

Swansea North BESS

Ecological Impact Assessment (EclA)
Report

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Summary

Report purpose	Ecological Impact Assessment (EclA) Report to inform the development of a Battery Energy Storage System (BESS).
Client and commission date	EDF Energy Renewables Ltd. February 2025
Date and methods of survey	An extended Phase 1 habitat survey was completed by Kirsty Rogers on 4 March 2025 as part of a Preliminary Ecological Appraisal and an initial scoping walkover of habitats north of the access track was completed on 31 March 2025 by Rhys Lewis. Herpetofauna surveys for great crested newt <i>Triturus cristatus</i> were completed on 24 April 2025 and reptile surveys are ongoing at the time of writing.
Key findings	There is 1 statutory designated site and 21 non-statutory designated sites (Sites of Interest for Nature Conservation (SINCs)) within 2 km of the Site. The SINCs include Llety-Morfil and Waun Garn Wen which are on and immediately adjacent to Site. Lowland mixed deciduous mixed woodland and hedgerow within the Site are likely to qualify as priority habitats under Section 7 of the Environment (Wales) Act 2016. The remaining habitats are common and widespread and do not have priority habitat status. Habitats on Site support protected species including bats (roosting, foraging and commuting), badger, breeding birds, reptiles, common toad and hedgehog.
Potential impacts	The design of the proposed development has sought to avoid any direct impacts on SINCs, ancient woodland sites and priority habitats by retaining these and a stepwise approach has been applied. Direct impacts include habitat loss (scrub and grassland) and indirect impacts upon habitats through accidental damage, disturbance (noise and visual) and pollution events.
Measures to avoid and/or reduce impacts during the design phase	A Construction and Environmental Management Plan (CEMP) should be produced and adhered to during all phases of the development. It should include the following: - Measures to avoid impacts on SINCs, ancient woodland sites, priority habitats and trees during construction including ways in which accidental physical damage, lighting, pollution, soil compaction and sediment mobilisation will be avoided. - Precautionary method statements detailing mitigation measures covering the following species: bats, common toad, badger, hazel dormouse, breeding birds, hedgehog and reptiles.
Opportunities for biodiversity enhancement	Current policy and legislation puts a duty on public authorities and developers to not only maintain biodiversity but also include enhancements for nature conservation and biodiversity (see Appendix 2, paragraphs 9.10 – 9.14). Enhancement measures may include: - Enhance retained hedgerows using supplementary planting and long-term management regime. - Create new hedgerow with native fruiting species of local provenance to improve connectivity. - Enhance retained marshy grassland to improve structure and species diversity. - New scrape / temporary pond creation in areas of marshy grassland to improve aquatic resource on the Site. - Installation of reptile banks and hibernacula within retained areas of grassland on Site. - Removal of invasive species across the Site.

1 Introduction

- 1.1 BSG Ecology was commissioned in February 2025, by EDF Energy Renewables Ltd., to undertake an Ecological Impact Assessment (EclA) Report for the development of a Battery Energy Storage System (BESS), at Abergelli Farm, Felindre (Ordnance Survey Grid Reference (OSGR) SN 65019 00719) (the 'Site'). The Site is within the City and County of Swansea Council Local Planning Authority (LPA) area.

Site description

- 1.2 The Site comprises approximately 22 ha of horse and goat grazed pasture, intersected by defunct hedgerows with trees, dense scrub and fencing, with an area of woodland, ponds and scrub bands. The woodland area falls under Llety-Morfil Site Importance for Nature Conservation (SINC)¹. The Site also includes an access track joining the Site to Heol Penfidy (a public road)² to the north. The Site boundary and are shown on **Figure 1**.
- 1.3 The surrounding landscape is similar to the habitats and features on Site, comprising grazing pasture bisected with hedgerow with isolated woodland blocks. The Afon Llan corridor runs 200 m south of the Site and several solar farms are present within the wider landscape, with two adjacent to the Site (to the north and east).
- 1.4 Felindre Compressor Station and substations are located 80 m west of the Site (at its closest point, Area 3). Felindre village is located 1.2 km northwest and the M4 corridor is 1.2 km to the south of the Site.

Description of project

- 1.5 The proposed scheme includes the construction of a BESS facility, with associated infrastructure.
- 1.6 The proposals show the proposed development footprint will be confined to areas of grazing pasture, with a standoff from field boundaries to reduce impacts on sensitive features (i.e., Llety-Morfil SINC and Afon Llan). No lighting is proposed as part of the scheme.
- 1.7 The minor works required to the access route onto Site have not been confirmed and so this is not yet considered within this report.

Purpose and aim of study

- 1.8 The purpose of this report is to detail methods and results of survey, identify ecological features that could be impacted by the proposed development, set out measures to avoid and reduce impacts on them, and to identify opportunities for ecological enhancement to deliver Biodiversity Net Benefit (BNB) in accordance with requirements of Planning Policy Wales 12 (PPW 12) Chapter 6 (Distinctive and Natural Places) (see **Section 5**).

¹ The SINC's qualifying features are wet and ancient semi-natural woodland, purple moor grass and rush pasture, and scrub habitats.

² At OSGR SN 64830 02254.

2 Method

Desk Study

- 2.1 A data request was made to the South East Wales Biodiversity Records Centre (SEWBRc) to obtain information on non-statutory designated sites and records of protected, invasive or otherwise notable species. The data request was for records from within the Site and a 2 km search radius³ from the Site boundary (presented in **Figure 1**). Data was received on 21 February 2025.
- 2.2 The desk study also involved a review of publicly available information including the UK Government's MAGIC⁴ website and Google Earth Pro⁵. Data from both sources was most recently accessed on 2 May 2025.
- 2.3 The MAGIC database was used to establish the presence of statutory designated sites of nature conservation interest in relation to the proposed development. Google Earth Pro was used to review recent and historical aerial photography for the local area, and to provide ecological context for the results of the Site assessment.
- 2.4 Historic ecological survey data and reports provided by EDF and reports publicly available from Swansea Councils Planning Portal were reviewed and are referenced where relevant within this report. These include the current Site and the wider surrounding area, primarily to the south and west associated with Felindre Compressor Station and substations. They included:
 - Parsons Brinkerhoff, 2014. *Abergelli Power Project Preliminary Environmental Information Report*. Prepared for Abergelli Power Ltd. Exeter.
 - AECOM Limited, 2018. *Abergelli Power Project Environmental Statement*. Prepared for Abergelli Power Ltd. Bristol.
 - Wardell Armstrong, 2023. *Preliminary Ecological Appraisal Report*. Swansea North Greener Grid Park. Prepared for Statkraft UK Ltd. Cardiff. (Swansea Council planning application ref. 2023/0889/FULL).
 - Tetra Tech, 2023, *Preliminary Ecological Appraisal*. Swansea Greener Grid Park. Prepared for Statkraft UK Ltd. Bristol. (Swansea Council planning application ref. 2024/0756/NMA).

Field survey

Phase 1 habitat survey

- 2.5 A Phase 1 habitat survey of the southern portion of the access track and habitats to the south and west of the access track, was completed by Kirsty Graham on 5 March 2025, referred to as the 'Survey Area' and shown on **Figure 2**. The survey method was based on industry standard guidance (JNCC, 2010). Habitats present at the Site were identified and mapped, with any features of ecological interest recorded as 'target notes'.
- 2.6 The survey was 'extended' to include an assessment of the Site's potential to support protected or otherwise notable species (IEA, 1995) e.g., badger, breeding birds, reptiles, hazel dormouse and bats. This included a provisional assessment of the potential of hedgerow trees to support roosting bats, by broadly categorising trees as having features with clear bat roost (moderate or high) potential or low value / no obvious features (low or negligible bat roost potential).
- 2.7 Evidence of the presence / potential for Invasive Non-Native Species (INNS), such as Japanese knotweed *Fallopia japonica*, was also noted.

³ SEWBRc allocate a "mobile" buffer to species to demonstrate their potential range. This is dependent on the individual species and their ability to travel significant distances within their ranges. Therefore, whilst data is requested for 2 km, records are frequently provided for species recorded up to 2 km beyond the search radius.

⁴ Available at www.magic.defra.gov.uk/magicmap.aspx

⁵ Google Earth Pro 7.3.3.7786.

- 2.8 An initial walkover of habitats north of the access track⁶ was completed on 31 March 2025 by Rhys Lewis to determine broad habitat types and characteristics and provide an initial baseline for reptile surveys and this assessment. A detailed habitat survey will be completed in May within the optimal survey season (see limitations below) given the potential for rarer vegetative communities, habitats and / or species following the SINC designation.

Limitations to method

- 2.9 The Site was surveyed outside the optimal survey period, “*the field season should be considered as starting in late March / early April in the south and late April / early May in the north of England*” (JNCC, 2010). As such species lists may not be exhaustive and in some cases, flora may not be visible and not recorded, or only identifiable to family or genus level. However, it is considered that sufficient information was gathered to determine and categorise broad habitat types in the field, which is considered appropriate to inform this assessment⁷.

Great crested newt

Habitat Suitability Index assessment

- 2.10 Six ponds within Site boundary were assessed for its suitability to support great crested newt (GCN) *Triturus cristatus* via the application of the Habitat Suitability Index (HSI) assessment method (Oldham et al., 2000). The pond was assessed on 24 April 2025. The HSI scoring method is a quantitative means of evaluating habitat quality for great crested newts using ten suitability indices:
- UK location,
 - Pond surface area,
 - No. of years out of 10 in which the pond dries out,
 - Water quality,
 - Percentage shade,
 - No. of waterfowl,
 - Presence of fish,
 - No. of ponds within 1 km,
 - Area of suitable terrestrial habitat within 500 m and accessibility of this habitat, and
 - Percentage of macrophyte cover.
- 2.11 The HSI provides a numerical index between 0 and 1 where scores closer to 0 indicate poor habitat with lower probability of great crested newt occurrence and those closer to 1 represent optimal habitat with a higher probability of occurrence. A score of ≥ 0.5 is generally considered indicative that the pond could be suitable to support a population of breeding great crested newts (ARG UK, 2010).

eDNA Survey

- 2.12 On 24 April 2025 eDNA samples were collected from the ponds on Site. The sample collection followed SureScreen Scientifics eDNA sample protocol, within the specified survey window for eDNA analysis and in accordance with the published methodology (Biggs *et al.* 2014). The sample collection was carried out by Becky Gibbs (accredited on survey licence S092692/1) who is familiar with the methodology and has undertaken eDNA sampling on a number of sites with other licenced surveyors.

Limitation to method

- 2.13 There was no limitation to the GCN survey method.

⁶ Within the Site redline boundary but outside the Survey Area.

⁷ Future surveys are scheduled within the optimal survey window (mid-May 2025) to update species lists and further confirm habitat type and condition.

Assessment

- 2.14 The evaluation and assessment have been undertaken with reference to the current Guidelines for Ecological Impact Assessment (EcIA) in the United Kingdom developed by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2024).

Important Ecological Features

- 2.15 The first stage of assessment is identifying which ecological features (habitats, species, ecosystems and their functions/processes) are important. Important features should then be subject to detailed assessment if they are likely to be affected by the Proposed Development⁸.
- 2.16 Ecological features can be important for a variety of reasons. Importance may relate, for example, to the quality or extent of designated sites or habitats, to habitat / species rarity, to the extent to which they are threatened throughout their range, or to their rate of decline.

Evaluation: Determining Importance

- 2.17 The importance of an ecological feature is considered within a defined geographical context. The following frame of reference has been used in this case:
- International (European),
 - National (United Kingdom),
 - Country (Wales),
 - Regional (Southwest Wales),
 - County (Swansea),
 - Local (Parish / electoral ward – Mawr ED), and
 - Site (the Site / redline boundary).
- 2.18 Features which require mitigation in order to ensure legal compliance are considered to be important features, even if their conservation value is low or not applicable (e.g. badger, which is not a rare species but receives legal protection on animal welfare grounds).

Impact Assessment

- 2.19 The impact assessment process involves:
- Identifying the importance of a feature (habitat, species or ecosystem of biodiversity value);
 - Identifying and characterising impacts on the feature;
 - Incorporating measures to avoid and reduce (mitigate) these impacts;
 - Assessing the significance of any likely residual effects after mitigation;
 - Identifying appropriate compensation measures to address significant residual effects; and
 - Identifying opportunities for ecological enhancement.

Mitigation

- 2.20 Where significant effects have been identified, the mitigation hierarchy has been taken into account, which sets out a sequential approach of avoiding significant effects where possible, applying mitigation measures to minimise unavoidable significant effects and then compensating for any remaining significant effects. Once avoidance and mitigation measures, and any necessary compensation measures, have been applied, and opportunities for enhancement incorporated,

⁸ It is not necessary to carry out detailed assessment of features that are sufficiently widespread, unthreatened and resilient to effects of the Development, such that there is no risk to their viability.

residual significant effects are then explicitly identified. This approach is reflected across UK planning policy.

Personnel Involved

- 2.21 Summaries of the qualifications and experience of personnel involved in the work, and their role in delivering it, are outlined below.
- Kirsty Graham (née Rogers) MZoo, ACIEEM: Kirsty is a Senior Ecologist at BSG Ecology and has worked as a professional ecologist since 2013. She has experience in numerous ecological assessments including extended Phase 1 habitat surveys for projects of various sizes. Kirsty has a particular interest in botany and has a Field Identification Skills Certificate (FISC)⁹ level 4. Kirsty completed the Phase 1 survey, co-ordinated subsequent surveys and is the author of this report.
 - Rhys Lewis, BSc (Hons). Rhys is a Consultant Ecologist. He has worked for BSG Ecology since 2023. During this time, he has authored a number of protected species reports and gained considerable field experience including with regard to botanical surveys. Rhys completed the habitat walkover of Area 2.
 - Matt Stewart BSc, MSc and Qualifying member of CIEEM. Matt is an Ecologist at BSG Ecology. Matt was responsible for completing the desk study for this report.
 - Owain Gabb MIEEM CEnv. Owain is a Director at BSG Ecology and has worked as a Consultant Ecologist since 2003, joining BSG Ecology in 2010. He has technically directed or managed the ecological inputs to onshore wind farms, solar schemes, grid connection projects, power stations (new nuclear and decommissioning schemes), energy from waste plants, parkland restoration schemes, residential and mixed-use developments, and provided ecological support to local planning authorities in evaluating the ecological evidence base for planning applications. Owain reviewed this report.
- 2.22 A summary of each BSG staff member's experience and competence as a professional ecologist is provided at <http://www.bsg-ecology.com/people/>.

⁹ Awarded by the Botanical Institute of Britain and Ireland (BSBI).

3 Results

- 3.1 In this section the results of fieldwork and desk study are brought together. Interpretation of the results and an assessment of the potential impacts of the proposed development are included in **Section 4**.

Designated Sites

- 3.2 The location of designated sites in relation to the Site boundary are shown on **Figure 1**. Designated sites are outlined below with reasons for notification / designation¹⁰.

Statutory Designated Sites

- 3.3 There is one statutory designated site within the search radius, Nant-Y-Crimp Site of Special Scientific Interest (SSSI), located 1.3 km west of the Site. Nant y Crimp is notified for its wet pastures, species-rich neutral grasslands and semi-natural woodland as well as associated scrub, which are host to several uncommon plant species.

Non-statutory Designated Sites

- 3.4 There are 21 non-statutory designated sites (20 Sites of Interest for Nature Conservation, SINC and one Wildlife Trust Reserve, WTR) within the search radius. Of these, two SINC are located within the Site boundary and a further three are on or within 500 m of the Site. These, alongside their location and reasons for designation, are summarised below.

- **Llety-Morfil SINC** (on-Site). Part of Llety-Morfil SINC (a composite site) is located in the north-eastern section of the Site, with a second part fringing the western edge of it. The SINC is designated for supporting Habitats of Principal Importance (HPI)¹¹ including wet woodland, ancient woodland, and purple moor-grass and rush pasture with other notable habitats including structurally diverse and species-rich scrub; and *Lasiommata megera* (moth, *Lepidoptera*), a species of principle importance (SPI)¹².
- **Waun Garn Wen SINC** (immediately adjacent to Site). Waun Garn Wen SINC encompasses a woodland band bisecting fields on the western edge of the access track. The SINC is designated for HPI including ancient semi-natural woodland (lowland mixed deciduous woodland), wet woodland and purple moor-grass and rush pasture (including moderately species rich pasture). Structurally diverse and species-rich scrub is also a notable feature.
- **Rhos Fawr SINC and Coed Barcud Wildlife Trust Reserve (WTR)** (45 m north of the Site access). Rhos Fawr contains woodland with ancient woodland indicator species, purple moor-grass and rush pasture (including 'moderately species-rich' examples) HPIs. Other notable habitats include structurally diverse and species-rich scrub and 'relatively' species-rich neutral grassland. The site also supports bird SPI including tree pipit *Anthus trivialis* and cuckoo *Cuculus canorus*. Coed Barcud WTR is an area of improved grassland within Rhos Fawr which has recently been planted as woodland, and which supports a number of bird species.
- **Middle Llan SINC** (200 m south of the Site). Middle Llan SINC is designated for its continuous semi-natural linear vegetation and watercourse with exposure/erosion features habitats (the latter is an HPI).
- **Rhyd-Y-Pandy Valley and Grasslands SINC** (280 m east of the Site). This SINC encompasses a large area and supports priority habitats including woodland containing an assemblage of ancient woodland species, native wet woodland, lowland meadow, purple moor-grass and rush pasture (with species-rich examples), reed beds and a watercourse with exposure/erosion

¹⁰ Designation information sourced from Natural Resources Wales: <https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/protected-areas-of-land-and-seas/find-protected-areas-of-land-and-sea/?lang=en> [accessed on 25 March 2025].

¹¹ Habitats of Principal Importance (HPI) for the purpose of maintain and enhancing biodiversity in relation to Wales, as listed in Section 7 of Environment (Wales) Act 2016.

¹² Species of principal importance (SPI) for the purpose of maintaining and enhancing biodiversity in relation to Wales, as listed in Section 7 of Environment (Wales) Act 2016.

features. The Site also supports bird species listed on Schedule 1 of the Wildlife and Countryside Act (as amended, 1981)¹³, including barn owl *Tyto alba* and red kite *Milvus milvus* and SPI species including skylark *Alauda arvensis*, tree pipit *Anthus trivialis*, reed bunting *Emberiza schoeniclus*, kestrel *Falco tinnunculus*, herring gull *Larus argentatus*, house sparrow *Passer domesticus*,

- 3.5 There are 15 SINC Sites beyond 500 m of the Site boundary, these are largely designated for HPI including wet woodland or ancient woodland / woodland with ancient woodland indicator species and a range of bird and invertebrate SPIs. The remaining SINC sites are not anticipated to be directly impacted (e.g., through habitat removal or modification) and / or indirectly impacted (e.g., through noise, visual disturbance or pollution effects) as a result of the proposed works. This is due to their lack of ecological connectivity to and distance from the Site. They are therefore not considered further in this report.

Ancient woodland sites

- 3.6 SEWBRc returned records of 35 Ancient Semi-Natural Woodland (ASNW)¹⁴, 9 Restored Ancient Woodland Sites (RAWS)¹⁵, one Plantation on Ancient Woodland Sites (PAWS)¹⁶ and three Ancient Woodland Site of unknown category within the search area.
- 3.7 One of these (ASNW) is within the Site and Llytr Morfil SINC boundary, see **Figure 1**. Two areas of RAWS are also present immediately adjacent to the western boundary of the Survey Area / Site boundary.
- 3.8 ASNW is defined as ‘any area that’s been wooded continuously since at least 1600 AD’ (Gov.uk, 2022). ASNW sites are frequent throughout the wider Swansea landscape, but often occur as isolated remnants, fragmented by modified habitats. The on-Site ASNWs are examples of this, forming isolated parcels throughout a patchy network of woodland habitat within the wider agricultural landscape. ASNW and RAWS are assessed as of County importance, given their distinctiveness and limited connectivity to off-Site woodland habitats.

Habitats

- 3.9 The habitats within the Survey Area and Target Note locations are presented on **Figure 2** and summarised in **Table 1**. Target Note (TN) descriptions and associated photographs are in **Appendix 1**, and referenced contextual photos are presented in **Section 7**.

Broadleaved woodland – semi natural (A1.1.1)

- 3.10 Broadleaved woodland in the Survey Area is restricted to the boundaries of the Site (extending off-Site) at the north-eastern (TN 8) and south-western corners.
- 3.11 The woodland is characterised by a canopy of abundant silver birch *Betula pendula* with frequent pedunculate oak *Quercus robur* and an open shrub layer of frequent bramble *Rubus fruticosus* agg. and occasional holly *Ilex aquifolium*. Goat willow *Salix caprea*, hazel *Corylus avellana*, alder *Alnus glutinosa* and European gorse *Ulex europaeus* are also present.
- 3.12 Ground flora largely comprises grassland species including frequent Yorkshire fog *Holcus lanatus* and soft rush *Juncus effusus*. Atlantic ivy *Hedera hibernica*, broad buckler-fern *Dryopteris dilatata*, polypody *Polypodium vulgare* and dog-rose *Rosa canina* are frequent or occasional in occurrence.

¹³ All nesting birds are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended), with greater protection is afforded to species listed on Schedule 1, see **Appendix 2** for summaries of references legislation, policy and other instruments.

¹⁴ “Broadleaf woodlands comprising mainly native tree and shrub species which are believed to have been in existence for over 400 years”, SEWBRc data search result ref. 0245-851.

¹⁵ Sites that are “believed to have been continually wooded for 400 years” and “have gone through a phase when canopy cover will have been more than 50% non-native conifer tree species and now have a canopy cover of more than 50% broadleaf” identified by using remote sensing techniques. SEWBRc data search result ref. 0245-851.

¹⁶ Sites which are “believed to have been continuously wooded for over 400 years” and “have been replanted with native or non-native species, most commonly with conifers” making up > 50% cover. SEWBRc data search result ref. 0245-851.

- 3.13 Broadleaved woodland is present within the northern part of the Site (beyond the Survey Area), associated with Llytr Morfil SINC. No detail assessment or species list has been collected to date¹⁷ for this area, and this has not been included within the assessment below.
- 3.14 The woodland on / adjacent to the Survey Area meets the relatively broad definition of 'lowland mixed deciduous woodland' HPI (Maddock, 2011) but does not meet the definition for local designation selection¹⁸ (Gwent Wildlife Trust, 2004). This habitat is limited within the Survey Area, restricted to fringing boundary features and is frequent within the wider surrounding landscape, therefore it is assessed as of **Local** level importance.
- 3.15 The woodland at TN 8 immediately adjacent to the Site may qualify as 'wet woodland' priority habitat (Maddock, 2011) and meet the guidelines for local designation (Gwent Wildlife Trust, 2004) given the abundance of alder throughout the canopy and the obviously inundated understory. However, this assessment is precautionary as the woodland was assessed from the Site boundary only; detailed species list or assessment was not possible. Whilst woodland is frequent throughout the wider landscape, wet woodland is less so and is therefore assessed as of **Local** importance.

Scrub – dense / continuous (A2.1) and scattered (A2.2)

- 3.16 A band of dense scrub is present along the southern section of the access track, through the Survey Area (photo 1).
- 3.17 Dense scrub on Site comprises seral vegetation, generally less than 5m in height with occasional scattered trees. The vegetation occurs in narrow bands that exhibit relatively uniform age and structure. Bramble is abundant across all parcels of scrub on Site, with frequent grey willow *Salix cinerea* and occasional silver birch. Occasional rosebay willowherb *Chamerion angustifolium*, hazel and bracken *Pteridium aquilinum* and rarely occurring ash *Fraxinus excelsior* are also present. Ground flora is generally sparse and species-poor, shaded out by the dense shrub layer, however where present comprises Yorkshire-fog, cock's-foot grass *Dactylis glomerata*, occasional soft and hard rush *Juncus inflexus* and locally frequent winter heliotrope *Petasites fragrans*.
- 3.18 Japanese knotweed (invasive, non-native species, INNS¹⁹) is also locally frequent within scrub habitat (see photo 2).
- 3.19 Scattered scrub is also present as encroaching vegetation on field boundaries, comprising gorse, dogwood *Cornus sanguinea* or rarely bramble.
- 3.20 Scrub habitat on Site does not meet the definition of any HPI or local designation guidelines, the latter considering only "structurally diverse and species-rich mixed scrub sites"²⁰ (Gwent Wildlife Trust, 2004). Dense scrub is a relatively commonly occurring habitat in the wider surrounding area with examples on Site containing a limited species diversity and has a uniform structure. However, dense scrub within the Survey Area does provide connectivity across the Site (and between parcels of Llytr-morfil SINC) and is therefore assessed as of **Local** importance.

Scattered Trees – broadleaved (A3.1)

- 3.21 Scattered trees are infrequent within the Survey Area largely occurring as mature trees along remnant hedgerows / field boundaries. Several mature scattered trees are also present bordering the access track, close to the buildings / barns associated with Abergelli Farm (off-Site) (see TN 1, 2 and 5).

¹⁷Future surveys are scheduled within the optimal survey window (mid-May 2025) to collect detailed species lists, and to determine habitat type and condition.

¹⁸ Which includes ancient woodland, replanted woodland with ancient woodland indicator species and semi-natural beach and yew, upland or wet woodlands (Gwent Wildlife Trusts, 2004).

¹⁹ Listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), see **Appendix 2**.

²⁰ "Mixed scrub' habitats considered for selection should normally contain at least 6 native woody species and that there is good structural diversity, for example with a varied range of shrub ages and canopy heights, the presence of small rides and clearings, good gradations in edge habitats, varied ground flora etc." (Gwent Wildlife Trust, 2004).

- 3.22 The most frequently occurring species is pedunculate oak, followed by silver birch. Hawthorn *Crataegus monogyna*, holly and hazel occur less frequently.
- 3.23 This habitat does not correspond to any HPI or local designation definitions. Mature trees within the Survey Area are assessed as of **Local** importance given their age, distinctiveness and potential to support protected species (see below).

Neutral grassland – semi-improved (B2.2)

- 3.24 Neutral semi-improved grassland is present as a narrow band alongside the northern edge of the southernmost field of the Survey Area. The grassland is unmanaged, resulting in a tussocky sward with an accumulated thatch layer (photo 3)
- 3.25 The sward contains common semi-improved grassland species (see below) but is classified as neutral grassland due to the abundance of cock's-foot grass in the sward, and the presence of occasional crested dog's-tail *Cynosurus cristatus*, red clover *Trifolium repens* and common knapweed *Centura nigra*. Additionally, the grassland is marginally more species diverse than others, with creeping cinquefoil *Potentilla repens*, meadow buttercup *Ranunculus acris*, common sorrel *Rumex acetosa*, rosebay willowherb and pendulous sedge *Carex pendula* also occasionally present.
- 3.26 This habitat does not correspond to any HPI or local designation definitions, the latter requiring at least eight indicator species²¹ of neutral grassland to be present to qualify as 'relatively species-rich', (Gwent Wildlife Trust, 2004); the sward contains only three listed species. This habitat is restricted within the Survey Area and is isolated by tracks and intensively grazed pasture. It is considered to be of **Site** importance.

Marshy grassland (B5)

- 3.27 Marshy grassland is the predominant habitat type within the Survey Area, being present within the enclosed pastures (photo 4 and 5). The pastures are horse or goat grazed leaving a relatively short sward (around 10 cm in height), very wet underfoot and heavily livestock poached, resulting in patches of exposed bare ground around gates / accesses and feeding areas.
- 3.28 The grassland communities contain > 25 % cover of soft-rush *Juncus effusus* or rush spp., *Juncus* spp. leading to their categorisation as marshy grassland. Soft rush and sharp-flowered rush *Juncus acutiflorus* are frequent with perennial rye grass and creeping buttercup *Ranunculus repens* featuring frequently. Rarely occurring common nettle *Urtica dioica* and ragwort *Senecio jacobaea* indicating local nutrient enrichment (likely resulting from livestock grazing). Herbs with a preference for wetter soils included mare's-tail *Hippuris vulgaris*, blinks *Montia fontana* and clustered dock *Rumex conglomeratus*.
- 3.29 Within the marshy grassland there are several wet seepages / flushes (at TN 3 and 4) containing localised patches wetland species including floating sweet-grass *Glyceria fluitans*, greater bird's-foot-trefoil *Lotus pedunculatus* lesser spearwort *Ranunculus flammula*, round-leaved crowfoot *R. omiophyllus* and brooklime *Veronica beccabunga*.
- 3.30 Marshy grassland is also present within grazing pasture in the northern part of the Site and appears in a similar condition as described above. No detail assessment or species list has been collected to date²² for this area, and this has not been included within the assessment below.
- 3.31 The marshy grassland does not correspond to either HPI 'purple-moor grassland and rush pasture' or 'species-rich marshy grassland'²³ (Gwent Wildlife Trust, 2004). This is due to a lack of species diversity and evidence of agricultural improvement. The habitat is assessed as of importance at the **Site** level only.

²¹ As listed within Table 2 of the Guidelines of the Selection of Wildlife sites in South Wales (Gwent Wildlife Trust, 2004).

²² Future surveys are scheduled within the optimal survey window (mid-May 2025) to collect detailed species lists, and to determine habitat type and condition.

²³ To qualify as species-rich the grassland community should contain at least 12 indicator species as listed within Table 5 of the Guidelines of the Selection of Wildlife sites in South Wales (Gwent Wildlife Trust, 2004). The sward contains 5 species listed.

Poor semi-improved grassland (B6)

- 3.32 Poor semi-improved grassland is present along a linear track at the eastern edge of the Survey Area. The grassland is long, unmanaged, and species poor (photo 1).
- 3.33 Species recorded include abundant Yorkshire fog, frequent cock's-foot and occasional common bent and soft rush. Herb species predominantly comprise creeping buttercup, ribwort plantain *Plantago lanceolata* and dandelion *Taraxacum officinale* agg.
- 3.34 Poor semi-improved grassland is also present within higher and drier areas within grazing pasture in the northern part of the Site. The vegetated appears tightly grazed by horses and stock poached. No detail assessment or species list has been collected to date²⁴ for this area, and this has not been included within the assessment below.
- 3.35 This habitat does not correspond to any HPI or local designation definitions. This habitat is assessed as of importance at the **Site** level only.

Running water (G2)

- 3.36 Running water is present as small flowing field ditches throughout the Survey Area.
- 3.37 The field boundary streams are small channels (approximately 0.5 m) wide with a slow flow. Aquatic vegetation was limited to a dense patch of common water-starwort *Callitriche stagnalis* in one of the slower flowing streams towards the southern edge of the Site.
- 3.38 Terrestrial species associated with steam and riverbanks are commonly associated with wet habitats including abundant alder, frequent soft-rush and occasional polypody *Polypodium vulgare*. Bramble was recorded along all steams often as locally dense patches, often covering the stream channel.
- 3.39 Minor streams do not correspond to any HPI or local designation definitions. The field streams are not vegetatively diverse, nor of good quality but do have some ecological value as wetland areas providing connectivity across the Site. These are assessed as of **Site** importance.

Hedgerows (J2)

- 3.40 Hedgerows border the grazing pasture / fields in the southern part of the Survey Area and the northernmost section of the access track.

Intact hedgerow – species poor (J2.1.2)

- 3.41 Intact species-poor hedge is present at one location bordering the eastern edge of the northernmost section of the access track. The hedgerow is tightly flailed to approximately 1m in height. The hedgerow canopy comprises abundant bramble with frequent hawthorn, gorse and localised patches of bracken. Goat willow is occasionally present with dog-rose and Japanese knotweed (INNS) occurring rarely. The ground flora is rank and unmanaged comprising poor semi-improved grassland species (see above) and occasional tall ruderals such as rosebay willowherb.

Defunct hedgerow – species poor (J2.2.2)

- 3.42 A stretch of species-poor defunct hedgerow forms the western pasture edge of the northernmost section of the access track. The hedgerow is tightly flailed to approximately 1.5 m with the sparse canopy layer containing several gaps (< 5 m). A low hedge bank is present along its entire length. Species composition is predominantly hawthorn and bramble with an area of Japanese knotweed (INNS) present in the centre (see **Figure 4**). The ground flora is species poor and similar in composition to the adjacent marshy grassland field (see above)

²⁴Future surveys are scheduled within the optimal survey window (mid-May 2025) to collect detailed species lists, and to determine habitat type and condition.

Hedgerow with trees – species-poor (J2.3.2)

- 3.43 The hedgerows on Site are characterised as species-poor hedge with trees. All have a hedge bank present, mature trees along their length and the majority (see Photo 6 and 7) have defunct, gappy canopy layers likely a result of livestock browsing. The canopy layers comprise abundant to frequent pendulate oak, frequent ivy, silver birch and occasional to rare hawthorn, goat willow, holly and gorse. The ground flora is universally species poor comprising marshy grassland species (see marshy grassland description above).
- 3.44 All hedgerows on Site meet the definition for priority habitat hedgerows (Maddock, 2011)²⁵ but do not meet guidelines to for qualify for local designation under hedgerow criteria (Gwent Wildlife Trust, 2004). Hedgerows on Site are defunct, with poor connectivity and limited species diversity, although containing some fruiting / flowering species which may support protected and notable species. Hedgerows on Site are assessed as of importance at the **Local** level only.

Bare ground and track

- 3.45 The access track though the site comprises compacted earth and sections of surfaced road. Neither have a vegetation community or any associated ecological value.

Table 1: Habitat summary table

Habitat code	Habitat	Habitat of Principle Importance (HPI)	Local designation criteria	Assessed geographic importance
A1.1.1	Broadleaved woodland – semi natural	'Lowland mixed deciduous woodland' HPI	No	Local
A3.1	Scattered broadleaved trees	No	No	Local
A2.1 / A2.2	Scrub – dense / continuous and scattered	No	No	Local
B2.2	Neutral grassland – semi-improved	No	No	Site
B5	Marshy grassland.	No	No	Site
B6	Poor semi-improved grassland	No	No	Site
G2	Running water	No	No	Site
J2	Hedgerows	Hedgerow HPI	No	Local
J4 / J3.7	Bare ground / track	No	No	None.

²⁵ "Any boundary line of trees or shrubs over 20m long and less than 5m wide, and where any gaps between the trees or shrub species are less than 20m wide" including "all hedgerows consisting predominantly (i.e., 80% or more cover) of at least one woody UK native species are covered by this priority habitat".

Protected species

- 3.46 SEWBrEC returned 2,074 records of 247 different species. The principal results in terms of relevance to development planning are summarised in **Table 2**; consideration is given to these records and to the habitats present on Site (previously described) when determining the potential for the Site to support protected species. A brief summary of the legislative protected for each species is provided within **Table 1** (below), with further detail outlined in **Appendix 2**.

Table 2: Summary of protected species and habitat suitability

Species	Data search results	Habitat suitability
Amphibians Great crested newt (GCN) <i>Triturus cristatus</i> is protected under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 and under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) (WCA). GCN and common toad <i>Bufo bufo</i> are listed as a species of principal importance (a priority species) under Section 7 of the Environment (Wales) Act 2016²⁶.	SEWBrEC returned no records of GCN within the search radius. Three ponds within the Site (Ponds 3, 4 and 5, shown on Figure 3) have previously been surveyed for great crested newts (in 2014, 2017, and 2018, AECOM 2018); no evidence of GCN was found. SEWBrEC returned 13 records for common toad with the closest record located 1.1 km from the Site. Common toad was also recorded as an incidental observation within the wider Site during reptile surveys completed by AECOM in 2017 (AECOM, 2018). Other amphibian records returned by the desk study include common frog <i>Rana temporaria</i> and palmate newt <i>Lissotriton helveticus</i>.	Aerial imagery / Ordnance Survey mapping shows 5 ponds within 250 m of the Site, these include Pond 1 (SN 64903 02187) and 2 (SN 64849 01987) to the west of the access track (off-Site), and Ponds 3 (SN 64849 01987), 4 and 5 (SN 65594 01236, on-Site). A 6th pond was found during the HSI survey visit (ref. Pond 6, SN 65607 01204). Pond locations are shown on Figure 3. A HSI was completed and found Ponds 1 and 3 were dry and Pond 2 was part of a flowing stream (i.e., not a pond). Pond 3 scored 0.81 (excellent), Pond 4 0.74 (good) and Pond 6 0.58 (below average) suitability for GCN. The HSI results are presented in Appendix 3. An eDNA survey of the ponds holding water (Ponds 4, 5 and 6) was completed alongside the HSI, and all ponds were found negative, the results are provided in Appendix 4. Abergelli is at the western edge of the range of GCN in Wales. The closest known records within the wider Swansea area are associated with an irregularly distributed (isolated) population in west Gower (Haysom <i>et al.</i> 2018). Given the negative survey results, lack of records and the Sites geographic locale, GCN are considered likely absent from Site and are not considered further in this report.

²⁶ Natterjack toad *Epidalea calamita* is also listed but is rare, with a highly localised distribution, only occurring on one site in Wales (on the north coast).

		The Site does have suitable habitats to support other common amphibians, including common toad and is assessed as of importance at the Site level for these species.
Badger Badgers <i>Meles meles</i> are protected under the Protection of Badgers Act (1992) and Schedule 6 of the Wildlife and Countryside Act 1981 (as amended).	SEWBRc returned 43 records of badger within the search radius, with 3 found within the Site boundary. Two of the record relate to a sett within the woodland associated with Llytr-morfil SINC (the eastern edge of the Site) from the 1960's and 1970's, the third is of a badger footprint in the southwestern part of the Survey Area in 2006. The remaining records are southwest of the Site associated with woodland parcels and adjacent grazing pasture. The closest of these are within woodland to the south of Felindre Compressor Station, and include a main sett recorded in 1998.	No badger setts were recorded within the Survey Area; however, field evidence of badger use and activity was noted along the access route at TN 6 and 7 during the Phase 1 survey. Field evidence included a fresh badger latrine, snuffle marks, a strong mammal track leading into the fields to the northwest, within the wider Site, and several footprints. Further field evidence, including snuffle marks and latrines were recorded close to the ponds during the HSI survey and it is considered likely a sett (of unknown size) remains within the woodland on Site (within Llytr-morfil SINC) Whilst no evidence of setts was recorded during the survey(s) badgers are frequently active on Site. Habitats including grazed pasture, woodland and scrub provides a foraging and commuting resource for badgers within the wider surrounding area (including clans to the southwest, identified within the data search). The Site is therefore assessed as of Local importance for this species.
Bats Bats are protected under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 and under Schedules 5 & 6 of the Wildlife and Countryside Act 1981 (as amended).	SEWBRc returned 201 records of bats within the search radius, including brown long-eared bat <i>Plecotus auritus</i>, common pipistrelle, <i>Pipistrellus pipistrellus</i>, Daubenton's bat <i>Myotis daubentonii</i>, greater horseshoe bat <i>Rhinolophus ferrumequinum</i> lesser horseshoe bat <i>Rhinolophus hipposideros</i>, undetermined <i>Myotis</i> species, Natterer's bat <i>Myotis nattereri</i>, noctule bat <i>Nyctalus noctula</i>, soprano pipistrelle <i>Pipistrellus pygmaeus</i> and whiskered bat <i>Myotis mystacinus</i>. Of those returned 29 are of bat roosts (or possible bat roosts) with the closest located approximately 360 m south within a barn at Maeseglwys Farm and 420 m west at Llety Morfil Farm. Both records are of small roosts of unidentified bats recorded in 2003 and 2006, respectively.	The Phase 1 survey identified several mature scattered trees along the access track which are of a suitable size and age to support roosting features for bats and showed obvious signs of damage and decay (TN 1, 2 and 5). Historic surveys in the surrounding area found the bat species assemblage recorded at the Site is broadly the same as those returned by the desk study. The habitats within the Surveyed Area comprise moderate suitability commuting²⁷ and foraging²⁸ resource for bats (Collins, 2024). The more valuable features are likely to be the gappy hedgerows, bands of scrub and grazing pasture, with higher quality habitats (i.e., woodland and ponds) within the wider area surrounding Site. Overall, the Site as a whole is assessed as of Local importance to bats given its connectivity to the wider surrounding landscape.

²⁷ 'Continuous habitat connected to the wider landscape that could be used by bats for flight-paths such as lines of trees and scrub or linked back gardens' (Collins, 2024).

²⁸ Moderate potential suitability for foraging is defined as "habitat that is connected to the wider landscape that can be used by bats for foraging such as tress, scrub, grassland or water", whereas high suitability for foraging is defined as "high quality habitat" and includes "broadleaved woodland, tree lined watercourses and grazed parkland". (Collins, 2024).

	The remaining records are closely grouped within an area of fields and hedgerows adjacent to Penllergaer Forest 1.2 km or associated with the residential area of Cwmrhdyceirw. Activity and transect surveys were completed by AECOM in 2014, 2017 and 2018 of the Site and a wider surrounding area. These found non-maternity roosts for common pipistrelle and brown long-eared bat within buildings in Abergelli Farm, 50 m from the Access Track. Activity surveys of the area found the bat community comprised primarily of common and soprano pipistrelle (86 % of passes) with smaller numbers of <i>Myotis</i> sp., noctule / serotines and brown long-eared bats. It was concluded that '<i>the highest numbers of [bat] passes were recorded along linear features such as hedges or steam with lower activity over open fields</i> (AECOM, 2018).	
Birds All nesting birds are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended). Greater protection is afforded to species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Some bird species are also listed as priority species under Section 7 of the Environment (Wales) Act 2016.	SEWBRc returned 1,145 records of 80 bird species within the search radius. Of these, 17 species are afforded enhance protection when breeding under Schedule 1 of the Wildlife and Countryside Act 1981., One species, red kite <i>Milvus milvus</i>, was recorded within the wider Site (overflying woodland associated with Llytr-morfil SINC). There is a barn owl <i>Tyto alba</i> record associated with a building 458 m west of the site that indicates possible breeding, and 23 other records of barn owl within grazing pasture / farmland to the west and east. The remaining records comprise winter visitors (i.e., goldeneye <i>Bucephala clangula</i>, brambling <i>Fringilla montifringilla</i>, green sandpiper <i>Tringa ochropus</i> and fieldfare <i>Turdus pilaris</i>), species that do not breed in South Wales (i.e., common scoter <i>Melanitta nigra</i> and corncrake <i>Crex crex</i>) or species associated with upland sites (i.e., merlin <i>Falco columbarius</i>) or large wetland habitats (i.e., osprey <i>Pandion haliaetus</i>). Other records returned from within the Site included linnet <i>Linaria cannabina</i> (listed under Section 7) and	The Survey Area contains various features suitable for supporting common passerine / farmland species (i.e., hedgerow and scrub), but is unlikely to offer suitable habitat for tree nesting raptors or open ground nesting species. Habitats in the wider Site (including woodland associated with Llytr-morfil SINC) offers additional opportunities for common and potentially notable breeding bird species (i.e., tree pipit <i>Anthus trivialis</i> recorded calling with the Site). Habitats across the wider Site (hedgerows and woodland) are common within the wider surrounding landscape and therefore the Site as a whole is considered to be of importance at the Site level only.

	species including willow warbler <i>Phylloscopus trochilus</i>, swift <i>Apus apus</i>, swallow <i>Hirundo rustica</i> and whitethroat <i>Curruca communis</i>. Breeding bird surveys were completed on Site (and in the wider surrounding area) in 2014 by BSG Ecology and 2017 by AECOM, with similar results returned by both surveys (AECOM, 2018). 45 species were recorded with 44 of these suspected to be breeding within their surveyed area. Of these twelve are listed on Section 7, 10 listed on the Birds of Conservation Concern (BOCC, <i>Eaton et al.</i>, 2009²⁹) red list and a further 8 on BOCC amber list (AECOM, 2018). No references to the locations of breeding species is given for 2017. Species recorded within the current Site boundary in 2014 include whitethroat, willow warbler, robin, tree pipit, chiffchaff and chaffinch (AECOM, 2018) .	
Hazel dormouse Hazel dormouse <i>Muscardinus avellanarius</i> is protected under the Conservation of Habitats and Species Amendment) (EU Exit) Regulations 2019 and under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended).	SEWBRc returned no records of hazel dormouse within the search radius. Records were included of a known population present along the M4 corridor, 2.5 km away at the closest point. Surveys of the Site and wider surrounding area for dormouse were completed in 2014 by BSG Ecology and repeated in 2017 by AECOM. Neither survey recorded dormice or evidence of their presence (AECOM, 2018).	Hedgerows on Site are variable in terms of suitability for supporting dormouse (i.e., with the majority offering undeveloped shrub layers, species poor / defunct), however, all have connecting canopies which would facilitate commuting through the Site (if present). Given the lack of records and evidence during previous survey efforts, hazel dormouse is considered likely absent and are not considered further.
Invertebrates Protection is afforded to species listed under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended).	SEWBRc returned 215 records of 67 invertebrate species within the search radius. Two of these are listed under Schedule 5, these are marsh fritillary <i>Euphydryas aurinia</i>, and white-letter hairstreak <i>Satyrrium w-album</i>. There are 17 records for marsh fritillary with the closest located 500 m west of the	There are no habitats within the Survey Area suitable to support Schedule 5 species returned by SEWBRc. Marsh fritillary requires devil's-bit scabious (their larval food plant) in areas of marshy grassland, whilst devil's-bit scabious was not recorded during the Phase 1 survey, areas of purple-moor grassland / marsh grassland are known within the wider Site (which have not been surveyed and may support this species).

²⁹ Eaton MA, Brown AF, Noble DG, Musgrove AJ, Hearn R, Aebischer NJ, Gibbons DW, Evans A and Gregory RD (2009) Birds of Conservation Concern 3: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man. British Birds 102, pp296–341.

Some species of invertebrates are listed as priority species under Section 7 of the Environment (Wales) Act 2016	Site (recorded in 1998). The remaining records as scattered west associated with grazing pasture. There are 2 records for white-letter hairstreak, both are beyond 2 km from the Site. Other invertebrate records include 49 species listed on Section 7, including wall <i>Lasiommata megera</i> present on Site (within the woodland associated with Llytr-morfil SINC). Narrow-bordered bee hawk-moth and cinnabar <i>Tyria jacobaeae</i> (also listed on Section 7) have been recorded from approximately 500 m west of the Site. An invertebrate survey was completed on Site (and the wider surrounding area) in 2014 by BSG Ecology Ltd. the survey recorded over 384 terrestrial and aquatic species, and thirteen moth species listed on Section 7. Marsh fritillary surveys were also completed, but no caterpillars / larval webs, free-flying adult were recorded and the foodplant, devil's-bit scabious, was absent.	White-letter hairstreak is found in associated with elm species (not recorded within the Survey Area) which it uses for breeding. Habitats present within the Survey Area are generally common throughout the wider landscape (i.e., species poor grazing pasture and hedgerow) and are unlikely to support a diverse assemblage or significant number of notable invertebrate species. The site is assessed as of Site value only, for invertebrate species.
Other protected / notable species Listed in Section 7 of Environment (Wales) Act 2016.	SEWBRc returned 26 records of hedgehog <i>Erinaceus europaeus</i> within the search radius, with one record returned from within the Survey Area in 2020. SEWBRc also returned 6 records of polecat <i>Mustela putorius</i>, the closest being approximately 300 m east. Other protected / notable species returned include fish species including European eel <i>Anguilla anguilla</i>, brown / sea trout <i>Salmo trutta</i> and salmon <i>Salmo salar</i> associated with the Afon Llan approximately 1 km from the Site.	The Survey Area offers suitable habitat to support both mammal species, with connecting hedgerows and woodland, and no significant barriers to dispersal. The Site is assessed as of Site value to hedgehog and polecat. The Survey Area has no significant rivers or streams suitable to support fish species returned by SEWBRc.
Otter Otter <i>Lutra lutra</i> is protected under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 and Schedules 5 & 6 of the Wildlife and Countryside Act 1981 (as amended).	SEWBRc returned 32 records of otter within the search radius. The closest record is approximately 600m southeast associated with the Afon Llan, with the remaining records all associated with the river and its tributaries. Surveys for otter were completed in 2014 by BSG Ecology and 2017 by AECOM, encompassing the Site	The Afon Llan is located 280 m south at its closest point to the Site / Survey Area. However, there are no significant streams or rivers within the Survey Area suitable to support or attract otter and the Survey Area comprises open habitats unsuitable for holt building or lying-up areas. It is therefore considered that otter is considered likely absent from the Survey Area and are not considered further.

	and surrounding area including a section of the Afon Llan. No evidence of otter use or activity was found, however upstream surveys (approximately 500 m upstream) in 2014 by BSG recorded an otter spraint. It was concluded that otter is active in the locality (i.e., the Afon Llan and minor tributaries of).	
Reptiles All reptiles are afforded protection under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended).	SEWBrEC returned 63 records of the four common reptile species within the search radius including slow worm <i>Anguis fragilis</i>, common lizard <i>Zootoca vivipara</i>, adder <i>Viperus berus</i> and grass snake <i>Natrix helvetica</i>. All records returned are beyond 1 km from the Site and are largely associated with woodland fringe habitats to the south and west. Reptile surveys along the access track though the Site (and adjacent habitats, off-Site) were completed by AECOM in 2014 and 2018. Grass snake was recorded during the 2014 survey, but not in 2018³⁰. Adult and juvenile common lizard were recorded along the access track in 2018, with a peak count of 6 individuals, described as a 'good population', AECOM 2018.	Reptile surveys are ongoing within suitable habitats in the Survey Area and wider Site, at the time of writing. Adult common lizard and grass snake (adults and juveniles) were recorded during the first two visits. The latter indicates a breeding population of grass snake is present. Suitable habitat within the Survey Area to support reptiles is restricted to hedge banks, ditches and ecotones with the majority of the remaining habitat (grassland pasture) lacking the structure and diversity to support animals. Habitats within the wider Site including woodland edges, ponds and marshy grassland however, (where grass snake have been recorded) offer better suitable habitat. The Site is currently assessed as of Local level importance for reptiles.
Water vole Water vole <i>Arvicola amphibius</i> is afforded protection under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended).	SEWBrEC returned one record of water vole, beyond 2 km from the Site. Surveys for water vole were completed in 2014 by BSG Ecology and 2017 by AECOM, encompassing the Site and surrounding area including a section of the Afon Llan. No evidence of water vole use or activity was found. Upstream surveys (extending approximately 500 m upstream) in 2014 by BSG recorded potential burrows, but these were not confirmed as water vole.	There are no suitable habitats (i.e., slow flowing streams, marsh or reedbeds) within the Survey Area to support or attract water vole. Given the limited availability of habitats within the wider area, lack of records or historic survey data, water vole are considered likely absent from Site and are not considered further within this report.
Invasive non-native, (INNS) plants	SEWBrEC returned 57 records of 9 invasive plant species within the search radius. These include, Japanese knotweed <i>Fallopia japonica</i> and Himalayan balsam <i>Impatiens glandifera</i> within 44 m of the access track.	Several stands of Japanese knotweed were recorded along the access track during the Phase 1 survey visit. A lone rhododendron plant was recorded on a field boundary at the southwestern edge of the Survey Area and Himalayan balsam was recorded during the HSI visits. The recorded positions of these species are shown on Figure 4.

³⁰ The report concluded that grass snake was likely present, and were unrecorded due to their wide range, and the change in the survey area between 2014 and 2018 (AECOM 2018).

Listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).	Other records returned include giant hogweed <i>Heracleum mantegazzianum</i> , Himalayan cotoneaster <i>Cotoneaster simonsii</i> , hollyberry cotoneaster <i>C. bullatus</i> , wall cotoneaster <i>C. horizontalis</i> , Japanese rose <i>Rosa rugosa</i> , Montbretia <i>Crocasmia x crocosmiiflora</i> and rhododendron <i>Rhododendron ponticum</i> .	
Protected plants Listed in Section 7 of Environment (Wales) Act 2016.8	SEWBRc returned one record of a Section 7 plant within the search radius, which is cornflower <i>Centaurea cyanus</i> located over 2 km from the Site.	Cornflower was not recorded during any of the survey visits, and habitats within the Survey Area are considered unsuitable to support this species, which is commonly found as an arable weed or within disturbed, dry / poor soils such waste areas, pavements or along roadsides. No other protected plants were recorded during the survey visits.

4 Potential Impacts and Recommendations

- 4.1 This section presents an interpretation of the results and an assessment of the potential impacts of the proposed development on the features identified in **Section 3**. Mitigation measures incorporated / 'embedded' within the scheme design are outlined here (Primary Mitigation Measures) and measures for legislative / policy requirements or standard industry practice (Tertiary Mitigation Measures). These are followed by any other anticipated mitigation requirements (Secondary Mitigation Measures). Opportunities for biodiversity enhancement in line with legislative and policy requirements are presented in **Section 5**.

Primary Mitigation Measures

- 4.2 The proposed development design has been informed by series of team meetings in which ecological constraints and opportunities have been discussed. The aim of this is to minimise the ecological impact of the scheme, as far as is possible given other constraints and viability considerations, through the design process, and demonstrates a stepwise approach has been followed. This includes:
- The Development Footprint has been revised and restricted to avoid any direct impacts on SINC, ASNW, priority habitats (i.e., woodland and hedgerows) and other boundary features, by retaining these within the scheme design. Further, in accordance with policy recommendations for ancient woodland and project-specific arboricultural advice, stand offs of at least 5 m from hedgerows, trees and secondary woodland, and 15 m from ancient woodland have been built into development design.

Tertiary Mitigation Measures

- 4.3 A Construction Environmental Management Plan (CEMP) will be produced to identify how best practice construction techniques and mitigation measures will be implemented during the construction phase. Such measures will include:
- Avoiding impacts on SINC, ancient woodland sites, priority habitats and trees through accidental physical damage, lighting, pollution, soil compaction and sediment mobilisation (along field ditches / streams). There may be a requirement for the presence of an Ecological Clerk of Works (ECOW) to assist in effective implementation of the CEMP.
 - Measures to avoid impacts on nesting birds including clearance of vegetation (where required) will be conducted outside of the bird nesting season to avoid disturbing or destroying active nests. Any removal of vegetation or construction occurring during the nesting bird season (which is typically taken as March to August inclusive), should be preceded by a survey (undertaken by a suitably experienced Ecological Clerk of Works (ECOW)) to identify active nests. Any nests found will be protected by work exclusion buffers and monitored by the ECOW.
 - A pre-commencement check for new badger setts will be completed by an ECOW in advance of ground investigation and construction works. Appropriate further mitigation measures to protect badgers, and avoid contravention of the law, will be set out in the CEMP (as necessary).
 - Measures to avoid killing / injuring of amphibians and reptiles will be implemented during construction. These will include staged removal of vegetation and hand-searching by an ECOW where necessary.
 - Construction and pre-commencement ground investigations will be timed, to minimise night-time working to minimise disturbance to bats. Artificial light to aid construction will be designed to minimise light spillage outside active construction areas. Artificial light will be directed away from any field boundaries, trees or buildings.
 - Night working will be avoided where possible during the construction phase. Where night-time working is required, sensitive lighting strategies will be designed to direct light away from habitat features.

- The CEMP will identify best practice to be applied to minimise water pollution from spillages associated with construction works and air pollution from construction vehicle emissions and dust generation.
- Boundary fencing for the facility will be designed to avoid entrapment of small mammals including hedgehog or polecat.
- Sensitive working practices will be adopted during the construction phase to prevent entrapment or other causes of harm to mammals (i.e. providing means of escape for any uncovered excavations, appropriately storage of chemicals and capping of exposed piping). Assessment of Potential Impacts and Secondary Mitigation Measures

Designated sites

- 4.4 One statutory designated site was identified within the search radius, Nant-y-Crimp SSSI.
- 4.5 Direct impacts (e.g., removal or modification) and indirect impacts (e.g., noise, visual disturbance, pollution or increased recreational activity) are not anticipated as a result of the proposed development due to the distance from the Site (1.3 km), the limited ecological / aquatic connectivity with the Site and the character of the habitats and features for which the SSSI is designated.

Non-statutory designated sites

- 4.6 There are 21 non-statutory sites / SINCs within 2 km of the Site, with two falling in or immediately adjacent to the Site boundary. Considering proximity, the features for which they are designated and ecological / hydrological connectivity to the Site, these two are considered at risk of direct and / or indirect impacts (in the absence of mitigation) as a result of the proposed development. SINCs are of **County** importance.
- 4.7 Policy ER 6 (Designated Sites of Ecological Importance) of Swansea Local Development Plan 2010 – 2025 (Swansea Council, adopted 2019) states that:

“Development that would adversely affect locally designated sites of nature conservation importance should maintain and enhance the nature conservation interest of the site. Where this cannot be achieved [it should be demonstrated that] any unacceptable harm is kept to a minimum by effective avoidance measures and mitigation, or where this is not feasible, compensatory measures must be put in place to ensure that there is no overall reduction in the nature conservation value of the area”.

Potential impacts

- 4.8 No direct impacts (i.e., loss / modification) are anticipated to either of the SINCs as both fall outside the Development Footprint and are further reduced by implementation of work exclusion buffers.
- 4.9 Indirect impacts will be avoided by following sensitive working methods outlined within a CEMP (see Tertiary Mitigation Measures, above). No residual impacts are anticipated.

Ancient woodland

- 4.10 There is one parcel of ASNW within the wider Site and RAWs are present immediately adjacent to. These sites are assessed as of **County** importance.
- 4.11 Policy ER 11 (Trees, Hedgerows and Development) of Swansea LDP 2010 – 2025 (Swansea Council, adopted 2019) states that:

“Development that would adversely affect trees, woodlands and hedgerows of public amenity or natural/cultural heritage value, or that provide important ecosystem services, will not normally be permitted. Ancient woodland, ancient woodland sites, ancient and veteran trees merit specific protection, and development will not normally be permitted that would result in; [fragmentation or loss of, ground damage / disturbance or loss of understory, reduction in connectivity / semi-natural

habitats adjacent to or changes to air quality or hydrology or adjacent land use to an ancient woodland / veteran or ancient tree].”

Potential impacts

- 4.12 Direct and at-distance impacts to ancient woodland sites will be reduced by implementation of work exclusion buffers to be determined by project-specific arboricultural advice. No residual impacts are anticipated.

Habitats

- 4.13 The lowland deciduous mixed woodland and hedgerow within the Site / Survey Area is likely to qualify as priority habitat listed on Section 7 of the Environment (Wales) Act 2016. This act requires the Welsh Government to take all reasonable steps to maintain and enhance them, and to encourage others to take such steps.

- 4.14 Policy ER 9 (Ecological Networks and Features of Importance for Biodiversity) of Swansea LDP 2010 – 2025 (Swansea Council, adopted 2019) states that:

“Development proposals will be expected to maintain, protect and enhance ecological networks and features of importance for biodiversity. Importance will be given to maintaining and enhancing the connectivity of ecological networks which enable the dispersal and functioning of protected and priority species. Development proposals that could result in an adverse effect on the connectivity of ecological networks and features of importance for biodiversity will only be permitted where:

- a. The need for the development outweighs the nature conservation value of the site,*
- b. It can be demonstrated that there is no satisfactory alternative location for the development,*
- c. A functional connected element of the natural resource is retained as part of the design of the development, and*
- d. Compensatory provision will be made of comparable or greater ecological value to that lost as a result of the development.”*

Potential impacts

- 4.15 No direct impacts (i.e., loss / modification) are anticipated to priority habitats (woodland and hedgerow) and scattered trees as all fall outside the Development Footprint and at-distance impacts will be reduced by implementation of work exclusion buffers.
- 4.16 Direct impacts (i.e., loss or modification) resulting from the proposed development includes the loss of a limited amount of dense scrub (of local importance) during the construction phase.
- 4.17 Indirect impacts will be avoided by following sensitive working methods outlined within a CEMP (see Tertiary Mitigation Measures, above). No residual impacts are anticipated.

Proposed safeguarding / mitigation

- 4.18 None proposed.

Compensation

- 4.19 The loss of scrub habitat will be compensated for by the enhancement of hedgerows within retained habitats on Site.

Protected species

- 4.20 The potential for impacts on protected species (in the absence of mitigation), recommendations for further survey, mitigation and consultation are presented within **Table 3**.

Table 3: Further survey, potential impacts, and mitigation recommendations for protected species.

Species	Further Survey	Potential Impacts	Avoidance/Mitigation Actions
Amphibians <i>Site importance</i>	No further survey recommended.	Killing / injury of priority species (common toad) during construction phase.	A Method Statement outlining appropriate sensitive working practices should be implemented and included within a CEMP (see Tertiary Mitigation Measures).
Badger <i>Local importance</i>	Badgers are a mobile species, known to be present in the surrounding land, a pre-works inspection for signs of badger is recommended to confirm no active setts are present within the working area plus a buffer of 30 m ³¹ .	Disturbance or entrapment (in open workings) during the construction phase.	A Method Statement outlining appropriate sensitive working practices should be implemented and included within a CEMP (see Tertiary Mitigation Measures). Additional measures to protect badgers will be put in place (if required) following the pre-works check.
Bats <i>Local importance</i>	No further survey is required for trees with negligible or PRF-I potential for roosting bats.	The development footprint is restricted to species poor marshy grassland / grazing pasture with all features of higher value in site terms (i.e., hedgerow) / commuting habitat retained. Therefore, the loss of limited amount of moderate suitability foraging habitats during construction / operation is anticipated. Disturbance or abandonment of off-Site roosts or displacement from	A Method Statement outlining appropriate sensitive working practices should be implemented and included within a CEMP (see Tertiary Mitigation Measures). The intention is that the majority of trees on Site will be retained and protected as part of the scheme design ³³ . However, if light pruning of trees with PRF-I is required during construction or operational phases (i.e., for reasons of Health and Safety) works should be completed following a toolbox talk by an ecologist, and in line with a working method statement.

³¹ Where badger setts are identified within 30 m of the works area, a suitably experienced Ecologist will be consulted to advise on the requirement for precautionary working methodologies or application for a Natural Resources Wales (NRW) badger mitigation licence.

³³ Please note, if trees with moderate / high potential are to be pruned or felled, close inspection (i.e., via endoscope or tree climbing) will be needed to confirm roosting potential and inform whether any subsequent survey, licensing and /or mitigation requirements will be needed. An NRW licence to permit otherwise unlawful works maybe required (if a roost is present and likely to be adversely affected).

Species	Further Survey	Potential Impacts	Avoidance/Mitigation Actions
		foraging and commuting habitat through lighting impacts during construction phase only ³² .	
Breeding Birds <i>Site importance</i>	If vegetation clearance cannot be timed to avoid the main nesting season (March to August, inclusive) a pre-works inspection by an ecologist will be required and any active nests retained in-situ until they are no longer in use.	Loss of a limited amount of nesting and foraging habitat (i.e., dense scrub). Damage or destruction of active nests.	A Method Statement outlining appropriate sensitive working practices should be implemented and included within a CEMP (see Tertiary Mitigation Measures).
Invertebrates <i>Site importance</i>	No further survey recommended.	None anticipated.	None.
Other protected/notable species (hedgehog / polecat) <i>Site importance</i>	No further survey recommended.	Killing/injury if present. Damage / destruction of habitats during construction of the Site. Loss of foraging habitat (grassland and limited amount of scrub) Risk of entrapment (in open workings) during the construction phase.	A Method Statement outlining appropriate sensitive working practices should be implemented and included within a CEMP (see Tertiary Mitigation Measures).
Reptiles <i>Local importance</i>	No further survey recommended.	Killing/injury. Damage, destruction and/or fragmentation of habitats.	A Method Statement outlining appropriate sensitive working practices should be implemented and included within a CEMP (see Tertiary Mitigation Measures).
Non-native, invasive plants	No further survey recommended.	Cause to spread during vegetation clearance.	Advice should be sought from a Specialist Invasive Species Contractor to establish appropriate working methods during the construction phase.

³² No lighting is proposed during the operational phase.

- 4.22 Where method statements are recommended in regard to protected species, these should be provided as a single statement for inclusion within, or alongside the CEMP. Each method statement should outline appropriate sensitive working practices (such as pre-works hand searches and vegetation removal under the supervision of a suitably qualified ECoW). These should be produced and enforced during all phases of the development, for the purposes of legal or legislative compliance, and will outline all preventative measures as described above. This CEMP can be secured within an appropriately worded planning condition.

5 Biodiversity Net Benefit

Policy Requirements

- 5.1 Chapter 6 (Distinctive and Natural Places) of Planning Policy Wales 12 (PPW 12) aims to ensure the planning system in Wales meets the challenges set out in the Global Biodiversity Framework³⁴, the Biodiversity Deep Dive recommendations developed in response to this (Welsh Government, 2022), and the Duty, under Section 6 of the Environment (Wales) Act 2016, to maintain and enhance biodiversity and ecosystem resilience in Wales.
- 5.2 The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental, and cultural well-being of Wales, as required by the Planning (Wales) Act 2015, the Well-being of Future Generations (Wales) Act 2015 and other key legislation and resultant duties.

Maintaining and Enhancing Biodiversity

- 5.3 PPW states that development should not cause any significant loss of habitats or populations of species, locally or nationally and, must working alongside nature and it must provide a net benefit for biodiversity and improve, or enable the improvement of, the resilience of ecosystems.
- 5.4 A stepwise approach should be worked through iteratively, with the result being a scheme of enhancement secured through the Proposed Development to provide a net benefit for biodiversity, with the improvement of ecosystem resilience, particularly improving the connectivity to the immediate surroundings, being a key contribution to on-site avoidance, minimisation, and mitigation strategies and enhancement.
- 5.5 A net benefit for biodiversity is the concept that development should leave biodiversity and the resilience of ecosystems in a significantly better state than before, through securing immediate and long-term, measurable, and demonstrable benefit, primarily on or immediately adjacent to the Site. The stepwise approach is the means of demonstrating the steps which have been taken towards securing a net benefit for biodiversity.
- 5.6 In doing so, regard must also be given to promoting the resilience of ecosystems, through the DECCA framework, which is framed as such:
- 5.7 Diversity between and within ecosystems,
- The extent or scale of ecosystems,
 - The condition of ecosystems including their structure and functioning,
 - The connections between and within ecosystems, and
 - Adaptability of ecosystems including their ability to adapt to, resist and recover from a range of pressures likely to be placed on them through climate change, for example.
- 5.8 Furthermore, PPW notes that ‘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). Even if the biodiversity value has been maintained, there must still be a proactive process to look for and secure enhancement through the design and implementation of the development’.

³⁴ See: <https://www.cbd.int/gbf/>

Biodiversity Net Benefit Commitments

- 5.9 The key aspects of achieving policy compliance are, illustrating how biodiversity has been considered in the design of the scheme and how biodiversity net benefit and increased ecosystem resilience will be achieved through the application. Therefore, it is necessary to demonstrate:

- How the stepwise approach to securing a net benefit for biodiversity has been applied.
- How ecosystem resilience will be demonstrably achieved through the development process.

Stepwise Approach to Biodiversity Enhancement

Baseline

- 5.10 The approach taken was to survey for the presence of important habitats, assess whether there was potential for protected species to occur, and to complete surveys for these species. The following features were identified:

- Non-statutory designated sites (Lletyr-morfil and Waun Garn Wen SINC),
- Priority habitats (woodland and hedgerows) and Ancient Woodland Sites,
- Common and widespread habitats including marshy grassland, poor semi-improved grassland and scrub,
- Common and widespread breeding passerine birds,
- Common amphibians, reptile and notable mammals' species (hedgehog and polecat),
- Foraging and commuting bats,
- Common invertebrate species, and
- Badger.

Site Design

- 5.11 The Site design was informed by survey results and a review of potential impacts to ensure key ecological features were considered and avoided at the design stage. The design of the proposed development has sought to avoid any direct impacts ancient woodland sites, priority habitats and trees in accordance with policy recommendations for ancient woodland and project-specific arboricultural advice. This has been achieved by:

- Placing the majority of the development within grassland pasture, to avoid boundary features of greater ecological value and which had the potential to support / were known to support protected / notable species.
- Retention of boundary features (i.e., hedgerows, woodland and trees) as far as practicable, with a limited amount of vegetation removal required to facilitate the construction process, to maintain ecological connectivity across the Site.
- Buffering the development area to avoid residual impacts to key boundary features including Ancient Woodland Sites, priority habitat (broadleaved semi-natural woodland) and boundary features.

Compensation measures

- 5.12 The proposed development will result in the loss of marshy grassland and a limited amount of scrub habitat.
- 5.13 In turn this will result in the loss of a limited amount of foraging / commuting / sheltering resource for protected species including common amphibians, foraging bats, badger, breeding birds, invertebrate species, reptiles, and other small mammals. Habitat enhancement for protected species (outlined below) will compensate for the short-term habitat loss and would provide overall enhancement to protected species.

Enhancement opportunities

- 5.14 The Proposed Development will deliver the following enhancement measures:
- Enhance existing hedgerows on Site by 'gapping-up' through supplementary planting. The hedgerows will be planted with mixture of native species of local provenance and include a various fruiting species to provide a long-term food resource, and overall resilience. The enhancement of hedgerows will retain ecological connectivity and resource across the Site (and between parcels of Llytr-morfil SINC) for a range of protected species, including reptiles, amphibians, birds and bats and terrestrial mammals. The hedgerows will be appropriately managed to encourage a dense / continuous shrub layer.
 - Creation of approximately 70 m of hedgerow to improve connectivity between Llytr-morfil SINC parcels, along an existing fence line to the east of the Proposed Development. The hedgerow will be planted with mixture of native species of local provenance and include a various fruiting species to provide a long-term food resource, and overall resilience.
 - Enhance retained marshy grassland stand-offs / buffer strips surrounding the Proposed Development SINC to improve species (floristic) and structural diversity over time. The grassland enhancement will provide a long-term foraging resource for a range of protected species, including reptiles, amphibians, birds and bats and terrestrial mammals.
 - Create wet scrapes / temporary ponds (and / or ecological valuable SUDs / wetland features) within areas of marshy grassland, to periodically hold water to create new habitat niches and provide a foraging resource for a range of protected species.
 - Creation of reptile banks and hibernacula in retained areas of marshy grassland to benefit reptiles and amphibian species.
 - Invasive species management – removal of Japanese knotweed and Himalayan balsam using a specialist invasive species contractor.
- 5.15 Where possible, habitat management and enhancement measures will be commenced at the earliest opportunity (i.e., pre-construction) to provide a continued resource to support any displaced species during the construction phase.
- 5.16 The enhancement measures for ecology receptors and wider biodiversity interest features will be detailed within a LEMP. The LEMP will also include an appropriate monitoring scheme to ensure the enhancement measures are delivered in accordance with the principles above.

Ecosystem resilience

- 5.17 Ecosystem resilience is defined as “the capacity of ecosystems to deal with disturbances, either by resisting them, recovering from them, or adapting to them, whilst retaining their ability to deliver services and benefits now and in the future” (NRW, 2016). The opportunities outlined above seek to retain and enhance habitats in line with this definition. Once implemented, the enhancements will help increase resilience in the local area, by providing connections between existing resources, an increase in condition / extent of priority habitats locally, the biodiversity of habitats to provide resilience to potential disease or changes in climate, and a long-term commitment to management. This is evidenced in **Table 4** below.

Table 4: Description of how biodiversity enhancement features satisfy biodiversity/ ecosystem enhancement according to the DECCA framework

Receptor	Enhancement description	Resilience of biodiversity/ ecosystems enhancement using DECCA framework				
		Diversity between and within ecosystems	Extent or scale of ecosystems	Condition of ecosystems and structure/ function	Connection between and within ecosystems	Adaptability
Hedgerow (existing)	'Gapping-up' existing hedgerows.	Structural and species diversity increased	Extent of functioning habitat increased	Condition, structure and function of hedgerow improved	Connection between ecosystems for mobile species improved by provision of habitat niche	Adaptability of mobile species increased with increased diversity of structure of hedgerows
Hedgerows (new)	New hedgerow planting	Structural and species diversity increased	Extent of functioning habitat and linkage increased	Condition, structure and function of hedgerow network improved with new hedgerow	Connection between ecosystems for mobile species improved by provision of habitat niche	Adaptability of mobile species increased with increased hedgerow network and diversity
Grasslands, mobile species	Marshy grassland enhancement	Structural and species diversity increased	n/a	Condition, structure and function of existing grassland improved through management	n/a	Adaptability of habitats increased with improved condition
Waterbodies, mobile species	Creation of scrapes / temporary pools	Increased habitat diversity	Extent of functioning habitat and linkage increased	Condition, structure and function of habitat improved through management	Connection between ecosystems for mobile species improved by provision of habitat niche	Adaptability increased with increased connectivity and habitat diversity
Reptiles and amphibians	Creation of reptile banks and hibernacula	n/a	Extent of functioning habitat increased	Increased breeding and sheltering opportunities to	Connection between ecosystems for mobile species improved by	Adaptability increased with increased connectivity

				build population resilience	provision of habitat niche	
Invasive species	Removal of invasive species	n/a	n/a	n/a	n/a	n/a

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7 Photographs

(overleaf)



Photo 1 – Dense scrub band bordering poor semi-improved grassland track



Photo 2 – Japanese knotweed *Fallopia japonica* within dense scrub.



Photo 3 – Example of unmanaged neutral grassland – semi-improved with tussocky structure and thatch.



Photo 4 – Marshy grassland within enclosed pasture at proposed development footprint, grazed and livestock poached.



Photo 5 – Marshy grassland within enclosed pasture south of the proposed development footprint, grazed and livestock poached.



Photo 6 – View of hedgerow along the southern edge of the proposed development site.



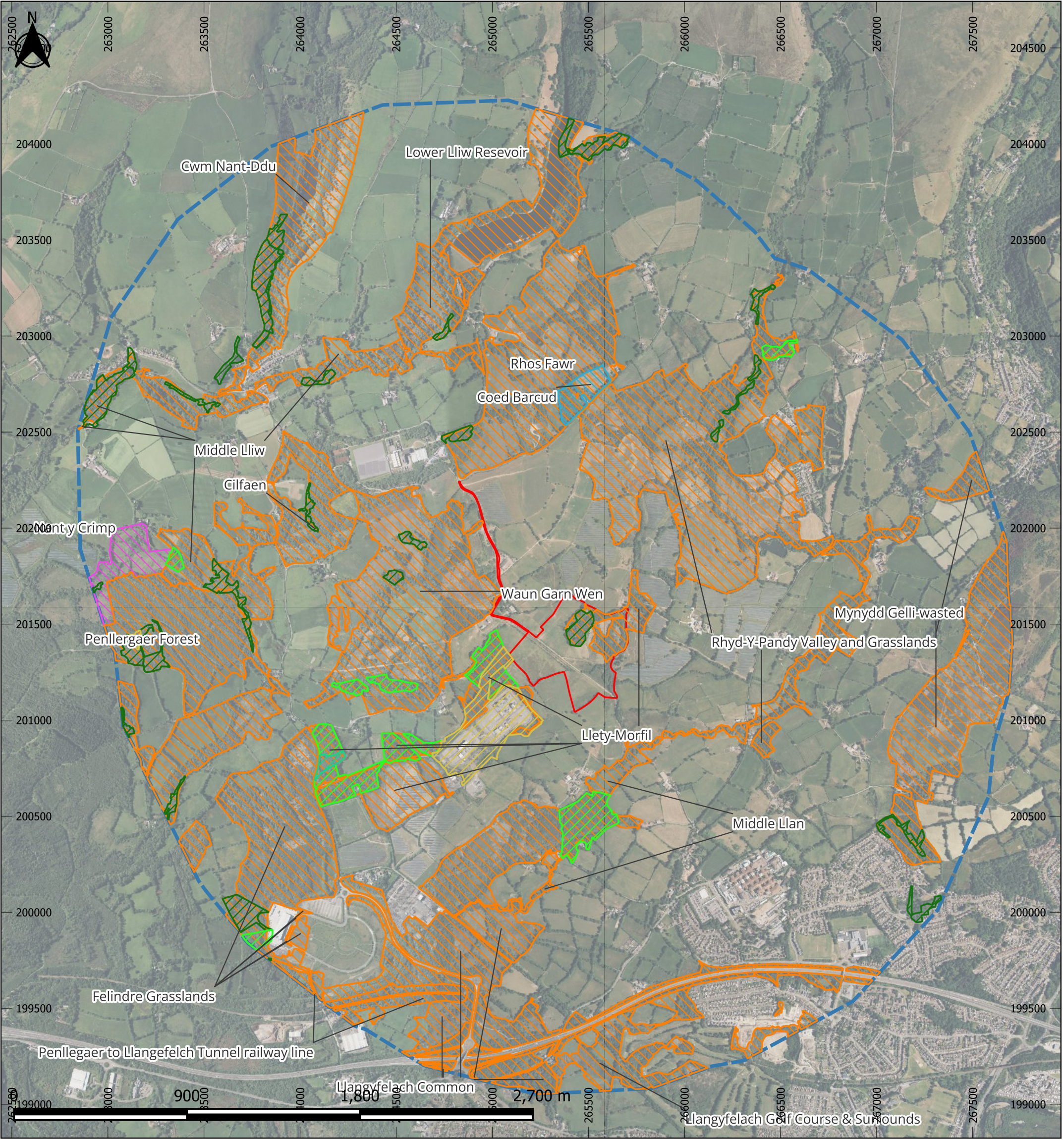
Photo 7 – View of hedge along the western edge of the proposed development site joining wet woodland (off-Site)



Photo 8 – View of track through Site

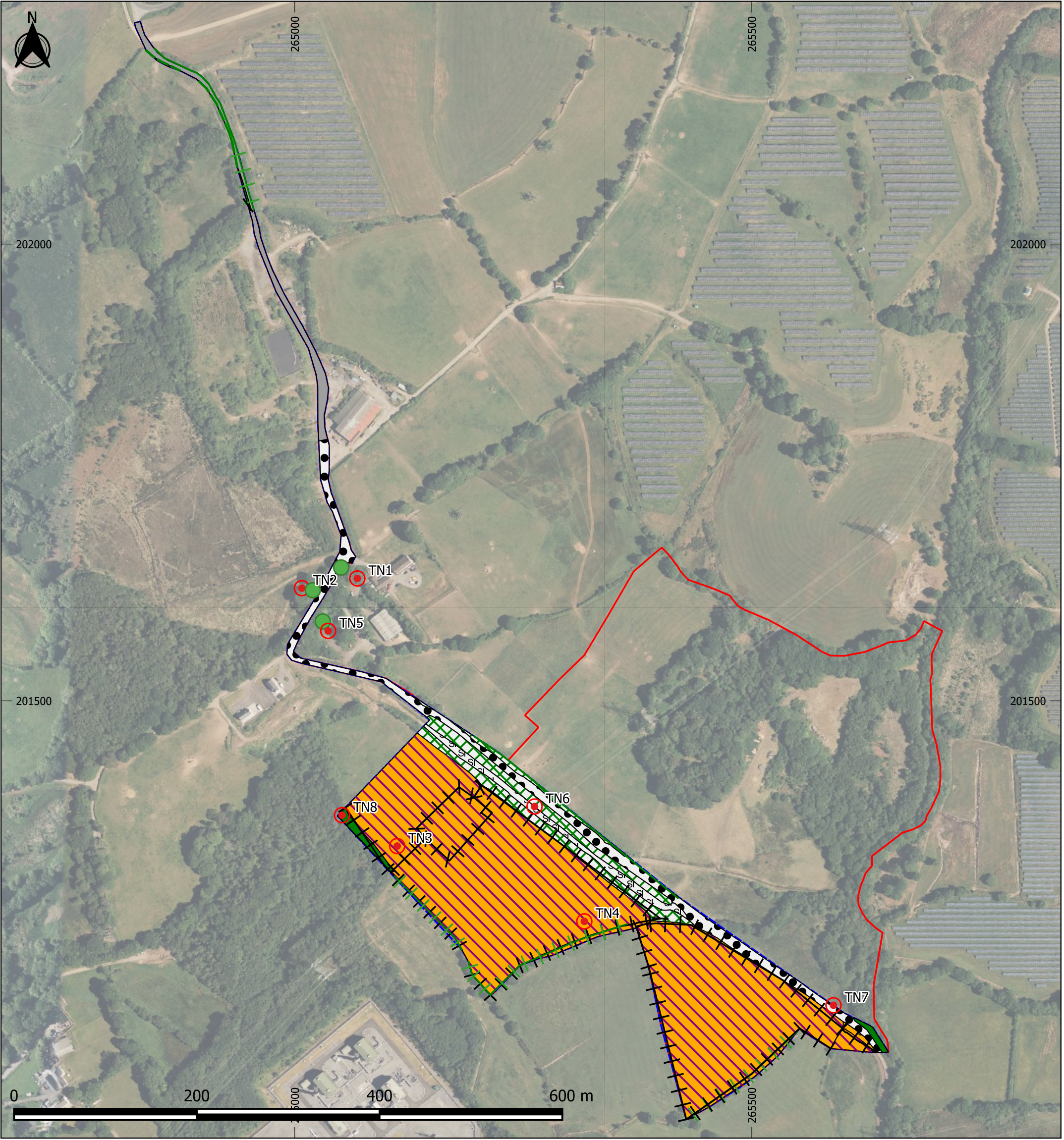
8 Figures

(overleaf)



Legend

- Ancient Semi Natural Woodland
- Restored Ancient Woodland Site
- Plantation on Ancient Woodland Site
- Ancient Woodland Site of Unknown Category
- Wildlife Site / Site of Interest for Nature Conservation (SINC) (Adopted)
- Site of Special Scientific Interest (SSSI)
- Wildlife Trust Reserve (WTR)
- 2 km buffer
- Site boundary



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PROJECT TITLE
SWANSEA NORTH BESS

DRAWING TITLE
Figure 2: Phase 1 result

DATE: 12/03/2025
DRAWN: SP
CHECKED: KR
APPROVED: KP
SCALE: 1:4,100
VERSION: 1.0

- Legend
- | | | | |
|--|---------------------------------|--|-------------------------------------|
| | Site boundary | | Broadleaved woodland - semi-natural |
| | Survey boundary | | Scrub - dense/continuous |
| | Broadleaved scattered tree | | Scrub - scattered |
| | Target Note | | Neutral grassland - semi-improved |
| | Intact hedge - species-poor | | Marsh/marshy grassland |
| | Defunct hedge - species-poor | | Poor semi-improved grassland |
| | Hedge with trees - species-poor | | Built up areas inc. hardstanding |
| | Fence | | Bare ground |



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PROJECT TITLE
BATRI AFON LLAN BATTERY

DRAWING TITLE
Figure 3: Pond Locations

DATE: 08/05/2025
DRAWN: KG

CHECKED: OG
APPROVED: OG

SCALE: 1:4,200
VERSION:1.0

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Area measurements for indicative purposes only.

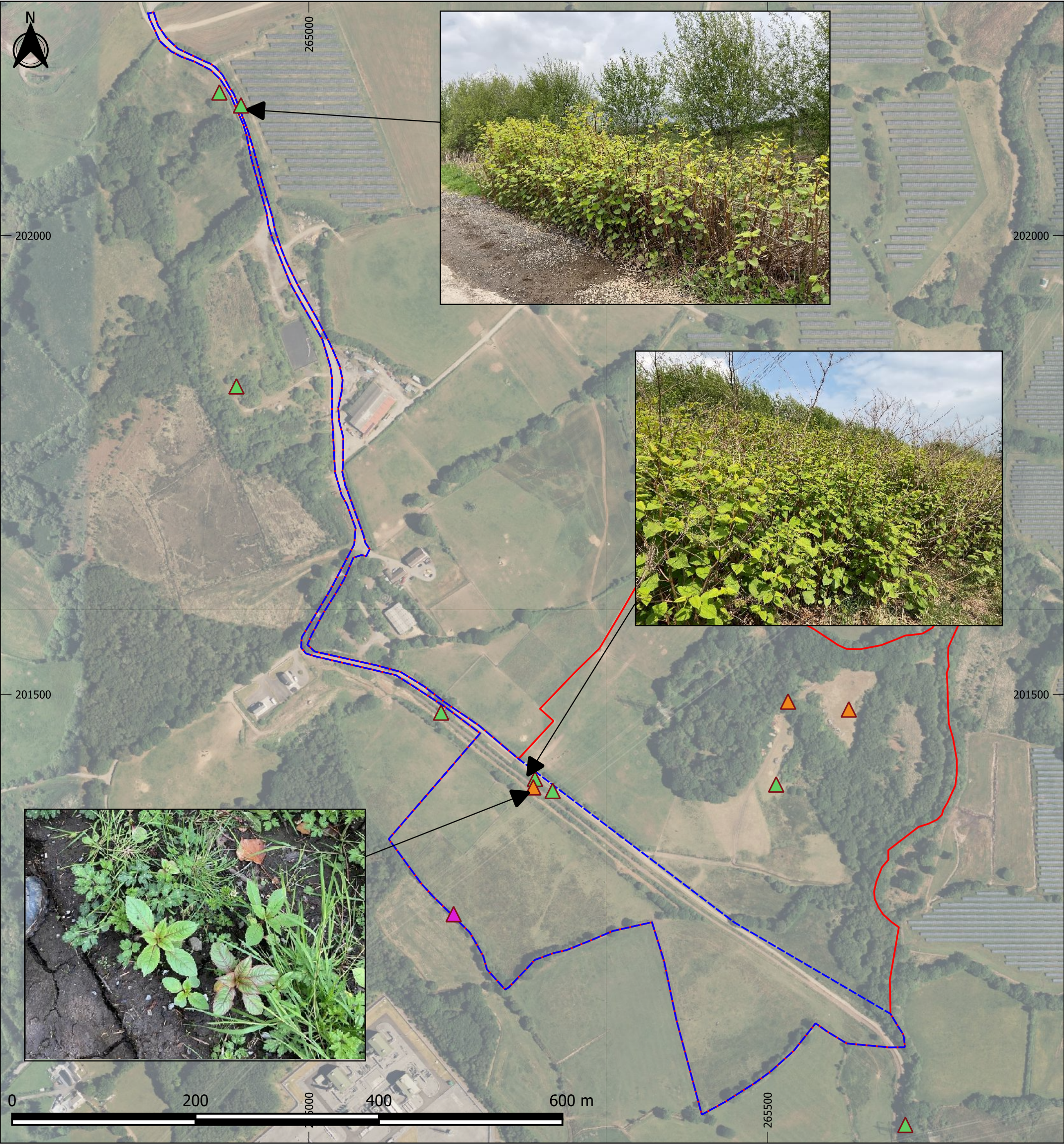
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Legend

-  Amphibian pond
-  Site boundary



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PROJECT TITLE
BATRI AFRON LLAN BATTERY

DRAWING TITLE
Figure 4: Invasive Non-native Species (INNS)

DATE: 08/05/2025
DRAWN: KG
CHECKED: OG
APPROVED: OG
SCALE: 1:4,100
VERSION:1.0

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Sources: BSG Ecology survey data

- Legend
- Notable Plant Species
- Rhododendron - *Rhododendron ponticum*
 - Japanese knotweed - *Fallopia japonica*
 - Himalayan balsam - *Impatiens glandulifera*
 - Survey boundary
 - Site boundary

9 Appendices

- Appendix 1: Target Notes
- Appendix 2: Summaries of Relevant Policy, Legislation and Other Instruments
- Appendix 3: Great Crested Newt (GCN) Habitat Suitability Index (HSI) results
- Appendix 4: Great Crested Newt (GCN) eDNA results

Appendix 1: Target Notes

Target Note Ref.	Description	Photograph
1	Mature tree Mature beech tree with PRF-I in the middle of the track.	
2	Mature tree Group of mature beech and oak trees with PRF-M on east side of track.	

3	Wet flush Wet flush present within field supporting a limited number of species including lesser spearwort and floating sweet-grass,		
4	Wet flush Wet flush vegetation locally present throughout marshy grassland field containing floating sweet-grass greater bird's-foot-trefoil, lesser spearwort, round-leaved crowfoot and brooklime.		

5	Mature tree Group of mature oak and beech trees with bat potential.	 A photograph showing a group of mature trees, including oaks and beeches, in a grassy field. The trees have thick trunks and dense foliage, with some ivy visible on the trunks. The sky is blue with some clouds.
6	Badger Strong mammal track with several snuffle marks and fresh latrine.	 A photograph showing a strong mammal track, likely a badger, in a grassy field. The track is a deep, dark line in the soil, with several snuffle marks and a fresh latrine visible. The surrounding vegetation is green and grassy.

7	Badger Two areas of prints on dirt track heading north and south.	
8	Wet Woodland (off-Site) Surveyed from Site boundary only. Dominant species include alder and goat willow with occasional silver birch, hazel and bramble.	

Appendix 2: Summaries of Relevant Policy, Legislation and Other Instruments

- 9.1 This section briefly summarises the legislation, policy and related issues that are relevant to the main text of the report. The following text does not constitute legal or planning advice.

Planning Policy Wales 11

- 9.2 PPW 11 seeks to sustain and create places in which...
- the role which landscapes, the historic environment, habitats and biodiversity, the characteristics of coastal, rural or urban environments play in contributing to Distinctive and Natural places are identified, understood, valued, protected and enhanced.
 - further fragmentation of habitats is avoided, wherever possible, and green networks, corridors and connecting habitat within developed areas is protected, and enhanced.
 - sites designated for their landscape or nature conservation importance are fully considered and their special characteristics and features protected and enhanced, whilst the network of sites should be recognised as being at the heart of improving the resilience of ecosystems.

- 9.3 Paragraph 6.4.4 states that:

"It is important that biodiversity and resilience considerations are taken into account at an early stage in both development plan preparation and when proposing or considering development proposals. [.....] All reasonable steps must be taken to maintain and enhance biodiversity and promote the resilience of ecosystems and these should be balanced with the wider economic and social needs of business and local communities. Where adverse effects on the environment cannot be avoided or mitigated, it will be necessary to refuse planning permission."

- 9.4 Paragraph 6.4.5 states 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, locally or nationally and must provide a net benefit for biodiversity. In doing so planning authorities must also take account of and promote the resilience of ecosystems....."

TAN 5 Nature Conservation and Planning (Wales only)

- 9.5 Technical Advice Note (TAN) 5 supplements Planning Policy Wales and provides advice about how the land use planning system in Wales 'should contribute to protecting and enhancing biodiversity and geological conservation.'
- 9.6 The TAN provides guidance to local planning authorities on: 'the key principles of positive planning for nature conservation; nature conservation and Local Development Plans; nature conservation in development management procedures; development affecting protected internationally and nationally designated sites and habitats; and development affecting protected and priority habitats and species.'
- 9.7 In section 2.4 when deciding planning applications that may affect nature conservation, 'local authorities should:
- contribute to the protection and improvement of the environment...seeking to avoid irreversible harmful effects on the natural environment,
 - ensure that appropriate weight is attached to designated sites of international, national and local importance,
 - protect wildlife and natural features in the wider environment, with appropriate weight attached to priority habitats and species in Biodiversity Action Plans,

- ensure that all material considerations are taken into account and decisions are informed by adequate information about the potential effects of a development on nature conservation,
- ensure that the range and population of protected species is sustained,
- adopt a stepwise approach to avoid harm to nature conservation, minimise unavoidable harm by mitigation measures, offset residual harm by compensation measures and look for new opportunities to enhance nature conservation; where there may be significant harmful effects local planning authorities will need to be satisfied that any reasonable alternative sites that would result in less or no harm have been fully considered.'

9.8 At section 3.3.2 regarding Local Development Plans policies the guidance states that a policy should be included in respect of the application of the precautionary principle.

9.9 Section 4 includes specific and detailed guidance, expanding on the principles set out in 2.4, in respect of the development control process including pre-application discussions, preparing planning applications, requests for further information and ecology in respect of Environmental Impact Assessment (EIA). The broad principles of development control requirements are set out as follows:

- 'adopting the five-point approach to decision-making – information, avoidance, mitigation, compensation and new benefits;
- ensuring that planning applications are submitted with adequate information, using early negotiation, checklists, requiring ecological surveys and appropriate consultation;
- securing necessary measures to protect, enhance, mitigate and compensate through planning conditions and obligation;
- carrying out effective planning enforcement; and
- identifying ways to build nature conservation into the design of new development.'

Environment (Wales) Act 2016

9.10 The Environment (Wales) Act 2016 passed into law in March 2016. Part 1 of the Act sets out Wales' approach to planning and managing natural resources at a national and local level with a general purpose linked to statutory 'principles of sustainable management of natural resources' defined within the Act.

9.11 Section 6 of the Act places a duty on public authorities to '*seek to maintain and enhance biodiversity*' so far as it is consistent with the proper exercise of those functions. In so doing, public authorities must also seek to '*promote the resilience of ecosystems*'. The duty replaces the section 40 duty in the Natural Environment and Rural Communities Act 2006 in relation to Wales, and applies to those authorities that fell within the previous duty.

9.12 Public authorities will be required to report on the actions they are taking to improve biodiversity and promote ecosystem resilience. This is expanded on in sub-section (2):

9.13 In complying with subsection (1), a public authority must take account of the resilience of ecosystems, in particular the following aspects—

- diversity between and within ecosystems;
- the connections between and within ecosystems;
- the scale of ecosystems;
- the condition of ecosystems (including their structure and functioning);
- the adaptability of ecosystems.

- 9.14 Section 7 concerns biodiversity lists and the duty to take steps to maintain and enhance biodiversity. It replaces the duty in section 42 of the NERC Act 2006. The Welsh Ministers will publish, review and revise lists of living organisms and types of habitats in Wales, which they consider are of key significance to sustain and improve biodiversity in relation to Wales.
- 9.15 The Welsh Ministers must also take all reasonable steps to maintain and enhance the living organisms and types of habitats included in any list published under this section, and encourage others to take such steps.

European protected species (Animals)

- 9.16 The Conservation of Habitats and Species Regulations 2017 (as amended) consolidates various amendments that have been made to the original (1994) Regulations which transposed the EC Habitats Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Council Directive 92/43/EEC) into national law.
- 9.17 “European protected species” (EPS) of animal are those which are shown on Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended). They are subject to the provisions of Regulation 43 of those Regulations. All EPS are also protected under the Wildlife and Countryside Act 1981 (as amended). Taken together, these pieces of legislation make it an offence to:
- e. Intentionally or deliberately capture, injure or kill any wild animal included amongst these species
 - f. Possess or control any live or dead specimens or any part of, or anything derived from a these species
 - g. deliberately disturb wild animals of any such species
 - h. deliberately take or destroy the eggs of such an animal, or
 - i. intentionally, deliberately or recklessly damage or destroy a breeding site or resting place of such an animal, or obstruct access to such a place
- 9.18 For the purposes of paragraph (c), disturbance of animals includes in particular any disturbance which is likely—
- a. to impair their ability—
 - i. to survive, to breed or reproduce, or to rear or nurture their young, or
 - ii. in the case of animals of a hibernating or migratory species, to hibernate or migrate; or
 - b. to affect significantly the local distribution or abundance of the species to which they belong.
- 9.19 Although the law provides strict protection to these species, it also allows this protection to be set aside (derogated) through the issuing of licences. The licences in England are currently determined by Natural England (NE) for development works and by Natural Resources Wales in Wales. In accordance with the requirements of the Regulations (2017, as amended), a licence can only be issued where the following requirements are satisfied:
- a. The proposal is necessary ‘to preserve public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment’
 - b. ‘There is no satisfactory alternative’
 - c. The proposals ‘will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

Definition of breeding sites and resting places

- 9.20 Guidance for all European Protected Species of animal, including bats and great crested newt, regarding the definition of breeding and of breeding and resting places is provided by The European Council (EC) which has prepared specific guidance in respect of the interpretation of various Articles

of the EC Habitats Directive.³⁵ Section II.3.4.b) provides definitions and examples of both breeding and resting places at paragraphs 57 and 59 respectively. This guidance states that 'The provision in Article 12(1)(d) [of the EC Habitats Directive] should therefore be understood as aiming to safeguard the ecological functionality of breeding sites and resting places.' Further the guidance states: 'It thus follows from Article 12(1)(d) that such breeding sites and resting places also need to be protected when they are not being used, but where there is a reasonably high probability that the species concerned will return to these sites and places. If for example a certain cave is used every year by a number of bats for hibernation (because the species has the habit of returning to the same winter roost every year), the functionality of this cave as a hibernating site should be protected in summer as well so that the bats can re-use it in winter. On the other hand, if a certain cave is used only occasionally for breeding or resting purposes, it is very likely that the site does not qualify as a breeding site or resting place.'

Competent authorities

- 9.21 Under Regulation 7 of the Conservation of Habitats and Species Regulations 2017 (as amended) a "competent authority" includes "any Minister of the Crown..., government department, statutory undertaker, public body of any description or person holding a public office."
- 9.22 In accordance with Regulation 9, "a competent authority must exercise their functions which are relevant to nature conservation, including marine conservation, so as to secure compliance with the requirements of the [Habitats and Birds] Directives. This means for instance that when considering development proposals, a competent authority should consider whether EPS or European Protected Sites are to be affected by those works and, if so, must show that they have given consideration as to whether derogation requirements can be met."

Birds

- 9.23 All nesting birds are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to intentionally kill, injure or take any wild bird or take, damage or destroy its nest whilst in use or being built, or take or destroy its eggs. In addition to this, for some rarer species (listed on Schedule 1 of the Act), it is an offence to disturb them whilst they are nest building or at or near a nest with eggs or young, or to disturb the dependent young of such a bird.
- 9.24 The Conservation of Habitats and Species Regulations 2017 (as amended) places duties on competent authorities (including Local Authorities and National Park Authorities) in relation to wild bird habitat. These provisions relate back to Articles 1, 2 and 3 of the EC Directive on the conservation of wild birds (2009/147/EC, 'Birds Directive'³⁶) (Regulation 10 (3)) requires that the objective is the 'preservation, maintenance and re-establishment of a sufficient diversity and area of habitat for wild birds in the United Kingdom, including by means of the upkeep, management and creation of such habitat, as appropriate, having regard to the requirements of Article 2 of the new Wild Birds Directive...' Regulation 10 (7) states: 'In considering which measures may be appropriate for the purpose of security or contributing to the objective in [Regulation 10 (3)] Paragraph 3, appropriate account must be taken of economic and recreational requirements'.
- 9.25 In relation to the duties placed on competent authorities under the 2017 Regulations, Regulation 10 (8) states: 'So far as lies within their powers, a competent authority in exercising any function [including in relation to town and country planning] in or in relation to the United Kingdom must use all reasonable endeavours to avoid any pollution or deterioration of habitats of wild birds (except habitats beyond the outer limits of the area to which the new Wild Birds Directive applies).'

Badger

- 9.26 Badger is protected under the Protection of Badgers Act 1992. It is not permitted to wilfully kill, injure, take, possess or cruelly ill-treat a badger, or to attempt to do so; or to intentionally or recklessly interfere with a sett. Sett interference includes disturbing badgers whilst they are occupying a sett,

³⁵ Guidance document on the strict protection of animal species of Community interest under the Habitats Directive 92/43/EEC. (February 2007), EC.

³⁶ 2009/147/EC Birds Directive (30 November 2009. European Parliament and the Council of the European Union.

as well as damaging or destroying a sett or obstructing access to it. A badger sett is defined in the legislation as “a structure or place, which displays signs indicating current use by a badger”.

- 9.27 ODPM Circular 06/2005³⁷ provides further guidance on statutory obligations towards badger within the planning system. Of particular note is paragraph 124, which states that “The likelihood of disturbing a badger sett, or adversely affecting badgers’ foraging territory, or links between them, or significantly increasing the likelihood of road or rail casualties amongst badger populations, are capable of being material considerations in planning decisions.”
- 9.28 Natural England provides Standing Advice³⁸, which is capable of being a material consideration in planning decisions. Natural England recommends mitigation to avoid impacts on badger setts, which includes maintaining or creating new foraging areas and maintaining or creating access (commuting routes) between setts and foraging/watering areas.

Reptiles

- 9.29 All native reptile species receive legal protection in Great Britain under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Viviparous lizard, slow-worm, grass snake and adder are protected against killing, injuring and unlicensed trade only. Sand lizard and smooth snake receive additional protection as “European Protected species” under the provisions of the Conservation of Habitats and Species Regulations 2017 (as amended) and are fully protected under the Wildlife and Countryside Act 1981 (as amended).
- 9.30 All six native species of reptile are included as ‘species of principal importance’ for the purpose of conserving biodiversity under Section 41 (England) of the NERC Act 2006 and Section 7 of the Environment (Wales) Act 2016.
- 9.31 Current Natural England Guidelines for Developers³⁹ states that ‘where it is predictable that reptiles are likely to be killed or injured by activities such as site clearance, this could legally constitute intentional killing or injuring.’ Further the guidance states: ‘Normally prohibited activities may not be illegal if ‘the act was the incidental result of a lawful operation and could not reasonably have been avoided’. Natural England ‘would expect reasonable avoidance to include measures such as altering development layouts to avoid key areas, as well as capture and exclusion of reptiles.’
- 9.32 The Natural England Guidelines for Developers state that ‘planning must incorporate two aims where reptiles are present:
- To protect reptiles from any harm that might arise during development work;
 - To ensure that sufficient quality, quantity and connectivity of habitat is provided to accommodate the reptile population, either on-site or at an alternative site, with no net loss of local reptile conservation status.’

Wild mammals in general

- 9.33 The Wild Mammals (Protection) Act 1996 (as amended) makes provision for the protection of wild mammals from certain cruel acts, making it an offence for any person to intentionally cause suffering to any wild mammal. In the context of development sites, for example, this may apply to rabbits in their burrows.

Invasive non-native species

- 9.34 An invasive non-native species is any non-native animal or plant that has the ability to spread causing damage to the environment.

³⁷ ODPM Circular 06/2005. *Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impacts within the Planning System* (2005). HMSO Norwich.

³⁸ <http://www.naturalengland.org.uk/ourwork/planningdevelopment/spatialplanning/standingadvice/specieslinks.aspx>

³⁹ English Nature, 2004. *Reptiles: guidelines for developers*. English Nature, Peterborough. <https://webarchive.nationalarchives.gov.uk/20150303064706/http://publications.naturalengland.org.uk/publication/76006>

- 9.35 Under the Wildlife and Countryside Act 1981 (as amended) it is an offence to release, or to allow to escape into the wild, any animal which is not ordinarily resident in and is not a regular visitor to Great Britain in a wild state or is listed under Schedule 9 of the Act.
- 9.36 It is an offence to plant or otherwise cause to grow in the wild invasive non-native plants listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

Hedgerows

- 9.37 Article 10 of the Habitats Directive⁴⁰ requires that 'Member States shall endeavour...to encourage the management of features of the landscape which are of major importance for wild fauna and flora. Such features are those which, by virtue of their linear and continuous structure...or their function as steppingstones...are essential for the migration, dispersal and genetic exchange of wild species'. Examples given in the Directive include traditional field boundary systems (such as hedgerows).
- 9.38 The aim of the Hedgerow Regulations 1997⁴¹, according to guidance produced by the Department of the Environment⁴², is "to protect important hedgerows in the countryside by controlling their removal through a system of notification. In summary, the guidance states that the system is concerned with the removal of hedgerows, either in whole or in part, and covers any act which results in the destruction of a hedgerow. The procedure in the Regulations is triggered only when land managers or utility operators want to remove a hedgerow. The system is in favour of protecting and retaining 'important' hedgerows.
- 9.39 The Hedgerow Regulations set out criteria that must be used by the local planning authority in determining which hedgerows are 'important'. The criteria relate to the value of hedgerows from an archaeological, historical, wildlife and landscape perspective.

⁴⁰ Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.

⁴¹ Statutory Instrument 1997 No. 1160 – The Hedgerow Regulations 1997. HMSO: London

⁴² The Hedgerow Regulations 1997: a guide to the law and good practice, HMSO: London

Appendix 3: Great Crested Newt (GCN) Habitat Suitability Index (HSI) results

Pond Ref.			HSI	Photograph
1	Grid Ref	SN 64903 02187	N/A - dry	
2	Grid Ref	SN 64849 01987	N/A – flowing stream	
3	Grid Ref	SN 64849 01987	N/A - dry	

4	Grid Ref	SN 65594 01236		
	Map Location	B	0.5	
	Surface area m2	601	1.00	
	Desiccation rate	never	0.90	
	Water quality	moderate	0.67	
	Shade (% of margin shaded 1m from bank)	65	0.90	
	Waterfowl	absent	1.00	
	Fish population	possible	0.67	
	Number of ponds within 1km	3	0.65	
	Terrestrial habitat	good	1.00	
	Macrophyte cover (%)	80	1.00	
	HSI score		0.81	
	Pond suitability		excellent	

5	Grid Ref	SN 65594 01236		
	Map Location	B	0.50	
	Surface area m2	212	0.40	
	Desiccation rate	rarely	1.00	
	Water quality	moderate	0.67	
	Shade (% of margin shaded 1m from bank)	40	1.00	
	Waterfowl	absent	1.00	
	Fish population	possible	0.67	
	Number of ponds within 1km	3	0.65	
	Terrestrial habitat	good	1.00	
	Macrophyte cover (%)	90	0.90	
	HSI score		0.74	
	Pond suitability		good	

6	Grid Ref	SN 65607 01204	
	Map Location	B	0.50
	Surface area m2	192	0.35
	Desiccation rate	sometimes	0.50
	Water quality	moderate	0.67
	Shade (% of margin shaded 1m from bank)	85	0.50
	Waterfowl	absent	1.00
	Fish population	possible	0.67
	Number of ponds within 1km	3	0.65
	Terrestrial habitat	good	1.00
	Macrophyte cover (%)	0	0.31
	HSI score		0.58
	Pond suitability		below average



Appendix 4: Great Crested Newt (GCN) eDNA results

(overleaf)

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GCN Report

Technical Report



SureScreen Scientifics

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GCN eDNA Analysis

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 analyzing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm GCN habitation or establish GCN absence.

Results

Lab ID	Site Name	OS Reference	Degradation Check	Inhibition Check	Result	Positive Replicates
GCN25 2850	Swansea North Bess - P6	SN 660054	Pass	Pass	Negative	0/12
GCN25 3953	Swansea North Bess - P4	SN 660054	Pass	Pass	Negative	0/12
GCN25 3954	Swansea North Bess - P5	SN 660054	Pass	Pass	Negative	0/12

Matters affecting result: none

Reported by: Amy Bermudez

Approved by: Consuela Sopronyi

Methodology

The samples detailed above have been analyzed 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 tube which then undergoes DNA extraction. The extracted sample is then analyzed 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 attention to detail to prevent the 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 analytical security.

SureScreen Scientifics Ltd is ISO9001 accredited and participates in Natural England's proficiency testing scheme for GCN eDNA testing.

Interpretation of Results

Sample Integrity Check:

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. Any samples which fail this test are rejected and eliminated before analysis.

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.

Inhibition Check:

Pass/Fail. The presence of inhibitors within a sample is assessed using a DNA marker. If inhibition is detected, samples are purified and re-analyzed. 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 the WC1067 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.

Inconclusive: Controls indicate inhibition or degradation of the sample, resulting in the inability to provide conclusive evidence for GCN presence or absence.

