative species may be used as replacement if agreed with the LPA.

5. NATIVE WOODLAND PLANTING

Ground Preparation

5.1. Cut existing rough grass and weeds to between 20mm and 30mm and remove 300x300mm squares of turf.

Planting

5.2. All native shrub planting to be UK grown, cell grown 60-80cm stock.

5.3. The minimum overall recommended rooting depth for shrubs is 600mm and for trees is 900mm. The first 300mm shall be made up of multi-purpose topsoil; it shall be ensured that a suitable subsoil provides the remainder of the minimum rooting depth. Before receiving topsoil, subsoils should be loosened using ripping equipment; this shall be done when the subsoil is dry to encourage soil shattering. All stones and other objects larger than 50 mm shall be removed from the prepared surface.

5.4. Shrub / tree planting is to be as per the planting pattern as set out on the planting plan and planting schedule, with shrubs / trees planted at even spaces into the prepared soil at the specified number per centre, with minimal disturbance to the rootball, and well firmed in. Planting should avoid man-made grids and lines, and should group species together in groups of 5-7 plants. Spread ornamental pine bark mulch to a depth of 75mm to a 900mm diameter around each planting station.

5.5. All bare-root planting stock will be protected from rabbit damage using approved proprietary 0.6m (for shrub species) or 1.2m (for tree species) plastic shrub/tree guards, supported with 0.9m (or 1.35m for trees) x 32mm x 32mm softwood stakes as advised by the manufacturer.

5.6. All areas to receive native shrub planting to be covered with weed supressing coir matting and pinned into place. Wood chip mulch be spread to a depth of 75mm across the full extent of the coir matting, ensuring that the root flare and base of the stem, along with any ground cover plants, are not buried.

Maintenance

5.7. Using approved herbicides, a 900mm diameter circle centred on each planting station shall be kept weed free throughout the maintenance period. In the autumn following planting the CA will prepare a list of all plants which are dead, dying or diseased and are to be replaced during the following planting season.

6. GRAZING MIXTURE AND MEADOW MIXTURE

Preparation

6.1. Areas of grassland to be seeded shall be sprayed out with a glyphosate herbicide (and/ or other suitable alternative) and cultivated to a depth of 100mm removing all weeds debris and stones over 75mm diameter. The surface shall be raked to smooth flowing contours with a fine tilth.

Seeding

6.2. Seeds shall be sown in September during calm weather and not when the ground is frost bound or waterlogged.

6.3. To achieve an even sowing, bulk with an inert carrier, such as sand. Seed shall be sown in two equal sowings in transverse directions at e.g. EG26 Standard old Fashioned Grazing Mixture and EM2 Standard General Purpose Meadow Mixture, 4g/m2. After sowing the contractor shall roll in the seed to guarantee intimate contact with the soil, ensuring not to rake or cover the seed with soil.

7. GENERAL MAINTENANCE

7.1. The Landscape contractor shall maintain all areas of new planting for a period of 12 months following practical completion. All stock deemed to be dead, dying or diseased within the defects period shall be replaced by the contractor at his own cost. The site is to be visited monthly throughout the year to undertake the Following operations:

- Weed clearance: All planting areas to be kept weed free by herbicide treatment.
- Litter clearance: All litter is to be removed from planting beds.
- Watering: All planted areas are to be watered for the first two years from May to September following any dry periods of 7 days.

Trees and Shrubs

7.2. All trees are to be watered weekly from May to the end of September unless unnecessary due to heavy rain; to receive 20 gallons of water. All shrubs are to be watered for the first two years from May to September following any dry periods of 7 days. All tree ties and stakes are to be checked and adjusted if too loose, too tight or if chafing is occurring. Any broken stakes are to be replaced. Any damaged shoots/branches are to be pruned back to healthy wood. Plants are to be pruned in accordance with good horticultural practice to maintain healthy, well-shaped specimens. Native shrubs - Using approved herbicides a 1m diameter circle centred on each planting station shall be kept weed free throughout the maintenance period. Stakes may be removed from Year 2 if plant is fully established and if shelter is suppressing further growth.

Hedges

7.3. Hedge lines shall be kept mulched until established. At the end of the Defects Liability Period / First Year's Maintenance the CA will prepare a list of all plants which are dead, dying or diseased and are to be replaced during the following planting season at the contractor's expense.

Revisions:
First Issue- 15/06/2022 LAB
A- [21/06/2022 LAB] Landscape proposal updated to client comment
B - [04/07/2022 IHW] Amended to client and ecologists comments
C - [08/07/2022 IHW] Amended to client and comments
D - [14/08/2022 IHW] Proposed pond added, panels simplified
E - [31/10/2022 IHW] Hedgerow alignments amended to central PRoW corridor following comments received from LPA PRoW officer
F - [13/02/2023 IHW] Redline amended; landscape adjusted to revised layout; PRoW alignments updated; connecting cable routes added
G - [28/02/2023 IHW] Redline amended; ecology notes added
H - [01/03/2023 IHW] Solar layout amended
J - [04/10/2023 IBD] Red line amended to exclude southern fields; solar layout amended site-wide; landscape proposals amended to suit revised solar layout
K - [05/10/2023 IBD] Reptile Mitigation Area amended
L - [11/10/2023 IBD] Planting clash corrected
M - [08/12/2023 IBD] Amended to suit layout PSC 100 001 V13
N - [13/12/2023 IBD] Key amended to client comments

Landscape Strategy
Parc Solar, Caenewydd

Client: Taiyo Power & Storage Ltd

DRWG No: **P21-2998_12** REV: **N**

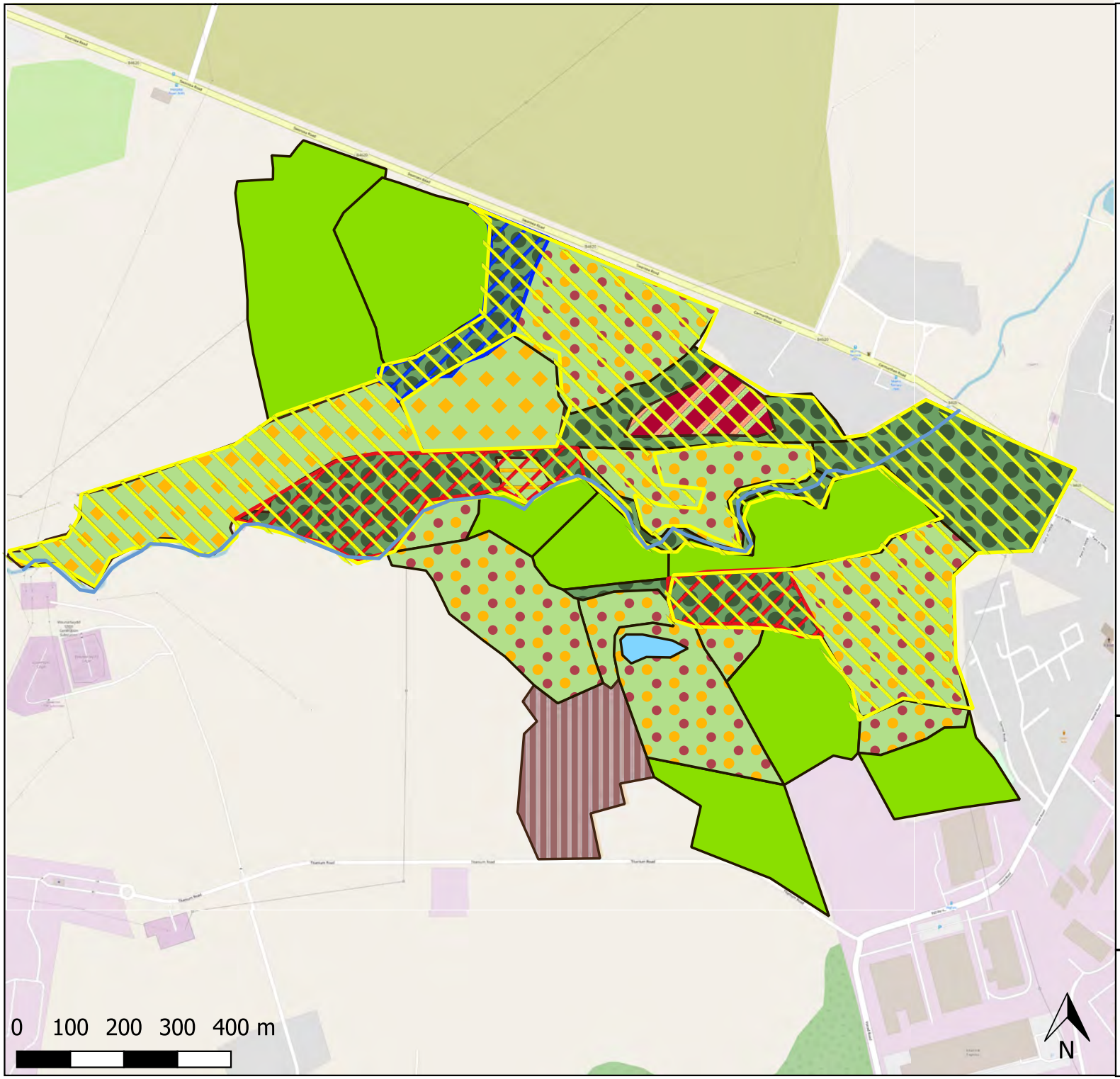
Drawn by : LAB/IBD Approved by: IBD

Date: 13/12/2023

Scale: 1:2000 @ A0

Pegasus Design

Appendix 8 – Ecological Walkover Survey of Cable Route



Legend

Designations

- Ancient Woodland
- SINC
- Resotred ancient woodland

Area Habitats

- Arrethenium neutral grassland
- Lolium-Cynosurus neutral grassland
- Holcus-Juncus neutral grassland
- Modified grassland
- Other woodland-broadleaved
- Purple moorgrass rush pasture
- Developed land
- Pond

Title: Preliminary Ecological Appraisal Map
Map No 22.3752.02-01
Site: Parc Solar Caenewydd Cable Route
Client: Taiyo Power and Storage Ltd.

Date: October 2023

Drawn by: AP

Checked by: LW

DEVON WILDLIFE CONSULTANTS