Wern Nature Reserve

Ecological Impact Assessment

Revision: DRAFT FOR CLIENT REVIEW

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Wern Nature Reserve

Ecological Impact Assessment

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EXECUTIVE SUMMARY

This Ecological Impact Assessment (EcIA) has been produced by Arcadis Consulting (UK) Ltd (Arcadis) for the Canal & River Trust and relates to the creation of Wern Nature Reserve. The proposed reserve creation is related to planned works on the Montgomery Canal.

This EcIA is provided to support the planning application for the works to create Wern Nature Reserve at Wern, Powys (nearest postcode SY21 9JX; the 'Site') located within the administrative area of Powys County Council.

The proposed work at the Site (5.5 ha), Wern Nature Reserve, includes the excavation of approximately 0.93 hectares of land to create a waterbody on the north side of the Site, with excavated material redistributed on site into three landscaping bunds in the east, west, and south of the Site. One small hedgerow will be removed to facilitate the works, and minor sections will be removed from two further hedgerows. A concrete channel in the north-east corner will connect the new waterbody with Montgomery Canal. Grassland habitat will connect the landscaping bunds and waterbody. The wetland areas are designed to support floating water-plantain (*Luronium natans*), as well as providing habitat for other flora and fauna.

The site borders and will be linked via a water channel to an international designated site, the Montgomery Canal SAC. All impacts in relation to the SAC are assessed in the associated Habitats Regulations Assessment, this is not included within the remit of this EcIA.

Alongside and following on from an initial Preliminary Ecological Appraisal (PEA), species surveys for:

- Bats;
- Water vole and otter;
- Great Crested Newt; and
- White clawed crayfish were conducted, to inform this EcIA.

The results of these surveys were considered alongside the details of the proposed works to inform an Ecological Impact Assessment. This ecological impact assessment concluded that:

- The project will result in an overall biodiversity net benefit in the value of habitats within the site, resulting from the conversion of grassland (a common and widespread habitat in the area) to more diverse grassland on the stockpiled mounds and wetlands of notable ecological value;
- Impacts to roosting bats will be avoided (as all roosting features are to be retained) and that habitats for foraging bats will be improved;
- Impacts to nesting birds can be avoided through works timings and a tree with suitability for nesting barn owl is to be retained;
- Water vole and otter would not be impacted by the works;
- Great crested newt would not be impacted by the works, if suitable reasonable avoidance measures are employed;
- White clawed crayfish will not be impacted by the works as they are considered to be absent from the area.

The majority of the additional work needed pertains to the requirement for a non-licensed methods statement and the appointment of an Ecological Clerk of Works (ECoW) to oversee construction processes. Upon implementing the suitable mitigation measures detailed in this report, it is anticipated that the proposed works will not result in significant adverse effects on biodiversity features.

Overall, if implemented appropriately, the project will result in a biodiversity net benefit.

1 INTRODUCTION

1.1 Background

This Ecological Impact Assessment (EcIA) has been produced by Arcadis Consulting (UK) Ltd (Arcadis) for the Canal & River Trust, which secured a £15 million grant from the UK government as part of the 'Levelling up Fund' to continue with the Montgomery Canal restoration. The canal runs from Northwest Shropshire (England) to eastern Powys (Wales) and was built over 200 years ago for transporting agricultural goods (primarily lime). However, after a breach in 1936, it was officially abandoned in 1944, since the late 1960s ad hoc restoration has been undertaken along the canal. The Welsh segment of the canal holds designations as a Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI) due to its significance for aquatic plants, particularly floating water-plantain *Luronium natans*, and invertebrates.

This EcIA is provided to support the planning application for the works to create Wern Nature Reserve at Wern, Powys (nearest postcode SY21 9JX; the 'Site') located within the administrative area of Powys County Council (Appendix A, Figure 1).

This EcIA is concerned with the creation of the wetland referred to as Wern Nature Reserve. The proposal is illustrated in Appendix A, Figure 2.

1.2 Site Location and Setting

The Site is located at grid ref: SJ 25675 13087, in Wern, on agricultural land adjacent to Coppice Lane in Wern, Powys, just inside Wales by the Wales-England Border (Appendix A, Figure 1). The Site consists of several habitat types including semi-improved grassland, tall ruderal, standing water, hedgerows, swamp and quarry (APEM, 2022). The wider landscape is dominated by agricultural land, with a residential property to the west and some agricultural buildings to the east. The Montgomery Canal runs along the north edge of the Site. The Site is situated along 'Section 24' of the entire canal restoration as defined in the Montgomery Canal Aquatic Plants Survey (Habitat Works, 2023).

1.3 Survey Reports Used to Inform this EcIA

Several ecological reports relating to the canal restoration have been produced and have been used to inform this assessment:

- Montgomery Canals – Reserves Preliminary Ecological Appraisal (APEM, 2022) - Appendix D; which includes a desk study and field surveys (**N.B. The initial PEA/site surveys looked at three reserve locations, this EcIA relates to one reserve location only, Wern).**
- Further species surveys (recommended by the PEA);
  - Great crested newt (GCN; *Triturus cristatus*) eDNA (Surescreen Scientifics Ltd., 2023a), reported by Arcadis in Appendix E;
  - Bat Roost Assessment and Survey (APEM, 2023c) - Appendix F.
  - eDNA survey for White Clawed Crayfish on the Montgomery Canal - Appendix G.
- Montgomery Canal Aquatic Plants Survey (Habitat Works, 2023) - Appendix H.

1.4 Relationship of this EcIA to the HRA

The proposed site is adjacent to a SAC, and therefore impacts to this site need to be assessed. A Habitat Regulation Assessment (HRA) has been compiled by Penny Anderson Associates (Penny Anderson

Associates Ltd , 2023). The creation of the reserve is part of a package to compensate for other activities in and around the SAC. All impacts in relation to the SAC are assessed in the associated Habitats Regulations Assessment, this is not included within the remit of this EcIA. The HRA must be read alongside this document.

1.5 Scope of Work

The proposed work at the Site (5.5 ha), Wern Nature Reserve, includes the excavation of approximately 0.93 hectares to create a waterbody on the north side of the Site, with excavated material redistributed on site into three landscaping bunds in the east, west, and south of the Site. Figure 3 shows the trees and hedgerows scheduled to be retained/removed to facilitate the works. One small hedgerow (G20) will be removed, and small sections from two further hedgerows will be removed (G11 and G17). A concrete channel in the north-east corner will connect the new waterbody with Montgomery Canal. Grassland habitat will connect the landscaping bunds and waterbody. Existing gates, fence and some vegetation will need to be removed to facilitate the works. It is currently understood that no trees will need to be removed. The proposal is illustrated in Appendix A, Figure 2.

The surveys included all areas within the land of the proposed works and any land temporarily affected during the works, as well as any areas that may be disturbed during the works and/or operation.

1.6 Purpose of this EcIA

The report is written with reference to the Guidelines for Ecological Impact Assessment in the UK and Ireland), and Guidelines for Ecological Report Writing (CIEEM, 2018). The EcIA will quantify and evaluate the potential effects of the development on habitats, species and ecosystems. This will involve an assessment of the habitats present within the footprint of the works, the potential for the Site to support protected species, the further surveys and reporting and to make recommendations for mitigation and enhancement (if appropriate) to be incorporated into the development.

This EcIA draws from information in the PEA (APEM, 2022) and additional follow-on surveys completed in summer 2023 (APEM, 2022), Appendix D - Appendix H.

2 METHODOLOGY

2.1 Overview

This section of this EcIA provides an overview of the methodologies of the desk and field studies conducted to inform this impact assessment, and the methodology of the impact assessment itself.

2.2 Desk Study

Data was obtained from Aderyn (the compiled environmental records centre for Wales) and included information on non-statutory designated sites and species records of notable, protected and invasive species within 2 km of the Site. Records were obtained in September 2022 (Aderyn, 2022). Species records from the last 20 years were considered relevant to the development as older records are unlikely to be representative of current local species populations.

The desk study also involved a review of publicly available information including:

- The Multi-Agency Geographic Information for the Countryside (MAGIC) website (DEFRA, 2022) for information relating European Statutory sites within 5 km of the Site (up to 10 km if bats are a qualifying feature), National Statutory sites to 2 km of the Site, priority habitats (such as ancient woodland); and
- Google Earth aerial imagery (Earth, 2022) to contextualise the Site within the landscape and identify waterbodies within 0.5 km of the Site.

2.2.1 Assessment of Ecological Features within this EcIA

The assessment of impacts from construction and operation has followed the methodology set out by (CIEEM, 2018). In line with this guidance, the following definitions are used for impacts and effects:

- Impact – Actions resulting in changes to an ecological feature. For example, the construction activities of a development removing a hedgerow; and
- Effect – Outcome to an ecological feature from an impact. For example, the effects on a dormouse population from loss of a hedgerow.

CIEEM guidelines (CIEEM, 2018) also state that the importance of an ecological feature should be considered within a defined geographical context (Appendix C). It is recommended in CIEEM, 2018 that the following frame of reference be used, or adapted to suit local circumstances:

- International;
- National (UK);
- Country (Wales);
- Regional (North-east Wales);
- County (Powys);
- Local (Wern); and,
- Site.

All species, habitats and integrated plant and animal communities that occur within the ‘zone of influence’ (ZoI) of the proposed development are defined as potential ‘ecological receptors’. The ZoI for ecological receptors varies, depending on the nature and behaviour of the receptors, and the type of impact that may affect them.

The ZoI of the proposed development on ecological receptors is considered to be the Site plus the distances listed in Table 1 below.

Table 1: ZoI for the proposed works

Ecological Receptor	ZoI
Statutory designated sites (international)	Up to 5 km
Statutory designated sites for which bats are a qualifying feature (international)	Up to 10 km
Statutory designated national sites	Up to 2 km
Non-statutory sites	Up to 2 km
Protected or notable habitats	On and adjacent to the Site
Protected or notable species	Up to 2 km (unless associated with a designated site)
Invasive non-native plant species	On the Site

2.3 Field Survey (PEA)

Initial field surveys consisting of a preliminary ecological appraisal (PEA) were carried out between 30 August 2022 and 2 September 2022 by APEM ecologists Alex Bingle (Senior) and Blair McNicol (Consultant). The weather conditions during the four days of surveys are listen in Table 2 below.

Table 2: Weather conditions at time of survey

Date	Weather
30.08.2022	16°C, dry, 5mph winds, 60% cloud cover
31.08.2022	17°C, dry, 8mph winds, 20% cloud cover
01.09.2022	17°C, dry, 8mph winds, 80% cloud cover
02.09.2022	18°C, dry, 5mph wins, 20% cloud cover

2.3.1 Extended Phase 1 Habitat Survey

During the PEA, a Phase 1 habitat survey was conducted, all habitats were identified and mapped according to industry standard guidance for Phase 1 habitat survey (JNCC, 2016).

This survey was extended to inspect for field evidence and suitability to support the following protected species:

- Badger (*Meles meles*);
- Bats;
- GCN and other amphibians;
- Hedgehog (*Erinaceus europaeus)*;
- Hazel dormouse (*Muscardinus avellanarius*);

- Reptiles;
- Otter (*Lutra lutra*);
- Water vole (*Arvicola amphibius*);
- White-clawed crayfish (*Austropotamobius pallipes*);
- Wild birds (including nesting);
- Protected plants; and
- Protected Invertebrates.

The presence of any invasive non-native species (INNS) was also noted.

2.3.2 Badger Survey

Concurrent with the PEA, a badger walkover was conducted. The badger survey consisted of a daytime walkover with the primary aim of establishing whether badgers were present within the Site and (per the findings of the survey) assess whether further work is required.

The area immediately adjacent to and up to 30 m from the Site boundary was surveyed for evidence of badger activity including;

- Sett entrances;
- Large spoil heaps outside sett entrances;
- Bedding outside sett entrances;
- Badger footprints;
- Badger paths;
- Latrines;
- Badger hairs on fences or bushes;
- Scratching posts; and
- Signs of digging for food.

2.3.3 Ground level tree assessment (GLTA)

During the PEA, all trees within 50 m of the proposed Site were inspected from ground level, to determine their potential to support roosting bats and followed the most up to date best practice guidance, available at the time of survey, (Collins, 2016). Trees were surveyed from the ground, with the use of close-focussing binoculars to assist in the observation and assessment of potential roost features (PRFs). Information was collected on PRFs observed during the ground-level survey and included: height of feature; orientation of the feature within the tree; orientation of bat access to the feature; description of the feature; and whether the tree can safely be climbed during a follow-up PRF Inspection Survey (if required).

The trees were assessed as having ‘High’, ‘Moderate’, ‘Low’, or ‘Negligible’ potential for roosting bats according to industry standard guidance (Collins, 2016).

Following the GLTA, five trees on Site were classed as having moderate or high potential for roosting or hibernating bats. Therefore, further survey was required to better understand how bats may be using the Site to inform mitigation.

2.3.4 Tree Climbing Survey

As trees with bat roosting potential were identified, an endoscope inspection was undertaken by APEM Principal Ecologist Alan Cowlishaw MCIEEM (NRW licence 76383:OTH:CSAB:2017), Senior Ecologist Courtney Hooper and Consultant Ecologist Jack Blackburn (both qualifying members of CIEEM). All trees were climbed on 10, 11 and 20 July 2023.

Bat roost inspection surveys were carried out according to the relevant best practice guidance at the time (Collins, 2016). Trees assessed as having moderate or high potential for the presence of roosting bats were designated for a roost inspection survey if there were clear, defined features that could be inspected using a torch or endoscope. The aim of this survey is to reclassify potential roost features and determine the presence of bats at the time of survey and the need for further survey and/or mitigation (Collins, 2016).

Where appropriate these trees were climbed with the assistance of ladders and/or tree climbing techniques by suitably qualified and experienced surveyors with experience of identifying evidence of or presence of bats. Surveys were undertaken by Natural Resources Wales (NRW) licensed bat worker (Alan Cowlishaw NRW License S091900-1). All surveyors held NPTC/City & Guilds Tree Climbing and Aerial Rescue (formerly CS38) certification.

2.3.5 Great Crested Newt Surveys (eDNA)

The initial walkover survey in 2022 identified potential for the Site to support GCN. There were three waterbodies identified on mapping within 500 m of the Site, Montgomery Canal, particularly a pond approximately 80 m east of the Site (SJ 26008 13057), referred to as P17 in Appendix E, a pond c.150 m from the site referred to as Pond 18 and a Pond 220m from the site referred to as Pond 19. Access was denied at Pond 18, and therefore it was not surveyed. Pond 19 was confirmed to not exist by the landowner in 2023. Full details of pond identification and scoping are shown in Appendix E.

The pool section of Montgomery Canal, P17, which runs adjacent to the north boundary of the Site and continues to the east and south-east was surveyed for eDNA in June 2022 and June 2023. To ensure consistency in reporting, this water body was named “Pond 17” at the time of survey, though this does not represent a true pond. To reduce potential confusion, we have referred to “Pond 17” as “P17” as detailed in Table 3 below.

Table 3: List of locations tested for GCN eDNA

Site Name	O/S reference
P17	SJ 26008 13057

eDNA is a detection method for GCN that determines presence/potential absence of the species by measuring the amount of recently shed DNA into waterbodies.

Water samples were extracted from the canal and sent to a laboratory for analysis by ADAS (2022) and SureScreen Scientifics (2023), and in accordance with the methodology provided in Biggs et al (Biggs, et al., 2014). If the sample contains above a threshold amount of GCN DNA, there is a significant probability that GCN are currently occupying the waterbody. If, however, the threshold is not reached, failure to prove presence of GCN is recorded and a negative result is ascribed.

2.3.6 Otter and Water Vole survey

All suitable habitat within and adjacent to the Site was surveyed for signs of otter and water vole at the same time as the PEA survey. This included 300 m along the canal from each side of the Site.

During the survey, surveyors walked along the toe of the banks and conducted continuous searches for otter and water vole presence. Otter and water vole field signs, if found, were recorded in the field by taking a National Grid Reference (NGR) point at each interval where field signs were observed.

2.3.6.1 Otter Survey

The otter survey was undertaken following best practice guidelines (Chanin, 2003). The survey involved searching for field signs of otter which included:

- Spraints;
- Tracks;
- Feeding remains;
- Slides;
- Holts (underground dens and breeding sites); and
- Couches (above ground sites where otters rest during the day).

2.3.6.2 Water Vole Survey

The water vole survey was undertaken and followed standard surveying methodology of the Water Vole Conservation Handbook. The survey involved searching for signs of water vole which included:

- Presence of water vole droppings;
- Evidence of water vole resting and breeding sites;
- Presence of water vole access points (runs and burrows);
- Evidence of feeding remains;
- Water vole feeding stations;
- Habitat information including bordering land use, vegetation type, bank profiles, stream depth, width and current; and
- Suitable habitat for water vole.

2.3.7 White Clawed Crayfish (WCC)

No suitable habitat was located within the Site, the adjacent habitat was surveyed for white clawed crayfish using eDNA approaches. The canal into which the wetland will be connected was assessed for presence of crayfish through eDNA surveys conducted upstream and downstream of the reserve location. Full details are presented in Appendix E and Appendix G.

2.3.8 Aquatic Plants Survey

A separate report for an Aquatic Plants Survey of the Montgomery Canal was completed by Habitat Works (Habitat Works, 2023), this included the section of the canal that is adjacent to the site, full details are presented in Appendix H. This survey considered protected and notable plant species, specifically floating water-plantain more closely, and so its methodology is briefly discussed here for clarity as its results are relevant to the EcIA.

Surveys were carried out in August (22, 23, 24, 25) and September (1, 2, 6, 9) 2022 by Nick Birkinshaw (ACIEEM) and Dermot McKee (ACIEEM; Natural England floating water-plantain survey licence holder: 2022-62537-SCI-SCI; accredited under Natural Resources Wales floating water-plantain survey licence number S091401/1).Weather conditions were good throughout and there were no limitations with regard to access.

The canal was divided into fifty survey sections, each of approximately one kilometre length for survey, and the report detailed results for the entirety of the canal, not just the waterway around the Site with which we are concerned. The Site lies within Section 24 of the Canal as defined by Habitat Works. This section was surveyed specifically on 25 August 2022 and the weather was dry with patchy cloud, wind B1 NW, 20^{o}C.

Each section was slowly walked using binoculars to view the off-side where necessary. All aquatic plants were noted and identified to species level where possible. A grapnel was used to retrieve samples for identification, mindful of the possible presence of floating water-plantain and other rare plants (Clarke, 2009). An estimate of

the abundance of two vegetation categories, emergent and floating-leaved/submerged, was made using a modified version of the DAFOR scale:

D = dominant (>70% cover);

A = abundant (30-70% cover);

F = frequent (10-30% cover);

O = occasional (3-10% cover);

R = rare (<3% cover); and

VR = very rare (present but extremely low cover).

The survey was carried out during the optimal season for detecting aquatic plant species. Weather conditions were good and water clarity was good. The surveyors are therefore confident that an accurate assessment of the composition and abundance of the aquatic plant community has been made.

2.4 Limitations of Survey

The recommendations from the surveys that took place in summer 2022 and are considered valid for a period of two years. The surveys conducted are considered appropriate to inform this EcIA. Where appropriate, pre works checks are specified to confirm the validity of the results pre construction as a safeguard against unlikely impacts due to species distributions changing.

The 2022 surveys were designed prior to detailed design. This EcIA was composed with knowledge of the proposed works, and so there is some slight disparity between recommendations (the EcIA considers embedded mitigation).

The results presented in this report represent those at the time of survey and reporting, and data collected from available sources. All areas of the Site were accessible.

2.5 Impact Assessment Methodology

In accordance with the BS 42020:2013 Biodiversity - Code of Practice for Planning and Biodiversity (BSI Standards, 2013), the criteria that have been used to determine the assessment of effects follows the approach recommended by the CIEEM guidelines (CIEEM, 2018), with the focus on those activities that could potentially generate significant ecological effects on Important Ecological Features (IEF) or result in a breach of wildlife legislation.

2.5.1 Determining Importance

A geographic frame of reference has been used to determine the importance of the ecological feature, from the most important being International and European to National, County, Local and the least important being Site level importance (Appendix C).

Those ecological features of Site importance and above, i.e., of sufficient importance to be material to decision-making and which could potentially experience significant effects as a result of the proposed development (effects that could negatively affect the integrity of the habitat or the favourable conservation status of a species' local population), have been classified as Important Ecological Features (IEFs) and have been 'Scoped in' for more detailed assessment, as outlined in the CIEEM Guidelines (CIEEM, 2018). Those ecological features of less than 'Site' importance have been 'Scoped Out' and are not subject to any further assessment within this impact assessment.

In accordance with the CIEEM Guidelines (CIEEM, 2018), where there is the potential for a breach of legislation in relation to protected species (regardless of their value), those species are also considered as IEFs.

2.5.2 Assessing Significance

The significance of an effect on an IEF has been determined following an analysis of the factors that characterise the effect. The CIEEM Guidelines (CIEEM, 2018) define significant effects as those that:

'…either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general... In broad terms, significant effects encompass impacts on the structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution).'

Thus, in each case, significance has been determined on the basis of a likely effect on the integrity or favourable conservation status of a feature, at a given geographic scale. The nature conservation importance of significantly affected IEF has been used to guide mitigation and related measures and help interpret the significance of residual effects.

3 RESULTS

3.1 Reporting Outline

The results cover the outcomes from the PEA (APEM, 2022), and the further field studies from 2023, all reported in full in Appendix D to Appendix H.

Desk study records per species is reported in each species section rather than in a separate desk study section.

3.1.1 Designated Sites for Nature Conservation

3.1.1.1 International Statutory Designated Sites for Nature Conservation

One International Statutory Designated site of importance for bats within 10 km of the site, Tanat and Vyrnwy Bat Sites SAC. This is over 8.5 km from the site and there is limited impact pathway between the works proposed on the site and the features listed on the designation for this SAC. As such, this site is not considered further in this EcIA.

Two statutory designated sites of international importance within 5 km of the Site were identified during the desk study. Montgomery Canal, which runs along the north boundary and continues on the east and south-east of the Site, is a Special Area of Conservation (SAC) (and a Special Site of Scientific Interest/ SSSI). Granllyn SAC, a SAC designated for great crested newts, is located c.3.5 km from the site. All information on impacts relating to these SACs are deferred to the Habitat Regulations Assessment (Penny Anderson Associates Ltd , 2023).

3.1.1.2 National Statutory Sites for Nature Conservation

There are two national statutory sites for nature conservation within 2 km of the works. The most distant is Cae Glas SSSI, a site designated for marsh stitchwort (*Stellaria palustris*) and tubular water-dropwort (*Oenanthe fistulosa*). There is limited impact pathway between the works and this site and therefore this site is not considered further.

The second designated site is Montgomery Canal SSSI, located immediately adjacent to the site. This is contiguous with the Montgomery Canal SAC and has comparable sensitivities. Therefore, to avoid duplication, the assessment of impacts to this SSSI is deferred to the HRA where the contiguous SAC is assessed.

3.1.1.3 Non-statutory Designated Sites for Nature Conservation

There is on B-line within 2 km of the site. There are five ancient woodland sites, one restored ancient woodland site, one plantation on ancient woodland site (PAWS) and one PAWS NRW priority area within 2 km of the Site. However, due to the localised nature of the proposed works, the zone of influence (Zol) for non-statutory sites is likely to be restricted to those located adjacent to or within 200 m of the Site, or those which have hydrological connectivity to the Site. This rules out influence to non-statutory designated sites for Nature Conservation as a result of the works.

3.1.2 Important Habitats

No priority habitat areas identified by Natural Resources Wales (NRW) fall within 200 m of the Site or are hydrologically connected to the Site and so no impacts to priority habitats are predicted. Site records of habitats are presented below.

3.2 Habitats

A Phase 1 habitat map for the Site is located in Appendix A,

Figure 4. This map is extracted from the PEA (APEM, 2022). Table 4 lists the recorded habitat types, species present and importance.

Table 4: Habitat Descriptions

Habitat	Description and Species Present	Photograph
Scattered trees: A3.1	Scattered trees were located along the boundaries of the Site and within hedgerows within the site. Species consisted of sessile oak (*Quercus robur*), hazel (*Corylus avellana*) and ash (*Fraxinus excelsior*).	
Semi-improved neutral grassland: B2.2	The semi-improved grassland formed the dominating habitat at the Site, located throughout each of the fields. The grasslands were utilised as grazing fields. Species present included spear thistle (*Cirisium vulgare*), creeping thistle (*Cirsium arvense*), red clover (*Trifolium pratense*), white clover (*Trifolium repens*), common mouse ear (*Cerastium fontanum*) , meadow butter cup (*Ranunculus acris*), dandelion (*Taraxacum officinale*), broadleaved dock (*Rumex obtusifolius*), creeping buttercup (*Ranunculus repens*), common nettle (*Urtica dioica*) , perennial rye grass (*Lolium perenne*), hedge bindweed (*Calystegia sepium*), meadow foxtail (*Alopecurus pratensis*), cocks foot (*Dactylis glomerata*), common hogweed (*Heracleum sphondyllium*) and cow parsley (*Anthriscus sylvestris*).	
Swamp: F1	There was a small area of swamp located within the north-west aspect of the Site. Species present; Cow vetch (*Vicia cracca*), common reed grass (*Phragmites australis*), Timothy grass (*Phleum pratense*), reedmace (*Typha latifolia*), and soft rush (*Juncus effusus*).	

Tall Ruderal: C3.1	There was a small area of tall ruderal located in north- west corner located adjacent to the swap habitat. This area was dominated by great willowherb (*Epilobium hirsutum*).	
Species rich intact hedgerow: J2.1.1	The south, south-west and north-west boundaries are formed with native species rich hedgerows. Woody species consisted of bramble (*Rubus fruticosus*), elder (*Sambucus nigra*), holly (*Ilex aquifolium*), dog rose (*Rosa canina*), goat willow, silver birch (*Betula pendula*) Ash, hazel, sessile oak, hawthorn and blackthorn. Ground flora consisted of bittersweet nightshade (*Solanum dulcamara*), angelica (*Angelica syvestris*), common hogweed, ribwort plantain (*Plantago lanceolata*), shepherds purse (*Capsella bursa-pastoris*), red campion (*Silene dioica*), bramble, perennial rye grass, cow parsley, great willowherb, hedge bindweed, cow vetch, creeping thistle.	
Species poor intact hedgerow: J2.1.2	The eastern and south-eastern boundary of Site were formed by a species poor native hedgerow. This area was dominated by a bramble and hawthorn hedgerow.	
Species rich defunct hedgerow: J2.2.1	The central aspect of Site was made up of a species rich defunct hedgerow. Woody species consisted of Sessile oak, hazel, hawthorn, bramble & sycamore.	Not available.

Standing water	The canal forms the northern boundary of the Site. The canal banks and water channel vegetation consisted of Water mint (*Mentha aquatica*), bird-foot trefoil (*Lotus corniculatus*), marsh woundwort (*Stachys palustris*), grey willow (*Salix cinerea*), cocksfoot, reedmace, common hogweed, meadow foxtail, common nettle, great willow herb, broadleaf dock, and goat willow. Information on the plant survey of aquatic plants in the canal are presented in Appendix H.	

3.3 Protected and Notable Species

3.3.1 Amphibians

3.3.1.1 Desk Study Results

No records of GCN from within 2 km of the Site were returned by the biological record centre (Aderyn, 2022).

One record of common amphibians within 2 km of the Site were returned by the biological record centre (Aderyn, 2022): this was a record for common frog (*Rana temporaria*) 1.1 km south-east of the Site.

3.3.1.2 Field Survey Results

The canal provides some breeding and foraging habitat for amphibians. The majority of the Site is grassland managed by livestock which is sub-optimal terrestrial habitat for GCN. The significant agricultural runoff into the canal has resulted in poor water quality and biodiversity at this section of the canal.

3.3.1.3 eDNA Survey Results

The sample of water from the canal (P17) tested negative for GCN eDNA, meaning either no DNA was present, or the amount of DNA amplified was below the threshold detection level.

Pond 18 could not be surveyed, as detailed in Appendix E. Therefore, a precautionary assessment of presence of GCN is made relating to this pond. This assessment is detailed in Appendix E.

3.3.2 Badger

3.3.2.1 Desk Study Results

Nine records of badger within 2 km of the Site were provided by the records centre (Aderyn, 2022). The closest record was a badger sighting located 455 m north-west of the Site. No badger sett records were returned within 30 m of the Site.

3.3.2.2 Field Survey Results

No setts or activity was identified within the Site. Numerous mammal paths were located along the southern boundary of the Site.

The Site provides suitable habitat for foraging, and there is suitable sett building habitat in the wider landscape.

3.3.3 Bats

3.3.3.1 Desk Study Results

Ten records of bat species within 2 km of the Site were returned by the biological records centre (Aderyn, 2022) including records of the following species:

- Soprano pipistrelle (*Pipistrellus pygmaeus*);
- Brandt's bat (*Myotis brandtiil);*
- Lesser horseshoe bat (*Rhinolophus hipposideros)*;
- Brown long-eared bat (*Plecotus auratus*); and
- Noctule (*Nyctalus noctula*).

The closest record to the Site was a soprano pipistrelle roost 255 m east of the Site in a private residential building.

3.3.3.2 GLTA results

The scattered trees on Site ranged from having low to high suitability for both summer roosting and hibernating bats (APEM, 2022). Table 5 shows the results from the GLTA at the Site.

Table 5: Ground Level Tree Assessment Results

Tree	Description	Suitability for Roosting Bats	Suitability for Hibernating Bats	Photographs
T1	Hawthorn located in the small copse to the south of Site. NGR: SJ 25715 12968	A small rot hole was located 2m up on the trunk on the southern aspect. This PRF has the potential to support a small number of crevice-dwelling bats. **Low potential to support roosting bats.**	The PRFs on the tree would not typically be regarded as providing the protection from weather or provide the favourable temperature and humidity conditions required during the winter period. However, due to the uncertain nature of hibernation occurring with the *Pipistrellus* genus unexpected incidents of hibernation could occur (Middleton, 2019). **Low potential to support hibernating bats.**	

Tree	Description	Suitability for Roosting Bats	Suitability for Hibernating Bats	Photographs
T2	Mature sessile oak located in the small copse to the south of Site. There was a dead branch with various cracks noted at 10m on the eastern side of the tree. NGR: SJ 25716 12975	The dead branch and extending cracks provide suitable habitat to support a small number of crevice-dwelling bats. **Low potential to support roosting bats.**	The PRFs on the tree would not typically be regarded as providing the protection from weather or provide the favourable temperature and humidity conditions required during the winter period. However, due to the uncertain nature of hibernation occurring with the *Pipistrellus* genus unexpected incidents of hibernation could occur (Middleton, 2019). **Low potential to support hibernating bats.**	
T3	A mature ash located small copse to the south of the Site. There was a cavity noted on a branch at 6m on the south-western aspect of the tree. There was also a cavity noted on the trunk at 4m on the north-eastern aspect of the tree. MGR: SJ 25711 12977	The branch cavity has the suitability to support a small number of crevice-dwelling bats. **Low potential to support roosting bats.**	The PRFs on the tree would not typically be regarded as providing the protection from weather or provide the favourable temperature and humidity conditions required during the winter period. However, due to the uncertain nature of hibernation occurring with the *Pipistrellus* genus unexpected incidents of hibernation could occur (Middleton, 2019). **Low potential to support hibernating bats.**	

Tree	Description	Suitability for Roosting Bats	Suitability for Hibernating Bats	Photographs
T4	A veteran oak in the centre of Site. This have NGR: SJ 25717 13007	Multiple features on all aspects of the tree. Due to the high number of PRF's on the tree, this has the potential to support high number of crevice-dwelling bats. **High potential to support roosting bats.**	Due to the high number of PRF's on the tree, that may lead to larger cavities it is considered likely that hibernating bats may utilise this tree. **Moderate potential to support hibernating bats.**	
T5	Mature oak located in the north of Site. NGR: SJ 25685 13054	Multiple features located throughout the tree. Due to the high number of PRF's on the tree, this has the potential to support high number of crevice-dwelling bats. **High potential to support roosting bats.**	Due to the high number of PRF's on the tree, that may lead to larger cavities it is considered likely that hibernating bats may utilise this tree. **Moderate potential to support hibernating bats.**	
T6	Mature oak on the south-eastern aspect of Site. NGR: SJ 25758 12996	Multiple features located throughout the tree. Due to the high number of PRF's on the tree, this has the potential to support high number of crevice-dwelling bats. **High potential to support roosting bats.**	Due to the high number of PRF's on the tree, that may lead to larger cavities it is considered likely that hibernating bats may utilise this tree. **Moderate potential to support hibernating bats.**	

Tree	Description	Suitability for Roosting Bats	Suitability for Hibernating Bats	Photographs
T7	Mature oak on the south-eastern aspect of Site. NGR: SJ 25758 12996	Multiple features noted on all sides of the tree. Due to the high number of PRF's on the tree, this has the potential to support high number of crevice-dwelling bats. **High potential to support roosting bats.**	Due to the high number of PRF's on the tree, that may lead to larger cavities it is considered likely that hibernating bats may utilise this tree. **Moderate potential to support hibernating bats.**	
T8	Mature oak on the south-eastern aspect of Site. There were multiple features noted on all sides of the tree. NGR: SJ 25768 12973	The cavities in the tree have the potential to support a moderate number of crevice-dwelling bats. **Moderate to high potential.**	The PRFs on the tree would not typically be regarded as providing the protection from weather or provide the favourable temperature and humidity conditions required during the winter period. However, due to the uncertain nature of hibernation occurring with the *Pipistrellus* genus unexpected incidents of hibernation could occur (Middleton, 2019**). Low potential to support hibernating bats.**	

3.3.3.3 Tree Climbing Results

Of the eight trees climbed, five trees had features with potential for bats. Current proposals do not involve removal of any of these trees. The landscape is due to be changed to a wetland habitat, however, the majority of the trees are in raised areas and therefore impacts will be minimal. Should proposals change, further survey of these trees may be required.

Tree Number	Feature Number	Feature Description	Feature Potential	Photograph
T1	1	Double leader on southern elevation.	Negligible	No photo available.
T3	1	Frost crack on southern elevation, approximately 6 m high.	Moderate	
T4	1	Frost crack with hollow on southern elevation, approximately 10 m high.	Low	
	2	Shearing crack.	Moderate	No photo available.
	3	Butt-rot on northern elevation, over 100 cm internal height.	High	
	4	Chambered butt-rot on northern elevation (contained birds' nest).	High	
T5	1	Knot hole on western elevation, approximately 10 m high.	Moderate	No photo available.
T6	1	Butt-rot approximately 2 m high on northern elevation. Disused barn owl nest observed.	High	

Tree Number	Feature Number	Feature Description	Feature Potential	Photograph
T7	1	Butt-rot on northern elevation.	High	
	2	Knot hole on southern elevation approximately 2 m high.	High	
	3	Hollow bole / tree hollow on southern elevation.	Moderate	No photo available.

3.3.4 Birds

3.3.4.1 Desk Study Results

The biological records centre (Aderyn, 2022) returned records of 137 bird species from within 2 km of the Site. These included Schedule 1 species (HMSO, 1981) such as goshawk (*Accipiter gentilis*), merline (*Falco columbarius*), kingfisher (*Alcedo atthsis*) and peregrine (*Falco peregrinus*). Records of Species of Principal Importance (Welsh Government, 2016), including starling (*Sturnus vulgaris*) were also returned.

The closest record was for a Kingfisher 165m north-east of the Site.

3.3.4.2 Field Survey Results

The hedgerows and scattered trees located on Site are suitable for a variety of nesting birds, however the habitats present are common and widespread. One tree on site had potential to support barn owl nesting, T6, this is retained within the works. The canal adjacent to the site has some limited potential to support kingfisher nesting.

3.3.5 Hazel Dormouse

3.3.5.1 Desk Study Results

No records of Hazel dormouse within 2 km of the Site were returned by the biological records centre (Aderyn, 2022), however dormice are known to be distributed throughout northeast Wales and along the English / Welsh borders (The Mammal Society, 2020).

3.3.5.2 Habitat suitability assessment results

The hedgerows located within the Site provide suitable foraging and nesting habitat for dormouse. However, the lack of connecting woodland and hedgerow margins suggest hazel dormouse is unlikely to be present on Site. No hedgerow removal is proposed to facilitate the works.

3.3.6 Invasive non-native species

3.3.6.1 Desk Study Results

No records of invasive species within 2 km of the Site were returned by the biological record centre (Aderyn, 2022).

3.3.6.2 Field Survey Results

No invasive species were recorded during the walkover surveys.

However, the Aquatic Plants Survey also searched for INNS and found them to be present in the adjacent canal at the time of survey (See Section 3.3.12 Aquatic Plants Survey Results).

3.3.7 Invertebrates

The local record centre (Aderyn, 2022) returned 83 records of invertebrates within 2 km of the Site. Records included Species of Principal Importance (Welsh Government, 2016) including knot grass (*Acronicta rumicis*) and shaded broad-bar (*Scotopteryx chenopodiata*).

The swamp, hedgerows and semi-improved neutral grassland are likely to support common and widespread invertebrate species. It is not considered that the site is likely to support a notable assemblage of invertebrates.

3.3.8 Other Mammals

One record of Hedgehog 1.5 km north of the Site was returned by the biological records centre (Aderyn, 2022).

The habitats within the Site are of moderate ecological value to hedgehogs due to presence of foraging, commuting, and hibernation habitat such as debris pole, hedgerows, and scrub.

3.3.9 Otter and Water Vole

3.3.9.1 Desk Study Results

Three records of otter within 2 km of the Site were returned by the records centre (Aderyn, 2022). The closest record of an otter was 355 m east of the Site.

No records of water vole within 2 km of the Site were returned.

3.3.9.2 Field Survey Results

No evidence of otter or water vole was identified during the survey.

The canal is likely to support commuting otters moving between larger watercourses such as the River Calan and the River Severn. The canal is unlikely to support water vole, as the banks of the canal are made from reinforced steel piles and concrete, with a hard-standing path.

3.3.10 Reptiles

3.3.10.1 Desk Study Results

One record of reptiles was returned by the biological records centre (Aderyn, 2022): a grass snake (*Natrix natrix)*, was recorded 1.2 km south of the Site.

3.3.10.2 Field Survey Results

During the survey a log pile was noted in the north-western aspect of the Site. This has the potential to support resting and hibernating reptiles. Removal of this feature has the potential to cause adverse effects to reptiles if present. The swamp and hedgerow margins within the Site could also provide suitable foraging and hibernation habitat for reptiles. The semi improved grassland that forms the majority of the area within the site, under its current management is unlikely to support reptiles.

3.3.11 White Clawed Crayfish (WCC)

3.3.11.1 Desk Study Results

No records of WCC were returned by the biological records centre (Aderyn, 2022).

3.3.11.2 Field Survey Results

No suitable habitat was located within the Site. The canal into which the wetland will be connected was assessed for presence of crayfish through eDNA surveys. These returned a presence of signal crayfish and an absence of white clawed crayfish. Full details are presented in Appendix E and Appendix G.

3.3.12 Aquatic Plants Survey Results

There was a single population of floating water plantain on the north section of the Site (Gridref: SJ 25522 13220) with Rare abundance on the DAFOR scale was recorded (Appendix A Figure 5). Approximately 400 m East of the Site, down the canal, there existed three further populations of floating water plantain at Occasional abundance on the DAFOR scale.

The submerged/floating-leaved plant community was dominant and was represented by rigid hornwort *(L. Ceratophyllum demersum*), needle spike-rush (*Eleocharis acicularis*), Canadian waterweed *(Elodea canadensis*), Nuttall's waterweed (*Elodea nuttallii*), frogbit (*Hydrocharis morsus-ranae*), common duckweed (*Lemna minor*), ivy-leaved duckweed (*Lemna trisulca*), fringed water-lily (*Nymphoides peltata*), blunt-leaved pondweed (*Potamogeton obtusifolius*) and water soldier (*Stratiotes aloides*). There was approximately 3% cover of filamentous algae/duckweed species.

The emergent community was frequent. Species present included lesser water-parsnip (*Berula erecta*), greater tussock-sedge (*Carex stricta*), water horsetail (*Equisetum fluviatile*), reed sweet-grass (*Glyceria maxima*) and water mint (*Mentha aquatica*).

The invasive non-native species Nuttall’s waterweed and Himalayan balsam (*Impatiens glandulifera*) were present.

However, the specific location of the invasive species in Section 24 of the canal, which contains the Site, was not precisely recorded.

N.B. The location of ‘Wern’ as defined in the Habitat Works report Appendix H is not the same as the location of the new Wern nature reserve with which this report is concerned.

4 DISCUSSION

4.1 Potential Ecological Constraints

4.1.1 Ecological features not assessed in this EcIA

As outlined above, the SAC and SSSI Montgomery Canal is located adjacent to the site. All assessment of impacts relating to this site are deferred to the associated HRA.

4.1.2 Ecological Features Scoped Out

The following ecological features have been scoped out as not requiring further consideration with regard to the proposed development on Site (no likely significant effects are anticipated from construction or operation):

- Non-statutory designated sites;
  - Further away than the zone of influence due to the localised impacts of these works.
- GCN
  - Unlikely present.
- White-clawed Crayfish;
  - Unlikely present.
- Water vole
  - Due to the sub optimal conditions and lack of biological records no adverse effects are considered likely to water vole.
- Invertebrates;
  - Any adverse effects to invertebrates are likely to be restricted to temporary displacement during construction.

4.1.3 Ecological Features Scoped In or Requiring Further Consideration

Mitigation relating to floating-water plantain on Site is deferred to the HRA as it is related to the designation of Montgomery Canal as an SAC / SSSI and is therefore not discussed further in this report.

The following ecological features have been scoped in as needing further consideration with regard to the proposed development (potential for effects from construction and/or operation in the absence of mitigation) and have been assigned a geographical context as outlined in Section 2.2.1:

- Amphibians including GCN – Local importance;
- Badger – Local importance;
- Bats – Local importance;
- Dormouse – Local importance;
- Habitats – County importance;
- Hedgehog – Local importance;
- Invasive non-native species (INNS) – Regional importance;
- Nesting Birds – Local importance;
- Otter – Local importance;
- Reptiles – Local importance;

4.2 Ecological Impacts and Mitigation

4.2.1 General

Where possible, the development should satisfy the requirements of the 'mitigation hierarchy' with regards to impacts on ecological receptors, through the following stepwise approach:

- Avoidance of impacts to wildlife and habitats e.g., by designing the layout to avoid ecological receptors;
- Mitigation, where significant harm cannot be entirely or partially avoided e.g., through the creation of alternative habitats elsewhere on site; and
- Compensation, where significant residual harm is offset e.g., through the provision of an equivalent or greater value of biodiversity.

4.2.2 Habitats

4.2.2.1 Potential impacts

Excluding the canal (standing water), which is addressed in the HRA, there were eight habitat types on the Site, including:

- B2.2 – Neutral grassland – semi-improved
- C3.1 – Other tall herb and fern – ruderal
- F1 – Swamp
- I2.1 – Quarry
- J2.1.1 – Intact Hedge – native species-rich
- J2.1.2 – Intact hedge – species-poor
- J2.2.1 – Defunct hedge – native species-rich
- Scattered trees – Bat roost potential (1-8)

It is currently understood that no trees require complete removal to facilitate the works. As such, impacts will be negligible so long as indirect impacts are avoided (discussed in Mitigation below).

A single small hedgerow (G11, Figure 3) is scheduled for removal. This however was too small to be mapped in the Phase 1 survey (

Figure 4) and hence it's removal should cause no significant adverse effects to wildlife.

Some minor hedgerow removal may be required to facilitate access (G17 and G11). This has the potential to adversely affect wildlife such as nesting birds, and dormouse.

Species-rich hedgerows are a priority habitat (Welsh Government, 2016) and exist on the northwest boundary of the Site. Works should be designed and implemented to avoid the removal or degradation of this habitat.

4.2.2.2 Mitigation

The minor hedgerow removal on site is small in scale and not predicted to cause adverse impacts to local wildlife. However, if the scope of work changes to include a greater extent of hedgerow removal, especially species-rich hedgerow removal, further survey and a license may be required.

All retained hedgerows and trees within the site must be protected throughout construction with tree protection fencing, which should consider the root protection areas of these features.

If the scope changes to remove trees highlighted in this EcIA as important or having bat potential, further survey work to prove no features are used by bats may be required.

Materials and machinery should not be stored along hedgerows or next to scattered trees, or on marshy grassland.

A landscape strategy that ensures that the site is replanted to maximise the ecological value of the created habitats must be secured to ensure that there is a net benefit for biodiversity. This should include both the wetland features and the surrounding habitats. Prescriptions for management and maintenance of the site must also be secured.

4.2.2.3 Significance of Residual Effects

Overall, the site proposals, if implemented correctly, will deliver a greater heterogeneity of more distinctive habitats within the area. This will result in a net benefit to biodiversity and **significant positive effect** on the habitats on the site.

4.2.3 Amphibians including Great Crested Newts

4.2.3.1 Potential Impacts

As the proposed development includes the removal of habitats in the vicinity of aquatic habitats including a pond that is precautionary assessed as having potential GCN presence, there is the potential to directly affect amphibians through killing or injuring animals during construction, and through habitat loss.

Overall, the site has limited value to GCN and other amphibians in the terrestrial phase, the semi-improved grassland is of limited vale to these species. In order to assess the potential risk of impacts to GCN, the tables below present a rapid risk assessment in relation to the potential impact upon great crested newt. The rapid risk assessment tool from Natural England is presented as Image 1. The results of the assessment are presented in Table 6. An explanation of what the colour coded risk assessment result means is presented below.

Image 1: Example Rapid Risk Assessment from the Natural England method Statement

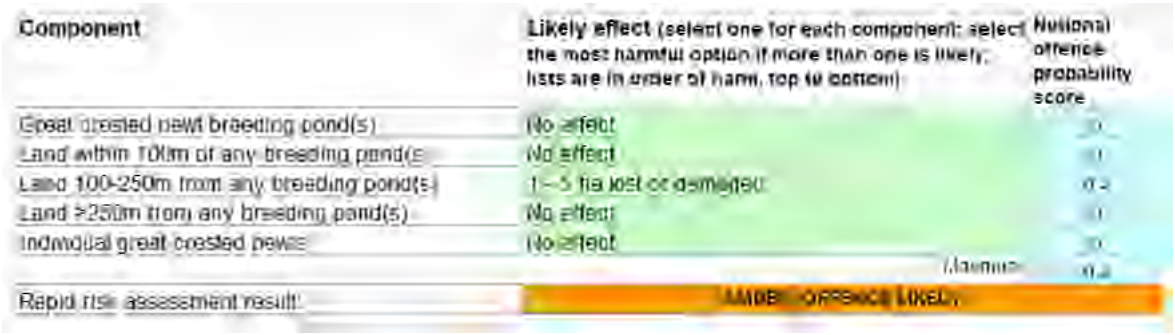

Table 6: Rapid risk assessment output for works

Area	Risk assessment	Advice
In the vicinity of 18	**AMBER: OFFENCE LIKELY**	Reasonable avoidance measures

As shown in the table above (Table 6), for the ponds that were given a precautionary assessment of presence, the assessed risk of conducting works is 'amber'. An amber assessment, as is stated in the section below, can be avoided through non-licensed avoidance measures.

"Amber: offence likely" indicates that the development activities are of such a type, scale and location that an offence is likely. In this case, the best option is to redesign the development (location, layout, methods, duration or timing; see non-licensed avoidance measures tool) so that the effects are minimised. You can do this and then re-run the risk assessment to test whether the result changes, or preferably run your own detailed site-specific assessment. Bear in mind that this generic risk assessment will over- or under-estimate some risks because it cannot take into account site-specific details, as mentioned in caveats above. In particular, the exact location of the development in relation to resting places, dispersal areas and barriers should be critically examined. Once you have amended the scheme you will need to decide if a licence is required; this should be done if on balance you believe an offence is reasonably likely." (Source: the instructions for the rapid risk assessment tool).

Considering the detail of the proposed works (the creation of a reserve offering significantly enhanced habitat for GCN) it is considered that a reasonable avoidance approach will be an appropriate methodology for avoiding impacts in relation to these works. The section below outlines the likely prescriptions for the reasonable avoidance measures. Any reasonable avoidance measures which are required must be secured within a method statement and followed by the appointed contractors at all times. Whenever works are being conducted within the great crested newt impact zones, it will be necessary for an ecological clerk of works to attend the site. An example toolbox talk which the ecological clerk of works would provide to the appointed contractors prior to work commencing is provided in Appendix E.

There is also the potential for indirect effects through disturbance and pollution/surface runoff from the works.

4.2.3.2 Mitigation

A precautionary method of works and supervision by an ECoW should be completed immediately prior to and during the removal of habitat to safeguard amphibians.

Best practice pollution prevention measures, such as the use of drip trays, should be utilised to prevent runoff from the works into the canal.

In the unlikely event that any GCN are identified during the works, all works must cease, and a Protected Species Licence from Natural Resources Wales may be required.

4.2.3.3 Significance of Residual Effects

If the above recommendations are adhered to, **there will be no significant residual effects**.

4.2.4 Badger

4.2.4.1 Potential Impacts

The works include significant excavation and the use of large machinery to create the new lake and so direct effects such as disturbance of badgers or their setts during the construction phase could occur. Although no field signs or setts were identified during the surveys, badgers are a highly mobile species and may use the Site for commuting or foraging. Setts may also be created before the works commence.

If additional lighting is required (temporary or permanent), this could also indirectly affect badgers through disturbance.

4.2.4.2 Mitigation

A prework check by an ecologist should be completed no more than 2 weeks prior to works beginning to ensure no new activity at the Site. If setts are found, all work must stop and be reassessed.

Excavations should also be covered at the end of each day or mammal ramps should be installed to avoid any badgers becoming trapped.

4.2.4.3 Significance of Residual Effects

If the above recommendations are adhered to, **no significant residual effects** are anticipated.

4.2.5 Bats

4.2.5.1 Potential Impacts

It is currently understood that no trees will be removed to facilitate the works. Therefore, only indirect impact to bats may occur during the construction phase.

4.2.5.2 Mitigation

If work is to be conducted at night a sensitive lighting scheme is required, based on good practice guidance and an ecologist should be consulted. This is necessary to avoid disturbing roosting, foraging, and commuting bats which are protected under Section 9 of the Wildlife and Countryside Act 1981 (as amended) and Regulation 43 of Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (HMSO, 1981) (HMSO, 2021).

The Root Protection Areas around trees will also mitigate impact to bats.

In the longer term, the site development will improve the availability of foraging resources for bats.

4.2.5.3 Significance of Residual Effects

If the above recommendations are adhered to, **no significant residual effects** are anticipated.

4.2.6 Dormouse

4.2.6.1 Potential Impacts

Due to the sub optimal conditions and lack of biological records no adverse effects are considered likely to dormouse.

4.2.6.2 Mitigation

As the impact to dormice is low, a non-licenced methods statement and ECoW supervision will be sufficient to mitigate potential impact. This is concluded under the assumption that areas of vegetation that require removal and are suitable for this species are very limited (less than $2m^2$).

If larger areas of vegetation require removal, dormouse surveys of the hedgerow, scrub and woodland edge habitat may be required a Protected Species Licence acquired from Natural Resources Wales in advance of any works.

4.2.6.3 Significance of residual effects

If the above recommendations are adhered to, **no significant residual effects** are anticipated.

4.2.7 Hedgehog

4.2.7.1 Potential Impacts

Hedgehogs are likely to pass through the Site, therefore there is the potential to cause indirect adverse effects to commuting/foraging hedgehog such as injury during the construction phase.

4.2.7.2 Mitigation

Best practice measures such as placing mammal ramps in excavations should be adhered to, to avoid any mammals (and other wildlife) becoming trapped. During vegetation removal (scrub, small hedgerow G20 and small hedgerow sections, G11 and G17), an ECoW should be present prior to and during the works, to conduct checks for hedgehog.

4.2.7.3 Significance of residual effects

If the above recommendations are adhered to, **no significant residual effects** are anticipated.

4.2.8 INNS

4.2.8.1 Potential Impacts

Himalayan Balsam and Nuttalls waterweed were present in the kilometre long section of the canal in which the Site Falls (Section 24). However precise location was not recorded.

Therefore, the works has the potential to cause adverse effects via the spreading of the seeds and contaminating the local and wider landscape.

4.2.8.2 Mitigation

Biosecurity measures will be required.

4.2.8.3 Significance of residual effects

If the above recommendations are adhered to, **no significant residual effects** are anticipated.

4.2.9 Nesting Birds

4.2.9.1 Potential Impacts

If any vegetation clearance is undertaken during the breeding season (March to August inclusive), the development has the potential to directly affect nesting birds through killing or injuring animals, or the destruction of nests, during the construction phase. The development also has the potential to indirectly affect breeding birds through temporary habitat loss or disturbance.

4.2.9.2 Mitigation

Any vegetation removal should be undertaken outside of the nesting bird season (March to August inclusive) where possible.

Where works within this season are unavoidable, the vegetation (e.g. G20, G11 and G17, Figure 3) should be checked by an ecologist prior to clearance. A pre-works check should be undertaken by an ECoW immediately prior to the vegetation removal taking place.

If nesting birds are present, an exclusion zone will be implemented around the nest, and works cannot proceed in this area until the chicks have fledged.

4.2.9.3 Significance of Residual Effects

If the above recommendations are adhered to, **no significant residual effects are anticipated**.

4.2.10 Otter

4.2.10.1 Potential Impacts

The canal is likely to support commuting otters moving between larger watercourses such River Calan and River Severn. Due to the close proximity of the River Severn to the Site, direct effects (injury/mortality) to otter during the construction phase is possible.

4.2.10.2 Mitigation

A pre-construction survey to check for signs of otter, particularly holts and resting sites, will be undertaken no more than two months before works commence. If an otter holt and/or resting site is found within 200 m of the proposed works, then a European Protected Species (EPS) development licence may be required before works can commence. All works taking place near suitable watercourses will be undertaken under ecological supervision and to a method statement.

For the duration of the works, a working Method Statement (MS) will be followed, including (and not limited to) the following avoidance measures to ensure the works comply with relevant legislation and prevent disturbance, injury and/or killing otter:

- Standard best practice and pollution control measures to prevent polluting the watercourse (detailed in a construction environmental management plan (CEMP));
- Night work (between dusk and dawn) should be avoided;
- Access roads should not be used or illuminated at night unless absolutely necessary;
- Heras fencing used to limit public access to the Site during construction will have space for otters to move freely underneath to ensure connectivity across the Site is not lost; and
- Contingency plans to respond to unexpected encounters with otter, including emergency measures and protocols.

An experienced ecologist should provide a toolbox talk to all contractors/ site staff and advise them of any ecological constraints on Site and mitigation required before any works commence.

Best practice measures such as placing mammal ramps in excavations and the drained canal should be adhered to, to avoid any mammals (and other wildlife) becoming trapped.

4.2.10.3 Significance of Residual Effects

If the above recommendations are adhered to, **no significant residual effects** are anticipated.

4.2.11 Reptiles

4.2.11.1 Potential impacts

Removal of the log pile at the Site has the potential to cause adverse effects to reptiles if present. The swamp, field edges and hedgerow margins within the Site could also provide suitable foraging and hibernation habitat for reptiles. If areas of vegetation in the above habitats are to be removed, direct adverse effects (such as injury or death) to reptiles are possible.

4.2.11.2 Mitigation

An ECoW should be present prior to and during the works, to conduct checks for reptiles. Any works should take place between March and September to avoid disturbance of hibernating reptiles. These measures should be secured in a method statement.

4.2.11.3 Significance of Residual Effects

If the above recommendations are adhered to, **no significant residual effects** are anticipated.

4.3 Summary

Table 7 Summarises the nature of mitigation/further survey work. A single report can encompass all receptors for which mitigation necessitates a 'Method Statement', as detailed below.

Table 7: Summary of mitigation/further survey work

Ecological Receptor Scoped In	Nature of Further survey work/ Attention
Habitats	It is understood that the scope of works does not include the removal of hedgerows or trees. Further survey efforts and assessment will be needed if this changes. All hedgerows and trees are to be given a buffer zone during construction. Materials and machinery should not be stored along hedgerows or next to scattered trees, or on marshy grassland. A landscape strategy that ensures that the site is replanted to maximise the ecological value of the created habitats must be secured to ensure that there is a net benefit for biodiversity. This should include both the wetland features and the surrounding habitats. Prescriptions for management and maintenance of the site must also be secured.
Amphibians	A PWMS and supervision by an ECoW will be required during site clearance to safeguard amphibians.

Ecological Receptor Scoped In	Nature of Further survey work/ Attention
	Best practice pollution prevention measures, such as the use of drip trays, should be utilised to prevent runoff from the works into the canal. In the unlikely event that any GCN are identified during the works, all works must cease, and a Protected Species Licence from Natural Resources Wales may be required.
Badger	A pre-works check by an ecologist should be completed no more than 2 weeks prior to works beginning to ensure no new activity at the Site. ECoW should check for badger activity on site before works commence and will advise further is activity/setts are found. Best practice measures such as placing mammal ramps in excavations and the drained canal should be adhered to, to avoid any mammals (and other wildlife) becoming trapped.
Bats	If work is to be conducted at night a sensitive lighting scheme is required, based on good practice guidance and an ecologist should be consulted. This is necessary to avoid disturbing roosting, foraging, and commuting bats which are protected under Section 9 of the Wildlife and Countryside Act 1981 (as amended) and Regulation 43 of Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (HMSO, 1981) (HMSO, 2021). Root Protection Areas around trees will prevent impact to roosting bats.
Dormouse	As the risk of impact to dormice is low, a non-licenced method statement and ECoW supervision will be sufficient to mitigate potential impact. This is concluded under the assumption that areas of vegetation require removal (less than $2m^2$). If larger areas of vegetation require removal, dormouse surveys of the hedgerow, scrub and woodland edge habitat may be required between March and November 2023 and a European Protected Species Licence acquired from Natural Resources Wales in advance of any works.
Hedgehog	Best practice measures such as placing mammal ramps in excavations and the drained canal should be adhered to, to avoid any mammals (and other wildlife) becoming trapped.
INNS	Biosecurity measures will be required.
Nesting Birds	Any vegetation removal should be undertaken outside of the nesting bird season (March to August inclusive) where possible. Where works within this season are unavoidable, the vegetation should be checked by an ecologist prior to clearance. A pre-works check should be undertaken by an ECoW immediately prior to the vegetation removal taking place. If nesting birds are present, an exclusion zone will be implemented around the nest, and works cannot proceed in this area until the chicks have fledged.

Ecological Receptor Scoped In	Nature of Further survey work/ Attention
Otter	A pre-construction survey to check for signs of otter, particularly holts and resting sites, will be undertaken no more than two months before works commence. If an otter holt and/or resting site is found within 200 m of the proposed works, then a European Protected Species (EPS) development licence may be required before works can commence. All works taking place near suitable watercourses will be undertaken under ecological supervision and to a method statement. For the duration of the works, a working Method Statement (MS) will be followed, including (and not limited to) the following avoidance measures to ensure the works comply with relevant legislation and prevent disturbance, injury and/or killing otter: • Standard best practice and pollution control measures to prevent polluting the watercourse (detailed in a construction environmental management plan (CEMP)); • Night work (between dusk and dawn) should be avoided; • Access roads should not be used or illuminated at night unless absolutely necessary; • Heras fencing used to limit public access to the Site during construction will have space for otters to move freely underneath to ensure connectivity across the Site is not lost; and • Contingency plans to respond to unexpected encounters with otter, including emergency measures and protocols. An experienced ecologist should provide a toolbox talk to all contractors/ site staff and advise them of any ecological constraints on Site and mitigation required before any works commence. Best practice measures such as placing mammal ramps in excavations and the drained canal should be adhered to, to avoid any mammals (and other wildlife) becoming trapped.
Reptiles	Non-licensed methods statement and ECoW to do pre-work checks for reptiles and supervise any vegetation clearance. Work should be undertaken between March to September inclusive to avoid disturbing hibernating reptiles

5 CONCLUSIONS

The following ecological features were identified as relevant to the Site and the development and considered IEFs, scoped in for further assessment:

- Habitats;
- Amphibians including GCN;
- Badger;
- Bats;
- Dormouse;
- Hedgehog;
- Invasive non-native species (INNS);
- Nesting Birds;
- Otter;
- Reptiles;

Following appropriate mitigation measures outlined in this report, it is considered that the proposed development will have **no significant residual negative effects** on biodiversity features.

Overall, if implemented appropriately, the project will result in a biodiversity net benefit.

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Appendix A: Figures

Figure 1 Red Line Boundary, Wern Reserve

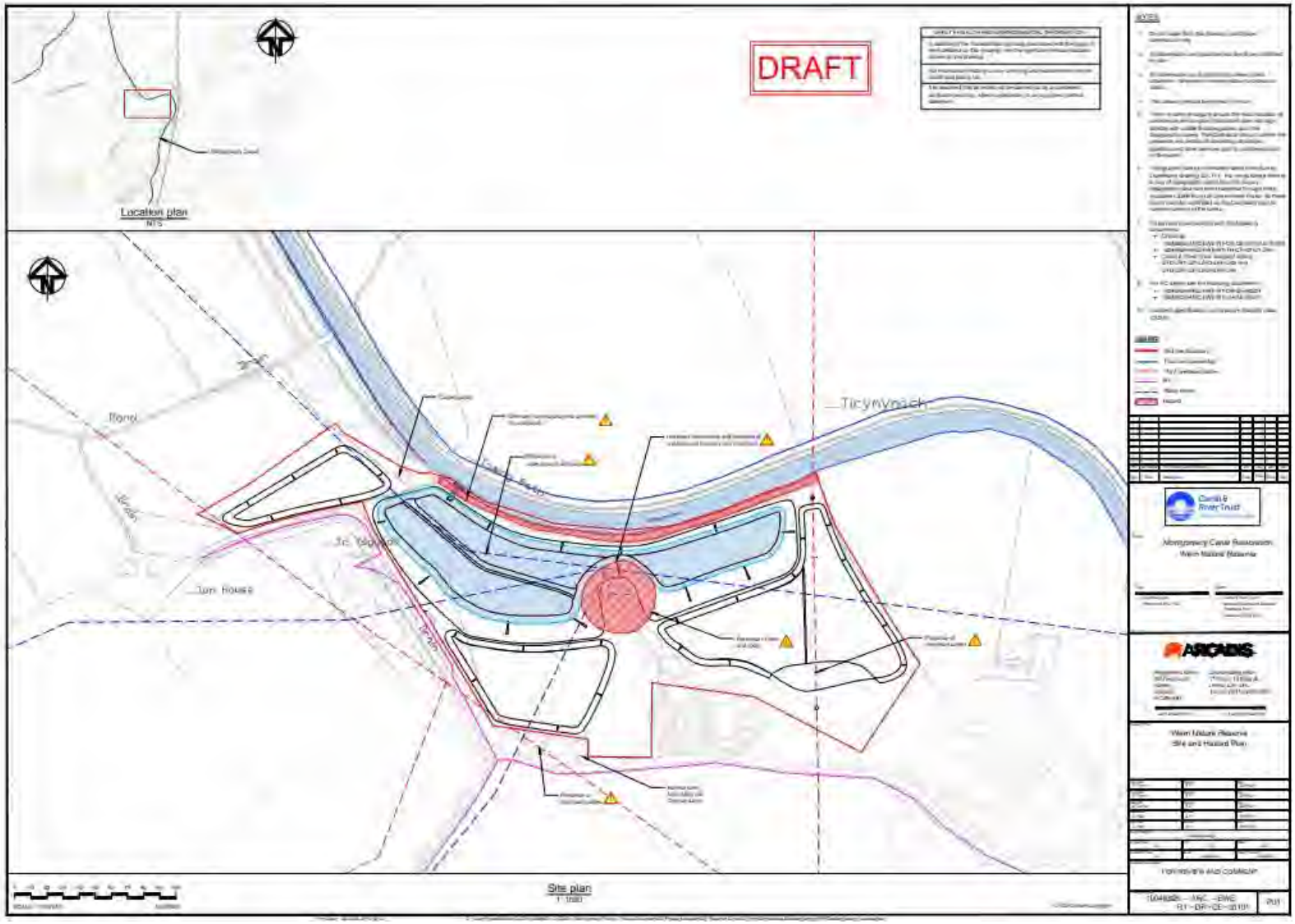


Figure 2 Proposed Works at Wern

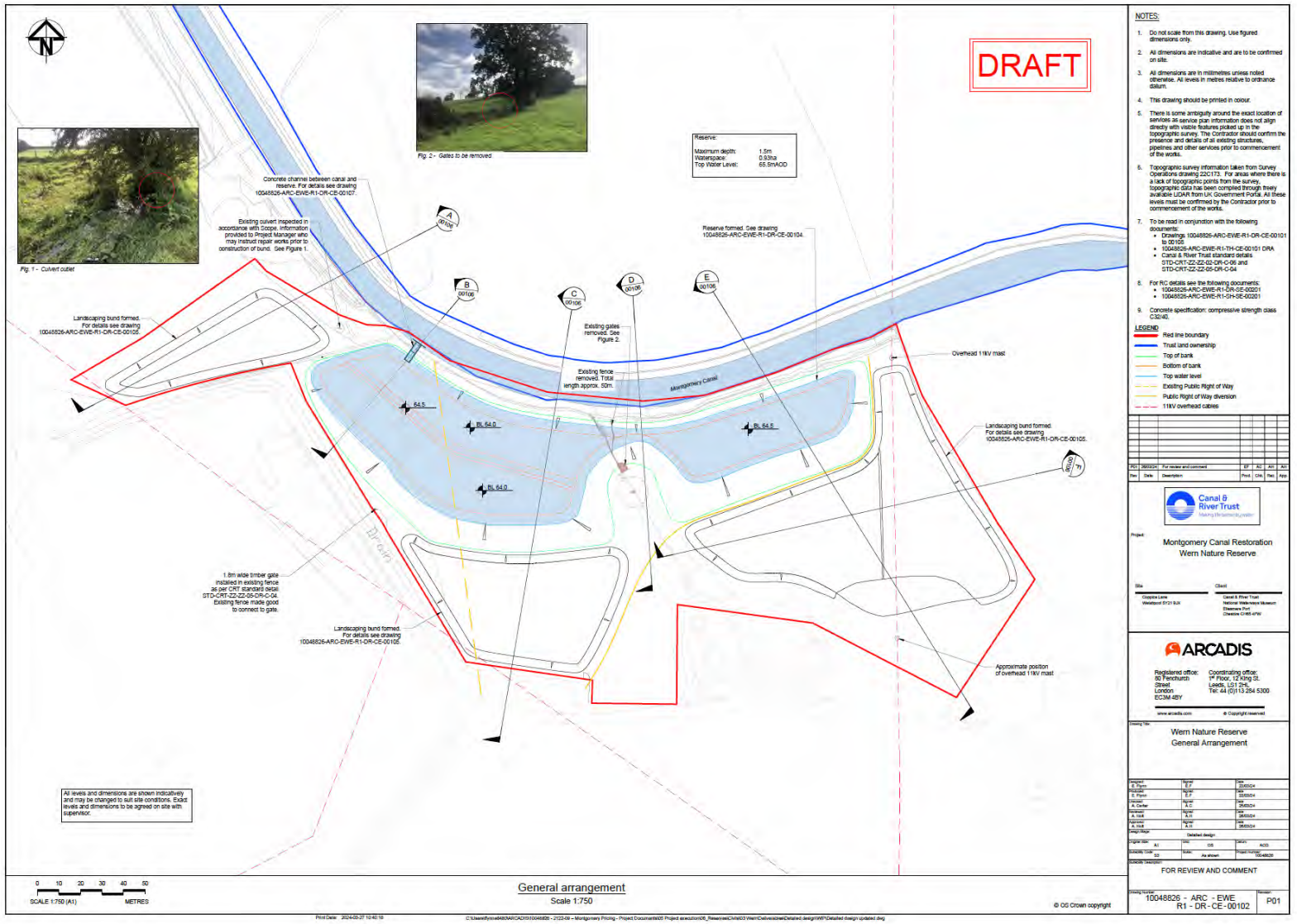
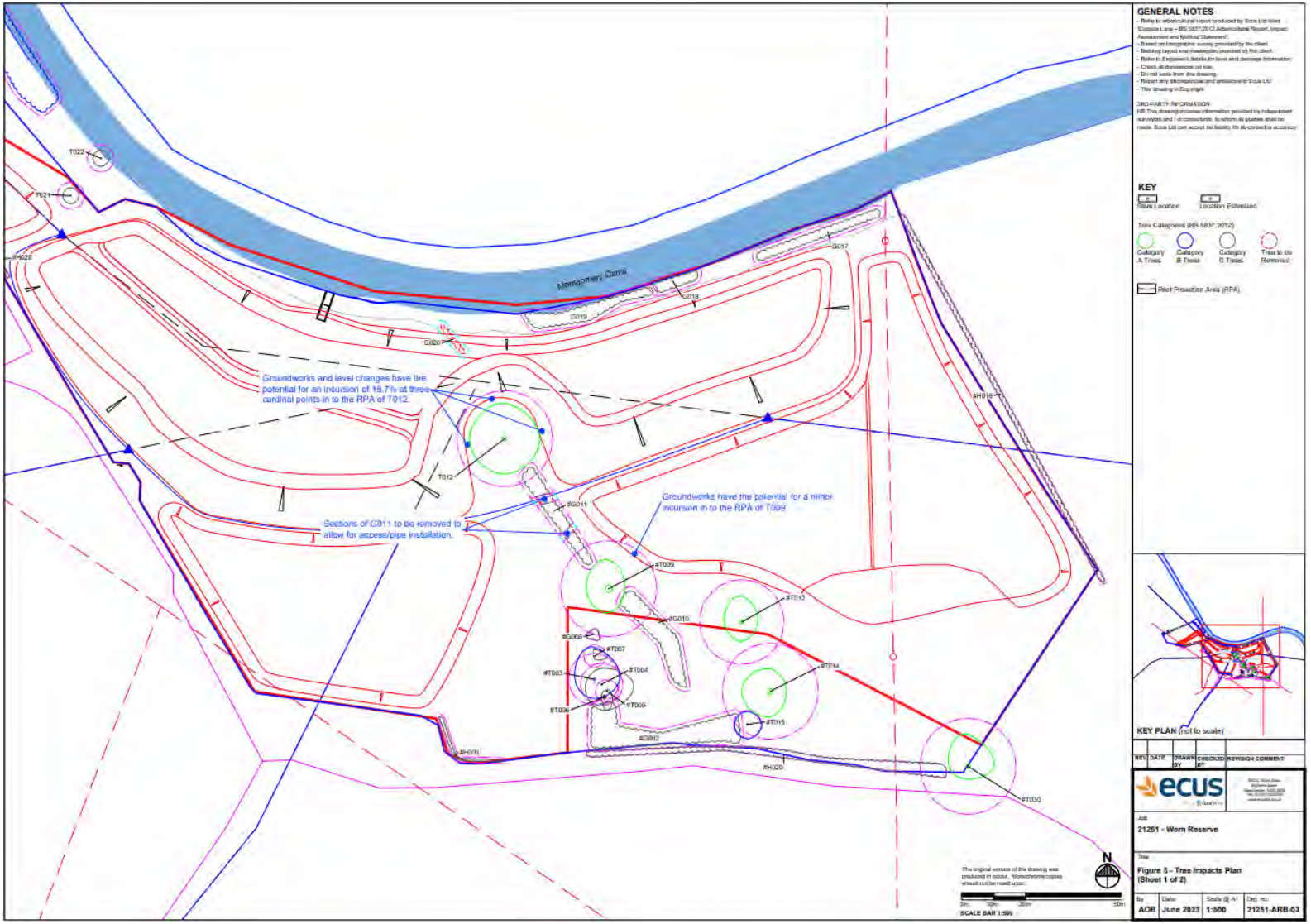


Figure 3: Tree Schedule Map, shows trees and hedgerows that will be removed and retained.




GENERAL NOTES
KEY
Tree Categories (BS 5837:2012)
Category A Trees
Category B Trees
Category C Trees
Trees to be Removed
Root Protection Area (RPA)
G021
H024
HT025
HT026
T022
T021
H028
H027
G029
T012
Groundworks and level changes have the potential for an incursion of 18.7% at three cardinal points in to the RPA of T012
Sections of G011 to be removed to allow for access/pipe installation
N
SCALE BAR 1:500
KEY PLAN (not to scale)
REV
DATE
DRAWN BY
CHECKED BY
REVISION COMMENT
ecus
21251 - Wern Reserve
Figure 6 - Tree Impacts Plan (Sheet 2 of 2)
By
AOB
Date
June 2023
Scale @ A1
1:500
Dwg. no.
21251-ARB-04

Figure 4: Phase 1 Habitat Survey Map

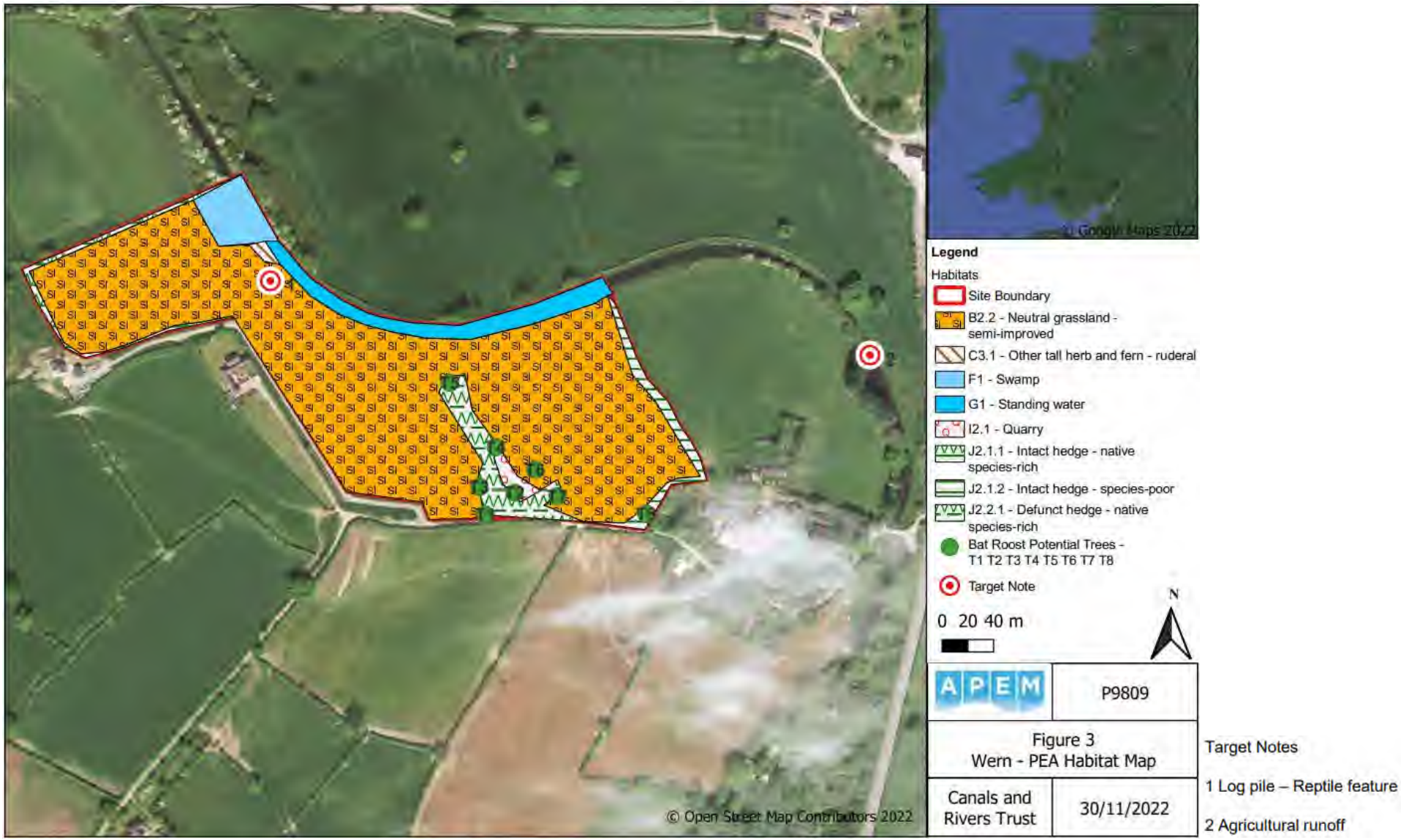
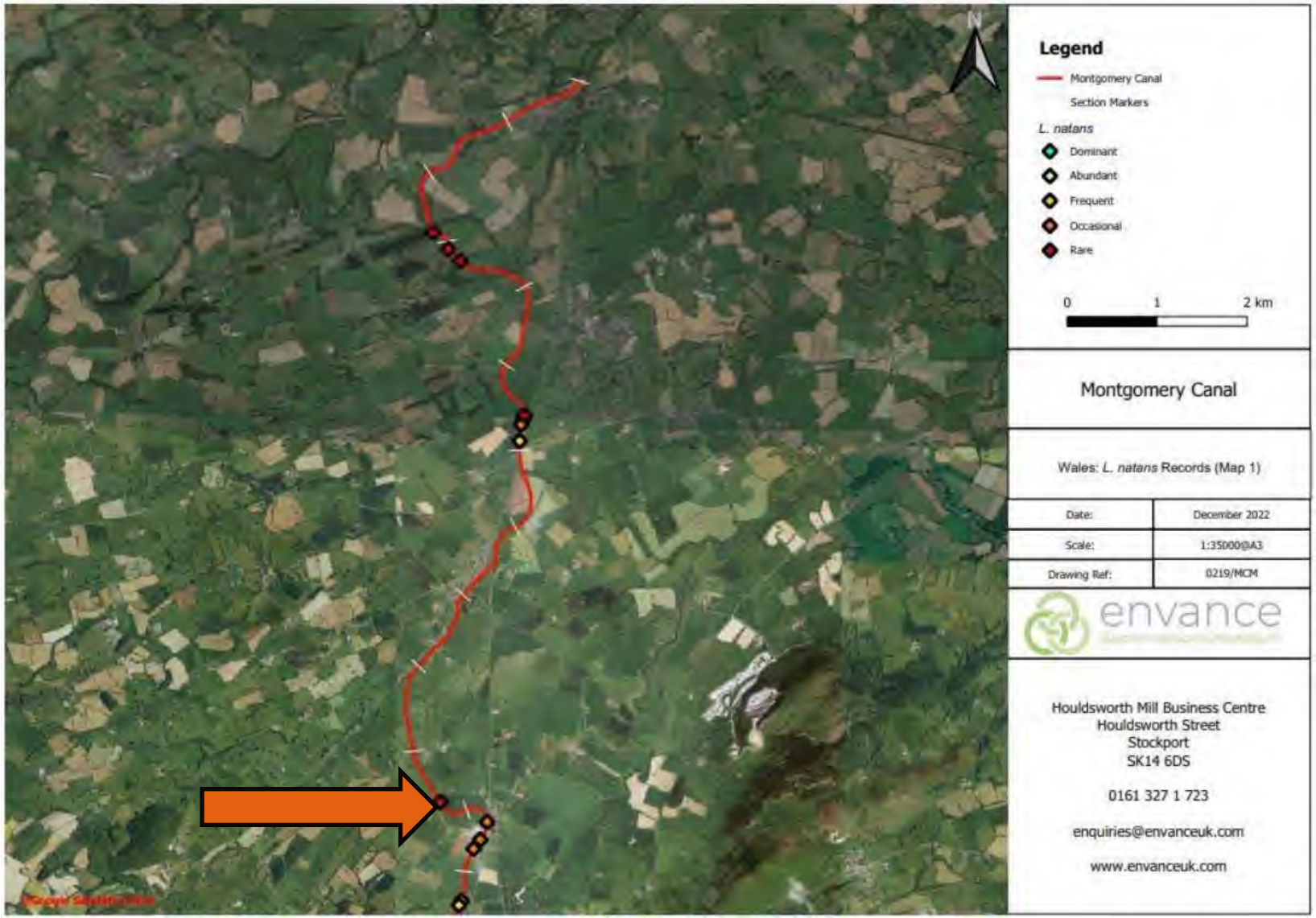


Figure 5: Floating water plantain locations from Aquatic Plants Survey. Orange arrow points to the location of the Site



Appendix B: Legislation and Policy Compliance

Legislation

INNS

The Invasive Alien Species (Enforcement and Permitting) Order 2019 (the Invasive Species Order') (HMSO, 2019b) strengthens the legislation in relation to widely spread species of European Union concern; requiring effective management measures to be put in place to minimise their impacts. It is an offence to import, keep, breed / grow, transport, sell, use, allow to reproduce, or release into the environment the species listed in Schedule 2 of this Order.

Details of how the works will comply with legislation is in Table 7

Dormouse

Regulation 42 of The Conservation of Habitats and Species Regulations 2019 (EU Exit) (as amended) (The Habitats Regulations) and Section 9 of the Wildlife and Countryside Act 1981 (as amended) states that

"A person who –

(a) Deliberately captures, injures or kills any wild animal of a European protected species,
(b) Deliberately, intentionally or recklessly disturb wild animals of any such species,
(c) Damages or destroys a breeding site of resting place of such animal
(d) Intentionally or recklessly obstructs access to a structure/place used for shelter/protection

is guilty of an offence"

Hazel dormice, their breeding sites and resting places are protected by Conservation of Habitats and Species Regulations 2019 (EU Exit) (as amended) and under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended).

The following constitutes an offence under the legislation:

- Deliberately capture, injure or kill hazel dormice;
- Damage or destroy a dormouse resting place or breeding site;
- Deliberately or recklessly disturb a hazel dormouse while it's in a structure or place of shelter or protection;
- Block access to structures or places of shelter or protection; and
- Possess, sell, control or transport live or dead hazel dormice, or parts of hazel dormice.

Details of how the works will comply with legislation is in Table 7

Amphibians

Great crested newts are listed on Appendix II of the Bern Convention and on Annexes II and IV of the EU Natural Habitats Directive. In England and Wales, the great crested newt is protected under Schedule 2 of the Conservation of Habitats and Species Regulations 2019 (EU Exit) (as amended) and under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended).

It is an offence to:

- Intentionally or deliberately capture, kill, or injure great crested newt;
- Intentionally or recklessly damage, destroy, and disturb great crested newt in a place used for shelter or protection, or obstruct access to such areas;
- Damage or destroy a great crested newt breeding site or resting place;
- Possess a great crested newt, or any part of it, unless acquired lawfully; and
- Sell, barter, exchange, transport, or offer for sale great crested newt or parts of them.

The legislation covers all newt life stages such that eggs, tadpoles and adult newts are all equally protected.

Native amphibians are protected under the Animal Welfare Act 2006. This states that is an offence to cause unnecessary suffering to an animal.

The four widespread species of amphibian, the smooth and palmate newts, the common frog and common toad, are protected only by Section 9(5) of the Wildlife and Countryside Act 1981 (as amended). This section prohibits sale, barter, exchange, transporting for sale and advertising to sell or to buy.

Details of how the works will comply with legislation is in Table 7

Reptiles

Reptiles (adder, grass snake, common lizard and slow worm) are protected through Section 9(1) of the Wildlife & Countryside Act 1981 (as amended) against intentional killing and injuring (note the provision in Section 9(1) of Wildlife & Countryside Act 1981 prohibiting "taking" does not apply to reptiles).

Details of how the works will comply with legislation is in Table 7

Birds

Nesting and nest building birds are protected under the Wildlife and Countryside Act (HMSO, 1981). It is an offence to:

- Intentionally kill, injure or take any wild bird;
- Take, damage or destroy the nest of any wild bird when it is in use or is being built; and
- Take or destroy an egg of any wild bird.

Some bird species are listed on Schedule 1 of this act, making it an offence to intentionally or recklessly disturb birds and their young at, on or near an 'active' nest.

Details of how the works will comply with legislation is in Table 7

Bats

In the United Kingdom (UK) all bat (Chiroptera spp.) species and their roosts are legally protected, by national legislation. This protection is detailed in the Wildlife and Countryside Act 1981 (as amended) (HMSO, 1981) and the Conservation of Habitats and Species Regulations 2019 (EU Exit) (as amended).

Together these pieces of legislation make it a criminal offence to:

- Deliberately take, injure or kill a wild bat; Intentionally or recklessly disturb a bat in its roost or deliberately disturb a group of bats;
- Damage or destroy a place used by bats for breeding or resting (roosts) (even if bats are not occupying the roost at the time);
- Possess or advertise/ sell/ exchange a bat of a species found in the wild (dead or alive) or any part of a bat; and
- Intentionally or recklessly, obstruct access to a bat roost.

Offences two and four from the above list are at greatest risk of being violated by these works. Details of how the works will comply with legislation is in Table 7

Badger

Badgers are protected and so are the setts they live in. Under the Protection of Badgers Act 1992, in England and Wales it is an offence to:

- Wilfully kill, injure or take a badger (or attempt to do so);
- Cruelly ill-treat a badger;
- Dig for a badger;

- Intentionally or recklessly damage or destroy a badger sett, or obstruct access to it;
- Cause a dog to enter a badger sett; and
- Disturb a badger when it is occupying a sett

The fourth and sixth offences from the above list are at most risk of being violated by the works. Details of how the works will comply with legislation is in Table 7

Hedgehog

Hedgehogs have some degree of legal protection in the UK:

- They are listed on schedule 6 of the Wildlife and Countryside Act (1981) which makes it illegal to kill or capture wild hedgehogs, with certain methods listed;
- They are also listed under the Wild Mammals Protection Act (1996), which prohibits cruel treatment of hedgehogs; and
- They are a species of 'principal importance' under the NERC Act (2006) and Environment Wales Act (2016) which is meant to confer a 'duty of responsibility' to public bodies.

Details of how the works will comply with legislation is in Table 7

Otter

Otters are an EPS under the Habitats Regulations 2019 (EU Exit) (as amended) (HMSO, 2021) and are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) (HMSO, 1981) and the Wild Mammals (Protection) Act (HMSO, 1996). Otters are also a SoPI under Section 41 of the NERC Act (2006) (HMSO, 2006).

It is an offence to:

- Capture, kill, disturb or injure otters (on purpose or by not taking enough care);
- Damage or destroy a breeding or resting place (deliberately or by not taking enough care);
- Obstruct access to their resting or sheltering places (deliberately or by not taking enough care); and
- Possess, sell, control or transport live or dead otters, or parts of otters.

The third offence listed above, which related to obstructing access, is of the highest risk of being committed for these works.

Details of how the works will comply with legislation is in Table 7.

Appendix C: Valuation Criteria

Importance	Feature type	Attributes
International	Sites	European sites; Ramsar sites; Biogenic Reserves; and World Heritage Sites. Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such.
	Habitats	N/A
	Species	A species population sufficiently large or critical that its loss would adversely affect the conservation status or distribution at an international or European scale.
National	Sites	Sites of Special Scientific Interest (SSSIs); National Nature Reserves (NNRs) and National Parks. Areas which meet the published selection criteria but have not themselves been designated as such.
	Habitats	Habitats of Principal Importance as listed under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Areas of irreplaceable habitats including ancient woodland and ancient or veteran trees.
	Species	A species population sufficiently large or critical that its loss would adversely affect the conservation status or distribution at a national scale.
Regional	Sites	Wildlife sites designated at a regional level.
	Habitats	Areas of habitats identified (including for restoration) in regional plans or strategies.
	Species	A species population or community sufficiently large or critical that its loss would adversely affect the conservation status or distribution at a regional scale. Species identified in regional plans or strategies.
County	Sites	Wildlife sites designated at a county (or equivalent) level including: County Wildlife Sites (CWSs); Local Wildlife Sites (LWS); Local Nature Conservation Sites (LNCS); Local Nature Reserves (LNRs); Sites of Importance for Nature Conservation (SINCs); and Sites of Nature Conservation Importance (SNCIs).
	Habitats	Areas of habitats identified in county or equivalent authority plans or strategies (where applicable).
	Species	A species population or community sufficiently large or critical that its loss would adversely affect the conservation status or distribution at a county or unitary authority scale. Species identified in a county or equivalent authority area plans or strategies.

Importance	Feature type	Attributes
Local	Sites	Wildlife sites listed at a local or parish level.
	Habitats	Areas of habitat considered to appreciably enrich the habitat resource in the local context including features of importance for migration, dispersal, or genetic exchange.
	Species	Species populations or communities considered to appreciably enrich the habitat resource in the local context including features of importance for migration, dispersal or genetic exchange.
Site	Sites	N/A
	Habitats	Areas of habitat considered to appreciably enrich the site, but not sufficiently large in extent or favourable condition to warrant inclusion at the Local level.
	Species	Species populations or communities considered to appreciably enrich the site, but not sufficiently large or critical to warrant inclusion at the Local level.
Not important	Sites	N/A
	Habitats	Habitats making a negligible contribution to biodiversity, even at the Site level.
	Species	Small or common / widespread species populations or communities making a negligible contribution to biodiversity, even at the Site level.

Appendix D: APEM PEA

Canals and Rivers Trust

Montgomery Canals – Reserves

Preliminary Ecological Appraisal

Blair McNicol

Client: Arcadis Consulting (UK) Ltd

Project reference: P00009809

Date of issue: December 2022

_____

Project Director: Keith Ross

Project Manager: Michael Underwood

Author: Blair McNicol

_____

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Report should be cited as:

"APEM (2022). Montgomery Canal – Reserves *Preliminary Ecological Appraisal*, December 2022, V1 Final"

Revision and Amendment Register

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
V1		All	All		

Contents

Non-Technical Summary	
Site Name	Wern, Powys, Wales**,** (nearest postcode: SY21 9JX, National Grid Reference SJ 25880 13101) Carreghofa, Powys, Wales (nearest postcode: SY22 2PE, National Grid Reference SJ 25489 20374) Red Lane, Pool Quay, Powys, Wales (Nearest postcode:SY21 9JX, National Grid Reference SJ 25880 13101)
Proposed Works	The proposed plan is to create compensatory wetland habitat at each site that connects to the Montgomery canal. To enhance and compensate for habitat lost on the canal margins from increased boating and dredging activities.
Methods	Desk study, extended Phase 1 habitat survey, Preliminary Roost Assessment, otter, badger, water vole and non-native invasive species surveys
Ecological Receptor	**Recommendations**
Statutory Sites	A Habitats Regulations Assessment should be undertaken in advance of the works. The need for SSSI assent will also be considered during the HRA process. Best practice pollution prevention (including the use of spill kits and drip trays) measures should be adhered to at all times.
Survey Results and Conclusion	In the absence of mitigation, the scheme has the potential to adversely affect the following ecological receptors: • The presence of the Montgomery canal SAC / SSSI located on Site. Due to the close proximity of the SAC/SSSI to the Site and direct hydrological connection, there is the potential for direct adverse effects associated with pollution. • Priority habitat (hedgerows, marshy grassland) through habitat removal, root damage. • Priority habitat (standing water, swamp) through pollution. • Bats through potential roost loss and habitat loss through construction. • Great crested newt through terrestrial habitat destruction during construction. • Hazel dormouse through injury and habitat destruction and fragmentation during construction and vegetation removal. • Badger through sett destruction and injury during construction. • Reptile through injury during construction and vegetation removal. • Nesting birds through destruction of nests and eggs during vegetation removal.
Habitats	**Priority Habitats:** All hedgerows and trees within the Site are to be given a buffer zone. The buffer zone should be at least as wide as the hedge is tall to ensure the majority of roots remain unaffected. Materials and machinery should not be stored along hedgerows or next to scattered trees, or on marshy grassland.

	If the scope of works includes the removal of hedgerows further survey efforts to include a hedgerow assessment survey and may require a hedgerow removal licence from the Local Planning Authority. Any removal or degradation of hedgerows should be replanted. We recommend that 1-1.2m high whips are planted (3 whips per metre) in a double row and included stock proof fencing to ensure adequate protection from browsing livestock. Hedgerow species should consist of an equal mix of: • 20% hazel (*Corylus avellana*); • 20% holly (*Ilex aquifolium*); • 20% hawthorn (*Crataegus monogyna*); • 20% blackthorn (*Prunus spinosa*); • 10% elder (*Sambucus nigra*); and, • 10% Dog rose (Rosa canina) Roosting Bats: Trees that have been assessed as having high (Wern – T4, T5, T6, & T7) or moderate (Carreghofa – T1, T2 & T3, Wern – T6) potential to support roosting bats because of the presence of cavities, crevices or cracks will require further survey: If works (felling/pruning) are required to these trees; prior to felling an endoscope inspection should be undertaken to determine the presence or likely absence of bats in PRFs. If it is not possible to downgrade the potential of the trees to low or negligible following the endoscope inspection, then further emergence/re-entry surveys are likely to be required. Trees identified as having moderate potential to support roosting bats because of the presence of thick ivy or are considered unsuitable for an endoscope inspection (1861, 1862, 1864, and 1888) will require further survey: If works (felling/pruning) are required to these trees; prior to felling two emergence/re-entry surveys will be required to determine the presence or likely absence of bats in PRFs. At least one of these surveys should be a dawn re-entry survey. Endoscope inspections can be undertaken at any time of year; however, surveys undertaken between May and August are often most informative. Emergence/re-entry surveys must be undertaken between May and August (weather dependant). Emergence/re-entry surveys must be undertaken a minimum of 2 weeks apart. If a bat roost is identified during the surveys, a European Protected Species licence from NRW will be required before any works can commence. Where trees have been assessed as having negligible or low potential to support roosting bats no further survey effort is required (Collins, 2016).

	Bagder: Further badger surveys will be required at Carregohfa to check the activity of the two outlier setts prior to works commence. A prework check by an ecologist at Wern nature reserve should be complete a few weeks prior to works beginning to ensure no new activity at the Site. **Dormice:** Should small areas of vegetation require removal (less than 2m2) it may be possible to complete this under the supervision of a licensed ecologist. If larger areas of vegetation require removal, dormouse surveys of the hedgerow, scrub and woodland edge habitat may be required between March and November 2023 and a European Protected Species Licence acquired from Natural Resources Wales in advance of any works. **Reptiles & Common Amphibians:** If removal of highlighted reptile features or vegetation (marshy grassland, scrub and hedgerow margins) is required, an Ecological Clerk of Works should be present prior to and during the works, to conduct checks for reptiles and common amphibians. **Terrestrial Mammals (Badger, Otter & Hedgehog):** Best practice measures such as placing mammal ramps in excavations should be adhered to, to avoid any mammals (and other wildlife) becoming trapped. If vegetation removal (scrub and hedgerow margins) is required, an ECoW should be present prior to and during the works, to conduct checks for hedgehog. **Wild Birds:** Any vegetation removal should be undertaken outside of the nesting bird season (March to August inclusive) where possible. Where works within this season are unavoidable, the vegetation should be checked by an ecologist prior to clearance. The pre-works check should be undertaken as close to and no longer than 48 hours prior to the vegetation removal taking place. If nesting birds are present, a buffer will be implemented around the nest, and works cannot proceed in this area until the chicks have fledged. **Nocturnal Wildlife/Lighting:** Additional lighting should be avoided. If additional lighting is a requirement (permanent and temporary) it should be reviewed by an ecologist prior to installation to assess the impacts to nocturnal wildlife.

1. Introduction

1.1 Purpose and Brief

As part of the Rivers and Canals Trust Montgomery Canal Nature reserves scheme, APEM Ltd (APEM) were commissioned by Arcadis Consulting (UK) Ltd to undertake a Preliminary Ecological Appraisal (PEA), Preliminary Roost Assessment (PRA), badger (*Meles meles*), otter (*Lutra lutra*), water vole (*Arvicola amphibius*), reptile and invasive non-native species (INNS) surveys at three potential reserve Sites located adjacent to the Montgomery canal in Mid-Wales, hereafter referred to as the 'Site'.

This report provides the survey methodology and results of the PEA, PRA, badger, otter, water vole, reptile and INNS surveys carried out at Wern and Carreghofa between August and September 2022. Following interpretation of the results, the report provides an assessment of the potential effects of the proposals on habitats and protected species. It also provides recommendations for further surveys that are required in advance of any works being undertaken at the Site and any necessary mitigation measures.

A ecological walkover survey has not be carried out at the Red Lane Site due to access limitations. Therefore, only a desk based study including statutory and non-statutory designated sites, and protected species records have been included within the report.

1.2 Site Description

The Sites include three areas located adjacent the Montgomery Canal which have be identified as potential reserve Sites.

Wern

The Wern Site is located in Wern, Powys, Wales**,** (nearest postcode: SY21 9JX, National Grid Reference (NGR) SJ 25880 13101 (see Appendix 1, Figure 1)).

The Site compromised of semi-improved grassland, tall ruderal, standing water, hedgerows, swamp and quarry with the wider landscape being dominated by agricultural land, with a residential property to the west and some agricultural building structures located to the east.

Carreghofa

The Carreghofa Site is located in Carreghofa, Powys, Wales (nearest postcode: SY22 2PE, NGR SJ 25489 20374 (see Appendix 1, Figure 2)).

The Site is consisted of arable, marshy grassland, tall ruderal, standing water, and hedgerows. The wider landscape was dominated by agricultural land, with residential properties to the east of the Site.

Red Lane

The Red Lane Site is located in Pool Quay, Powys, Wales (Nearest postcode:SY21 9JX, NGR SJ 25880 13101 (see Appendix 1, Figure3)).

As the Site has yet to be surveyed, it has been reviewed using the satellite imagery available (Google Earth, 2022). The Site is dominated by grassland habitat, with the canal forming the northern and eastern boundaries. The wider landscape is dominated by agricultural land and infrastructure.

1.3 The Proposed Works

The proposed works plan to create three nature reserves along the Montgomery Canal. The plans are to create approximately 6.8 hectares of compensatory wetlands habitat. Each Site will be fed from the canal to mimic the habitats that are to be reduced within the canal due to increased boating and dredging activities.

Carreghofa

The Carreghofa Site is to be the largest of the three with approx. 3 hectares available to convert to wetlands habitat.

Wern

The proposed works for the Wern Site is to create 1.8 hectares of wetland habitat. The Site is a former quarry so groundworks will be required to check feasibility and infill.

Red Lane

The proposed works for the Red Lane Site is to create approx. 2 hectares of wetlands habitat, the area available may increase if there are any shortfall at the Wern Site.

1.4 The Survey Area

The survey areas include:

- Areas directly within the land take for the proposed works, including access;
- Areas which will be temporarily affected during the proposed works; and,
- Areas where there is a risk of disturbance during the proposed works and/ or operation.

The survey areas can be found in Figures 1-3, Appendix 1.

2. Methodology

2.1 Desk Study

Data was requested from Aderyn (the local environmental records centre for Wales) and included information on statutory designated sites within 5 km of the Site and non-statutory designated sites and records of protected, invasive or otherwise notable species within 2 km of the Sites. Records were obtained on 6th September 2022 (Aderyn, 2022). Species records from the last 20 years were considered relevant to the scheme as older records are unlikely to be representative of current local species populations.

The desk study also involved a review of publicly available information including:

- The Multi-Agency Geographic Information for the Countryside (MAGIC) website (DEFRA, 2022) for information relating European Statutory sites within 5 km of the Site.
- Google Earth aerial imagery (Google Earth, 2022) to contextualise the Site within the landscape and identify waterbodies within 0.5 km of the Site.

2.2 Field Surveys

Field surveys were carried out between the 31st August 2022 and 2nd September 2022 by Senior Ecologist Alex Bingle and Consultant Ecologist Blair McNicol. The weather conditions at the time of the survey are detailed in the table below.

Table 1 - Weather conditions at time of survey

Date	Weather
30/08/22	16°C, dry, wind speed 5mph, 60% cloud cover
31/08/22	17°C, dry, 8mph winds, 20% cloud cover
01/09/22	17°C, dry, 8mph winds, 80% cloud cover
02/90/22	18°C, dry, 5mph wins, 20% cloud cover

2.2.1 Extended Phase 1 Habitat Survey

During the Phase 1 habitat survey, all habitats were identified and mapped according to industry standard guidance for Phase 1 habitat survey (JNCC, 2010).

The survey area was inspected for field evidence and suitability to support the following protected species:

- Badger;
- Bats (*Chiroptera* spp.);
- Great crested newt (*Triturus cristatus*) and other amphibians;
- Hedgehog (*Erinaceus europaeus*);
- Hazel dormouse (*Muscardinus avellanarius*);
- Reptiles;
- Otter;
- Water vole;
- White-clawed crayfish (*Austropotamobius pallipes*);
- Wild birds;
- Protected plants; and
- Protected Invertebrates

The presence of any invasive non-native species (INNS) was also noted.

2.2.2 Preliminary Roost Assessment (Buildings)

The PRA and subsequent building/ tree classification followed current best practice guidance (Collins, 2016)

The buildings were inspected for potential roosting features (PRFs) and field evidence of bats including droppings, individual bats (live or dead), feeding remains, scratch marks, urine staining, grease marks and clean cobweb-free gaps around potential entrance points and crevice roost sites. Tree was classified within one of four categories (High, Moderate, Low, Negligible), describing its roost potential (Collins, 2016).

The buildings were also assessed for their potential to support nesting birds.

Each building was assessed as having 'High', 'Moderate', 'Low', or 'Negligible' potential for roosting bats according to industry standard guidance (Collins, 2016).

2.2.3 Ground Level Tree Assessment (GLTA) - Bats

All trees within the Site Boundaries were inspected from ground level, to determine their potential to support roosting bats and followed best practice guidance (Collins, 2016). Trees were surveyed from the ground, with the use of close-focussing binoculars to assist in the observation and assessment of potential roost features (PRFs). Information was collected on PRFs observed during the ground-level survey and included: height of feature; orientation of the feature within the tree; orientation of bat access to the feature; description of the feature; and whether the tree can safely be climbed during a follow-up PRF Inspection Survey (if required).

Each tress was assessed as having 'High', 'Moderate', 'Low', or 'Negligible' potential for roosting bats according to industry standard guidance (Collins, 2016).

2.2.4 Badger Survey

The survey consisted of a daytime walkover with the primary aim of establishing whether badgers were present within the Site and (per the findings of the survey) assess whether further work is required.

The area immediately adjacent to and up to a 30m from the Site boundary was surveyed for evidence of badger activity including;

- sett entrances,
- large spoil heaps outside sett entrances,
- bedding outside sett entrances,
- badger footprints,
- badger paths,
- latrines,
- badger hairs on fences or bushes,
- scratching posts,
- signs of digging for food.

2.2.5 Otter and Water Vole survey

All suitable habitat within and adjacent to the Site was surveyed for signs of otter and water vole. This included 300m along the canal from each side of the Sites.

During the survey, surveyors walked along the toe of the banks and conducted continuous searches for otter and water vole presence. Otter and water vole field signs, if found, were recorded in the field by taking a NGR point at each interval where field signs were observed.

Otter Survey

The otter survey was undertaken following best practice guidelines (Chanin, 2003). The survey involved searching for field signs of otter which included

- Spraints;
- Tracks;
- Feeding remains;
- Slides;
- Holts (underground dens and breeding sites); and,
- Couches (above ground sites where otters rest during the day).

Water Vole Survey

The water vole was undertaken and followed standard surveying methodology of the Water Vole Conservation Handbook (Strachan, Moorhouse, & Gelling, 2011). The survey involved searching for signs of water vole which included:

- Presence of water vole droppings;
- Evidence of water vole resting and breeding sites;
- Presence of water vole access points (runs and burrows);
- Evidence of feeding remains;
- Water vole feeding stations;
- Habitat information including bordering land use, vegetation type, bank profiles, stream depth, width and current; and Suitable habitat for water vole.

2.3 Limitations

The results presented in this report represent those at the time of survey and reporting, and data collected from available sources.

The Red Lane Site will be surveyed at a later date only the data search information has been reviewed for this Site, recommendations will be updated upon completion of the survey.

3. Results and Discussion

3.1 Statutory and Non-statutory Sites – Wern

Table 2 details the statutory and non-statutory designated Sites located within 2 km of the Wern Site which have been provided by LERC Wales' Biodiversity Information & Reporting Database (Aderyn, 2022)and obtained from Magic Maps (DEFRA, 2022).

There are five ancient woodland sites, one restored ancient woodland site, one plantation on ancient woodland site (PAWS) and one PAWS NRW priority area within 2km of the site. Due to the localised nature of the proposed works, the zone of influence (ZoI) for non-statutory sites is likely to be restricted to those located adjacent to or within 200 m of the Site, or those which have hydrological connectivity to the Site.

Table 2: Statutory & non-statutory sites – Wern

Site Name	Designation Type	Reason for Designation	Distance and Direction from Site (km)
Statutory			
Montgomery Canal	Special Area of Conservation (SAC) / Site of Special Scientific Interest (SSSI)	Designated for its unique aquatic plant life.	On Site

3.1.1 Potential Adverse Effects

The Montgomery canal SAC / SSSI is located on the site boundary. Due to the close proximity of the SAC/SSSI to the Site and direct hydrological connection, there is the potential for direct adverse effects associated with pollution during the construction phase. A Habitats Regulations Assessment is likely to be required in advance of the works. The need for a SSSI assent from Natural Resources Wales should also be considered.

All non-statutory sites are located outside of the ZoI (the closest non-statutory site is NRW Priority Ares - PAWS which is located 1.9 m south of the Site) from the proposed works, and so adverse effects are not anticipated.

3.2 Statutory and Non-statutory Sites – Carreghofa

Table 3 details the statutory and non-statutory designated sites located within 2 km of the Carreghofa Site which have been provided by LERC Wales' Biodiversity Information & Reporting Database (Aderyn, 2022) and obtained from Magic Maps (DEFRA, 2022).

There is one wildlife trust reserve, one road verge nature reserve, 8 ancient semi natural woodland sites, 9 restored ancient semi natural woodland sites,6 plantation on ancient woodland site (PAWS), 6 NRW (PAWS) priority areas and one NRW heathland and grassland priority area. Due to the localised nature of the proposed works, the zone of influence (Zol) for non-statutory sites is likely to be restricted to those located adjacent to or within 200 m of the Site, or those which have hydrological connectivity to the Site.

Table 3: Statutory & non-statutory sites – Carreghofa

Site Name	Designation Type	Reason for Designation	Distance and Direction from Site (km)
Statutory			
Montgomery Canal	SAC/SSSI	Designated for its unique aquatic plant life.	On site
Llanymynech and Llynclys Hills	SSSI	Designated for it's suitability to support a number of rare invertebrates such as Grizzled Skipper (*Pygrus malvae.*	1.1 km North

3.2.1 Potential Adverse Effects

The Montgomery canal SAC / SSSI is located on the site boundary. Due to the close proximity of the SAC/SSSI to the Site and direct hydrological connection, there is the potential for direct adverse effects associated with pollution during the construction phase. A Habitats Regulations Assessment is likely to be required in advance of the works. The need for a SSSI assent from Natural Resources Wales should also be considered.

The Llanymynech and Llynclys Hills SSSI is located 1.1 km north west of the Site. There is no hydrological connectivity and has a large intervening distance from the Site activities. Therefore, potential adverse effects are unlikely to occur.

All non-statutory sites are located outside of the ZoI (the closest non-statutory site is Llanymynech Rock which is located 1.2 km north of the Site) from the proposed works, and so adverse effects are not anticipated.

3.3 Statutory and Non-statutory Sites – Red Lane

Table 4 details the statutory and non-statutory designated sites located within 2 km of the Carreghofa Site which have been provided by LERC Wales' Biodiversity Information & Reporting Database (Aderyn, 2022) and obtained from Magic Maps (DEFRA, 2022).

There are 37 ancient woodland sites, 22 restored ancient woodland sites, 15 plantations on ancient woodland site (PAWS), 15 PAWS NRW priority areas and 2 Wildlife trust reserves within 2km of the Site. Due to the localised nature of the proposed works, the zone of influence (ZoI) for non-statutory sites is likely to be restricted to those located adjacent to or within 200 m of the Site, or those which have hydrological connectivity to the Site.

Table 4: Statutory & non-statutory sites – Red Lane

Site Name	Designation Type	Reason for Designation	Distance and Direction from Site (km)
Statutory			
Montgomery Canal	SAC / SSSI	Designated for its unique aquatic plant life.	On Site
Bron-y-buckley wood	SSSI	Designated for its ancient woodland habitat and geological features	1.8 km North-West

3.3.1 Potential Adverse Effects

The Montgomery canal SAC / SSSI is located on the Site boundary. Due to the close proximity of the SAC/SSSI to the Site and direct hydrological connection, there is the potential for direct adverse effects associated with pollution during the construction phase. A Habitats Regulations Assessment is likely to be required in advance of the works. The need for a SSSI assent from Natural Resources Wales should also be considered.

The Bron-y-buckley wood is located 1850 north west of the Site. There is no hydrological connectivity and has a large intervening distance from the site. Therefore, potential adverse effects are unlikely to occur.

All non-statutory sites are located outside of the ZoI (the closest non-statutory site is Severn farm Pond which is located 1 km south of the Site) from the proposed works, and so adverse effects are not anticipated.

3.4 Habitats

A Phase 1 Habitat map for the Sites can be found in Appendix 1, Figures 3 &4.

3.4.1 Habitat Descriptions

The habitats identified within the survey areas during the Phase 1 Habitat survey are described in Table 5 &6 below.

Table 5 – Wern Habitats and Descriptions

Habitat	Description and Species Present	Ecological Importance and Assessment of Likely Effects
Dense Scrub: A2.1	Areas of dense scrub was located to the northeast and northwest of the Site. (Photograph 1). This area was dominated by goat willow (*Salix caprea)* and blackthorn (*Prunus spinosa*)	The scrub is important up to a Site level and is of low ecological value due to its common nature and small size. It is not anticipated that this habitat will be removed to facilitate the works. If works require the removal of this habitat no adverse effects are anticipated.
Scattered trees: A3.1	Scattered trees were located along the boundaries of the Site. (Photograph 2). Species consisted of sessile oak (*Quercus robur)*, hazel *(Corylus avellana)* and ash (*Fraxinus excelsior*).	The scattered trees are important up to a Site level and are of low ecological importance due to its common nature and abundance of similar habitat nearby. There is potential for adverse effects from the removal of scattered trees

Habitat	Description and Species Present	Ecological Importance and Assessment of Likely Effects
Semi-improved neutral grassland: B2.2	The semi-improved grassland formed the dominating habitat at the Site, located throughout each of the 3 fields. The grasslands were utilised as grazing fields. (Photograph 3) Species present included spear thistle (*Cirisium vulgare)*, creeping thistle (*Cirsium arvense)*, red clover (*Trifolium pratense)*, white clover (*Trifolium repens)*, common mouse ear (*Cerastium fontanum)* , meadow butter cup (*Ranunculus acris)*, dandelion (*Taraxacum officinale)*, broadleaved dock (*Rumex obtusifolius*), creeping buttercup (*Ranunculus repens)*, common nettle (*Urtica dioica)* , perennial rye grass (*Lolium perenne)*, hedge bindweed (*Calystegia sepium)*, meadow foxtail (*Alopecurus pratensis)*, cocks foot (*Dactylis glomerata)*, common hogweed (*Heracleum sphondyllium)* and cow parsley (*Anthriscus sylvestris)*.	The semi-improved grassland has low ecological value due to low species diversity and well managed condition. It is considered important at Site level only. The proposed works has the potential to directly impact these habitats through habitat removal and degradation.
Swamp: F1	There was a small area of swamp located within the north-west aspect of the Site (Photograph 4). Species present; Cow vetch (V*icia cracca*), common reed grass (*Phragmites australis)*, Timothy grass (*Phleum pratense)*, reedmace *(Typha latifolia),* and soft rush (*Juncus effusus).*	The swamp is a Habitat of Principal Importance (Welsh Government, 2016) and important up to a Site level. It is not anticipated that this habitat will be removed as part of the works. The works proposed should enhance this habitat.
Tal ruderal: C3.1	There was a small area of tall ruderal located in north- west corner located adjacent to the swap habitat (Photograph 5).	The tall ruderal habitat is of moderate ecological value and is only important at Site level.

Habitat	Description and Species Present	Ecological Importance and Assessment of Likely Effects
	This area was dominated by great willowherb (*Epilobium hirsutum).*	It is not anticipated that this habitat will be removed as part of the works.
Species rich intact hedgerow: J2.1.1	The south, south-west and north-west boundaries are formed with native species rich hedgerows. (Photograph 6) Woody species consisted of bramble (*Rubus fruticosus)*, elder (*Sambucus nigra)*, holly (*Ilex aquifolium)*, dog rose (*Rosa canina*), goat willow (*Salix caprea)*, silver birch (*Betula pendula)* Ash, hazel, sessile oak, hawthorn and blackthorn. Ground flora consisted of bittersweet nightshade (*Solanum dulcamara)*, angelica (*Angelica syvestris)*, common hogweed (*Heracleum sphondylium)*, ribwort plantain (*Plantago lanceolata)*, shepherds purse (*Capsella bursa-pastoris)*, red campion (*Silene dioica)*, bramble, perennial rye grass, cow parsley, great willowherb, hedge bindweed, cow vetch, creeping thistle.	The hedgerows on Site are Priority Habitats (Welsh Government, 2016) and are important up the Site level. The works may involve the removal or degradation of this habitats. If hedgerows are to be removed this could cause a significant reduction in the ecological value of the hedgerow network, through habitat fragmentation. Furthermore, the works could indirectly affect the hedgerows through root damage/compaction during construction.
Species poor intact hedgerow: J2.1.2	The eastern and south-eastern boundary of Site were formed by a species poor native hedgerow (Photograph 7). This area was dominated by a bramble and hawthorn hedgerow.	
Species rich Defunct hedgerow: J2.2.1	The central aspect of Site was made up of a species rich defunct hedgerow. (Photograph 8) Woody species consisted of Sessile oak, hazel, hawthorn, bramble & sycamore.	

Habitat	Description and Species Present	Ecological Importance and Assessment of Likely Effects
Standing water	The canal forms the northern boundary of the Site. (Photograph 9) The canal banks and water channel vegetation consisted of Water mint (*Mentha aquatica)*, bird-foot trefoil (*Lotus corniculatus)*, marsh woundwort (*Stachys palustris*), grey willow (*Salix cinerea)*, cocksfoot, reedmace, common hogweed, meadow foxtail, common nettle, great willow herb, broadleaf dock, and goat willow,	The canal on Site is a Priority Habitat (Welsh Government, 2016), SAC and SSSI. It is important at an international level. Due to the direct hydrological connection with the Site and the canal, there is the potential for adverse effects via pollution during the construction phase. A Habitats Regulations Assessment is likely to be required in advance of the works. The need for a SSSI assent from Natural Resources Wales should also be considered. This will include an approved method statement that includes a suitable pollution prevention plan.

Table 6 –Habitats and Descriptions - Carreghofa

Habitat	Description and Species Present	Ecological Importance and Assessment of Likely Effects
Scattered trees: A3	Scattered trees were located across the Site (Photograph 10) Species consisted of Sessile oak and sycamore (*Acer pseudoplatanus)*	The scattered trees are important up to a Site level and are of low ecological importance due to its common nature and abundance of similar habitat nearby.

		There is potential for adverse effects from the removal of scattered trees.
Marshy grassland: B5	There was a small area of marshy grassland located in the north-east corner of the Site. (Photograph 11) Species consisted of soft rush and reedmace.	The marshy grassland is a Habitat of Principal Importance (Welsh Government, 2016). It is important at Site level. There is potential for adverse effects from the removal of marshy grassland.
Tal ruderal: C3.1	There was a strip of tall ruderal located to the north-east of the Site (Photograph 12). Species consisted of creeping thistle, spear thistle, broadleaved dock, common hogweed, dandelion and great willow herb.	The tall ruderal habitat is of moderate ecological value and is only important at Site level. It is not anticipated that this habitat will be removed as part of the works.
Standing water: G1	The canal formed the eastern and south-east boundary of the Site (Photograph 13). Canal bank and channel vegetation consisted of alder (*Alnus glutinosa)*, bittersweet nightshade, meadowsweet, grey willow and reedmace.	The canal is a Habitat of Principal Importance (Welsh Government, 2016), SAC and SSSI. It is important at an international level. Due to the direct hydrological connection with the Site and the canal, there is the potential for adverse effects via pollution during the construction phase. A Habitats Regulations Assessment is likely to be required in advance of the works. The need for a SSSI assent from Natural Resources Wales should also be considered. This will

		include an approved method statement that includes a suitable pollution prevention plan.
Species rich intact hedgerow: J2.1.1	In the north-east and south boundary of Site there was areas of species-rich native hedgerows located along the length of the canal (Photograph 14). Woody species consisted of hawthorn, dog rose, elder, holly, ivy, ash, sessile oak. Understory species consisted of broad buckler fern (*Dryopteris dialata)*, curly dock (*Rumex crispus)*, grey willow, common hogweed, bramble, bittersweet nightshade.	The hedgerows on Site are Priority Habitats (Welsh Government, 2016) and are important up the Site level. The works may involve the removal or degradation of this habitats. If hedgerows are to be removed this could cause a significant reduction in the ecological value of the hedgerow network, through habitat fragmentation. Furthermore, the works could indirectly affect the hedgerows through root damage/compaction during construction.
Species poor intact hedgerow: J2.1.2	The northern boundary is a species poor native hedgerow. (Photograph 15) This area was dominated by a bramble hedge. The ground flora consisted of; common nettle, spear thistle, bramble, broadleaf dock, cow parsley, cocksfoot, dandelion and blackthorn saplings.	
Arable field: J1.1	Arable field with unknown crop. (Photograph 16)	This habitat is of negligible ecological importance. Works will involve complete removal of this habitat. No

		adverse effects on this habitat are anticipated.

3.5 Species

Below is a summary of the likely status of relevant protected and notable species within 2 km of the Site.

3.5.1 Badger

Wern

Nine records of badger were provided by the records centre (Aderyn, 2022), from within 2km off the Site. The closest was a sighting of a badger 455m north-west of the Site recorded in 2019. No badger sett records were returned within 30m of the Site.

No conclusive evidence was identified during the survey (such as setts, latrines or footprints). Numerous mammal paths were located along the southern boundary of the Site.

The Site provides suitable foraging habitat with suitable sett building habitat in the wider landscape. Due to the potential to support badgers and the biological records showing activity in the local area. Removal of these habitats could potentially cause adverse effects through sett destruction or degradation of suitable habitat.

If the proposals include excavation or the use of large machinery indirect effects such as injury during the construction phase could occur. If additional lighting is required (temporary or permanent), this could also indirectly affect badgers through disturbance.

Carreghofa

Seven records of badger were provided by the records centre (Aderyn, 2022), form within 2km of the Site. The closest record was a badger sighting 1.2 km north of the Site in 2018.

Two setts were located in the hedgerow understorey forming the north-east boundary of the site. Snuffle holes and an old latrine were noted near the setts.

The hedgerow margins on Site and grassland in the wider landscape provide suitable sett building and foraging habitat for badgers. Removal of these habitats could cause direct adverse effects.

If the proposals include excavation or the use of large machinery indirect effects such as injury during the construction phase could occur. If additional lighting is required (temporary or permanent), this could also indirectly affect badgers through disturbance.

Red Lane

Eleven records of badger were provided by the records centre (Aderyn, 2022), from within 2km off the Site. The closest was a sighting of a badger 690 m south-west of the Site recorded in 2015.

3.5.2 Bats

Wern

Ten records of bat species were returned by the biological records centre (Aderyn, 2022) including records of the following species:

- Soprano pipistrelle (*Pipistrellus pygmaeus*);
- Brandt's bat (*Myotis brandtii*);
- Lesser horseshoe bat (*Rhinolophus hipposideros*)
- Brown long eared bat (*Plecotus auritus*); and
- Noctule (*Nyctalus noctula*).

The closest record to the Wern Site was a sighting of a Soprano pipistrelle roost in the gable end of a private residential building 255 m east of the Site in 2015.

Carreghofa

Fifteen records of bat species were returned by the biological records centre (Aderyn, 2022) including records of the following species:

- Soprano pipistrelle;
- Daubenton's bat (*Myotis daubentonii);*
- Whiskered bat (*Myotis mystacinus*);
- Lesser horseshoe bat;
- Brown long eared bat; and
- Noctule.

The closest record to the Carreghofa Site was a sighting and bat recording of a Daubenton's bat foraging 915m east of the Site in 2014.

Red Lane

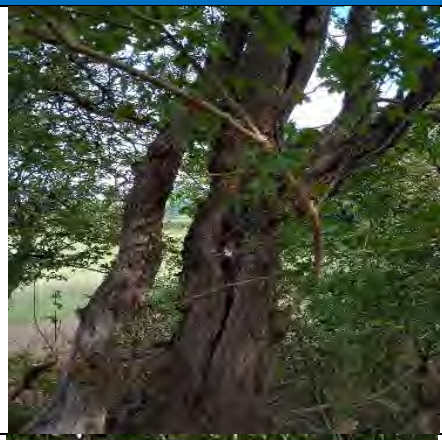
Thirty-eight records of bat species were returned by the biological records centre (Aderyn, 2022) including records of the following species:

- Soprano pipistrelle;
- Brandt's bat;
- Whiskered bat
- Lesser horseshoe bat :
- Brown long eared bat ; and
- Noctule.

The closest record to the Red lane Site was a sighting and bat recording of a Soprano pipistrelle foraging 179 m east of the Site in 2013.

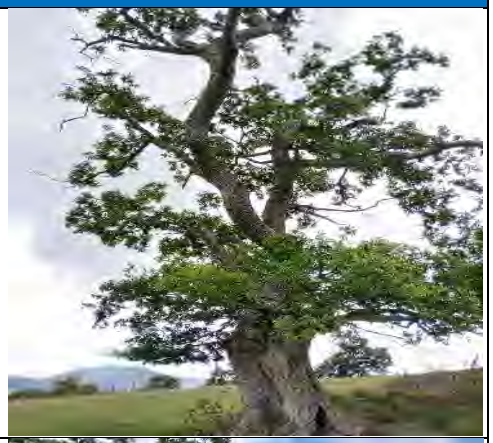
A PRA and GLTA were undertaken at the Wern and Carreghofa Sites. All high, moderate and low potential trees have been recorded in Table 6 below.

Table 6 - Preliminary Bat Roost Assessment – Wern

Tree	Description	Suitability for Roosting Bats	Suitability for Hibernating Bats	Photographs
T1	Hawthorn located in the small copse to the south of Site. NGR: SJ 25715 12968	A small rot hole was located 2m up on the trunk on the southern aspect. This PRF has the potential to support a small number of crevice dwelling bats. **Low potential to support roosting bats**.	The PRFs on the tree would not typically be regarded as providing the protection from weather or provide the favourable temperature and humidity conditions required during the winter period. However, due to the uncertain nature of hibernation occurring with the *Pipistrellus* genus unexpected incidents of hibernation could occur (Middleton, 2019). **Low potential to support hibernating bats**.	
T2	Mature sessile oak located in the small copse to the south of Site. There was a dead branch with various cracks noted at 10m on the eastern side of the tree. NGR: SJ 25716 12975	The dead branch and extending cracks provide suitable habitat to support a small number of crevice dwelling bats **Low potential to support roosting bats**.	The PRFs on the tree would not typically be regarded as providing the protection from weather or provide the favourable temperature and humidity conditions required during the winter period. However, due to the uncertain nature of hibernation occurring with the *Pipistrellus* genus unexpected incidents of hibernation could occur (Middleton, 2019). **Low potential to support hibernating bats**.	

Tree	Description	Suitability for Roosting Bats	Suitability for Hibernating Bats	Photographs
T3	A mature ash located small copse to the south of the Site. There was a cavity noted on a branch at 6m on the south-western aspect of the tree. There was also a cavity noted on the trunk at 4m on the north-eastern aspect of the tree. MGR: SJ 25711 12977	The branch cavity has the suitability to support a small number of crevice dwelling bats. **Low potential to support roosting bats**.	The PRFs on the tree would not typically be regarded as providing the protection from weather or provide the favourable temperature and humidity conditions required during the winter period. However, due to the uncertain nature of hibernation occurring with the *Pipistrellus* genus unexpected incidents of hibernation could occur (Middleton, 2019). **Low potential to support hibernating bats**.	
T4	A veteran oak in the centre of Site. This have NGR: SJ 25717 13007	Multiple feature on all aspects of the tree. Due to the high number of PRF's on the tree, this has the potential to support high number of crevice dwelling bats. **High potential to support roosting bats.**	Due to the high number of PRF's on the tree, that may lead to larger cavities it is considered likely that hibernating bats may utilise this tree. **Moderate potential to support hibernating bats**.	

Tree	Description	Suitability for Roosting Bats	Suitability for Hibernating Bats	Photographs
T5	Mature oak located in the north of Site. NGR: SJ 25685 13054	Multiple features located throughout the tree. Due to the high number of PRF's on the tree, this has the potential to support high number of crevice dwelling bats. **High potential to support roosting bats.**	Due to the high number of PRF's on the tree, that may lead to larger cavities it is considered likely that hibernating bats may utilise this tree. **Moderate potential to support hibernating bats**.	
T6	Mature oak on the south-eastern aspect of Site. NGR: SJ 25758 12996	Multiple features located throughout the tree. Due to the high number of PRF's on the tree, this has the potential to support high number of crevice dwelling bats. **High potential to support roosting bats.**	Due to the high number of PRF's on the tree, that may lead to larger cavities it is considered likely that hibernating bats may utilise this tree. **Moderate potential to support hibernating bats**.	

Tree	Description	Suitability for Roosting Bats	Suitability for Hibernating Bats	Photographs
T6	Mature oak on the south-eastern aspect of Site. NGR: SJ 25758 12996	Multiple features noted on all sides of the tree. Due to the high number of PRF's on the tree, this has the potential to support high number of crevice dwelling bats. **High potential to support roosting bats.**	Due to the high number of PRF's on the tree, that may lead to larger cavities it is considered likely that hibernating bats may utilise this tree. **Moderate potential to support hibernating bats**.	
T7	Mature oak on the south-eastern aspect of Site. There were multiple features noted on all sides of the tree. NGR: SJ 25768 12973	Multiple features noted on all sides of the tree. Due to the high number of PRF's on the tree, this has the potential to support high number of crevice dwelling bats. **High potential to support roosting bats.**		

Tree	Description	Suitability for Roosting Bats	Suitability for Hibernating Bats	Photographs
T8	Mature oak located just outside the Site boundary. There were multiple trunk cavities noted at various heights on the western aspect, facing the Site. NGR: SJ 25835 12950	The cavities in the tree have the potential to support a moderate number of crevice dwelling bats. **Moderate to high potential.**	The PRFs on the tree would not typically be regarded as providing the protection from weather or provide the favourable temperature and humidity conditions required during the winter period. However, due to the uncertain nature of hibernation occurring with the *Pipistrellus* genus unexpected incidents of hibernation could occur (Middleton, 2019). **Low potential to support hibernating bats**.	

Table 7 - Preliminary Bat Roost Assessment – Carreghofa

Reference	Description	Suitability for Roosting Bats	Suitability for Hibernating Bats	Photographs
T1	Mature oak located in the north central aspect of the Site. There were multiple prf's noted around all aspects of the tree. NGR: SJ 25485 20454	There is a rot hole located on the trunk at 6m on the south side of the tree. A broken branch with cracks was located at 3 on the south western side of the tree. A branch cavity was noted at 6m on the north-western side if the tree and a split branch was located 4m on the northern aspect of the tree. Due to the moderate number of PRFs that are suitable to support a number of crevice dwelling bats this has moderate to high bar roost potential. **Moderate to High potential to support roosting bats**	The PRFs on the tree would not typically be regarded as providing the protection from weather or provide the favourable temperature and humidity conditions required during the winter period. However, due to the uncertain nature of hibernation occurring with the *Pipistrellus* genus unexpected incidents of hibernation could occur (Middleton, 2019). **Low potential to support hibernating bats**.	

Reference	Description	Suitability for Roosting Bats	Suitability for Hibernating Bats	Photographs
T2	Mature oak located in the north central aspect of the Site. There were two dead branches one located at 4m on the south-eastern aspect of the tree and the other at 6m on the south-western side of the tree. NGR: SJ 25239 20462	The dead branches are suitable to support a small number of crevice dwelling bats. **Moderate potential to support roosting bats.**	The PRFs on the tree would not typically be regarded as providing the protection from weather or provide the favourable temperature and humidity conditions required during the winter period. However, due to the uncertain nature of hibernation occurring with the *Pipistrellus* genus unexpected incidents of hibernation could occur (Middleton, 2019). **Low potential to support hibernating bats**.	
T3	A mature oak located out with the Site boundary. The whole trunk was covered in thick Ivy. NGR: SJ 25183 20446	The ivy on the tree is suitable to support a small number of crevice dwelling bats. The thick ivy coverage on the trees could be covering potential PRFS such as other holes and crevices on the trunk. **Moderate potential to support roosting bats**	The PRFs on the tree would not typically be regarded as providing the protection from weather or provide the favourable temperature and humidity conditions required during the winter period. However, due to the uncertain nature of hibernation occurring with the *Pipistrellus* genus unexpected incidents of hibernation could occur (Middleton, 2019).	

Reference	Description	Suitability for Roosting Bats	Suitability for Hibernating Bats	Photographs
			Low potential to support hibernating bats.	
T4	Dead willow located north-west of the site. The trunk was covered in ivy. NGR: SJ 25108 20395	The ivy on the tree is suitable to support a small number of crevice dwelling bats. The thick ivy coverage on the trees could be covering potential PRFS such as other holes and crevices on the trunk. **Low potential to support roosting bats.**	The PRFs on the tree would not typically be regarded as providing the protection from weather or provide the favourable temperature and humidity conditions required during the winter period. However, due to the uncertain nature of hibernation occurring with the *Pipistrellus* genus unexpected incidents of hibernation could occur (Middleton, 2019). **Low potential to support hibernating bats**.	N/A
T5	Mature sycamore tree located outside? the site boundary to the South-West. The tree was covered in ivy. NGR: SJ 25165 20364	The ivy on the tree is suitable to support a small number of crevice dwelling bats. **Low potential to support roosting bats**		**N/A**

Reference	Description	Suitability for Roosting Bats	Suitability for Hibernating Bats	Photographs
T6	Mature oak located outside? the site boundary to the South-West. The tree was covered in ivy and a dead branch was located at 4m on the south west side of the tree. NGR: SJ 25178 20364	The ivy and dead branch is suitable to support a small number of crevice dwelling bats. The thick ivy coverage on the trees could be covering potential PRFS such as other holes and crevices on the trunk. **Low potential to support roosting bats.**	The PRFs on the tree would not typically be regarded as providing the protection from weather or provide the favourable temperature and humidity conditions required during the winter period. However, due to the uncertain nature of hibernation occurring with the *Pipistrellus* genus unexpected incidents of hibernation could occur (Middleton, 2019). **Low potential to support hibernating bats**.	

3.5.3 Great Crested Newt and Common Amphibians

Wern

No records of great crested newt (GCN) were returned by the biological record centre (Aderyn, 2022) from within 2 km of the Site. One record of common amphibian was returned by the biological records centre (Aderyn, 2022).

The closest record to the Wern site was of a common frog which was 1.1 km south-east of the Site in 2019.

A reed bed was present at Site which has the potential to provide suitable breeding habitat for GCN.

The canal provides suitable habitat breeding and foraging habitat for amphibians. The terrestrial habitat located within the Site is sub-optimal for GCN as it is grassland managed by livestock. There was a significant amount of runoff into the canal from the agricultural field next to site at (TN1 – Figure 3), resulting in poor water quality and biodiversity at this section of the canal.

Due to the lack of records and the suboptimal nature of both the reedbed and terrestrial habitat on Site, adverse effects are considered unlikely for GCN and other amphibians. However due to the direct link to the Site to the canal there is the potential to have adverse effects to GCN and other amphibians via direct pollution from Site.

Carreghofa

Two records of great crested newt (GCN) were returned by the biological record centre (Aderyn, 2022) from within 2 km of the Site. There were eleven records of common amphibians returned by the biological record centre (Aderyn, 2022) including smooth newt (*Lissotriton vulgaris)*, common toad (*Buffo buffo)* and common frog (*Rana temporaria*). The closest being a record of a records of a common frog 1.1 km north- east of the Site in 2018.

The closest record of a GCN to the Site was of a sighting 1.3 km north of the Site in 2019.

The canal, hedgerow margins and marshy grassland at the Site could provide suitable foraging habitat for GCN and suitable breeding and foraging habitat for other amphibians.

The terrestrial habitat was dominated by an arable field. This habitat would provide poor foraging habitat due to high agricultural activity at Site.

Due to the suboptimal nature of terrestrial habitat on Site, adverse effects are considered unlikely for GCN and other amphibians. However due to the direct link to the Site to the canal

there is the potential to have adverse effects to GCN and other amphibians via direct pollution from Site. Adverse effects (injury) to common amphibians is possible during the construction phase.

Red Lane

Three records of great crested newt (GCN) were returned by the biological record centre (Aderyn, 2022) from within 2 km of the Site. There were five records of common amphibians returned by the biological record centre (Aderyn, 2022) including palmate newt (*Lissotriton helveticus*) and common toad (*Buffo buffo)*. The closest being a record of a sighting of a common toad 790 m south-west of the Site in 2012. The closets record of GCN was 1.1 km east of the Site recorded in 2019.

3.5.4 Hazel Dormouse

Wern

No records of hazel dormouse were provided by the biological records centre (Aderyn, 2022) from within 2 km of the Site.

The hedgerows located along the Site boundaries provide suitable foraging and nesting habitat for dormice. However, the lack of connecting woodland and hedgerow margins provide sub optimal commuting habitat for hazel dormice.

Due to the sub optimal conditions and lack of biological records no adverse effects are considered likely to dormouse.

Carreghofa

No records of hazel dormouse were provided by the biological records centre (Aderyn, 2022) from within 2 km of the Site.

The hedgerows located along the Site boundaries provide suitable foraging and nesting habitat for dormice. Furthermore, the extended site provides an extensive network of hedgerows, providing dormice with habitat connectivity to the wider landscape.

If the works require the removal or degradation of the hedgerow margins there is the potential to cause adverse effects to dormouse.

Red Lane

No records of hazel dormouse were provided by the biological records centre (Aderyn, 2022) from within 2 km of the Site.

3.5.5 Hedgehog

Wern

One record of hedgehog was returned by the biological records centre (Aderyn, 2022), within 2km of the Site. This being a sighting 1.5 km north of the Site in 2019.

The habitats within the Site are of moderate ecological value to hedgehogs due to the presence of foraging, commuting, and hibernation habitat such as debris piles, hedgerows and scrub.

Hedgehogs are likely to pass through the Site, therefore there is the potential to cause indirect adverse effects to commuting/foraging hedgehog such as injury during the construction phase.

Carreghofa

Four records of hedgehog were returned by the biological records centre (Aderyn, 2022). The closest record was located 375m east of the Site in 2019.

The habitats within the Site are of moderate ecological value to hedgehogs due to the presence of foraging, commuting, and hibernation habitat such as tall ruderal, hedgerows and scrub.

Hedgehogs are likely to pass through the Site, therefore there is the potential to cause indirect adverse effects to commuting/foraging hedgehog such as injury during the construction phase.

Red Lane

Twelve records of hedgehog were returned by the biological records centre (Aderyn, 2022), from within 2km of the site. The closest record was located 490m south-west of the Site in 2019.

3.5.6 Reptiles

Wern

One record of reptiles was returned by the biological records centre (Aderyn, 2022), from within 2 km of the Site. This was a sighting of a grass snake (*Natrix helvetica)* 1.2 km south of the Site.

During the survey a log pile (TN2 - Figure 3) was noted in the north-western aspect of the Site. This has the potential to support resting and hibernating reptiles. Removal of this feature has the potential to cause adverse effects to reptiles if present.

The swamp and hedgerow margins within the Site could also provide suitable foraging and hibernation habitat for reptiles. If areas of vegetation in the above habitats are to be removed in the reptile active season (March to October) direct adverse effects (such as injury or death) to reptiles are possible.

Carreghofa

The biological records centre (Aderyn, 2022) returned 24 records of reptiles from within 2 km of the survey Site. These included records of common lizard (*Zootoca vivipara*), grass snake (*Natrix helvetica)* and slow worm (*Anguis fragilis*). The nearest record was that of a grass snake located 150 m north-east of the Site in 2015.

There was a reptile mat noted east of the Site located along the canal at Carreghofa bottom loch (TN1 – Figure 4), placed by the Canal and Rivers Trust indicating previous surveys have been complete.

The tall ruderal, marshy grassland and hedgerow margins may provide suitable foraging and refuge for reptiles. If areas of vegetation in the above habitats are to be removed in the reptile active season (March to October) direct adverse effects (such as injury or death) to reptiles are possible.

Red Lane

The biological records centre (Aderyn, 2022) returned 10 records of reptiles from within 2 km of the survey Site. This includes records of grass snake (*Natrix helvetica)* and slow worm (*Anguis* fragilis). The nearest record was that of grass snake located 1.1 km east of the Site in 2012.

3.5.7 Otter and Water Vole

Wern

Three records of otter were returned by the records centre (Aderyn, 2022) from within 2 km of the Site. No records of water vole were returned by the biological records centre (Aderyn, 2022).

The closest record to site was an otter sighting 355m east of the site in 2019.

No evidence of otter or water vole was identified during the survey. The canal is likely to support commuting otters traveling to larger watercourses such as River Calan and River

Severn. But it is unlikely to support water vole as the banks of the canal were man made from reinforced steel piles and concrete, with a hard-standing path.

Due to the close proximity of the River Sever to all sites indirect effects (injury) to otter during the construction phase are possible. Due to the lack of evidence and records and the sub optimal habitat throughout Site adverse effects to water vole is negligible.

Carreghofa

No records of otter or water vole were returned by the records centre (Aderyn, 2022) from within 2 km of the Site.

No evidence of otter or water vole was identified during the survey. The canal is likely to support commuting otters to moving between larger watercourses River Calan and River Severn. But it is unlikely to support water vole as the banks of the canal were man made from reinforced steel piles and concrete, with a hard-standing path.

Due to the close proximity of the River Severn to all sites indirect effects (injury) to otter during the construction phase are possible. Due to the lack of evidence and records and the sub optimal habitat throughout site adverse effects to water vole is negligible.

Red Lane

Three records of otter were returned by the records centre (Aderyn, 2022) from within 2 km of the Site. No records of water vole were returned by the biological records centre (Aderyn, 2022).

The closets record to the site was an otter spraint 675 m south-east of the Site in 2017.

3.5.8 White-clawed Crayfish

Wern, Carreghofa and Red Lane

No records of white-clawed crayfish (WCC) were returned by the biological records centre (Aderyn, 2022).

No suitable habitat was located within the Site; therefore, it is deemed unlikely the works will adversely affect white-clawed crayfish.

3.5.9 Wild Birds

Wern

The biological records centre (Aderyn, 2022) returned records of 137 bird species from within 2 km of the Site. These included Schedule 1 species (HMSO, 1981) such as goshawk (*Accipiter*

gentilis), merlin (*Falco columbarius*), kingfisher (*Alcedo atthsis)* and peregrine (*Falco peregrinus*). Species of Principal Importance (Welsh Government, 2016) include starling (*Sturnus vulgaris*).

The closest record was a Kingfisher seen foraging along canal 165 m north-east of the Site.

The hedgerows and scattered trees located on Siteite are suitable for a variety of nesting birds.

Due to the specific breeding requirements of Schedule 1 birds and the absence of these habitats on Site, no adverse effects are anticipated.

If the works require any vegetation removal during nesting bird season (March-August), adverse effects to nesting birds through destruction of nests could occur.

Carreghofa

The biological records centre (Aderyn, 2022) returned records of 85 bird species from within 2 km of the Site. These included Schedule 1 species (HMSO, 1981) such as kingfisher and peregrine. Species of Principal Importance (Welsh Government, 2016) include starling, yellowhammer (*Emberiza citronella)* and kestrel (*Falco tinnunculus*).

The scattered trees, scrub, canal and hedgerows are suitable for a variety of nesting birds.

Due to the specific breeding requirements of Schedule 1 birds and the absence of these habitats on Site, no adverse effects are anticipated.

If the works require any vegetation removal during nesting bird season (March-August), adverse effects to nesting birds through destruction of nests could occur.

Red Lane

The biological records centre (Aderyn, 2022) returned records of 245 bird species from within 2 km of the Site. These included Schedule 1 species (HMSO, 1981)such as red kite (*Milvus milvus),* whooper swan (*Cygnus cygnus)* and red wing (*Turdus iliacus).* Species of Principal Importance (Welsh Government, 2016) include starling, herring gull (*Larus argentinus)* and song thrush (*Turdus philomelos).*

3.5.10 Protected Invertebrates

Wern

Eighty-three records of invertebrates were returned by local records centre (Aderyn, 2022). Records of Species of Principal Importance (Welsh Government, 2016) including knot grass (*Acronicta rumicis*) and shaded broad-bar (*Scotopteryx chenopodiata).*

The swamp, hedgerows and semi-improved neutral grassland are likely to support common and widespread invertebrate species. Any adverse effects to invertebrates are likely to be restricted to temporary displacement during construction.

Carreghofa

Three hundred and fifty-six records of invertebrates were returned by local records centre (Aderyn, 2022). Records of Species of Principal Importance (Welsh Government, 2016) including small heath (*Coenonympha pamphilus),* grey dagger (*Acronicta psi)* and cinnabar (*Tyria jacobaeae).*

The hedgerows, tall ruderal, marshy grassland and scrub are likely to support common and widespread invertebrate species. Any adverse effects to invertebrates are likely to be restricted to temporary displacement during construction.

Red Lane

One hundred and seventy-nine records of invertebrates were returned by local records centre (Aderyn, 2022). Records of Species of Principal Importance (Welsh Government, 2016) including small grey dagger (*Acronicta psi)* and cinnabar (*Tyria jacobaeae).*

3.5.11 Invasive Non-native Species

Wern, Carreghofa and Red Lane

No records of invasive species were returned by the biological record centre (Aderyn, 2022) from with 2 km of the Site.

No invasive species were recorded during the walkover surveys.

4. Recommendations

Following the initial surveys at the Site, the following recommendations for further survey effort and or mitigation measures have been made.

Table 4 Ecological Recommendations

Ecological Receptor	Recommendation
Montgomery Canal SAC/SSSI	A Habitats Regulations Assessment should be undertaken in advance of the works. The need for SSSI assent will also be considered during the HRA process. Best practice pollution prevention (including the use of spill kits and drip trays) measures should be adhered to at all times.
Habitats	All hedgerows and trees within the Site are to be given a buffer zone. The buffer zone should be at least as wide as the hedge is tall to ensure the majority of roots remain unaffected. Materials and machinery should not be stored along hedgerows or next to scattered trees, or on marshy grassland. If the scope of works includes the removal of hedgerows further survey efforts to include a hedgerow assessment survey and may require a hedgerow removal licence from the Local Planning Authority. Any removal or degradation of hedgerows should be replanted. We recommend that 1-1.2m high whips are planted (3 whips per metre) in a double row and included stock proof fencing to ensure adequate protection from browsing livestock. Hedgerow species should consist of an equal mix of: • 20% hazel (*Corylus avellana*); • 20% holly (*Ilex aquifolium*); • 20% hawthorn (*Crataegus monogyna*); • 20% blackthorn (*Prunus spinosa*); • 10% elder (*Sambucus nigra*); and, • 10% Dog rose (Rosa canina)
Roosting Bats	Trees that have been assessed as having high (**Wern – T4, T5, T6, & T7**) or moderate (**Carreghofa – T1, T2 & T3, Wern – T6**) potential to support roosting bats because of the

	presence of cavities, crevices or cracks will require further survey: If works (felling/pruning) are required to these trees; prior to felling an endoscope inspection should be undertaken to determine the presence or likely absence of bats in PRFs. If it is not possible to downgrade the potential of the trees to low or negligible following the endoscope inspection, then further emergence/re-entry surveys are likely to be required. Trees identified as having moderate potential to support roosting bats because of the presence of thick ivy or are considered unsuitable for an endoscope inspection (1861, 1862, 1864, and 1888) will require further survey: If works (felling/pruning) are required to these trees; prior to felling two emergence/re-entry surveys will be required to determine the presence or likely absence of bats in PRFs. At least one of these surveys should be a dawn re-entry survey. Endoscope inspections can be undertaken at any time of year; however, surveys undertaken between May and August are often most informative. Emergence/re-entry surveys must be undertaken between May and August (weather dependant). Emergence/re-entry surveys must be undertaken a minimum of 2 weeks apart. If a bat roost is identified during the surveys, a European Protected Species licence from NRW will be required before any works can commence. Where trees have been assessed as having negligible or low potential to support roosting bats no further survey effort is required (Collins, 2016).
Badger	Further badger surveys will be required at Carregohfa to check the activity of the two outlier setts prior to works commence. A prework check by an ecologist at Wern nature reserve should be complete a few weeks prior to works beginning to ensure no new activity at the site.
Dormice	Should small areas of vegetation require removal (less than $2m^2$) it may be possible to complete this under the supervision of a licensed ecologist. If larger areas of vegetation require removal, dormouse surveys of the hedgerow, scrub and woodland edge habitat may be required between March and November 2023 and a European Protected Species Licence acquired from Natural Resources Wales in advance of any works.

Reptiles and Common Amphibians	If removal of highlighted reptile features or vegetation (marshy grassland, scrub and hedgerow margins) is required, an Ecological Clerk of Works should be present prior to and during the works, to conduct checks for reptiles and common amphibians.
Terrestrial Mammals (Badgers, otter and hedgehogs)	Best practice measures such as placing mammal ramps in excavations should be adhered to, to avoid any mammals (and other wildlife) becoming trapped. If vegetation removal (scrub and hedgerow margins) is required, an ECoW should be present prior to and during the works, to conduct checks for hedgehog.
Wild Birds	Any vegetation removal should be undertaken outside of the nesting bird season (March to August inclusive) where possible. Where works within this season are unavoidable, the vegetation should be checked by an ecologist prior to clearance. The pre-works check should be undertaken as close to and no longer than 48 hours prior to the vegetation removal taking place. If nesting birds are present, a buffer will be implemented around the nest, and works cannot proceed in this area until the chicks have fledged.
Nocturnal Wildlife / Lighting	Additional lighting should be avoided. If additional lighting is a requirement (permanent and temporary) it should be reviewed by an ecologist prior to installation to assess the impacts to nocturnal wildlife.

This report and its conclusions are valid for a maximum period of two years from the survey date, unless there is a significant change to the status of the habitats on Site or surrounding landscape during this time.

5. References

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Appendices

Appendix 1 – Figures

Figure 1 – Site Boundary – Wern

Legend

Habitats

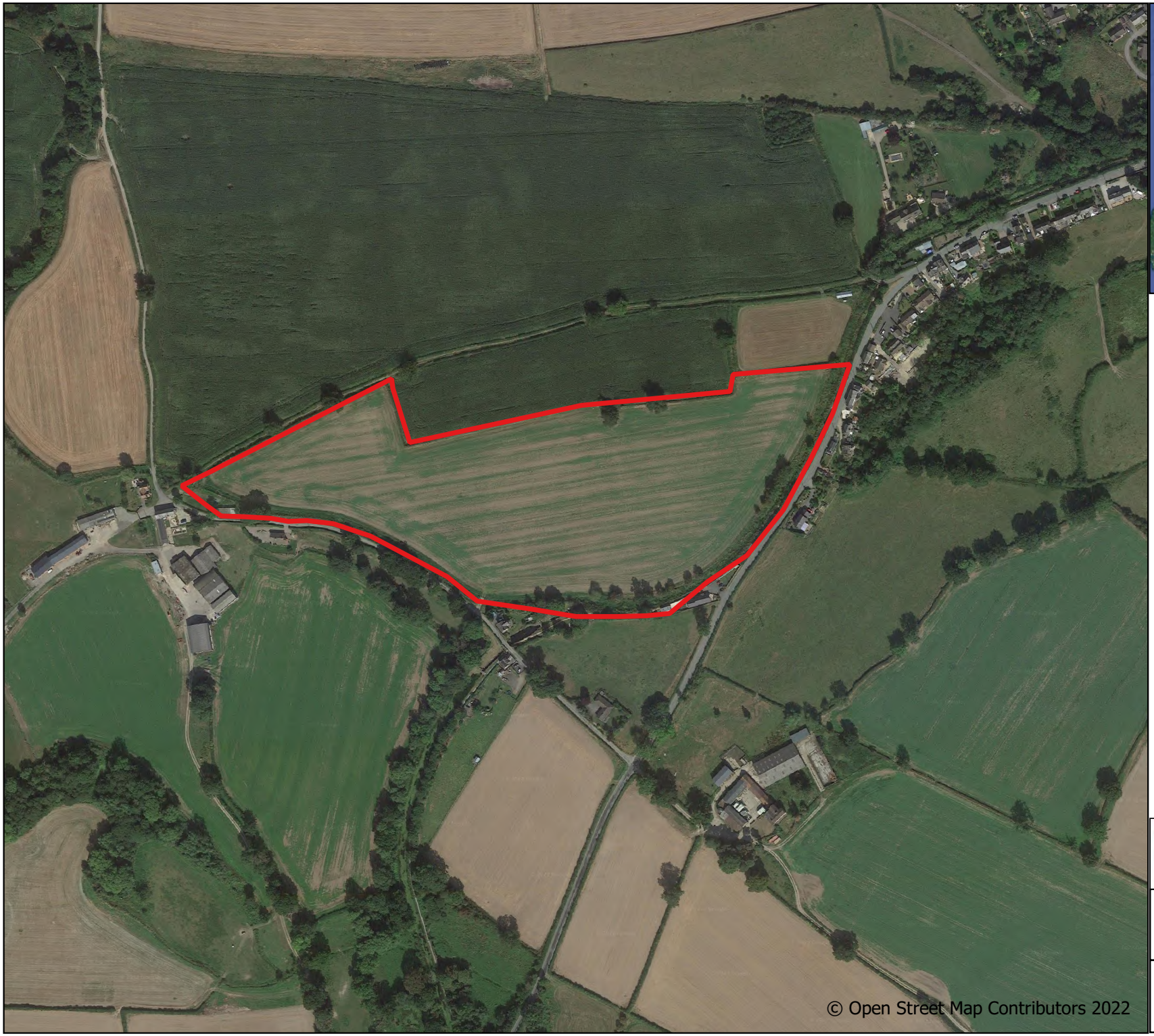
Site Boundary

0 20 40 m

N

APEM	P9809
Figure 1 Wern - Site Boundary Map	
Canals and Rivers Trust	18/11/2022

Figure 2 – Site Boundary – Carreghofa



Legend

Habitats

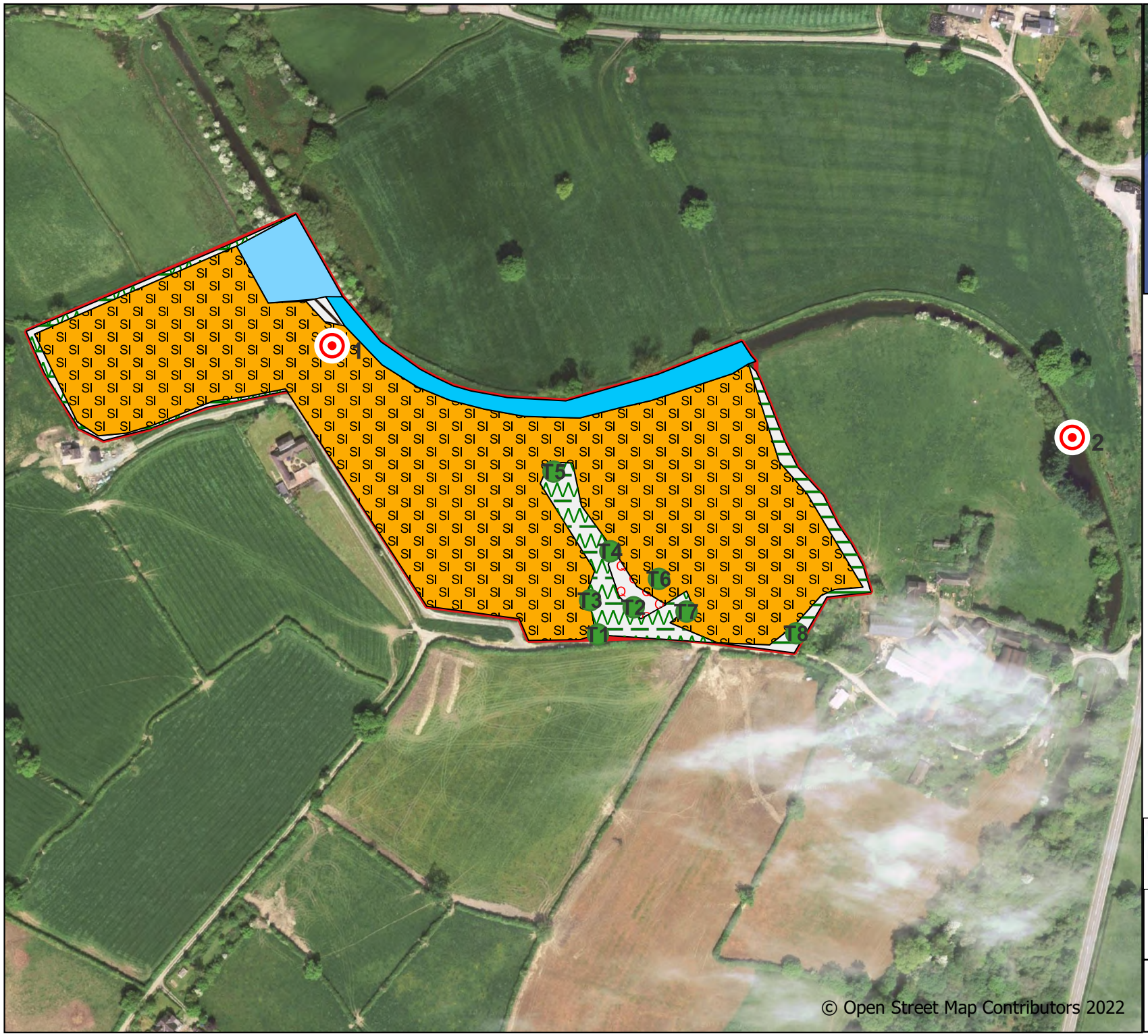
Site Boundary

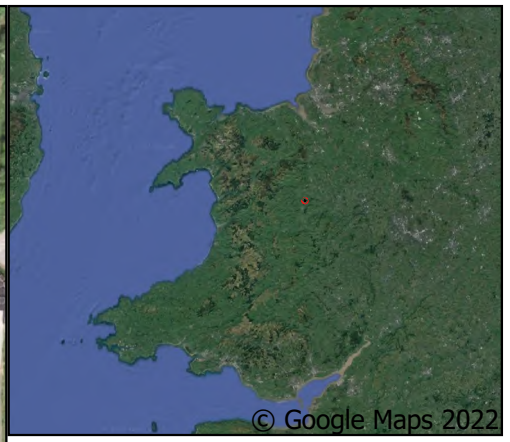
0 2040 m

N

APEM	P9809
Figure 2 Carreghofa - Site Boundary Map	
Canals and Rivers Trust	18/11/2022

Figure 3 – Phase 1 Habitat Map – Wern





Legend

Habitats

- Site Boundary
- B2.2 - Neutral grassland - semi-improved
- C3.1 - Other tall herb and fern - ruderal
- F1 - Swamp
- G1 - Standing water
- I2.1 - Quarry
- J2.1.1 - Intact hedge - native species-rich
- J2.1.2 - Intact hedge - species-poor
- J2.2.1 - Defunct hedge - native species-rich
- Bat Roost Potential Trees - T1 T2 T3 T4 T5 T6 T7 T8
- Target Note

0 20 40 m

N

APEM	P9809
Figure 3 Wern - PEA Habitat Map	
Canals and Rivers Trust	30/11/2022

(Overleaf)

Target Notes

1 Log pile – Reptile feature

2 Agricultural runoff

Figure 4 – Phase 1 Habitat Map – Carreghofa