Preliminary Ecological Appraisal of Wonderbank, Brymbo on Behalf of Brymbo Heritage Trust

Date	Author	Project Number	Approved by	Version	Comments
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Site	Wonderbank, Brymbo	**OS Grid Reference**	SJ 29052 53491
Surveyors	Richard Cutts	**Survey Date**	28/03/2025
Type of Survey	Preliminary Ecological Appraisal		
Summary of Proposed Work	Solar farm with associated infrastructure; underground grid connection to the Brymbo Heritage Site along existing trackways		
Designated Sites Affected	No designated nature conservation sites will be affected by the proposed works.		
Habitats Affected	Scrub has already been removed from most of the site, remaining low-diversity scrub may need to be cleared.		
Species Affected	Amphibians (including great crested newts (GCN)), reptiles and small mammals may be present. Scrub loss has reduced nesting opportunities for birds.		
Survey Conclusions	• Habitats on site are in a transitional state and in the absence of further management they are likely to revert to low diversity scrub • The open habitat (cleared scrub) present to the time of the survey would provide some foraging/shelter for reptiles and amphibians, but very limited habitat for birds, including ground-nesting species • Higher quality habitat is present in the immediate vicinity and well connected to the site • Impacts of the proposed development will mainly be due to disturbance during the works		
Further Surveys Required	• A badger survey will be required prior to the start of works		
Avoidance Requirements	n/a		
Mitigation / Restoration Requirements	• General RAMs have been recommended, including timings of works • A **GCN licence will be required** due to the risk of GCN being present; further RAMs including supervision of works will be required • A **badger licence may be required** if setts are found in the vicinity of working areas • Biosecurity controls will be required to prevent the spread of Japanese knotweed • The open habitat within the site will be restored to species-rich grassland		
Compensation Requirements	• Compensatory tree/shrub/hedgerow planting should be considered to offset the loss of scrub from the site. Due to the site constraints, this would likely have to be done off site.		
Proposed Enhancements	• Creation of species-rich grassland will provide an overall enhancement to biodiversity on the site • Other opportunities for enhancement (both on site or in adjacent areas) could include the creation of refugia/habitat piles, pond creation, and erection of a barn owl nesting box		

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1.0 Introduction

1.1 Project Introduction

1.1.1 Enfys Ecology were commissioned by Brymbo Heritage Trust to undertake a Preliminary Ecological Appraisal (PEA) of an area of land, the 'Wonderbank' off Brake Road in Brymbo (grid reference SJ 29052 53491).

1.1.2 The proposed works involve the creation of a solar farm, with associated energy and security infrastructure, and will include a grid connection to Brymbo Heritage Site.

1.1.3 The Wonderbank is an area of woodland, scrub and grassland immediately to the south of the town of Brymbo, and immediately west of the Brymbo Heritage Site. The proposed development area is on a former colliery spoil heap in the centre of the Wonderbank; the history of the site management and habitats is summarised in Section 2.3).

1.1.4 The primary objectives (CIEEM, 2017a) of a Preliminary Ecological Appraisal Report (PEAR) are to:

- identify the likely ecological constraints associated with a project;
- identify any mitigation measures likely to be required;
- identify any additional surveys that may be required to inform an Ecological Impact Assessment (EcIA); and,
- identify the opportunities offered by a project to deliver ecological enhancement.

1.1.5 This document has been produced to advise a client of ecological constraints and opportunities to inform their design options (avoidance), likely mitigation, restoration and compensation requirements, and the need for further surveys. In addition, the report may provide initial recommendations in relation to relevant ecological enhancement opportunities given the site's context. This report may not necessarily provide the Local Planning Authority with enough information to assess the ecological impacts of a proposal.

1.1.6 This report has been produced in accordance with CIEEM (2017a) 'Guidelines for Preliminary Ecological Appraisal' and CIEEM (2017b) 'Guidelines for Ecological Report Writing'.

1.1.7 This report has been produced by This report has been produced by Richard Cutts. Richard has a background in ecological and geological fieldwork, and has been at Enfys Ecology since 2022. He has significant experience in undertaking Phase1 and UKHab surveys in North Wales. Richard also carries out a range of protected species work, including bats, amphibians, reptiles and badgers. He is a qualifying member of CIEEM.

1.1.8 The report builds upon a recent PEA of the site carried by Dulas in October 2024 to inform the current proposals for the solar farm (Cottrell, 2024). It has also been informed by various ecology surveys and reports carried out by Enfys Ecology at Brymbo Heritage Site since 2017, including a PEA of the Brymbo Heritage Site (Cutts, 2022) and an earlier management plan produced for the whole site (Yardley, 2018).

1.1.9 The survey work to inform this report was carried out in March 2025. Habitats and species found within a discrete area of land are subject to change, this report should therefore be considered valid for a period of eighteen months in accordance with best practice (CIEEM, 2019).

1.1.10 Relevant legislation and planning policy information are included in Appendix A.

1.2 Project Proposals

1.2.1 The reports/drawings provided by the client at the time of production of this PEAR are detailed in Table 1.1.

Table 1.1: Project Information Sources

Information	Organisation	Reference and Date
Proposed site plan	Dulas	Brymbo Community Solar. Figure 2: Proposed Site Layout (version 3a)

2.0 Site Description

2.1 Survey Area

2.1.1 The development area is positioned in the centre of the Wonderbank, and consists of a relatively open area of scrub and grassland surrounded by taller scrub and trees, enclosed by a boundary fence (see Section 2.3 for further discussion on the previous habitats and management). The proposed grid connection Brymbo Heritage Site forms an eastward extension along a grass track and then along the trackway within the heritage site. A wider clearing – an access track and powerlines – runs north-south along the western edge of the development area and links to an electrical substation 160m to the south. Agricultural fields le to the south of the Wonderbank, with the outskirts of Brymbo to the north and the 'ecology area' of the Brymbo Heritage Site immediately to the east. Scrub and woodland on the Wonderbank is separated from woodland within the heritage site by a 5-30m wide strip of open ground. The survey area is shown in Figure 2.1 below.



Figure 2.1: The survey area (red outline)
Base image © Google Maps 2025

2.2 Wider Area - Connectivity and Green Infrastructure

2.2.1 The surrounding area is dominated by agricultural fields and scattered urban areas, with urban density increasing towards the east. Blocks of woodland provide a good degree of habitat connectivity within the wider landscape, supplemented by hedgerows on field boundaries, including within/between some of the urban areas; the most contiguous tracts of woodland follow watercourses, the closest of which are 1.3km and 1.8km to north and south of the site, respectively. Upland areas, including heathland, lie just over 3.3km to the south-west. The wider area is shown in Figure 2.2 below.

2.2.2 (PPW 12, paragraph 6.2.1). Green infrastructure (GI) is defined in Planning Policy for Wales (PPW) Edition 12[1] as "*the network of natural and semi-natural features, green spaces, rivers and lakes that intersperse and connect places*". Green infrastructure (GI) can function at a range of different scales; from entire ecosystems such as wetlands and rivers to parks, fields and gardens at the local scale and street trees, hedgerows, roadside verges, and green roofs/walls at the micro scale. Development proposals should take GI into consideration in order to avoid negative impacts on habitats and species, and seek ways to maintain and enhance biodiversity.



Figure 2.2: The site (red outline) and the wider surrounding area
Base image © Google Maps 2025

[1] See: https://www.gov.wales/planning-policy-wales

2.3 Site History and Previous Management

2.3.1 The proposed development area is situated on top of a coal mine spoil heap. NRW Phase 1 mapping (www.datamapwales.gov.uk) shows the Wonderbank area as neutral semi-improved grassland fringed to the north and west by strips of semi-natural broadleaved woodland. The mapping of these habitats cannot be accurately dated (surveys were carried out between 1979 and 1997), but pre-dates remediation works and clearance of the wider Brymbo steelworks area.

2.3.2 During remediation and clearance works of the wider steelworks area, the coal spoil was capped with clay. Some tree planting was carried out around the central area and on the eastern end of the Wonderbank (see Figure 2.3 below). The bare ground may have been reseeded following the remediation works.

2.3.3 Following the remediation works, grassland and small trees/scrub became established on the Wonderbank. By 2018, it was largely covered by dense scrub and small trees (willow, birch, hawthorn, hazel, gorse and broom), with sparse understorey; more open areas along the footpath and the edges of the scrub had a more diverse and wildflower-rich assemblage (Yardley, 2018). Bramble scrub and tall ruderal vegetation was regenerating where vegetation had previously been cleared along the powerlines in the west of the Wonderbank, and the presence of Japanese knotweed was noted in the north and west of the area.

2.3.4 Previous management recommendations for the Wonderbank were to eradicate Japanese knotweed and to remove the majority of the willow and birch scrub, in part to prevent damage to clay seal above the coal spoil, but also to allow (re)establishment of a meadow grassland on the proposed solar farm site (Yardley, 2018).

2.3.5 Scrub was cleared from the central part of the Wonderbank in 2019; however, grassland was not established/maintained and the area subsequently scrubbed over again. Scrub was cleared again in September 2024 to restart regular habitat management of the site, and in preparation for the solar farm development.



Figure 2.3: The Wonderbank area during remediation works, circa 2006
Image from Goole Earth, © Bluesky, Infoterra Ltd & COWI A/S 2025

3.0 Methodology

3.1 Desk Study

3.1.1 A desk study was undertaken through Cofnod, the North Wales Environmental Information Service, to determine the presence of statutory and non-statutory sites for nature conservation, and records of protected, or species and habitats of principal importance listed under Section 7 of the Environment (Wales) Act 2016. Desk study data was provided by Cofnod on 27h March 2025. The records were used to inform the survey and recommendations, and to provide context for evaluating the species and habitats found during the survey. Any relevant species results from the desk study are referred to in Section 4.

3.1.2 The desk study used a 1km search radii for this project.:

3.1.3 The desk study also included review of the following ecological reports which were made available for this and adjacent sites:

- Enfys Ecology: Brymbo Steelworks Heritage Area - Ecological Management Plan (Yardley, 2018)
- Enfys Ecology: Brymbo Heritage Area - Preliminary Ecological Appraisal (Cutts, 2022)
- Dulas: Brymbo Community Solar Park - Preliminary Ecological Appraisal (Cottrell, 2024)

3.2 Field Survey

3.2.1 The field survey was conducted on 28th March 2025 by Richard Cutts, a suitably experienced professional ecologist.

3.2.2 The weather conditions during the survey were warm and dry.

3.2.3 All parts of the site were visited were possible, the habitats were mapped following the standard Phase 1 Habitat Survey methodology (JNCC, 2010). Any rare or invasive species or incidental sightings of protected species were recorded, as necessary. A search for evidence or potential for protected species was carried out, including amphibians, bats, and reptiles. Evidence of badgers (*Meles meles*) including setts, dung pits, hairs, footprints, and scratching posts or trees was searched for. Trees with suitable features for roosting bats, including knot holes and other crevices, hollow trunks and dense ivy coverage were identified.

3.3 Limitations

3.3.1 Some areas of the site could not be accessed or thoroughly searched due to dense and impenetrable scrub; in general it was not feasible in a reasonable timescale to directly assess the large stands of scrub and trees bordering the proposed development area. These areas were viewed from nearby, and a representative sample of habitats was visited. This is not considered to have affected the results of the survey as vegetation types could be seen and recorded, however it is possible that some plant species were missed even if locally dominant (in a small area).

3.3.2 Habitats on the Wonderbank outside of the proposed development area were not examined in detail. These areas are discussed where relevant in the results of the habitat survey (see Section 4.3). The habitat map in Section 4 should not be taken as definitive with respect to the exact boundaries of habitats to the south and west of the proposed development area, but gives an accurate impression of the habitats represented at the site.

3.3.3 The proposed grid connection to the Brymbo Heritage Site extends beyond the boundary of the Wonderbank and eastwards along a track. The track consists of species-poor semi-grassland (as described in Cutts, 2022) and this area was not included in the survey (other than confirming that there had been no significant changes to the track or surrounding habitat) and is not described in Section 4.4.

3.3.4 The results of this survey consist only of those species encountered during a short space of time on one day. Species that use the site infrequently or are present at different times of the year may not be recorded, and the absence of species from the results of a single survey should not be taken as indicating the species' definite absence from the area in question. Descriptions of plant species concentrate on the most obvious and abundant species present as determinant of habitats present.

3.3.5 While reasonable efforts have been made to search for invasive non-native species (INNS), and any seen were recorded, this is not a comprehensive invasive species survey and does not claim or imply the definite absence of Japanese knotweed or other invasive plants, for which a specific survey should be commissioned. Japanese knotweed was present on site, but was generally closely intergrown with scrub and it is likely that small stands or individual plants with the areas of scrub have been overlooked.

3.3.6 The survey was undertaken at the end of the March, just prior to the optimal season for PEA. Some flowering plants present may not have been visible and so will not have been recorded, but this is considered unlikely to have significantly limited the accuracy of the survey in this instance.

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3.4 Terminology

3.4.1 In this report ‘site’ and ‘survey area’ are used to refer to the area surveyed by the ecologist, which is subject to the proposed development or planning application. The only exception may be some unavoidable use of ‘site’ when discussing designated sites such as SSSIs. ‘Search area’ refers to the area from which data was obtained for the desk study.

3.4.2 English species names are generally (but not exclusively) used in the text for readability, however Appendix C contains a list of species recorded and gives scientific names.

4.0 Results

4.1 Desk Study – Designated and Notable Sites

4.1.1 There was one statutory designated within 1km of the survey area.

4.1.2 There were five non-statutory designated sites within 1km of the survey area.

4.1.3 There were three areas of ancient woodland within 1km of the survey area.

4.1.4 Details of the designated sites are provided in Table 4.1.

Table 4.1: Designated Sites within 1km of the Site

Name	Designation	Approximate distance from site (km)	Reason for designation
Coedwig Ffosil Brymbo/ Brymbo Fossil Forest	SSSI	0.35	Duckmantian Coal Measures that contain an internationally important plant fossil assemblage
Mount Zion	Wildlife Site	0.21	Dense/continuous scrub, marsh/ marshy grassland, semi-improved neutral grassland, standing water
Brymbo Pony Fields	Wildlife Site	0.72	Dense/continuous scrub, semi-improved neutral grassland
Glascoed Wood	Wildlife Site	0.86	Marsh/marshy grassland, semi-improved neutral grassland, semi-natural broad-leaved woodland
Cae Plasmostyn Bach	Wildlife Site	0.99	Semi-improved neutral grassland
Brymbo Fossil Forest	RIGS	0.35	Duckmantian Coal Measures that contain an internationally important plant fossil assemblage

4.2 Desk Study – Species Records

4.2.1 Cofnod hold 493 records within 1km of the site from the previous 20 years, including 74 records of UK and European protected species; individual records can include a number of sightings and therefore reflect the minimum number of plants or animals of a given species observed in the area. There were no records from within the survey area itself, and only one record from within the wider Wonderbank area.

4.2.2 The results of the desk study for protected fauna are detailed in Table 4.4, Section 4.7. Results of the Cofond data search are provided in Appendix B; full data (e.g. specific locations) has not been provided for sensitive data.

4.2.3 There are no records of notable flora from within the study site. There are six records of native bluebell (*Hyacinthoides non-scripta*), a species protected by the Wildlife and Countryside Act 1981 (as amended), from within 1km of the site.

4.2.4 There are five records of invasive non-native species from within a 1km grid square overlapping the Wonderbank, all dating from 2010 and referring to plants found in the

former Brymbo Steelworks area. The species are Japanese knotweed, Japanese rose, Himalayan cotoneaster, Portugal laurel and white stonecrop. New Zealand pigmyweed, sea-buckthorn, cherry laurel, montbretia and variegated yellow archangel have all been recorded with 1km of the site.

4.2.5 There are no records of fungi within 1km of the site, suggesting a lack of recorder effort for fungi in the area.

4.3 Phase 1 Habitat Survey

4.3.1 The following Phase 1 Habitat and feature types were recorded within or adjacent to the site:

A1.1.1	Broadleaved woodland – semi-natural
A1.1.2	Broadleaved woodland – plantation
A2.1	Dense scrub
B6	Species-poor semi-improved grassland
C3.1	Tall ruderal
J2.4	Fence
J5	Other – here used for an area of bare ground/cleared scrub

4.3.2 A Phase 1 Habitat map with target notes is provided in Figure 4.1 below. Descriptions of the habitats are provided in Table 4.2 with information associated with target notes provided in Table 4.3. Where relevant, photographs are included with the text.

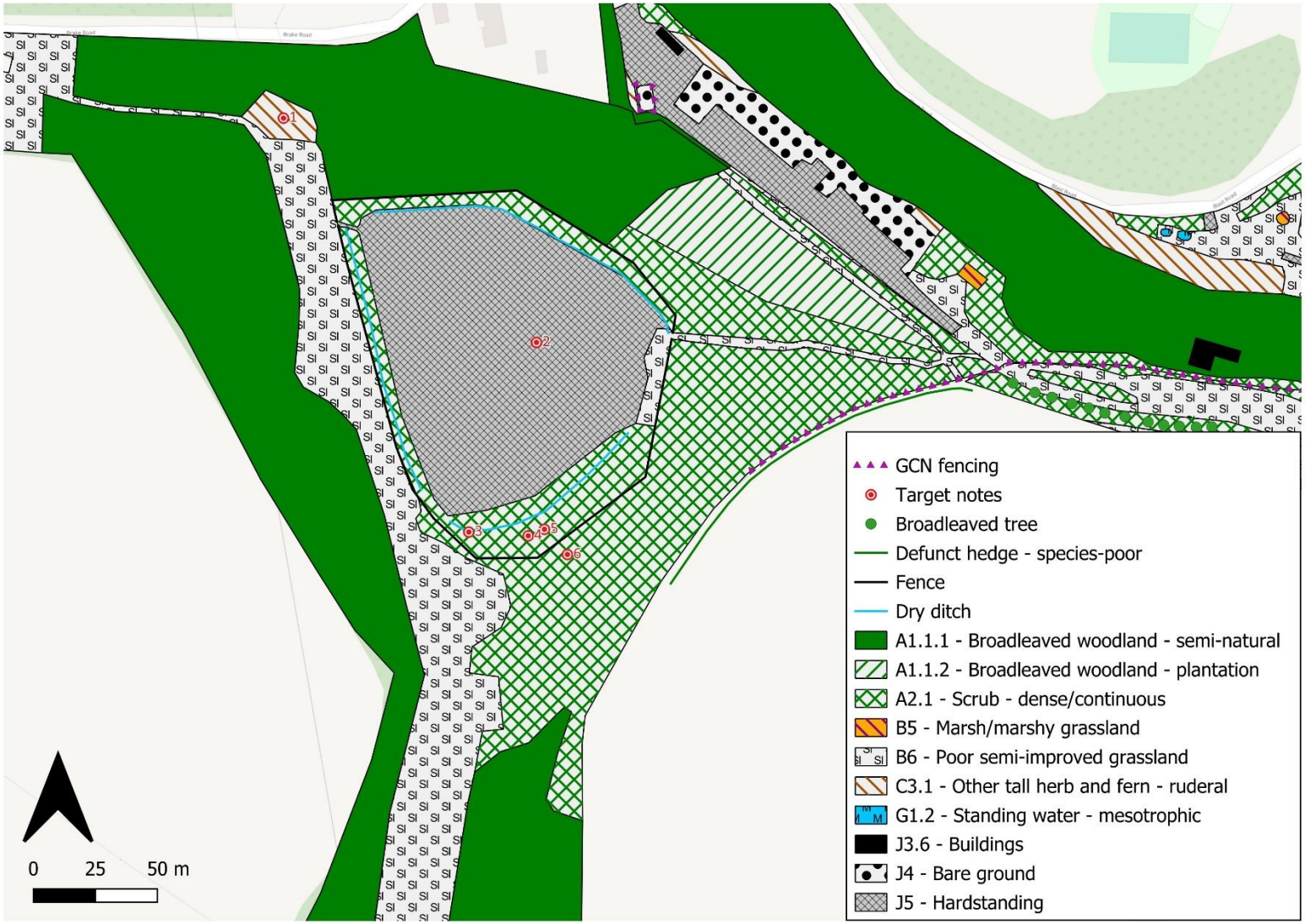


Figure 4.1: Phase 1 Habitat Survey Map

Base image © OpenStreetMap Contributors 2025

Table 4.2: Habitat Descriptions

Bare ground/cleared scrub	
The majority of the site consisted of an area of open ground, littered with brash, the result of clearance of scrub from this area in 2024. Below and between the brash, both bare soil and patchy vegetation were present. While some bare ground had clearly been created by machinery churning the surface, the sparse vegetation throughout this habitat was most likely a reflection of a very sparse understorey being present prior to clearance of the scrub. Refuse was scattered throughout this habitat, as were occasional piles of soil. Vegetation, where present, was variable but very low diversity, and consisted of mosses, short grass (creeping bent, Yorkshire fog), hard rush, horsetails, and various forbs including willowherb/rosebay, nettles, cleavers, bittercress, mouse-ear, creeping buttercup and bramble. Large sedges (likely pendulous sedge) were locally abundant, particularly close to the edges of the site. The former scrub species were not identified but, based on previous habitat descriptions (Yardley, 2018) and surrounding habitat, were mostly likely dominated by birch and willow. The former scrub would have been classified as dense scrub, and the area is likely to rapidly revert to this in the absence of regular management; however, the scrub was absent at the time of the survey and the intention is to manage this area to prevent its regrowth. This habitat lacked distinctive flora and features to clearly fit within established Phase 1 habitat classifications, and has therefore been mapped as 'other habitat'. However, it did share features with several habitats and is best considered as a complex mosaic of the following habitats:	 **Cleared scrub in the centre of the site (view east)**  **Cleared scub in the centre of the site, with a pile of rubble, dirt and waste material (view south-east)**  **Cleared scrub in the centre of the site (view north)**  **Cleared scrub at the western edge of the site (view north)**

- J4 - Bare ground: Bare soil and brash could be considered as bare ground under Phase 1 classification, but patchy vegetation accounted for approximately 30% of the area; later in the season, growth of grass, ruderal species and scrub will likely mask the extent of bare ground.

- B6 - Species-poor semi-improved grassland: Grass was present in patchy carpets, with very low diversity of grasses and forbs, and no indicator species of other grassland types; however, bare ground accounted for a significant area, even in places where grass was most well established.

- J1.3 - Ephemeral/short perennial: Habitat generally associated with 'waste' ground, and typically has a similar character to the cleared area, but no typical species of this habitat were observed on the site; ephemeral/short perennial plants, if present, would have been young and potentially obscured by brash.

- C3.1 - Tall ruderal: Ruderal species were present and locally abundant (particularly around piles of dirt and stones), but young and inconspicuous; their abundance is likely greater than initial observations suggest, and these species may dominate large parts of the site later in the season.



Large sedges growing through brash



Bare soil with patchy moss and grass, and fragments of brash



Patchy but relatively diverse vegetation associated with soil and gravel pile in the centre of the site

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Scrub	
Scrub was present along the boundaries of the site, and extended to the south and east. Inside the northern site boundary, this was a narrow strip of young birch and willow, transitioning northwards into taller, densely packed birch and willow at the edge of a small block of woodland. Ground flora was low-diversity and similar to that in the adjacent cleared area, although less sparse; mosses, grass and large sedges were the dominant plants. Similar scrub, which also contained bramble, gorse and taller birch trees formed a wider strip inside the western site boundary. A larger block of scrub was present at the southern end of the site, similar in composition to the scrub at the western edge. A narrow track running through it was bordered by tussocky grasses (Yorkshire fog, cock's foot), hard rush and abundant primrose and large sedges. Japanese knotweed was also scattered throughout this area of scrub, as individual plants or small stands. Scrub to the east of the site, which bounded the path that will be used for the grid connection to the Brymbo Heritage Site, had a higher diversity with additional species including hawthorn, blackthorn, broom and dog rose. Ground flora was sparse, except in more open areas including the margins of the path, and again consisted mainly of grasses and mosses.	 **View east adjacent to the northern site boundary; thin strip of brich and willow scrub (left) between woodland and the cleared central area (right)**  **View west across scrub at the western site boundary**  **Scrub at the southern end of the site**  **Path through scrub at the southern end of the site**

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Path at the eastern end of the Wonderbank, bordered by diverse scrub

Species-poor semi-improved grassland

A patch of low diversity semi-improved grassland was present at the eastern edge of the site, and extending downhill to the eastern corner of the Wonderbank as a path. The grassland generally had a short sward dominated by creeping bent and perennial rye grass, but areas of taller sward (at the margins, and transitioning into scrub understorey) were dominated by tussocky Yorkshire fog and cock's foot. Other flora included white clover, ribwort plantain, creeping buttercup, willowherb/rosebay, small patches of hard rush, and in the taller sward, thistles and sorrel. The eastern path also had a significant amount of bare ground.

The areas of shorter sward had the lowest diversity and were closer to improved grassland than semi-improved grassland in terms of their composition. However, this may be a structural difference reflecting management rather than a notable floral change, and it was not practical to divide the areas of grassland at the resolution of the mapping; therefore, the grassland had all been mapped as 'species-poor semi-improved grassland'.



Semi-improved grassland at the south-eastern edge of the site, with areas of tall sward (left) and short sward (right); view south-west



Semi-improved grassland at the south-eastern edge of the site, with areas of tall sward (right) and short sward (middle); view north-east



Semi-improved grassland at the eastern edge of the site, leading eastwards (downhill) along the path to the Brymbo Heritage Site



Path at the eastern end of the Wonderbank, bordered by diverse scrub

Dry ditch

Dry ditches were present along the edges of the site. The flora in them was indistinguishable from the open/bare ground areas and the scrub ground flora. The northern ditch had been colonised by small birch trees and, notably contained numerous fragments of plastic tree guards. Flora in the southern ditch, which was largely overrun by scrub, was most diverse and included giant horsetail and abundant large sedges.



Fragments of plastic tree guards in the northern ditch

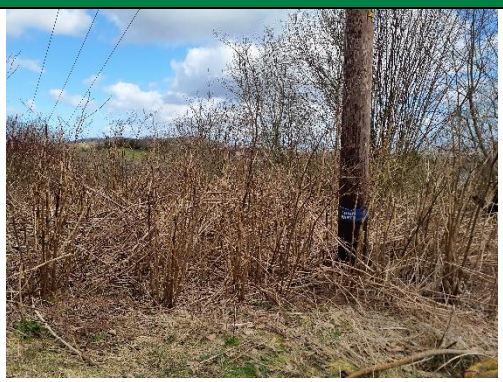


Birch saplings in the northern ditch

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	 **Ditch at the western margin of the site (middle), within scrub**	 **Dense birch saplings and large sedges dominating the southern ditch**

Table 4.3: Target Note Descriptions

Target Note	Description
1	A large stand of Japanese knotweed was present to the north-west of the site. 
2	This area has also been recently cleared of bracken and planted with young trees, mostly willow species. 
3-6	Individual/small numbers of knotweed; more may be present but plants were difficult to distinguish within the scrub as they were not in leaf at the time of the survey.

4.4 Flora

4.4.1 Floral diversity of the site was very low on average, due in part to large areas of the site having been recently cleared of scrub, but also due to the scrub understorey being generally sparse. Floral density was greatest along the margins of the proposed development area (and adjacent habitats), where ditches, grassland and scrub were present.

4.4.2 None of the species recorded during the survey are protected by the Wildlife and Countryside Act 1981 (as amended) or listed under Section 7 of the Environment (Wales) Act 2016. No other nationally or locally rare species were recorded.

4.4.3 Bluebells are present in the local area, but are more typical of woodland, hedgerows and fields than the habitats on site. They could potentially grow in more open areas including the recently cleared central area of Wonderbank. However, whilst they would not have been in flower at the time of the survey, emergent bluebells would have been apparent amongst the brash and bare ground and, as none were observed, it is considered unlikely that they are present on site.

4.4.4 Appendix C contains a list of plant species recorded during the survey.

4.5 Invasive Non-Native Species

4.5.1 Japanese knotweed was present within the survey area, within the remaining scrub close to the southern boundary, and a large of stand of Japanese knotweed was also present to the north-west of the survey area. Japanese knotweed was previously widespread on the Wonderbank, particularly in the north and west (Yardley, 2018), and has been reduced but not entirely eradicated through subsequent management.

4.5.2 None of the other invasive non-native species recorded from the local area (see Section 4.2.4) were observed within the survey area or adjacent parts of the Wonderbank, and they are considered unlikely to be present.

4.6 Fungi

4.6.1 Fungi were not specifically searched for as part of this survey, which was carried out at a time of year when many species would not have fruiting bodies. Scarlet/ruby elf cup were observed in the cleared area at the centre of the site (the two species are indistinguishable without the use of microscopy), and are associated with dead wood in woodlands including birch scrub and willow carr.

4.7 Fauna

4.7.1 No protected or notable species or signs of the presence of protected or notable species were seen within the survey area during the survey.

4.7.2 The survey results for protected species including records within a 1km radius of the site are described in Table 4.4 below.

Table 4.4: Results of Protected and Notable Species Assessment

Species	Suitability of Habitat	Desk Study Records	Further Species Consideration Required?
Amphibians – including great crested newts *Triturus cristatus* (GCN)	The site has no standing water, and so there was limited breeding habitat for amphibians within the survey area; however, breeding populations of amphibians including great crested newts are present in ponds within the Brymbo Heritage Site ecology area, approximately 130m to the west. Existing amphibian exclusion fencing, which restricts amphibians moving between the ecology area and the wider area of the former Brymbo Steelworks, runs along part of the southern edge of the Wonderbank. The development area is 'inside' the amphibian fencing. There is good habitat connectivity between the ponds and the development area, including scrub, strips of rough grassland and vegetated ditches. Refuse, disturbed soil and brash present in the development area at the time of the survey would provide shelter for amphibians. Great crested newts are therefore very unlikely to breed on site, but given there is an established population very close by and the site is accessible to them, it is very possible that they are using the terrestrial habitats on site and may be encountered during the works.	There are eight records of great crested newts within 1km from the site; the closest is 95m east of the site. There are 25 records of common amphibians (common frog, common toad, palmate newt, smooth newt) within 1km from the site; the closest is 95m east of the site.	Yes
Badger *Meles meles*	No evidence of badgers was seen. The site is suitable for badger foraging and they are very likely to use the site. The area is likely to be suitable for sett building in places. As no evidence was seen, it is not thought likely that a sett is present in the vicinity of the development area, however, the presence of a sett cannot be ruled out in the areas which could not be accessed. [redacted]	[redacted]	Yes

Table 4.4: Results of Protected and Notable Species Assessment

Species	Suitability of Habitat	Desk Study Records	Further Species Consideration Required?
Bats	The site is unlikely to be suitable for roosting bats, there were no trees large enough to support large enough gaps, cracks or crevices for bat use. Narrow-trunked birch and willows under 5m high were the only larger trees, and it is unlikely bats are resident on site. The entire area is very suitable for bat foraging, and bats likely fly around or across it. Larger trees in the north and west of the wider Wonderbank area may have roost features but have not been surveyed. Woodland in the ecology area to the east is also likely to have trees with roost features. Several species of bats are also known to forage around and roost within the buildings in Brymbo Heritage Site (Hughes, 2020; Cutts, 2023a),	There are four Cofnod records of bats within 1km of the site, including common pipistrelle and *Myotis* species. The closest records for both species are 320m to the east at the 'Agent's House', where a common pipistrelle roost is present. Other bat species recorded from the Foundry Area at Brymbo Heritage Site include lesser horseshoe and brown long-eared, including day roosts and hibernation roosts (Cutts, 2023a).	Yes – foraging only
Birds	All of the taller vegetation on site should be considered suitable habitat for nesting birds. There is less potential for ground nesting species as the cleared area in the centre of the site is very exposed (the previous scrub habitat would have provided nesting opportunities), and other open areas are relatively small and, being close to footpaths, likely subject to regular disturbance. Well established scrub and woodland immediately adjacent to the site would provide valuable nesting and foraging habitat for a range of bird species.	There are 290 records of 60 species of birds within a 1km radius of the site. Records include numerous Schedule 1 species: Barn owl, brambling, fieldfare, peregrine, red kite, redwing. The closet records of Schedule 1 species are barn owl at the 'Agent's House', 320m to the east.	Yes
Hedgehog *Erinaceus europaeus*	The entire site is suitable for hedgehogs.	There are 12 records of hedgehog within 1km, the closest being 440m south-east of the site.	Yes

Table 4.4: Results of Protected and Notable Species Assessment

Species	Suitability of Habitat	Desk Study Records	Further Species Consideration Required?
Reptiles	The entire site area is suitable for reptile species, particularly the interface between scrub and rough grassland/open ground areas, which are also suitable for basking. Brash and refuse currently present on the site would provide shelter for reptiles. There is good habitat connectivity for reptiles, particularly along the edges of scrub and paths, within the wider landscape.	There is one record of grass snake within 1km, 380m to the north-east. A small population of common lizards has also been recorded from Brymbo Fossil Forest, 350m to the south-east (Cutts, 2023b).	Yes
Other species	The area does not have habitat suitable for otter (*Lutra lutra)*, water vole (*Arvicola amphibious*), red squirrel (*Sciurus vulgaris)* or other protected species.	There are no records of otters, water vole or red squirrel within 1km of the site.	No

5.0 Discussion

5.1 Proposed Works

5.1.1 The proposed works to the site include the installation of solar panels with associated infrastructure and security. An underground grid connection will be made to the Brymbo Heritage Site, following existing tracks. Figure 5.1 below shows the current plans for the site.

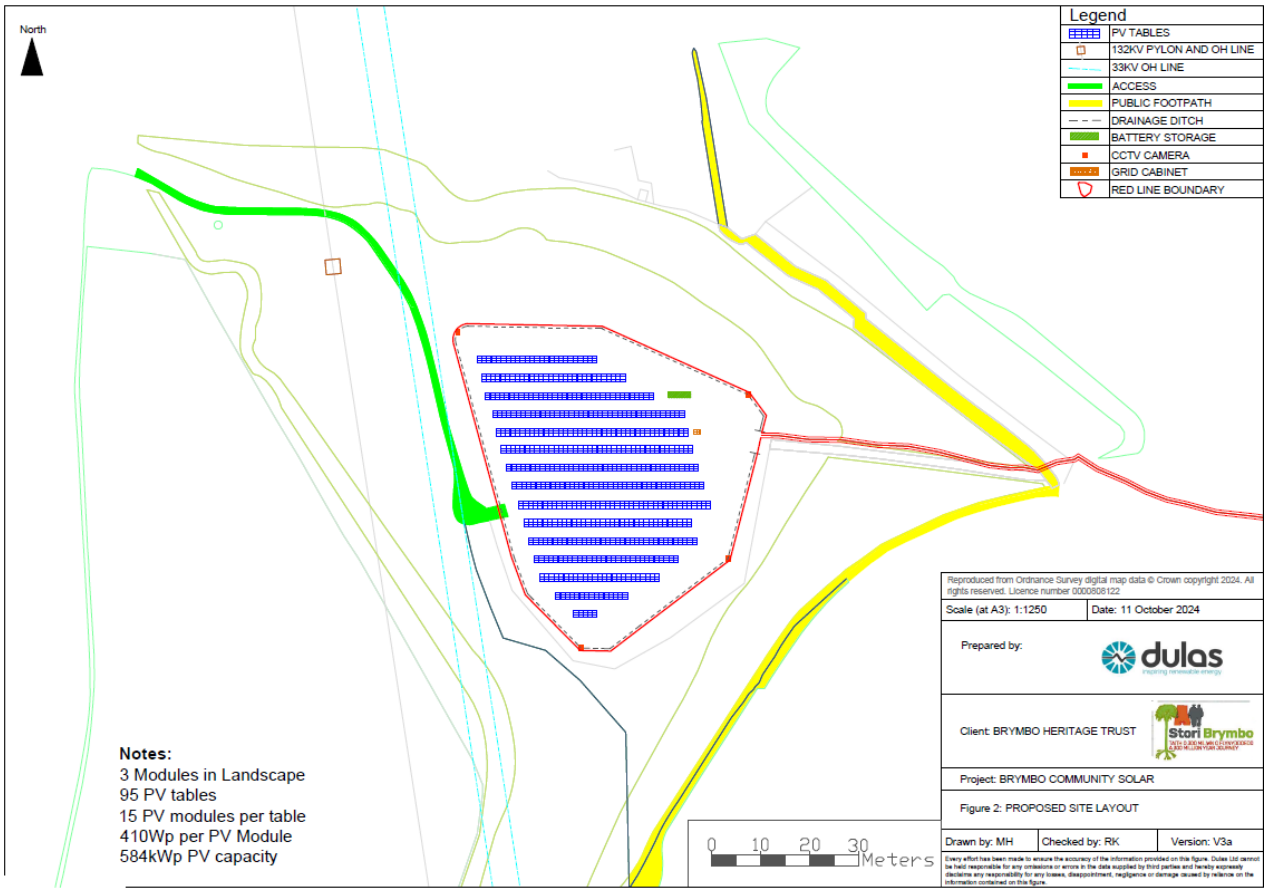


Figure 5.1: Plan of the Proposed Works
Base image © Dulas 2024

5.2 Impacts on Designated and Notable Sites

5.2.1 The proposed works will not have an impact on any statutory or non-statutory designated nature conservation sites.

5.2.2 The works will not have an impact on areas of ancient woodland identified within a 1km radius of the study site.

5.3 Habitats

5.3.1 Table 5.1 provides information with respect to the habitats which were recorded on site and whether these habitats are listed as a 'habitat of principal importance' under Environment (Wales) Act 2016 or listed as a local Biodiversity Action Plan habitat, or other local conservation priority habitats. Consideration of the potential impacts of the proposed project on the habitats are also discussed.

Table 5.1: Overall Site Assessment Rating

Habitat Recorded	Habitat Value	Brief Discussion
Other habitat – cleared scrub	-	Habitat is in poor condition and reflects a transitional state following site clearance. Some habitat will be lost as a part of the works.
Scrub	-	Large area of (presumably) low-diversity scrub has been lost due to clearance. Remaining scrub within the site boundary has some ecological value but is relatively low diversity; higher diversity scrub and woodland is present to the north and east, outside of the development area.
Semi-improved grassland	-	A small area of low diversity grassland will be damaged/ disturbed as part of the works
Key: HPI – Habitat of Principal Importance under Environment (Wales) Act 2016 ACBP – Anglesey Corporate Biodiversity Action Plan (date)		

5.3.2 Clearance of scrub from the central area of the Wonderbank has reduced diversity and left a disturbed transitional habitat that currently lacks a distinctive flora. It was not possible to assess the ecological value of the previous scrub cover but, based on previous surveys (Yardley, 2018) and remaining habitat on site, it likely had a dense cover of birch and willow with an impoverished ground flora. This would have provided shelter and foraging for a range of bird and mammal species, although higher quality scrub and woodland borders the site.

5.3.3 In its current condition, the cleared area will provide good habitat for invertebrates (particularly due to the amount of brash left to decay in situ), and provides better foraging for reptiles and amphibians than the scrub would have. However, this habitat is considered to be transitory and likely short-lived.

5.3.4 In the absence of further management, the area of cleared scrub is anticipated to transition though a mixture of low-diversity tall ruderal/ephemeral flora into low-diversity scrub. Regular clearance of scrub and tall herbs may allow grassland to become established, although this is unlikely to have particularly high diversity without further intervention (e.g. reseeding and an appropriate program of mowing/strimming), and will be hampered by the amount of brash currently left on site.

5.3.5 The areas of grassland within the development area are species-poor and unremarkable, although rougher grassland around the margins had higher diversity and ecological value. Installation of the underground grid connection will cause damage to and disturbance of the

lowest quality grassland but, as they will continue to be maintained as tracks, these areas are expected to be reinstated to grassland following the works in which case there will be negligible long-term impact.

5.3.6 Most of the botanical interest in the site was in the scrub at the southern edge of the site and bordering the eastern path. Based on the current plans and the extent of the preparatory clearance, these areas may be unaffected by the current proposals; however, it is likely that at least some of the remaining scrub within the boundary fence in the centre of the Wonderbank will need to be removed to enable the works.

5.3.7 There is an opportunity to improve the habitats on site post-development, which will need to be regularly managed regardless in order to prevent scrub species developing in proximity to the solar farm.

5.4 Flora

5.4.1 None of the plant species recorded during the survey are protected by the Wildlife and Countryside Act 1981 (as amended) or listed on Section 7 of the Environment (Wales) Act 2016. In addition, no nationally or locally rare species were recorded.

5.5 Fauna

5.5.1 The primary impact of the scheme on fauna using the site is likely to be disturbance associated with the works, as destructive works associated with site clearance have already been carried out. Some low-quality habitat has been lost, and will primarily affect nesting/foraging birds and small animals; however, better quality habitat is available for these species in the immediate area and will remain undisturbed. The impact of this is likely to be outweighed by the enhancements to the site.

5.5.2 ***Amphibians*** **-** The site has suitable foraging habitat for amphibians, especially with the central area being cleared of scrub but with brash left in place for shelter, and there are records of great crested newts (GCN) a short distance away (95m). Therefore amphibians including GCN are very likely to be present on site and may be encountered during any works. Amphibians are considered unlikely to be breeding within the site as no suitable breeding habitat was recorded, but it is not impossible there are small pools of standing water hidden in the scrub. Therefore some basic Reasonable Avoidance Measures (RAMS) should be put in place during any works to minimise any risk of harm to amphibians, these are provided in Section 6.3. Due to the high risk of GCN being present, **a GCN mitigation licence will also be required**, which will have an accompanying method statement setting out further specific mitigation requirements.

5.5.3 ***Badger*** **-** The site is very suitable for badgers, and setts may be present in close proximity to working areas. In addition to general RAMs provided in Section 6.3, **badgers surveys must be carried out prior to works starting**, including a thorough search of adjacent scrub/woodland

for active setts. **Any works in proximity to an active badger sett will require a licence and additional mitigation measures** (see Section 6.3.5).

5.5.4 ***Bats*** - The site is unlikely to be used by roosting bats, but bats probably use the area for foraging. The works are considered unlikely to significantly affect bats or bat use of the site, as no further vegetation clearance and no increase in lighting is proposed. No surveys or mitigation will be necessary for bats; however, if additional lighting is required, mitigation measures for lighting must be considered (see Sections 6.2 and 6.3).

5.5.5 ***Birds*** **-** No evidence of nesting birds was seen within the site, but this is expected as the survey took place towards the start of the typical nesting season. All of the trees, scrub and shrubs on and adjacent to site would provide suitable nesting and foraging opportunities and must be considered potential nesting habitat. The cleared area at the centre of the Wonderbank provided no suitable cover for ground-nesting birds and rougher grassland around the margins was limited to narrow strips. RAMs detailed in Section 6.3 will be followed to prevent disturbance to nesting birds.

5.5.6 ***Hedgehog*** **-** The site has good potential for hedgehogs and good connectivity to other suitable hedgehog areas. However, the works are considered unlikely to negatively affect hedgehogs, and no mitigation measures are proposed, other than those covered under the Site General Reasonable Avoidance Measures in Section 6.3.

5.5.7 ***Reptiles*** **-** The site is considered suitable for reptiles, and a population of common lizards is known to be present a short distance (350m) from the site. Clearance of scrub, whilst leaving brash in situ, has (temporarily) improved the habitat for reptiles. As with amphibians, the works are unlikely to have a significant negative impact on reptiles; however, the RAMS set out in Section 6.3 should be put in place to minimise any impacts on any reptiles encountered during the scheme.

5.5.8 ***Other Species*** **-** No specific mitigation is necessary for other protected species as none are expected to be present. General RAMS set out in section 6.3 should be followed, and will also minimise any potential impacts on any other small animals using the site.

5.6 Fungi

5.6.1 As the site was formerly grassland (see Section 2.3), a high diversity/ancient grassland fungal assemblage may have originally been present. Coil spoil sites can also have unique fungal assemblages. However, previous works to cap the coal spoil at the Wonderbank were destructive and likely removed/seriously degraded any pre-existing fungal assemblages. The birch/willow scrub present prior to recent clearance therefore likely has an immature/low diversity fungal assemblage; rare or scarce species are considered unlikely to be present, and further fungi surveys will not be required.

5.7 Invasive Non-Native Species (INNS)

5.7.1 Japanese knotweed was present in the scrub in the south of the site, and a large patch to the north-west of the site; it was previously widespread across parts of the Wonderbank but there have been previous attempts to eradicate it that appear to have reduced its area. There is potential for Japanese knotweed to be encountered anywhere within the site, including access tracks, and it will require control, and in particular efforts to prevent spreading this plant.

5.7.2 Japanese knotweed is a highly invasive plant, capable of regeneration from small fragments of plant material, and can cause significant damage to habitats and property. Eradication of Japanese knotweed will require commitment to several years of control, and strict biosecurity controls to prevent the spread of contaminated material. **Seeking advice from a company that specialises in knotweed control is strongly recommended.**

5.7.3 Care must be taken not to cut knotweed or disturb soil surrounding the plants, even in the course of other management activities (e.g. thinning scrub), as small fragments can easily be spread to establish new plants.

5.7.4 It is recommended that identified knotweed plants are clearly marked with spray paint to aid in their location for control purposes and to prevent accidental disturbance during other activities.

5.7.5 Individual plants can be treated with herbicide during the growing season; again, seeking specialist advice on control measures and a management plan is strongly recommended.

5.7.5 Any knotweed material, including potentially contaminated soils, must be disposed of as controlled waste at a licensed landfill that can accept said material. Alternatively, waste material can be piled, buried or burnt on site; NRW should be notified prior to burying or burning any material on site, as additional control measures may be required. A knotweed specialist will be able to provide advice on disposal methods.

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6.0 Avoidance, Mitigation and Restoration

6.1 The Step-Wise Approach

6.1.1 Development proposals should take green infrastructure into consideration in order to avoid negative impacts on habitats and species, and seek ways to maintain and enhance biodiversity. Impacts on habitats and species should be treated in a step-wise manner (Planning Policy Wales PPW12, paragraph 6.4.15), by seeking to:

- **Avoid** damage to biodiversity in its widest sense by maintaining the largest possible area of existing habitat supporting biodiversity and functioning ecosystems, particularly Section 7 habitats and species where present, through careful development design and consideration of long-term maintenance and management and ensuring that retained habitats continue to be well connected to adjacent habitats to provide connectivity for key species.
- **Mitigate** or **restore** by identifying measures to address the specific negative effects by repairing damaged habitats and disturbed species. The measures should seek to restore in excess of like for like, accounting for disturbance and time lags for the recovery of habitat and species, and in every case, mitigation or restoration measures should seek to build ecosystem resilience within the site and where possible the wider area.
- As a last resort off-site **compensation** for unavoidable damage must be provided. This must be of significant magnitude to fully compensate for any loss.
- All development must **deliver a net benefit** for biodiversity and ecosystem resilience from the baseline state (proportionate to the scale and nature of the development proposed).

6.2 Avoidance

6.2.1 Based on the ecological information set out in this Preliminary Ecological Appraisal, there will be no impacts on any Habitats of Principal Importance for Wales.

6.2.2 With respect to the potential impact of bats from lighting associated with development schemes, the Institute of Lighting Professionals (2023) 'Bats and Artificial Lighting at Night' guidance suggests that the ecological mitigation hierarchy applies to lighting design: Impacts to biodiversity should be avoided in the first instance through design and where this has been clearly demonstrated not to be possible, appropriate mitigation needs to be put in place. Compensation is the least desirable option, so all other avenues should first be explored and ruled out. In parallel, opportunities to design lighting betterment for biodiversity should be sought wherever possible.

6.2.3 It is therefore important to integrate avoidance measures into developmental design, by retaining ecologically functional 'dark corridors' within schemes wherever feasible, and in preference to seeking lighting mitigation strategies. Consideration should be given to the lighting effect of a scheme on Key Habitat and Supporting Habitat areas for bats, as well as commuting routes.

6.2.4 The presence of Japanese knotweed both on/adjacent to the site and its access routes means that there is a high risk of spreading this highly invasive plant in, within and off site unless

biosecurity procedures are followed at all times. General biosecurity measures which should be adopted as part of any development project are provided in Appendix E. Any soil, dirt or plant material must be considered contaminated and either disposed of securely on site, or treated as controlled waste and removed to licensed landfill. Clothing, tools and vehicles must be free of dirt and plant material prior to leaving site.

6.3 Mitigation

6.3.1 This section sets out the likely mitigation measures which could be adopted as part of the project to minimise potential impacts on biodiversity features.

6.3.2 The following general mitigation measures should be adopted at all times during the works:

- Prior to the start of works, a toolbox talk should be given to everyone involved in the project to set out any ecological protection measures and a log of this should be kept.
- Working areas should be kept to the minimum required.
- Works should be avoided within 1 hour of dawn and dusk where possible, in order to avoid disturbance to nocturnal animals. If works during this time are needed, all lighting should be directional and directed away from boundary edges and any surrounding habitat.
- Storage of fuel must follow best practice. Potential pollutants should be restricted to site compounds and hardstanding areas. Spill kits should be readily available throughout the works.
- Should it be necessary to have any excavations left open overnight a suitable ramp (such as a plank or branch) must be provided to allow badgers, and other animals to escape the pit. Ramps could be created by grading the slope at the edges or using scaffold boards.
- All materials brought onto site should be stored on hard standing where possible. Materials should be stored on raised pallets or bagged, to prevent amphibians (or other wildlife) from taking refuge beneath them.
- Any terrestrial mammals seen must be allowed to leave the area on their own. If this is not possible e.g. the animal is injured or trapped then an ecologist must be called.
- If at any point in the works an amphibian or reptile is found within the works area all works in the vicinity of the sighting must immediately cease. Common amphibians should be moved from the working area by site workers (wearing gloves) and placed in a nearby hedgerow. Reptiles will usually retreat to a safe area of their own accord. If, at any point, GCN are discovered during the works then works will have to stop and a licence may be required from NRW before they can continue.

6.3.3 The following mitigation measures should be adopted during the construction-phase in order to minimise any potential impacts on habitats or species.

6.3.4 ***Amphibians / Reptiles*** – Additional RAMs will be followed to minimise the risk to reptiles and amphibians, including GCN. Any additional specific mitigation requirements for GCN will be detailed in the method statement for the GCN mitigation licence which will be required for these works.

- Groundworks and clearance of any piles of brash, rubble, plant material or other 'habitat piles' should avoid colder months due to the possibility of disturbing hibernating animals including amphibians and reptiles. These works should be avoided between October and April or when daytime temperatures are below 10°C.

- Brash, rubble and waste material must be cleared from the working areas prior to the commencement of any works. This should be carried out under the supervision of an ecologist, and clearance by hand is preferred where ever this is possible. Brash and rubble can be piled to create refugia in areas at the edge of the site, outside of working areas (also see Section 7.2.4).

- An ecologist must check the working area immediately prior to the commencement of any groundworks.

- To discourage amphibians and reptiles from moving into working areas, vegetation in working areas should be maintained at a short height. Should any taller vegetation need to be cleared this should be carried out in a directional manner, working from the centre of the site towards the edges, under supervision of an ecologist. Vegetation should be cut to a height of no less than 15cm, then left for a minimum of 24 hours before cutting it down to ground level.

6.3.5 ***Badgers*** - A pre-works badger survey must be completed to ensure that badgers have not started to inhabit the suitable habitat areas within or adjacent to the site prior to the commencement of development. If at any point a badger sett is discovered on or adjacent to the site, then a suitably qualified ecologist should be informed; the ecologist will assess the sett and advise if any further action is required. No works should take place within 10m of a sett, and not within 30m if using machinery, unless under an appropriate licence. **Works in close proximity to an active badger sett are likely to require a licence and must not proceed until one is obtained**.

6.3.6 ***Bats*** - After avoiding, wherever possible, the potential impacts of Artificial Lighting At Night (ALAN) through scheme designs, if further mitigation measures are required in the form of lighting controls, ILP (2023) recommend that a lighting professional helps to select those light sources, lamps, LEDs and their fittings which are most appropriate for the project. Further details regarding lighting designs from ILP (2023) are given in Appendix D. The following overarching mitigation measures are recommended:

- Careful choices would need to be made about the type of lighting chosen for a scheme, and this should be designed through a multi-disciplinary design approach.

- Whilst Part Night Lighting (PNL) schemes and the installation of LED lights may have energy-saving benefits, they can result in an increase in light intensity, impacting on bat behaviours, and the lighting design for each site should be developed using information from bat surveys, and pre-development light level data.

6.3.7 To minimise disturbance to nesting birds, bats, and other nocturnal animals, illumination of surrounding habitat (e.g. scrub and woodland) should be avoided during and post-works. Any post-works lighting, such as security lights, should follow ILP (2023) guidance, as detailed in Appendix D.

6.3.8 ***Hedgehogs*** - Care must be taken regarding clearance of any piles of brushwood, rubble, plant material or other 'habitat piles' in the colder months due to the possibility of disturbing hibernating animals including hedgehogs. Such piles should not be disturbed between October and April or when daytime temperatures are below 10°C.

6.3.9 ***Nesting Birds*** – All vegetation clearance during the nesting season (March-September inclusive) may impact nesting birds, and so further survey may be required in order to establish if nests are present. Therefore it is recommended that as far as possible all vegetation clearance takes place outside these months. If this is not possible, all vegetation to be cleared MUST be thoroughly checked for nests, immediately prior to the works**; if any active nests are present all works in the vicinity must cease until all chicks have fledged**.

6.4 Restoration

6.4.1 Loss of the existing vegetation from much of the site area will be unavoidable, but these losses will be offset through the reseeding of the development area to create a wildflower-rich grassland. A brownfield site wildflower mix has been proposed for the site (Cottrell, 2024; BFS 14 - Brownfield Site Wildflower Mix (Open Mosaic Habitat on Previously Developed Land) - 80% Flora - Phoenix Amenity Supplies), which would create a diverse and invertebrate-friendly flora.

6.4.2 The ground prior must be prepared prior to reseeding; any debris or waste should be removed and the ground cultivated (e.g. by rotovator or harrowing). An appropriate cutting or grazing regime must then be followed to allow the desired species to become established (refer to Dulas, 2024 for details).

6.4.3 Areas where the desired grassland species fail to take hold should be recultivated and reseeded; hardier, grass-rich seed mixes should be considered for areas where the wildflower mix has failed to thrive (e.g. due to shading or waterlogging).

6.4.4 The long-term goal of removing of Japanese knotweed from the site and adjacent areas (see Section 5.7) would also improve the habitats, and prevent further degradation and loss of native species. Fully eradicating the plant requires herbicide control over several years and is a significant undertaking that requires planning. There is also a high risk of inadvertent spread of the plant. **Consultation with a knotweed specialist to develop a long-term management plan is therefore strongly recommended**.

7.0 Compensation and Enhancement

7.1 Compensation

7.1.1 This section of the report identifies which habitats/species features may need to be compensated for as part of the proposed development, and provides information to incorporate the recommended compensation proposals into the scheme design.

7.1.2 Scrub has been lost from the central area of the Wonderbank and, while the current open habitat will be replaced by species-rich grassland (see Section 6.4), this will not compensate for the loss of scrub cover. It is also assumed that the majority, if not all, of the remaining scrub within the fence line surrounding the solar farm will need to be removed both as part of the works and to prevent shading of the solar panels.

7.1.3 Consideration should therefore be given to compensation planting of trees, shrubs and/or hedgerows for this loss of the scrub; however, there will be limited space for this within the red line boundary and therefore off-site alternatives should be considered (this could include the Brymbo Heritage Site). Examples of suitable species are given in Table 7.1.

Table 7.1: Recommended Native Tree and Hedgerow Species

Latin name	Common name
Acer campestre	Field maple
Cornaceae	Dogwood
Corylus avellane	Hazel
Crataegus monogyna	Hawthorn
Euonymus europaea	Spindle
Ilex aquifolium	Holly
Prunus avium	Wild Cherry
Prunus domesticus	Denbigh Plum
Prunus domesticus	Damson
Prunus padus	Bird Cherry
Pyrus pyraster	Wild Pear
Rosa canina	Dog rose
Sorbus aria	Whitebeam
Sorbus aucuparia	Mountain ash/rowan
Sorbus torminalis	Wild service tree
Viburnum lantana	Wayfaring tree
Viburnum opulus	Guelder rose

7.2 Enhancement

7.2.1 Planning Policy Wales (PPW12, paragraph 6.4.5) confirms that planning authorities must seek to maintain and enhance biodiversity in the exercise of their functions. This means development should not cause any significant loss of habitats or populations of species (not including non-native invasive species), locally or nationally and must work alongside nature

and it must provide **a net benefit for biodiversity** and improve, or enable the improvement, of the resilience of ecosystems.

7.2.2 Creation of wildflower-rich grassland at the solar farm as part of restoration of site (see Section 6.4) will provide an overall biodiversity enhancement over the former low-diversity scrub habitat once it is successfully established. Where possible, a 1-2m wide strip of taller vegetation should be maintained around the edge of the grassland to provide cover for small animals.

7.2.3 The previous ecological report recommends the creation of two reptile refugia on the edge of the scrub habitat (Cottrell, 2024). Additional simple brash, rubble and soil piles can be created within the Wonderbank area using material which will otherwise need to be removed from the site, and would provide shelter for amphibians, reptiles, small mammals and invertebrates. These would ideally be in south-facing positions at the edges of the scrub/grassland.

7.2.4 Similar refugia or habitat piles could also be created adjacent to the trackway within the Brymbo Heritage Site. However, it is strongly recommended that material from the Wonderbank is not used for these due to the high risk of accidentally importing Japanese knotweed.

7.2.5 The creation of ponds in the wider Wonderbank area, on flat ground to the north-west or south of the solar farm, has previously been proposed and would enhance the site for GCN and other amphibians (Yardley, 2018).

7.2.6 Barn owls have previously been recorded from the Brymbo Heritage Site (Hughes, 2020; Cutts, 2023a). The open grassland at the solar farm will provide good hunting habitat for barn owls, and the erection of a pole-mounted barn owl box on the edge of the solar farm is recommended. Further details on barn owl box specifications and installation are provide by the Barn Owl Trust (Home Page - The Barn Owl Trust).

8.0 Further Works

8.1 Further Works

8.1.1 No further survey work will be required on site to inform the proposed plans. Table 8.1 below provides further information on the necessary further works required on site before the works can commence (subject to planning permission).

Table 8.1: Further Work Required

Habitats / species	Further requirements
Badger	Pre-works checks for badger activity and setts; licence may be required following the checks particularly if setts are present.
GCN	GCN mitigation licence will be required

8.1.2 Table 8.2 below provides a summary of ecological considerations associated with the proposed development. Note that "Pre-construction" means prior to the works phase beginning on site, whereas "Immediately prior to clearance" means during the works, but prior (ideally within 48 hrs) to that particular operation (e.g. tree felling, demolition) beginning.

Table 8.2: Summary of Other Ecological Considerations

Constraint	Work Stage	Species	Action	Location	When possible
Japanese knotweed control	All	Japanese knotweed	Plan and remove	Site including access routes	Seek specialist advice on timing of control measures
Biosecurity	All	Japanese knotweed	Biosecurity measures	Site including access routes	Biosecurity measures to be in place during all work stages
If any vegetation clearance in March – September	Immediately prior to clearance, whenever this occurs	Nesting birds	Nesting bird checks	Any scrub, tree, or tall vegetation clearance	March- September
Clearance of brash, rubble, soil, waste material	All	Amphibians including GCN, reptiles, hedgehogs	Check carefully for animals	Site	Must **not** be done during possible hibernation (November-March)
If badger sett located	All	Badgers	Seek ecological advice	Site	All year

8.2 Green Infrastructure Statement

8.2.1 Planning Policy Wales (PPW12, paragraph 6.2.12) states that a green infrastructure statement should be submitted with all planning applications. This statement should be proportionate to the scale and nature of the development proposed and will describe how green infrastructure has been incorporated into the proposal. This will need be provided to support a planning application, and should illustrate how the step-wise approach has been adopted in relation to the project proposals.

8.2.2 Further information regarding green infrastructure requirements within Wrexham County Borough Council is given in Appendix A.

9.0 References

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APPENDIX A Legislation and Planning Policy

Amphibians

The most common species are protected from sale under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). These are as follows: common frog, *Rana temporaria*; common toad, *Bufo bufo*; palmate newt, *Lissotriton helveticus*; and, smooth / common newt, *Lissotriton vulgaris.* This legislation protects them from sale, or advertising / offering them for sale.

The UK's two rarest amphibians are protected under the Conservation of Habitats and Species Regulations 2017 (known as 'the Habitats Regulations'). This is because they have declined throughout Europe in recent decades. The Habitats Regulations lists the following amphibians as European Protected Species (EPS):

- Great crested (or Warty) newt, *Triturus cristatus*
- Natterjack toad, *Epidalea calamita*

Under the Habitats Regulations, it is an offence if you:

- Deliberately capture, injure or kill any wild animal of an EPS;
- Deliberately disturb wild animals of any such species;
- Deliberately take or destroy the eggs of such an animal; or,
- Damage or destroy a breeding site or resting place of such an animal.

Disturbance is defined as that which is likely:

- To impair their ability: to survive, to breed or reproduce, or to rear or nurture their young, or, in the case of animals of a hibernating or migratory species, to hibernate or migrate; or
- To affect significantly the local distribution or abundance of the species to which they belong.

There are other offences relating to the possession, transport, selling or exchange of a protected species.

Badgers

The Protection of Badgers Act 1992 fully protects badgers and their setts. Offences include:

- killing, injuring and taking (or attempting these);
- possession of a dead badger (or derivative);
- cruelly ill-treating a badger;
- damaging a badger sett or any part of it;
- destroying a badger sett;
- obstructing access to / entrance of a badger sett;
- causing a dog to enter a badger sett;
- disturbing a badger whilst occupying a sett.

Badgers are also listed on Schedule 6 of the Wildlife and Countryside Act 1981 (as amended), which prohibits certain methods of killing and capture.

Bats

All species of bat, their breeding sites and their resting places in England and Wales are protected through a 'dual' system of protection, under the England and Wales Habitats Regulations and Wildlife and Countryside Act (1981) as amended. Because two regimes give legal protection to bats, the implications of both regimes must be fully understood.

Regulation (Reg.) 43 of the England and Wales Habitats Regulations makes it an offence to:

- deliberately capture, injure or kill a bat;
- deliberately disturb bats (which includes any disturbance which is likely to impair their ability to survive, to breed or reproduce, or to rear or nurture their young, or in the case of animals of a hibernating or migratory species, to hibernate or migrate or to affect significantly the local distribution or abundance of the species to which they belong);
- damage or destroy a breeding site or resting place of a bat; or
- possess, control, transport, sell or exchange, or offer for sale or exchange, any live or dead bat or part of a bat or anything derived from a bat or any part of a bat

Under Section 9 of the W&CA (s.9(4)(b), 9(4)(c) and 9(5) only), it is an offence (in relation to bats) to:

- intentionally or recklessly disturb a bat while it is occupying a structure or place of shelter or protection;
- intentionally or recklessly obstruct access to any structure or place used by a bat for shelter or protection; or
- sell, offer or expose for sale, or have in their possession or transports for the purpose of sale, any live or dead bat or any part of, or anything derived from a bat (or be responsible for adverts suggesting the intention to do this).

Under both laws Natural Resources Wales are empowered to issue licences to carry out work to bat roosts for reasons of overriding public interest. It is not illegal to tend to a disabled bat pending recovery.

Birds

Under the Wildlife and Countryside Act 1981 (as amended) and the Countryside and Rights of Way (CRoW) Act 2000, all wild birds, their nests and eggs are protected during the breeding season (typically March to August inclusive). This makes it an offence to:

- Intentionally kill, injury or take any wild bird.
- Take, damage or destroy the nest of a wild bird included in Schedule ZA1.
- Take, damage or destroy the nest of any wild bird while that nest is in use or being built.
- Take or destroy an egg of any wild bird.

Hedgehogs

Hedgehogs are listed under Section 7 of the Environment (Wales) Act 2016, therefore public bodies have a duty to conserve them in the exercise of their functions.

They are listed under Section 6 of the Wildlife and Countryside Act 1981 (as amended) which makes it an offence for them to be killed or taken by certain methods.

Reptiles

All British reptiles are protected from intentional killing, injuring and sale under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), including the four common species:

- Adder, *Vipera berus*
- Grass snake, *Natrix helvatica**
- Slow worm, *Anguis fragilis*
- Common lizard, *Zootoca vivipara*

* The native UK grass snake (as referred to as the barred grass snake) was originally listed under *Natrix natrix* in the W&CA 1981 (as amended); formerly considered to be a sub-species of *N. natrix* (*N. natrix helvatica*), the barred grass snake was recognised as a separate species in 2017 following genetic analysis of European *Natrix* populations.

This legislation aims to protect them from persecution and also from exploitation in the pet trade, and for which the following are offences:

- Intentional killing, injuring or taking.
- Intentionally or recklessly damaging / destroying a place of shelter / protection.
- Intentionally or recklessly disturbing an animal in its place of shelter / protection.
- Intentionally or recklessly obstructing access to its place of shelter / protection.
- Possession (live or dead, including derivatives), sale and offering for sale.

The UK's two rarest reptiles are afforded additional protection under the Conservation of Habitats and Species Regulations 2017 (known as 'the Habitats Regulations'). This is because they have declined throughout Europe in recent decades. The Habitats Regulations lists the following reptiles as European Protected Species (EPS):

- Sand lizard, *Lacerta agilis*
- Smooth snake, *Coronella austriaca*

Under the Habitats Regulations, it is an offence if you:

- Deliberately capture, injure or kill any wild animal of an EPS;
- Deliberately disturb wild animals of any such species;
- Deliberately take or destroy the eggs of such an animal; or,
- Damage or destroy a breeding site or resting place of such an animal.

Disturbance is defined as that which is likely:

- To impair their ability: to survive, to breed or reproduce, or to rear or nurture their young, or, in the case of animals of a hibernating or migratory species, to hibernate or migrate; or
- To affect significantly the local distribution or abundance of the species to which they belong.

There are other offences relating to the possession, transport, selling or exchange of a protected species.

Protected Plants

The Wildlife and Countryside Act 1981 (as amended) makes it illegal to uproot any wild plant without the permission of the landowner. In addition, plants which are either rare or vulnerable to exploitation are listed on Schedule 8, for which it is an offence to:

- Intentionally pick, uproot or destroy.
- Sell, offer or expose for sale.

Invasive Non-Native Species

Invasive non-native species are listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), for which the following are offences:

- Release into the wild, or to allow the escape of, any animal which is not ordinarily resident, or a regular visitor to, Great Britain in a wild state, or which is included in Part 1, Schedule 9.
- Plant in the wild, or otherwise cause to grow there, any plant included in Part 2, Schedule 9.

National Planning Policy

National Planning Policy in Wales is set out in Planning Policy Wales, Edition 12 , issued in February 2024. This document sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. PPW, the TANs, MTANs and policy clarification letters comprise national planning policy.

PPW Edition 12 Section 6.4 states that "*biodiversity underpins the structure and functioning of ecosystems*" and identifies that the "*planning system has a key role to play in helping to reverse the decline in biodiversity and increase the resilience of ecosystems, at various scales, by ensuring appropriate mechanisms are in place to both protect against loss and to secure enhancement*". The broad framework for implementing the Environment (Wales) Act 2016 Section 6 Duty, securing a net benefit for biodiversity and building resilience through the planning system includes addressing all of the following attributes: diversity, extent, condition, connectivity, and adaptability to change.

Green infrastructure (GI) is defined in Planning Policy for Wales (PPW) Edition 12 as "*the network of natural and semi-natural features, green spaces, rivers and lakes that intersperse and connect*

places". Green infrastructure can function at a range of different scales, from entire ecosystems to street trees and is capable of providing several functions at the same time and as a result offers multiple benefits, for social, economic and cultural as well as environmental resilience.

Development proposals should take biodiversity and green infrastructure (GI) into consideration in order to avoid negative impacts on habitats and species, and seek ways to maintain and enhance biodiversity. Impacts on habitats and species should be treated in a step-wise manner (PPW 12, paragraph 6.4.15), by seeking to:

- **Avoid** damage to biodiversity in its widest sense by maintaining the largest possible area of existing habitat supporting biodiversity and functioning ecosystems, particularly Section 7 habitats and species where present, through careful development design and consideration of long-term maintenance and management and ensuring that retained habitats continue to be well connected to adjacent habitats to provide connectivity for key species.
- **Mitigate** or **restore** by identifying measures to address the specific negative effects by repairing damaged habitats and disturbed species. The measures should seek to restore in excess of like for like, accounting for disturbance and time lags for the recovery of habitat and species, and in every case, mitigation or restoration measures should seek to build ecosystem resilience within the site and where possible the wider area.
- As a last resort off-site **compensation** for unavoidable damage must be provided. This must be of significant magnitude to fully compensate for any loss.
- All development must **deliver a net benefit** for biodiversity and ecosystem resilience from the baseline state (proportionate to the scale and nature of the development proposed).

PPW12 also sets out the national policy requirements in relation to planning permissions where protected species, trees, hedgerows and woodlands and *irreplaceable natural resources* have the potential to be impacted.

Local Planning Policy

The Wrexham Local Development Plan (LDP) 2013 – 2028 and Local Planning Guidance Notes provide relevant information associated with biodiversity and green infrastructure in Wrexham Borough County Council area:

- WCBC LDP 2013-2028 Policy SP5: Planning Obligations
- WCBC LDP 2013-2028 Policy SP12: Design Principles & Masterplanning Framework
- WCBC LDP 2013-2028 Policy SP14: Natural Environment
- WCBC LDP 2013-2028 Policy SP19: Green Infrastructure
- WCBC LDP 2013-2028 Policy NE1: International and National Nature Conservation Designations
- WCBC LDP 2013-2028 Policy NE2: Local Designations for Nature Conservation and Geological Importance
- WCBC LDP 2013-2028 Policy NE3: Trees, Woodlands and Hedgerows
- WCBC LPG Note No 7 – Landscape and Development.
- WCBC LPG Note No 17 – Trees and Development.

- WCBC LPG Note No 26 – Landscape and Industrial Developments.
- WCBC LPG Note No 29 – Wrexham Industrial Estate Employment Development and Nature Conservation.
- WCBC LPG Note No 32 – Biodiversity and Development.
- WCBC LPG Note No 35 – Great Crested Newt Mitigation Requirements Johnstown Newt Site SAC and the Wider Countryside.

APPENDIX B Desk Study

Desk Study Data included as separate Appendix.

APPENDIX C Plant Species List

This list is not exhaustive but refers to species observed during the site visit. Mosses (except indicators of bog habitat if present), lichens, algae and other lower plants and fungi were not identified. No protected or notably rare plant species were found.

Table C.1: Plant Species List

English Name	Scientific Name
Blackthorn	*Prunus spinosa*
Bramble	*Rubus fruticosus* agg.
Broom	*Cytisus scoparius*
Cock's foot	*Dactylis glomerata*
Common mouse ear	*Cerastium fontanum*
Common nettle	*Urtica dioica*
Common sorrel	*Rumex acetosa*
Cleavers	*Galium aparine*
Creeping bent	*Agrostis stolonifera*
Creeping buttercup	*Ranunculus repens*
Dog rose	*Rosa canina*
Giant horsetail	*Equisetum telmateia*
Hairy bittercress	*Cardamine hirusta*
Hard rush	*Juncus inflexus*
Hawthorn	*Crataegus monogyna*
Horsetail	*Equisetum* sp.
Japanese knotweed	*Reynoutria japonica*
Pendulous sedge	*Carex pendula*
Primrose	*Primula vulgaris*
Ribwort plantain	*Plantago lanceolata*
Thistle	*Cirsium* sp.
Western gorse	*Ulex gallii*
White clover	*Trifolium repens*
Willow	*Salix sp.*
Willowherb/Rosebay	*Epilobium* sp./*Chamaenerion angustifolium*
Yorkshire fog	*Holcus lanatus*

APPENDIX D Bats and Lighting Design Recommendations

To assist with the decision-making process in relation to bats and lighting for development projects, the Institution of Lighting Professionals (2023) suggest that the following are considered when choosing luminaires:

- All luminaires should lack UV elements when manufactured. Metal halide, compact fluorescent sources should not be used.
- LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.
- A warm white light source (2700Kelvin or lower) should be adopted to reduce blue light component.
- Light sources should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats (Stone *et al.*, 2012).
- Internal luminaires can be recessed (as opposed to using a pendant fitting) where installed in proximity to windows to reduce glare and light spill.
- Waymarking inground markers (low output with cowls or similar to minimise upward light spill) to delineate path edges.
- Column heights should be carefully considered to minimise light spill and glare visibility. This should be balanced with the potential for increased numbers of columns and upward light reflectance as with bollards.
- Only luminaires with a negligible or zero Upward Light Ratio, and with good optical control, should be considered - see ILP (2021) GN01.
- Luminaires should always be mounted horizontally, with no light output above 90° and/or no upward tilt.
- Where appropriate, external security lighting should be set on motion sensors and set to as short a possible a timer as the risk assessment will allow. For most general residential purposes, a 1 or 2 minute timer is likely to be appropriate.
- Use of a Central Management System (CMS) with additional web-enabled devices to light on demand. Use of motion sensors for local authority street lighting may not be feasible unless the authority has the potential for smart metering through a CMS.
- The use of bollard or low-level downward-directional luminaires is strongly discouraged. This is due to a considerable range of issues, such as unacceptable glare, poor illumination efficiency, unacceptable upward light output, increased upward light scatter from surfaces and poor facial recognition which makes them unsuitable for most sites. Therefore, they should only be considered in specific cases where the lighting professional and project manager are able to resolve these issues.
- Only if all other options have been explored, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed. However, due to the lensing and fine cut-off control of the beam inherent in modern LED luminaires, the effect of cowls and baffles is often far less than anticipated and so should not be relied upon solely.

ILP (2023) provide guidance associated with the layout (location, orientation and height) of newly built structures and hard standing, as the design can have a considerable impact on light spill:

- Key or Supporting Habitat is often located alongside, or to the rear of buildings, on new developments. In this case, the removal or reduction of windows can be the most effective way to permanently limit light spill, potentially alongside the internal reconfiguration of the building, to ensure high-use spaces are not as impacted by loss of natural light.
- It may be possible to include Key or Supporting Habitat into unlit public open space such as parks. However, schemes should avoid including Key or Supporting Habitats in residential gardens, as uncontrolled and inappropriate lighting may be introduced by residents following occupation.
- It is often considered better for a residential scheme to specify good quality downward-directional external light fittings for security, and/or at the front entrance, on short PIR timers, rather than risk the imposition of poor quality and poorly controlled lighting at a later date.
- Buildings, walls and hard landscaping may be sited and designed so as to block light spill from reaching habitats and features.
- Paved surfaces should not be located within Key Habitat or buffer zones, unless they form part of unlit public open space.
- Taller buildings may be best located toward the centre of the site, or sufficiently set back from Key Habitats, to minimise the effect of their light spill.
- Column mounted luminaires can be located so that the rear shields are adjacent to habitats, or narrow optics selected that direct light into the task area where needed.
- As planting may be removed, die back or inadequately replaced over time, it should never be relied on as the sole means of attenuating light spill.

ILP. (2023). *Bats and Artificial Lighting At Night*. Guidance Note GN08/23. Institute of Lighting Professionals & Bat Conservation Trust.

APPENDIX E General Biosecurity Measures

Biosecurity means taking measures to ensure that good practices are in place to minimise the risk of importing and spreading invasive non-native species (INNS), pests and infectious disease. As non-native species or diseases could be transmitted in any water or material, a good biosecurity routine is essential, even if invasive non-native species are not apparent.

General good-practice biosecurity measures include:

- A toolbox talk detailing the general risks of invasive non-native species (INNS) relevant to the site and the project should be delivered to all workers, showing the various life stages and how to recognise these plants and animals.

- A cleaning station should be set up at the site exits including facilities to wash boots and vehicles.

- **All** footwear of staff leaving site (for **any** reason and no matter for how short a time) should be cleaned (i.e., visually free of soil and debris) before leaving site.

- Soil and vegetation should be washed off with clean water (and brushes). Water (which should not be contaminated with any disinfectant or other pollutants) should then be disposed of by pouring on site to soak away. No water should be disposed of directly into a watercourse.

- The wheels or tracks (and any other part which has come into contact with the soil) of all vehicles which have entered the area must be thoroughly washed and be free of soil and debris before leaving the site.

- No one should remove any soil or vegetation from the working area for any reason.

It may be necessary to produce a site-specific and project-specific Biosecurity Risk Assessment to support the construction phase of the project, once detailed design works have been completed and timings and construction methods are known. This Biosecurity Risk Assessment should identify the specific biosecurity risks associated with the works and detail operational procedures to minimise the risk of spreading invasive non-native species (INNS) and other biosecurity risks.

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