



Land at Clywedog Rd South (Site 5b) Wrexham Industrial Estate

Ecological Survey Report

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1 Introduction

1.1 Background

Kingdom Ecology have carried out an ecological assessment of an approximate 6ha area of land located at Clywedog Road South at Wrexham Industrial Estate, LL13 9AE (National Grid Reference- SJ 370 489). The assessment has been carried out to identify any ecological constraints which should be considered during any future development of the site.

An initial desk study and an Extended Phase 1 Habitat Survey of the site was carried out on the 19th September 2017. Further surveys comprising of butterfly, great crested newt, breeding bird, bat activity, reptile and badger surveys were completed in Spring/Summer 2018.

Butterfly surveys were completed by Andy Whitfield (CEcol, CEnv). Andy has over 20 years' experience of undertaking butterfly surveys and assessments and is currently undertaking a part-time PhD at Lancaster University studying habitat requirements and management techniques for maintaining the high brown and pearl bordered butterfly populations in the South Lakes and Morecambe Bay limestone area

The remaining surveys were carried out by Richard Roe (BSc, MSc, MIEEM, CEnv). Richard has extensive experience of undertaking habitat and protected species surveys as a professional ecological consultant with over seventeen years' experience. Richard is also a licensed great crested newt and bat worker.

1.2 Purpose of Report

This report provides and outlines the findings of a desk study and field surveys undertaken in September 2017 and May- September 2018. Field surveys comprised of habitat and botanical surveys plus further specific bat, reptile, great crested newt, breeding bird, badger and butterfly surveys.

The field surveys and desk study aimed to map and identify broad habitat types at the site and to identify and evaluate species and habitats which would be either of importance in terms of their conservation value or afforded statutory legal protection.

Following a description of the desk study results, survey findings and an overall evaluation of habitats at the site, the report goes on to make recommendations for further works, mitigation and ecological enhancement measures where relevant.

1.3 Relevant Protected Species Legislation

1.3.1 Environment (Wales) Act 2016

Section 6 of the Environment (Wales) Act 2016 places a legal obligation on public bodies in Wales to 'maintain and enhance biodiversity' whilst carrying out their functions.

Section 7 of that Act requires Welsh Ministers to publish and maintain lists of species and types of habitats in Wales that are regarded as of 'principal importance' for the purpose of maintaining and enhancing that biodiversity.

This section of the Act replaces the biodiversity duty originally outlined in Section 42 of the NERC Act 2006.

The presence at any proposed development site, of any priority habitat or priority species identified on these lists is of importance within the local authority planning process.

1.3.2 Birds

All wild birds in England and Wales are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to intentionally kill, injure or take any wild bird, or take, damage or destroy the nest (whilst being built or in use) or its eggs.

1.3.3 Bats

All British bat species are fully protected under the Wildlife and Countryside Act 1981 (as amended) and through their inclusion in Schedule II of the Habitats Regulations 2010 which transpose Annex II of the Council Directive 92/43/EEC 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora ("EC Habitats Directive") which defines European protected species of animals.

British bats species are afforded further protection by the Countryside and Rights of Way Act 2000; and the Natural Environment and Rural Communities Act 2006.

Taken together, this legislation makes it an offence to:

- Intentionally or deliberately kill, injure or capture bats.
- Deliberately disturb bats, whether at roost or not.
- Damage, destroy or obstruct access to bat roosts.
- Possess or transport bats, unless acquired legally.
- Sell, barter or exchange bats.

A bat roost is interpreted as “any structure or place, which any wild bat uses for shelter or protection.” (Bat Conservation Trust 2012¹). A bat roost is protected whether or not bats are present at the time.

All species of British bat are considered a European Protected Species (EPS). The Conservation of Habitat and Species Regulations (2010) provide derogation against certain offences which could potentially affect an EPS through the EPS Licensing system.

1.3.4 Badger

Badgers are afforded protection under the Protection of Badgers Act (PBA) 1992; this act was introduced on welfare grounds. The Act is based primarily on the need to protect badgers from baiting and deliberate harm or injury. Badgers are not considered to be a species of any conservation concern. However the Act contains restrictions that apply more widely and can have implications where badgers and development come into conflict. All the following are considered criminal offences:

- to willfully kill, injure, take, possess or cruelly ill-treat a badger;
- to attempt to do so; or
- to intentionally or recklessly interfere with a sett.

Sett interference includes damaging or destroying a sett, obstructing access to a sett, and disturbing a badger whilst it is occupying a sett. It is not illegal, and therefore a licence is not required, to carry out disturbing activities in the vicinity of a sett if no badger is disturbed and the sett is not damaged or obstructed.

1.3.5 Reptiles

All native reptiles are protected in the UK under the Wildlife and Countryside Act 1981 (as amended). The law makes it an offence to intentionally kill, injure, sell or advertise to sell any of the six native species.

The smooth snake and the sand lizard are afforded further protection under the 1981 Act, by making it an offence, to possess, handle, capture or disturb them.

¹ Bat Conservation Trust (2012) 'Bat Surveys: Good Practice Guidelines 2nd Edition'

1.3.6 Butterflies

Approximately 400 invertebrate species are listed under Section 7 of the Environment (Wales) Act 2016. Section 6 of the same Act requires every public body in the exercising of its functions to 'have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity'. The presence at any proposed development site, of any priority species identified on these lists is of importance within the local authority planning process.

Survey at the site focused on the potential presence of Dingy skipper and Grizzled skipper which have both been recorded within the wider Wrexham Industrial Estate and are both listed under Section 7 of the Environment Act.

1.3.7 Great Crested Newt

The great crested newt (*Triturus cristatus*) receives full protection under the Wildlife and Countryside Act 1981 (as amended) and through their inclusion in Schedule II of the Habitats Regulations 2010. This legislation makes it an offence to:

- intentionally kill, injure or take a great crested newt;
- disturb a great crested newt;
- intentionally or recklessly damage, destroy, obstruct access to a breeding site or resting place of a great crested newt;
- sell, offer for sale, possess or transport a great crested newt for the purpose of sale.

The great crested newt is listed as a priority species under Section 7 of the Environment (Wales) Act 2016.

1.4 Evaluation Methodology

The results of the desktop and field surveys are used to identify ecological resources that may be of relevance to the proposals. The CIEEM *Guidelines for Ecological Impact Assessment* (CIEEM, 2006) sets out the recommended approach for valuing ecological resources, and for assessing the effects of proposed activities on them. It suggests that three types of value can be attributed to ecological resources – biodiversity value, community/social value and economic value, and that these should, as far as possible, be considered separately. CIEEM (2006) also advises that legal protection should be considered separately from value, and that the value of an ecological or nature conservation resource should be determined within a defined geographical context; it recommends that the following frame of reference be used:

- International
- UK
- National
- Regional
- County or Metropolitan
- District (or Unitary Authority, City or Borough)
- Local or Parish
- Within zone of influence only (this may be the project site or a larger area)

Designated sites (e.g. SSSIs, SPAs etc.) are generally straightforward to evaluate in relation to this frame of reference. Evaluation of other habitats and species needs to take into consideration a range of criteria, such as their rarity, diversity levels, population sizes and trends, whether they are replaceable or 're-creatable' (for habitats) etc. Appropriate criteria are proposed and discussed in various documents, such as in *A Nature Conservation Review* (Ratcliffe, 1977)², *Guidelines for the selection of biological SSSIs* (JNCC, 1989)³, *Local Sites* (Defra, 2006⁴; Wales Biodiversity Partnership 2008⁵) and also in local and national Biodiversity Plans (BAPs) including Species and Habitat Action Plans (SAPs and HAPs)(see Anon, 1995 for UK BAP)⁶.

Species may be evaluated by reference to their rarity and status in the national or local context. In addition to protected species, rare species, as defined in the Red Data Books/Red Lists/Scarce species lists and in the national and local Biodiversity Action Plans, are recognised to hold value.

Section 6 of the Environment (Wales) Act 2016 places a legal obligation on public bodies in Wales to 'maintain and enhance biodiversity' whilst carrying out their functions.

² Ratcliffe, D.A. 1977. *A Nature Conservation Review*. Cambridge University Press.

³ JNCC, 1989. *Guidelines for the selection of Biological SSSIs*. Nature Conservancy Council, Peterborough.

⁴ DEFRA 2006. *Local Sites Guidance on their Identification, Selection and Management*

⁵ Wales Biodiversity Partnership (2008) *Guidelines for the Selection of Local Sites in Wales*, <http://www.biodiversitywales.org.uk/>

⁶ Anon, 1995. *Biodiversity: The UK Biodiversity Steering Group Report*. Vol. 2. Action Plans. HMSO.

Section 7 of that Act requires Welsh Ministers to publish and maintain lists of species and types of habitats in Wales that are regarded as of 'principal importance' for the purpose of maintaining and enhancing that biodiversity.

The conservation status of declining British birds has been defined in the *Birds of Conservation Concern Report 2015* (Eaton et al. 2015)⁷; where appropriate, this assigns bird species to the Red or Amber list of birds of either high or medium conservation concern, according to a range of defined criteria.

⁷ Eaton et al (2015) *The Population Status of Birds in the UK, Channel Islands and the Isle of Man*, British Birds

2 Field Survey Methods

2.1 Survey Aims and Objectives

The survey aim was to assess the site as to its ecological importance by assessing the value of habitats present and their suitability to support any protected or notable species. The purpose of this was to highlight any ecological constraints associated with future development proposals.

Field survey comprised of an initial Extended Phase 1 Habitat survey, this included an assessment of habitats at the site in terms of their suitability to support any other protected species including breeding birds, badgers, bats, great crested newt, reptiles and notable invertebrates.

Following on from the initial Extended Phase 1 Habitat survey, further targeted surveys were completed during the 2018 field season to determine the likely presence/absence and importance of the site for breeding birds, badgers, bats, great crested newt, reptiles and notable butterflies.

Species that are considered unlikely to be significantly affected by the proposed development, even if known to be present in the general vicinity, were 'scoped out' of the assessment.

2.2 Extended Phase 1 Habitat Survey

2.2.1 Methods

An Extended Phase 1 Habitat Survey of the study site was undertaken on the 19th September 2017 with update visits to key habitats carried out June-August 2018. Survey was carried out following standard methodologies as described in the '*Handbook for Phase 1 Habitat Survey - a technique for environmental audit*' (JNCC, 2004⁸).

⁸ JNCC (2004) '*Handbook for Phase 1 Habitat Survey - a technique for environmental audit*'

The aims of the Extended Phase 1 Habitat Survey were to:

- identify and map all areas of semi-natural habitat within the study area;
- provide a botanical description of the semi-natural habitats surveyed;
- identify areas or habitats that are of particular ecological interest for nature conservation and which require more detailed investigation;
- provide additional information regarding incidental observations of protected species and the potential of habitats to support such species.

A habitat map was produced and lists of dominant or notable vascular plant species were recorded in each of the major habitat types where relevant.

2.3 Reptile Survey

2.3.1 Overview

The initial site walkover survey carried out in September 2017 identified the site as supporting suitable habitat for reptiles with areas of bramble scrub, tall grassland and occasional areas of more open habitat providing potential basking sites.

Further reptile surveys were carried out during the 2018 field season comprising of artificial refugia searches and visual surveys. Surveys were carried out following methods described in the Herpetofauna Workers' Manual (JNCC, 2003) and Froglife Advice Sheet 10, 'Reptile Surveys' (Froglife 1999).

2.3.2 Artificial Refugia Survey

Reptiles must bask in the morning and evening before becoming active. Artificial refugia surveys take advantage of this need by providing artificial basking and sheltering habitat. The artificial refugia used for this survey comprised of black corrugated roofing sheets measuring 0.5m x 0.5m.

80 artificial refugia were deployed on the 20th May 2018 in suitable locations and habitats across the site. Refugia deployment focusing on areas of open grassland habitats within the centre of the site.

The refugia were allowed to bed down for 3 weeks before being checked for the presence of reptiles. The refugia survey was carried out between 08:00-11:00 and 16:00-20:00. Survey was carried out throughout the summer 2019.

Survey took place during periods of sunshine with temperatures recorded between 14 and 21°C. Survey avoided taking place during wet or windy weather conditions.

2.3.3 Visual Survey

Visual surveys were undertaken in conjunction with and in addition to the artificial refugia checks. These surveys involved slowly walking across the study area during suitable weather conditions and watching for basking reptiles and searching beneath other refugia such as logs, stones, discarded corrugated sheeting etc for sheltering reptiles.

2.4 Bird Survey

2.4.1 Methods

Bird surveys comprised of three walked transects covering all habitat types at the site. The survey used an adaptation of the Common Birds Census (CBC) methodology (Bibby et al, 1992) as used by the British Trust for Ornithology's (BTO) Common Bird Census. The surveys involved recording all birds observed, their locations and activity/behaviour.

Bird surveys were carried out during the mornings and started within an hour and a half of sunrise. Surveys were carried out under suitable calm, dry weather conditions with unrestricted visibility.

The survey consisted of three survey visits during the bird breeding period (mid-March to mid-July) with at least 10 days between each survey visit. Surveys were conducted on the 8th May, 21st May and the 12th June 2018. Survey data was supplemented by additional bird observations recorded during other ecological surveys undertake at the site throughout spring/summer 2018.

The transect route passed within 50m of all habitats at the site allowing all habitats to be sampled. High-powered binoculars were used to assist identification of bird species.

Observations (of song, call or sighting) were marked on the survey map using British Trust for Ornithology (BTO) two-letter species codes. Following the completion of surveys, the survey maps were analysed and the breeding status of recorded birds was split as follows:

Breeding (B)- This category includes birds confirmed as breeding or considered likely to be breeding at the site. It is assigned through a combination of registrations recorded on two or more survey visits including the following criteria:

- male in song (on the ground or in flight);
- male and/or female calling (on the ground or in flight);
- male and/or female repeatedly calling (on the ground or in flight);
- aggressive encounters between species (including the same species) perceived to be in the defence of territory, nest or young (on the ground or in flight);
- a nest (with or without an adult in attendance) or man-made structure (e.g. nest box) containing either eggs or young;
- adult bird/s carrying nesting material or entering/leaving nesting-site with nesting material;
- adult bird/s carrying food or faecal sack or entering/leaving nesting-site with food or faecal sack; and
- calling and/or silent juveniles with or without parents in attendance.

Possible breeding (P) -A combination of registrations recorded on a single survey visit including the above criteria and the following:

- pair observed in suitable habitat in breeding season; and
- building or excavating a nest site.

Non-breeding (NB) -One or more registration (not including the criteria listed above) recorded on one or more survey visit including the following criteria:

- adult bird/s carrying or foraging for food not presumed to be for young/juveniles; and
- species observed during the breeding season but not in habitat deemed to suitable for nesting.

The conservation status of all species detected was recorded according to their position in the BoCC3 Red and Amber lists, and as listed in Section 7 of the Environment (Wales) Act 2016.

2.4.2 Constraints

The recognised survey window for breeding birds is mid-March to mid-June. The first survey visit was not carried out until early-May. However had any early breeders nested on site, the first visit would still have been sufficiently early as to have detected their presence. Given this, the delay in commencement of the survey is not considered to have adversely affected the survey results obtained.

2.5 Bat Surveys

The initial site walkover survey carried out in September 2017 identified the site as supporting suitable foraging habitat for bats with areas of woodland and scrub present around the fringes of the site.

Consequently, further bat activity transects and an automated detector survey were completed at the site during the 2018 field season.

The bat activity transects surveys comprised of four walked activity transects completed each month May-August 2018. Survey aimed to identify and evaluate bat assemblages present and to assess and evaluate existing habitats in terms of their importance to local bat populations.

2.5.1 Bat Activity Transects

The survey objectives were to identify and evaluate bat foraging and commuting habitat at the site and to identify and evaluate bat species assemblages present.

Surveys were based upon recommendations provided in the Bat Conservation Trust's *Bat Surveys: Good Practice Guidelines* 3rd Edition (BCT 2016)⁹.

Transect Methodology

Bat activity transect surveys were targeted at identifying the type and intensity of bat activity, both spatially and temporally, as well as the bat species present. The survey also aimed to assess the relative abundance of species present and the importance of different habitat features/areas.

⁹ Bat Conservation Trust (2016) Bat surveys – Good Practice Guidelines 3rd Edition. Bat Conservation Trust, London.

Surveys were carried out along a pre-determined transect route, devised to encompass a wide range of habitats within the assessment area including grassland, scattered scrub, woodland and bramble scrub habitats.

Transects were interspaced by four 'listening station' stops or 'point counts', where the surveyor would pause for four minutes to record levels of bat activity, including the number and species of bat, number of bat passes (discrete bursts of echolocation) of each species, and activity types i.e. commuting, foraging and/or social calling. Each listening station was visited twice during each survey visit. An average of the number of the number of bat passes at each point count location was taken for the entire survey period to produce an index of activity. Where constant bat activity was recorded at a point count location, 20 bat passes were attributed. The bat activity index was scored as follows:

- 0.1-3 passes- Low bat activity
- 3.1-7 passes- Moderate bat activity
- 7.1-12 passes- High bat activity
- 12.1-20 passes- Very high bat activity

Information on incidental bat activity and species encountered were also target noted when walking between point counts, including direction of bat travel and bat use of features in the landscape.

Notes on weather conditions and survey times were also recorded. Surveys were undertaken during suitable weather conditions i.e. >8°C with minimal rainfall and wind. Weather conditions during survey are shown in Table 7 in the Appendix.

Surveys were carried out using heterodyne and time expansion bat detector (Anabat Walkabout) combined with an Anabat Express frequency division bat detector to record calls in real time in a zero crossing format to permit further call analysis with AnalookW software.

Four dusk transects were walked in total on the 20th May, 12th June, 30th July and 22nd August. This level of survey effort allowed assessment of the site across the main bat activity season.

Dusk transect surveys commenced within 10 minutes of sunset and continued up to two hours after thus coinciding with the peak periods of bat activity.

The transect route followed a circular route taking in all habitat types at the site.

2.5.2 Automated Detector Survey

An automated bat detector (Titley Anabat Express) was deployed at the site between the 2nd and the 12th June 2018 in order to provide further information on bat species present.

2.5.3 Evaluation of Bat Habitats

Using the activity and automated survey results, the site was assessed in terms of its value as foraging and commuting habitat for bats.

The process for determining this evaluation is based upon a scoring system presented at the Mammal Society/CIEEM *Advances in Ecological Impact Assessment for Mammals Symposium 2007* (Wray *et al.* unpublished).

This scoring system assesses the following factors when determining the value of a site for bats:-

- Rarity of species present
- Numbers of bats of each species encountered
- Presence of roosts nearby
- Landscape characteristics

Each of these factors is examined and allocated a 'point score'. The points are then totalled to produce a value for the site based upon the CIEEM *Guidelines for Ecological Impact Assessment* geographical frames of reference as described in Section 1.4 and shown in Table 1 below.

Table 1 - Bat habitat evaluation - Assessment score in relation to ecological evaluation category

Score	Evaluation Category
0-10	Site only
11-20	Locally important
21-30	Important at District Level
31-40	Important at County Level
41-50	Regionally important
>50	Nationally/internationally important

Each individual factor is determined and scored as follows:-

Rarity of Species

The rarity of each species encountered on site is determined using the JNCC's UK Mammals: *Species Status and Population Trends* (Battersby 2005¹⁰). This document provides an estimate of population number, rarity and conservation status in Wales and the rest of the UK.

- Common species (population over 100,000) include: common pipistrelle, soprano pipistrelle, brown long-eared, Natterer's and Daubenton's bat.
- Rarer species (population between 10,000–100,000) include: lesser horseshoe, whiskered, Brandt's, Leisler's and noctule bat
- Rarest species (population less than 10,000) include: Nathusius' pipistrelle, greater horseshoe, barbastelle, Bechstein's and serotine bat.

Scores are attributed as follows:

- Common species – 2 points
- Rarer species – 5 points
- Rarest – 20 points

The presence of bat species at the site is determined from the evening activity surveys.

Number of bats encountered

Across the three activity surveys, the highest numbers of bats recorded is used to determine the points score for the 'number of bats encountered'.

- Individual bats – 2 points
- Small numbers – 5 points
- Moderate numbers – 10 points
- Large numbers – 20 points

The number of bats present at the site is determined through the evening activity surveys.

¹⁰ Battersby, J. (Ed) & Tracking Mammals Partnership. 2005. *UK Mammals: Species Status and Population Trends. First Report by the Tracking Mammals Partnership*. JNCC/Tracking Mammals Partnership, Peterborough.

Proximity of roosts/potential roosts

The score for the proximity of actual or potential roosts is determined as follows:-

- No roosts or suitable roosting habitat - 1 point
- Small number of roosts- 3 points
- Moderate number of roosts/unknown number of roosts- 4 points
- Large number of roosts or close to SSSI for species- 5 points
- Close to SAC for species- 20 points

Habitat Characteristics

Habitat at the study site is assessed and scored with regards to suitability for foraging or commuting bats. This assessment takes account of likely aerial insect densities, connectivity of habitats, diversity of habitats available and suitability of foraging habitat.

Where habitats do not fit in to the descriptions below, a score has been attributed based upon professional judgement. Scores are calculated as follows:-

- Limited suitable habitat e.g. industrial landscape or new housing estate with no established planting - 1 point
- Low value suitable habitat e.g. suburban or intensive agricultural landscape - 2 points
- Moderate value suitable habitat e.g. isolated patches of woodland within less intensive agricultural landscape- 3 points
- High value suitable habitat e.g. mixed agricultural landscape with small patches of woodland - 4 points
- Very high value suitable habitat e.g. complex mosaic - 5 points

2.6 Great Crested Newt

2.6.1 Overview

The September 2017 walkover survey identified the study site as offering suitable terrestrial habitats for great crested newt.

Whilst the study site itself does not support any suitable aquatic breeding habitats, the walkover survey identified a canalised drainage ditch located adjacent to the site and on the opposite side of Clywedog Road South as offering some low suitability, potential breeding habitat.

Further survey comprising of a great crested newt egg search and eDNA survey of areas of standing water within the ditch were therefore carried out.

The egg search of suitable aquatic vegetation within the ditch was carried out on the 8th May 2018.

2.6.2 Presence/absence eDNA Survey

The eDNA sampling method requires the collection of water samples which are sent to a laboratory for analysis.

This technique aims to detect DNA that is present in the environment in which an animal lives. Great crested newt DNA can enter ponds via their urine, faeces, skin cells etc. Natural Resources Wales accepts eDNA test results as evidence of presence or absence of great crested newt.

The survey was undertaken on 2nd June 2018 by Richard Roe, a licensed great crested newt worker.

The survey was carried out following the protocol recommended by Natural Resources Wales¹¹. In summary, this involved taking 20 water samples from within the drainage ditch using a sample kit provided by Surescreen Scientifics. The drainage ditch periodically supports deep (<10cm), slow-flowing pools behind short weirs along its length. These areas support good, macrophytic egg-laying habitats. These locations were targeted for collection of water samples.

Before each sample was taken, the water column was mixed gently to maximise the chances of detecting GCN eDNA. Once all the samples had been collected, they were vigorously shaken for ten seconds in a whirl bag to ensure any eDNA was mixed across the whole water sample. A pipette was then used to add water samples to sterile tubes containing ethanol to preserve any eDNA present. Each tube was then mixed for a further ten seconds to prevent eDNA degradation. Preserved samples were then stored at a cool ambient temperature before being returned to Surescreen Scientifics on the 4th June 2018 for analysis.

2.7 Butterfly Survey

2.7.1 Methods

Survey at the site focused on the potential presence of dingy skipper and grizzled skipper which have both been recorded within the wider Wrexham Industrial Estate and are both listed under Section 7 of the Environment Act.

¹¹ Biggs J et al (2014). Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA. Freshwater Habitats Trust, Oxford

The site was visited on five occasions throughout the flight period of the two butterflies (May – June) and when other populations in the area were known to be on the wing. All visits were undertaken in accordance with the United Kingdom Butterfly Monitoring Scheme (UKBMS), Fixed-route Transects climatic protocols (<http://www.ukbms.org/methods.aspx>) and were walked between 11.00 and 16.00 during periods with temperatures above 14°C, low winds and at least 60% sunshine.

The site was walked such that all suitable areas of habitat for butterfly ovipositing and nectaring were recorded and surveyed from at least a 2m vantage point and areas of potential ovipositing and/or nectaring habitat surveyed.

2.7.2 Survey timing

The site was visited on five optimal dates:

- 08/05/2018- light wind, sunny, 19°C
- 14/05/18 – light wind, sunny, 17°C
- 19/05/18 – light wind, sunny, 22°C
- 23/05/18 – light wind, sunny, 21°C
- 13/06/18 – light wind, sunny, 21°C

3 Desktop Study

3.1 Sources of Information

Ecological information on habitats, species and designated nature conservation sites has been sought from COFNOD who are the local biological records centre for the North Wales Region.

3.2 COFNOD Data

3.2.1 Species

COFNOD holds several records of protected species within 2km of the site including the following:

- Barn owl
- Goshawk
- Common pipistrelle
- Whiskered bat
- Polecat
- Badger
- Otter
- Great crested newt
- Adder
- Slow-worm

COFNOD hold no records of any protected species within the study site itself.

Whiskered bat have been recorded within 100m of the site.

There are records of great crested newt within 500m of the site from the HMP Berwyn site (412m to the east of the site) and from ponds located within farmland to the west of the site (430m to the west of the site).

Both of these ponds are considered to be isolated from the study site by intervening housing and commercial units.

COFNOD holds no other records of protected species within 250m of the study site.

3.2.2 Designated Sites

No statutory designated sites are located within 1km of the study area itself.

Three Local Wildlife Sites (LWS) are located within 2km of the study site comprising of the Wrexham Industrial Estate LWS (comprising of Bryn Road Grassland, Erlas Black Wood and the Oaks), Peter's Dingle LWS and Cefn Park LWS.

4 Survey Results

4.1 Site Description

The study site measures approximate 6ha in area. The proposed development would be located just within the northern half of the site however the assessment has included land within the southern half of the study area which could offer opportunities for habitat enhancement/management.

The site principally comprises of an area of grassland habitat that has remained unmanaged for several years. A range of successional habitats have developed including areas of coarse, unimproved grassland with scattered hawthorn scrub which grades into areas of tall herb community, bramble scrub and dense thorny scrub.

There is a band of broadleaved woodland which runs along the northern and eastern edges of the site. The easterly block of woodland forms part of a larger, more-or-less unbroken corridor of semi-natural, woodland vegetation which runs for approximately 1600m from the southern boundary of the site on Bridge Road South, through the wider Industrial Estate, before joining Redwither Brook approximately 950m to the east of the site. Redwither Brook eventually flows into the River Clywedog at the south-eastern edge of the Industrial Estate.

The woodland is likely to function as a wildlife corridor through the Industrial Estate.

The site is bounded to the west by Clywedog Road South, to the south by Bridge Road South, to the east by the gardens of the adjacent Pentre Maelor housing estate and to the north by commercial units associated with the Industrial Estate. Habitats at the site are linked at the site's northeast corner to a similar area of unmanaged grassland also comprising of grassland/scrub/woodland mosaic.

Wider habitats comprise of residential housing, industrial units, occasional areas of amenity grassland and further areas of unmanaged, rough grassland and scrub.

The site location is shown on Figure 1 in the Appendix.

A habitat map of the site is shown on Figure 2 in the Appendix. Photographs showing typical habitats at the site are also given in the Appendix.

4.2 Habitats

The site principally comprises of patches of herb-rich grassland with frequent sedges, umbellifers, creeping thistle and common knapweed amongst the sward. The grassland habitats are mostly indicative of MG1e (False oat-grass, common knapweed sub-community) as defined by the National Vegetation Classification system (Rodwell 1992¹²).

Scattered hawthorn saplings are present throughout the grassland areas. There are some patches of dense bramble scrub, principally around the edges of the site.

There is evidence of historical mechanical earth works at the site with occasional long, narrow, shallow troughs (less than 15cm deep/wide) found across the site. The land may have been stripped of top soil in the recent past (at least over 15 years ago). This would explain the site's retention of open, species-rich, grassland habitats which may be attributable to relatively nutrient-poor soil substrates which may have also slowed the rates of bramble scrub encroachment at the site.

There are occasional footpaths through the site which are used recreationally by dog walkers and residents from the adjacent housing estate. These comprise of areas of mown and trampled grass with areas of bare ground.

It is likely that if left unmanaged, the site would develop into continuous bramble scrub, followed by dense thorn scrub and ultimately further broadleaved woodland.

The grassland habitats present are considered to be of biodiversity value comprising of species-rich, unimproved, neutral grassland. Species of conservation interest identified within the sward include spiny retharrow and pepper-saxifrage.

The scrub habitats present are of low botanical interest and are commonly occurring throughout the UK within similar neglected agricultural and industrial sites.

Habitats encountered are Target Noted on Figure 2 and described further within Table 2 below.

¹² Rodwell, J.S. (ed) 1992. *British Plant Communities. Volume 3. Grassland and Montane Communities*. Cambridge University Press.

Table 2- Habitat Descriptions

Target Note	Habitat	Description
1	Grassland/Tall herb/bramble scrub mosaic	The majority of the site comprises of unmanaged, unimproved, neutral grassland. The sward principally supports coarse grass species with frequent tall herbs and patches of bramble and meadowsweet. Grasses comprise of frequent cock's-foot, Yorkshire fog, red fescue and false oat-grass with occasional tufted hair-grass, meadow fox-tail, crested dog's-tail, common bent, common sedge, false-fox sedge, soft rush and hard rush. The tall herb species present include stands of common knapweed, hoary ragwort, meadowsweet and creeping thistle with cow parsley, hedge parsley and hogweed. Other occasional herbs include cowslip, yarrow, ribwort plantain, angelica, broadleaved willow-herb, creeping buttercup, meadow buttercup, broadleaved dock, ox-eye daisy, creeping cinquefoil, hairy tare, common vetch, bush vetch, bird's-foot trefoil, common toadflax, meadow vetchling, agrimony, common fleabane, pepper saxifrage, spiny restharrow, common-spotted orchid and self-heal. The grassland is interspersed with patches of scattered young hawthorn scrub and batches of bramble scrub. Footpaths pass through the eastern end of the grassland. These areas comprise of a shorter, grass dominated sward with patches of bare ground. The footpaths are mechanically mown.
2	Broadleaved woodland	There is a stand of broadleaved woodland along the northern boundary of the site. The woodland comprises of mature oak and willow with a dense underscrub of hawthorn, blackthorn and ash and a field layer of ivy. The hawthorn and blackthorn scrub extends beyond the southern boundary of the woodland into the adjacent grassland. There is a dry drainage ditch present within the woodland.
3	Broadleaved woodland	There is a band of predominantly broadleaved woodland running along the eastern edge of the site where it adjoins the neighbouring housing estate. The woodland comprises of a broad mix of tree species many of which are likely to be plantation in origin. The tree species present include Scots pine, apple, maple, silver birch, blackthorn, hawthorn, oak and ash. There is a fringe of blackthorn scrub with bramble running along parts of the woodland.

**Land at Clywedog Road South
Ecological Assessment**



Target Note	Habitat	Description
		The footpath described in Target Note 1 runs parallel with the woodland with occasional paths running into the woodland through to the rear gardens of adjacent residential properties. The band of woodland links to the more natural woodlands at Target Notes 2 and 4 to form a single large block of continuous woodland.
4	Broadleaved woodland	The broadleaved woodland in this area principally comprises of mature hawthorn trees with occasional scattered mature oak trees. The woodland has a field layer predominantly comprising of ivy with occasional patches of nettle. There are several paths and tracks that pass through this woodland into the adjacent housing estate. The woodland links to the strip of woodland at Target Note 3 and scrub habitats at Target Note 7.
5	Dense scrub/ dry ditch	There is an area of dense hawthorn scrub located here which extends out from the adjacent area of mature oak/hawthorn woodland. There is also a dry ditch in this location.
6	Grassland/Tall herb/bramble scrub mosaic	Habitats in this area are similar to those described for Target Note 1, comprising of unmanaged, unimproved, neutral grassland with frequent tall herb and with frequent, scattered young hawthorn shrubs. As previously, the sward supports mainly coarse grass species with frequent tall herbs and patches of bramble. Grasses comprise of frequent cock's-foot, Yorkshire fog, red fescue, meadow foxtail and false oat-grass with occasional tufted hair-grass, common sedge, and soft rush. The tall herb species present include stands of common knapweed, hoary ragwort and creeping thistle with cow parsley and hogweed. Other occasional herbs include bush vetch, ribwort plantain, creeping buttercup, bramble, bird's-foot trefoil, broad-leaved dock, yarrow, perforate St. John's-wort and ox-eye daisy. There are also patches of nettle and stands of rosebay willow-herb.
7	Dense scrub with scattered oaks	Habitat in this area comprises of dense blackthorn and hawthorn scrub with scattered mature oak trees.

Target Note	Habitat	Description
8	Grassland/Tall herb/bramble scrub mosaic	This area comprises of a continuation of the unmanaged, unimproved, neutral grassland with frequent tall herb and scattered young hawthorn shrubs as described in Target Notes 1 and 6. There is a dry ditch in the area which supports stands of bulrush, great willow-herb and meadowsweet. A new hedgerow has been planted along the southern boundary of the site (approximately 6 years old). The hedgerow comprises of young hawthorn, blackthorn, hazel and dog rose.

4.3 Protected Species Surveys

4.3.1 Overview

The Extended Phase 1 Habitat Survey completed in 2017 considered the site's suitability to support protected species. Following on from the 2017 survey, further targeted surveys were completed during the 2018 field season to determine the likely presence/absence of and importance of the site for breeding birds, badgers, bats, great crested newt, reptiles and notable butterflies.

4.4 Reptile Survey

4.4.1 Overview

The study site supports some suitable reptile foraging habitat in areas of grassland and scrub. However, given the relatively tall height of vegetation present, suitable basking sites are limited.

Nevertheless, the site is partly linked to other areas of suitable reptile habitat comprising of further areas of neglected grassland which surrounds the northern and eastern edges of the adjacent housing estate. There is further similar habitat located to the south west of the site on the opposite side of Clywedog Road South (although this road is likely to act as a partial barrier to any movement of reptiles between the two sites).

Common reptile species are known to be present within other suitable habitats at the Industrial Estate albeit, in relatively low numbers (small numbers of adder, slow-worm and grass snake were recorded at the nearby HMP Berwyn Prison Site during site clearance).

4.4.2 Results

Artificial refugia checks were completed on the 12th, 13th, 20th June; the 3rd and 30th July and on the 4th and 15th August 2018. Eighty refugia were deployed within open grassland habitats around the centre of the site.

Survey was carried out in warm, dry and calm conditions with the surveys conducted on days with sunshine.

No reptiles were recorded at the site whatsoever during refugia and visual surveys or incidentally during other field surveys undertaken at the site.

It is considered to be unlikely that the site supports any significant reptile population.

Weather conditions during survey are provided in Table 5 in the Appendix.

4.5 Breeding Birds

4.5.1 Overview

Surveys were undertaken on the 8th May, 21st May and the 13th June 2018. All surveys were completed within four hours of sunrise. Weather conditions during all surveys were dry with no more than a light breeze.

In total, 30 bird species were recorded during surveys. This total includes incidental records of barn owl which were identified foraging at the site during bat activity surveys.

Habitats at the study site can be divided into two broad habitat types—open grassland/bramble mosaic within the centre of the site and scrubby woodland scrub around the northern and eastern edges of the site.

A full list of bird species encountered with breeding and conservation status is presented in Table 6 in the Appendix. Figure 3 in the Appendix shows the approximate location of assumed bird territories overlaid on a habitat map for the site. Territory location is based upon where ‘possible breeding’ or ‘breeding’ birds were encountered across the three surveys.

4.5.2 Breeding status

Following survey, 10 species (33.3%) are categorised as ‘breeding’ at the site, 13 (43.3%) are categorised as ‘possible breeding species’ and 7 species (23.3%) are not considered to be breeding on site. The non-breeding birds mainly comprise of colonially nesting birds and birds requiring suitable buildings in which to nest including swallow, barn owl and house sparrow.

4.5.3 Conservation Status

Details of the conservation status of individual birds recorded are given in Table 4 and summarised as follows:-

- 3 red list species were recorded on site (herring gull, house sparrow and starling)
- 5 amber listed species were recorded on site (willow warbler, barn owl, dunnock and kestrel).
- Barn owl, a Schedule 1 Wildlife and Countryside Act Species, was recorded foraging at the site.
- Species listed under Section 7 of the Environment Act recorded at the site include kestrel, herring gull, dunnock, starling and house sparrow.

4.6 Bats

4.6.1 Initial Bat Habitat Assessment

Trees around the boundaries of the site would not be affected by development proposals. Consequently, a full assessment of the roosting potential of all trees present was not undertaken. However, an initial characterisation of the adjacent woodland habitats was completed during the Extended Phase 1 Habitat Survey.

The woodlands present were found to offer limited bat roosting opportunities within occasional mature trees however, most of the trees present are of a relatively young age and have not yet developed any large cavities, splits or other features suitable for roosting bats.

There are likely to be bat roosts within the residential properties located to the east of the site.

The scrub and woodland edge habitat offers suitable bat foraging habitat.

The surrounding, wider Industrial Estate offers fragmented pockets of suitable bat foraging habitat with small areas of woodland and scrub interspersed amongst large, less suitable areas of hardstanding, amenity grassland and industrial units.

Given the proximity of potential roost sites within the nearby housing and the presence of suitable foraging habitat along the bands of woodland and scrub, the site is considered to support habitats which are likely to be of some value to local bat populations.

However, it is considered unlikely that the Industrial Estate as a whole supports a rich assemblage of bats.

Following this initial assessment of habitats, further bat activity surveys were undertaken in Summer 2018.

4.6.2 Activity Survey Results

Bat activity surveys were carried out from May through to August 2018.

Figure 4 shows the walked transect route and Point Count locations (with activity index levels) overlaid on top of the Phase 1 Habitat Survey results. Summary data of Point Count Results are given in Tables 7 and 8 in the Appendix.

Dates, weather conditions and sunset times are given in Table 9 in the Appendix.

An Anabat Express was also deployed at the site from the 2nd June-12th June 2018. Figure 4 shows where the Anabat was positioned.

4.6.3 Results Analysis

The bat activity surveys identified the site as supporting relatively low numbers of foraging bats. Bats were generally encountered individually, either commuting along or foraging over the woodland habitats along the northern and eastern edges of the site. Bats were not recorded foraging over the open grassland habitats.

Of the four point counts, low levels of bat activity were recorded at three of the count points with moderate levels of bat activity only recorded at one count point (Point Count 4 on Figure 4).

Species encountered comprised mainly of foraging and commuting common pipistrelle and soprano pipistrelle.

Other species occasionally recorded included noctule commuting over the site and myotis species (considered likely to be whiskered bat) foraging along the eastern boundary of the site.

Encounters with bats between point counts were also infrequent, with general activity over the site considered to be limited.

The Anabat Express recorded common pipistrelle, soprano pipistrelle and noctule bat activity at the site.

4.6.4 Habitat Evaluation

The overall value of the site has been assessed and scored following the methods described in section 2.5.

In summary the site was found to generally support common species of bats in individual numbers with low numbers of surrounding bat roosts. The habitats at the site and surrounding the site are considered to be of moderate value for bats.

The assessment scored a total of **10 points** which equates to an assessment of '**site only**' value for the study area with regards to the CIEEM (2006) evaluation framework.

The assessment results and scores are given in Table 3 below.

Table 3 – Site Results and Evaluation Score

Category	Results	Score
Species rarity?	Common species	2
Numbers of bats?	Individual bats	2
Nearby roosts?	Low number of roosts	3
Landscape character?	Moderate	3
Total Score		10

4.7 Great Crested Newt

4.7.1 Habitat Suitability Assessment and eDNA Survey Results

The September 2017 walkover survey identified the study site as offering good quality great crested newt terrestrial habitat within scrub, woodland, rough grassland and tall herb habitats.

The study site does not support any suitable aquatic habitats for great crested newt as the three drainage ditches identified at the site were found to be dry during survey and are likely to be dry for much of the year (Target Notes 2, 5 and 8).

Whilst the study site itself does not support any suitable aquatic breeding habitats, the walkover survey identified a canalised drainage ditch located outside of the site and on the opposite side of Clywedog Road South as offering some low suitability potential breeding habitat (Target Note 9 on Figure 2).

The drain is approximately 20-30cm deep and approximately 1m in width. The drainage ditch is located within a concrete channel and is likely to permanently hold water.

The drain supports areas of dense aquatic vegetation comprising of water mint, fool's water-cress, meadowsweet and great willow-herb. The drain has some patches of open water, mostly at its southern end.

The drainage ditch is considered to offer low suitability great crested newt breeding habitat.

Great crested newt have been recorded in ponds located within farmland to the west of the site (ponds located approximately 430m to the west of the site). However, these ponds are considered to be isolated from the study site and the drainage ditch by intervening commercial units located on Clywedog Road South.

Further survey comprising of a great crested newt egg search and eDNA survey of areas of standing water within the drain at Target Note 9 were carried out in Spring 2018. No newt eggs of any species were found within the drainage ditch.

Water samples from the ditch were collected and these were analysed for great crested newt eDNA. The laboratory at Surescreen Scientifics returned a 'negative' result for great crested newt eDNA.

Taking account of the survey results it is considered unlikely that great crested newt would be present at the site.

4.8 Butterflies

4.8.1 Overview

The grassland habitats at the site were found to be relatively flower-rich supporting suitable plant species for larva and adult grizzled and dingy skipper butterflies (bramble, dog rose, creeping cinquefoil, yarrow, ragwort, fleabane, bird's foot-trefoil, buttercups and vetches). These butterflies are listed as priority species under Section 7 of the Environment (Wales) Act 2016.

Both of these species of notable butterfly have been recorded within similar habitats located at the HMP Berwyn site located approximately 400m to the southeast of the site. The ecology mitigation area for the Prison Site is being actively managed to promote habitats for dingy and grizzled skipper butterflies.

Suitable butterfly habitats at the Prison Site are linked to the study site by the area of flower-rich, rough grassland which surrounds the northern and eastern edges of the adjacent housing estate.

4.8.2 Survey Results

Survey at the site focused on the potential presence of dingy skipper and grizzled skipper which have both been recorded within the wider Wrexham Industrial Estate.

The study site was visited on five occasions throughout the flight period of the two butterflies (May - June). Other local populations of dingy and grizzled skipper were known to be on the wing during this period. Neither species was recorded at the site during survey.

In terms of suitable habitats for the dingy and grizzled skipper, the site was found to comprise of an extensive area of unimproved grassland, scattered scrub, tall herb vegetation and woodland.

Occasional foodplants were found to be present at the site. Although larval foodplants are present, the habitats are considered as marginal for both dingy and grizzled skipper due to the dense grassland sward and the lack of open, non-vegetated areas.

The presence of larval foodplants on the site and the presence of nectaring resources means that the site may be visited by these butterflies but the habitats are considered suboptimal for the maintenance of dingy and grizzled skipper butterfly populations.

Small heath butterfly was recorded at the site. This butterfly, although relatively common, has suffered recent declines in numbers and is listed under Section 7 of the Environment (Wales) Act 2016 as a species of 'principal importance' in Wales.

The results of the surveys showing butterfly species recorded are presented in the Table 4 below with weather data presented in Table 10 in the Appendix.

Table 4- Butterfly Survey Results

Date	Results
08/05/18	Orange tip
14/05/18	Green veined white (3)
19/05/18	
23/05/18	Small heath (3), Green veined white
13/06/18	Small heath (2)

4.9 Badgers

No badger setts or badger field signs were recorded at the site. However, badgers are known to be present within the wider Industrial Estate and consequently there is considered to be a reasonable likelihood that badgers could occasionally visit the site to forage.

5 Evaluation

5.1 Habitats

The site principally comprises of a range of successional habitats that have developed on an area of derelict grassland.

These habitats comprise of a mosaic of unimproved, neutral grassland, tall herb, woodland and scrub communities which have developed through neglect of the site.

The site appears to support relatively low nutrient soil conditions which have allowed a species-rich grassland to develop and which has slowed the full colonisation of the site by bramble and thorny scrub. There is some evidence to suggest that the oligotrophic soil conditions may be attributable to top soil stripping in the past.

The grassland habitats present are considered to be of locally important biodiversity value comprising of species-rich, unimproved, neutral grassland. Species of conservation interest identified within the sward include spiny retharrow and pepper-saxifrage. No plant species listed under Section 7 of the Environment (Wales) Act 2016 were identified at the site.

The scrub habitats present are of low botanical interest and are commonly occurring throughout the UK within similar neglected agricultural and industrial sites.

If left unmanaged, it is likely that the site would develop into continuous bramble scrub, followed by dense thorn scrub and ultimately further broadleaved woodland.

There is a continuous band of broadleaved woodland which runs along the northern and eastern boundaries of the site.

Mixed broadleaved woodland is listed under Section 7 of the Environment (Wales) Act 2016 as a habitat of 'principal importance' in Wales.

The woodland forms part of a more-or-less unbroken corridor of semi-natural vegetation which runs for approximately 1600m from the southern boundary of the study site on Bridge Road South, through the wider Industrial Estate, before joining Redwither Brook approximately 950m to the east of the site.

The woodland is considered to be of relatively low botanical interest, however owing to its likely function as one of the main wildlife corridors through the Industrial Estate, the woodland is considered to be a feature of locally important biodiversity value.

5.2 Protected Species

Targeted surveys were completed during the 2018 field season to determine the likely presence/absence of and importance of the site for breeding birds, badgers, bats, great crested newt, reptiles and notable butterflies.

The findings of these surveys are summarised and evaluated below.

5.2.1 Reptiles

No reptiles were recorded at the site whatsoever during targeted reptile refugia and visual surveys or incidentally during other field surveys undertaken at the site.

It is considered to be unlikely that the site supports any significant reptile population.

5.2.2 Breeding birds

In total 30 bird species were recorded during surveys. A full list of species recorded along with their conservation status is presented in Table 4 in the Appendix.

The site is considered to offer good habitat for breeding birds with nesting opportunities offered within areas of woodland and scrub whilst foraging opportunities are offered throughout the breeding season with the areas of flowering scrub and flower-rich grassland likely to attract high densities of nectar feeding insects.

Moderately high numbers of individual birds were recorded at the site, with most bird species identified calling from within the dense woodland at the fringes of the site; whitethroat were generally recorded within the 'savannah' type habitats within the centre of the site; whilst barn owl and kestrel were recorded hunting over the grassland habitats which are likely to support good populations of small mammals. House sparrow and starling were recorded around the gardens of the residential properties located to the east of the site.

Although the site was found to support good numbers of individual birds, the bird species recorded are considered to be relatively common.

Several species recorded at the site, although relatively common, are considered to be species whose populations are in decline and are so are listed as either red or amber species on the list of Birds of Conservation Concern¹³.

¹³ Eaton *et al* (2015) *The Population Status of Birds in the UK, Channel Islands and the Isle of Man*, British Birds

This includes house sparrow, starling, dunnock, willow warbler, kestrel, and barn owl. All of these species use the site either as part of their breeding territory or home range. Herring gull (a red list species) was only recorded over-flying the site.

These species are not considered likely to be nesting within the grassland habitats at the site and are instead likely to be nesting either within the surrounding scrub/woodland habitats or away from the site itself. However, the grassland habitats are likely to offer an important foraging resource through the provision of seeds, invertebrates, fruits and small mammals.

Given the moderately high numbers of individual birds recorded at the site, albeit of relatively common species, the site is considered to be of **local** conservation importance for breeding birds.

5.2.3 Bats

The woodland present around the edges of the site were found to offer limited bat roosting opportunities within occasional mature trees. Most of the trees present are of a relatively young age and have not yet developed any suitable bat roosting features.

There are likely to be bat roosts within the residential properties located to the east of the site.

The bat activity surveys identified the site as supporting relatively low numbers of foraging bats. Bats were generally encountered individually either commuting along or foraging over the woodland habitats along the northern and eastern edges of the site. Bats were not recorded foraging over the open grassland habitats.

Common bat species were generally recorded at the site principally comprising of common pipistrelle and soprano pipistrelle with noctule and whiskered bat also infrequently recorded.

The surrounding, wider Industrial Estate offers fragmented pockets of suitable bat foraging habitat with small areas of woodland and scrub interspersed amongst large areas of hardstanding, amenity grassland and industrial units.

Taking all of this into account, the study area was assessed as being of **'site only'** value with regards to bats.

5.2.4 Great Crested Newt

The study site supports good quality great crested newt terrestrial habitat within scrub, woodland, rough grassland and tall herb habitats. However, the study site does not support any suitable aquatic habitats for great crested newt.

Great crested newt have been recorded in ponds located within farmland to the west of the site (ponds located approximately 430m to the west of the site). However, these ponds are considered to be isolated from the study site by intervening commercial units located on Clywedog Road South.

There is a drainage ditch located immediately adjacent to the site on the opposite side of Clywedog Road South. This is considered to represent the only waterbody suitable for great crested newt that is within 500m of the site and not isolated by intervening barriers.

Further survey including an eDNA survey of areas of standing water within the drain returned a 'negative' result for great crested newt.

Taking account of the survey results, it is considered unlikely that great crested newt would be present at the site.

5.2.5 Butterflies

The Wrexham Industrial Estate is acknowledged as maintaining important populations of the dingy and grizzled skipper butterfly. Both of these butterflies are Species of Principal Importance.

Review of existing data and site surveys did not record the presence of these butterflies at the proposed development site. In addition, the habitat assessments of these sites did not indicate that they were potentially viable for the presence of these species.

Although neither species was recorded within the study site, the adoption of habitat creation and management within and outside of the site has the potential to provide additional resources and contribute to the maintenance and enhancement of the butterfly, and other invertebrate, populations within the Wrexham Industrial Estate.

Small heath butterfly was recorded at the site. This butterfly, although relatively common, has suffered recent declines in numbers and is listed under Section 7 of the Environment (Wales) Act 2016 as a species of 'principal importance' in Wales.

5.2.6 Badgers

No badger setts or badger field signs were recorded at the site. However, badgers are known to be present within the wider Industrial Estate and consequently there is considered to be a reasonable likelihood that badgers could occasionally visit the site to forage.

6 Recommendations

6.1 Habitats

6.1.1 Habitat Management and Creation

It is recommended that any future development of the site avoids negative impacts upon the bands of woodland along the site's eastern and northern boundaries.

Where possible an appropriate buffer area should be retained between the edge of the developed area and these woodland features.

It is recommended that the woodlands within and adjacent to the study site are enhanced through the implementation of a woodland management plan. Parts of the existing woodlands are very dense and scrubby. To increase the value of woodland habitats it is recommended that denser sections are thinned out and that any higher value trees are encouraged to come through. This can be achieved through 'haloing' (haloing involves the felling and pruning back of surrounding low-value trees and scrub so that they do not shade out and stunt the development of the more valuable adjoining trees). The thinning out of the woodland should allow more light through to the field layer potentially enhancing conditions for woodland ground flora.

The proposed development will result in the loss of some unimproved, species-rich grassland. This habitat is considered to be of conservation value.

A habitat management plan should be developed for the site and these habitats should be managed for their biodiversity value.

Should it prove practical, areas within the development sites should be created for invertebrate conservation in general, and dingy and grizzled skipper butterflies in particular.

The establishment of features such as bunds, mounds and other areas should be created using nutrient poor soils. Medium-coarse aggregate material should be used for such features with a limestone or other high pH material preferable as it facilitates the development and maintenance of an open, species-rich sward.

Bare ground areas should be orientated, where possible, such that they are exposed to the full sun during much of the day, i.e. south facing.

The banks should be sown with an appropriate wildflower mix (e.g. Emorsgate Seeds EM6F) and/or a translocation of species from within the development site such as common birds-foot trefoil, creeping cinquefoil, wild strawberry and agrimony.

Other areas should be created/managed that maintain species-rich grassland flowers for nectaring butterflies.

Other opportunities to enhance the biodiversity of the site should be taken such as the creation of wildlife ponds and areas of managed wildflower meadows within any amenity areas.

It is recommended that such areas to be retained and managed for their biodiversity value are sited alongside the retained blocks of woodland where they can be connected to the wider woodland wildlife corridor. This would provide a larger continuous block of valuable habitat as opposed to creating less valuable, small fragments of habitat scattered about the proposed development.

It is recommended that any loss of grassland habitats at the site is compensated through off-site habitat management and/or habitat creation where possible.

Off-site, habitat creation and management should include similar grassland/scrub mosaics to that already present at the site and should also include habitats of value to dingy and grizzled skipper butterflies-such as the development and maintenance of areas of open ground and early successional grassland.

This will require many of the techniques outlined above as general principles but will require the adoption of ongoing management comprising rotational disturbance on certain areas to prevent succession to grassland and scrub. It should however, be noted that any management plan will also need to acknowledge the importance of later successional stages for these butterflies and other invertebrates.

6.1.2 Bat and Bird Mitigation

New bird nesting and bat roosting habitat can be provided through the implementation of a bat and bird box scheme. Bat and bird boxes can be installed on suitable trees within the woodland blocks themselves and can be built into proposed new buildings at the site.

Lighting proposals will need to ensure that additional light spill on to the woodland areas is kept to a minimum, with dark corridors retained along both the northern and eastern site boundaries.

A lighting designer would likely be appointed during the detailed design stage of the project. The lighting designer should consult the 'Bats and Lighting Research Project' (Stone 2013) which provides recommendations for limiting the negative effects of lighting on bats.

Where possible the use of artificial lighting should be avoided. Lighting should be directed away from the site's northern and eastern boundaries and should be designed to avoid light trespass into surrounding areas by the fitting of hoods and cowls.

Lighting sources should be 'bat friendly' using LEDs or low wattage lamps.

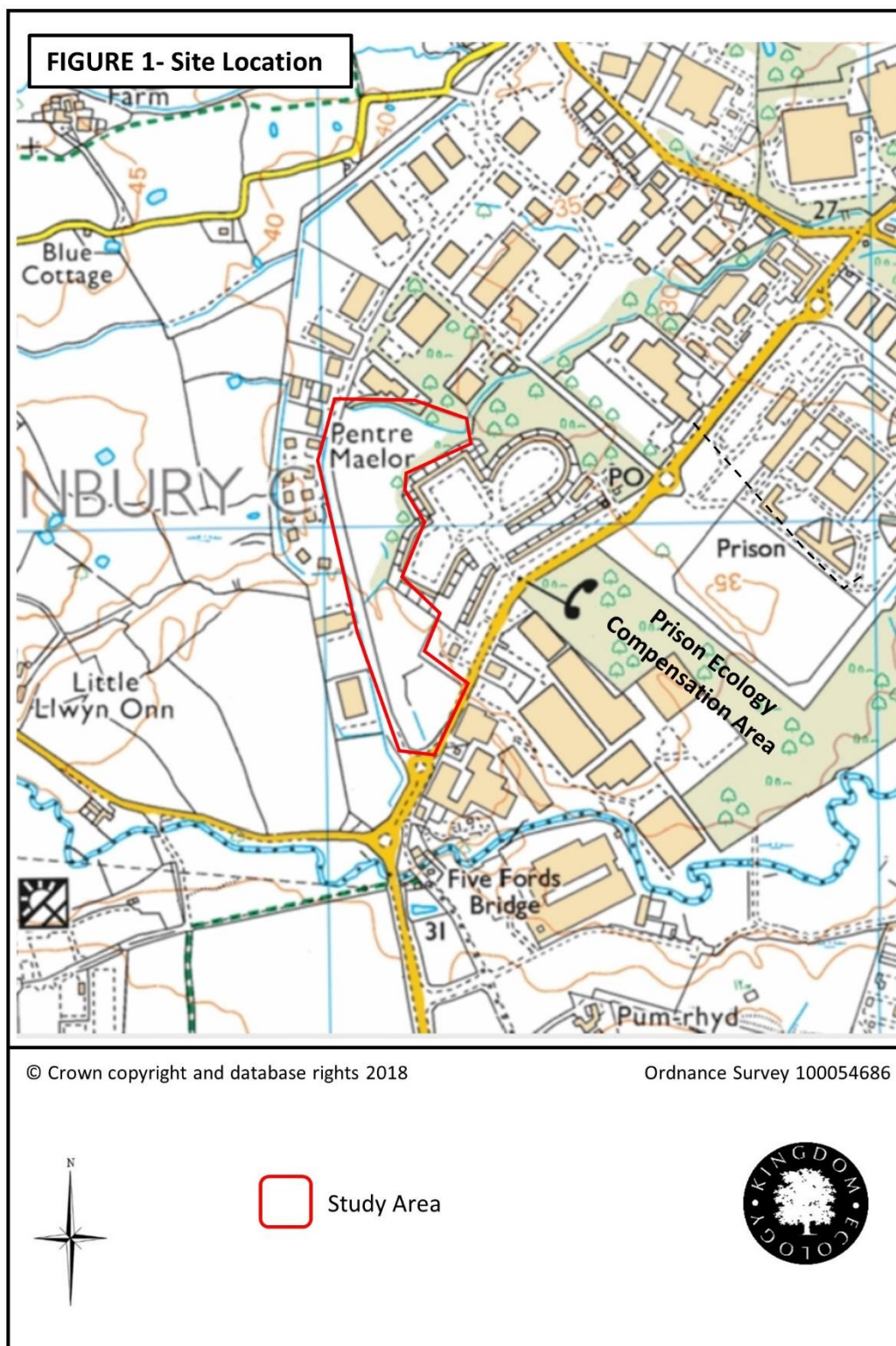
All wild birds in England and Wales are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to intentionally kill, injure or take any wild bird, or take, damage or destroy the nest (whilst being built or in use) or its eggs.

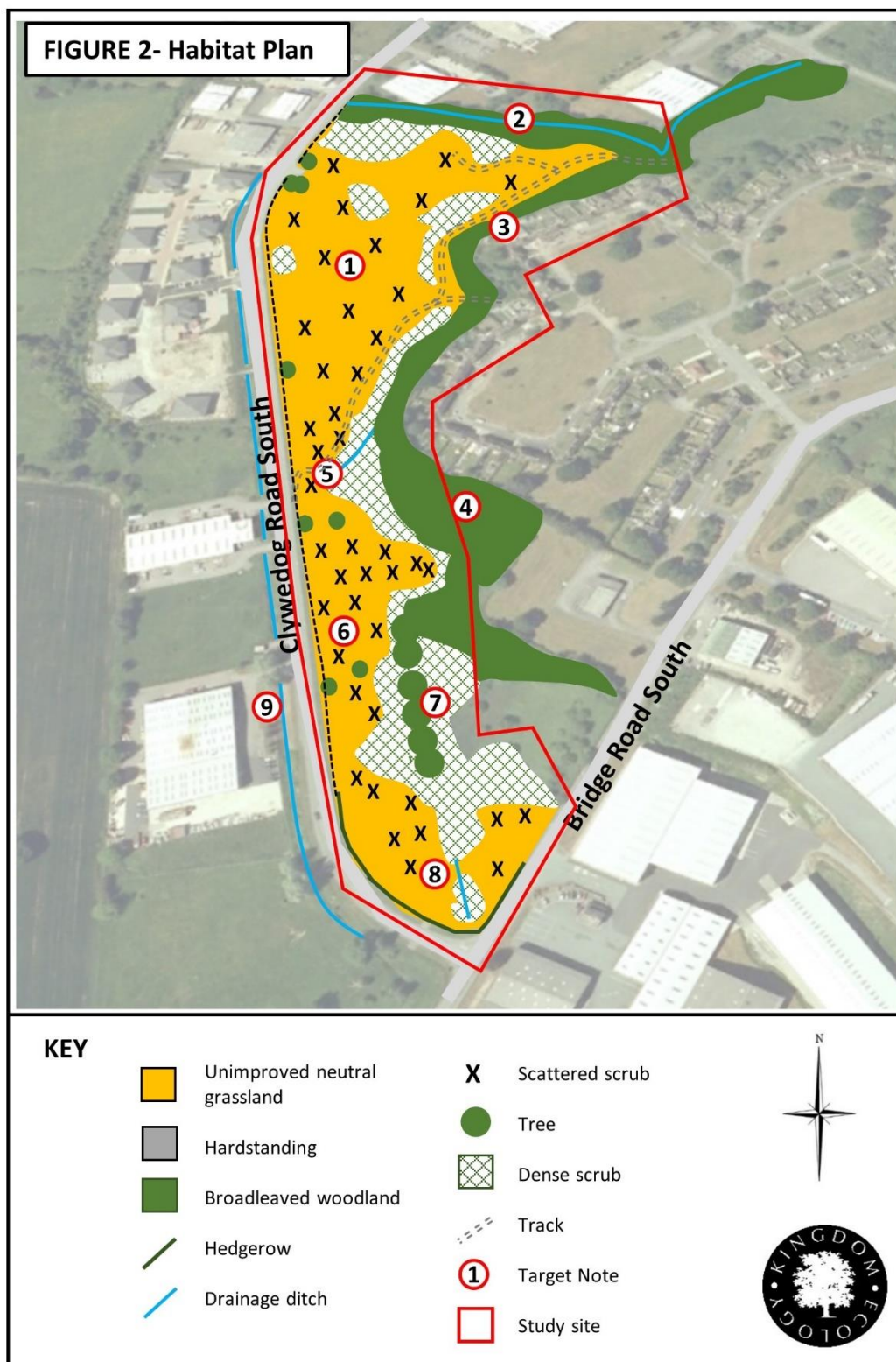
The scrub and trees present could be used by nesting birds during the breeding bird season. Where possible, any future development of the site should be timed to avoid impacting upon suitable nesting habitat during the breeding season (March-August inclusive).

6.2 Further Enhancements

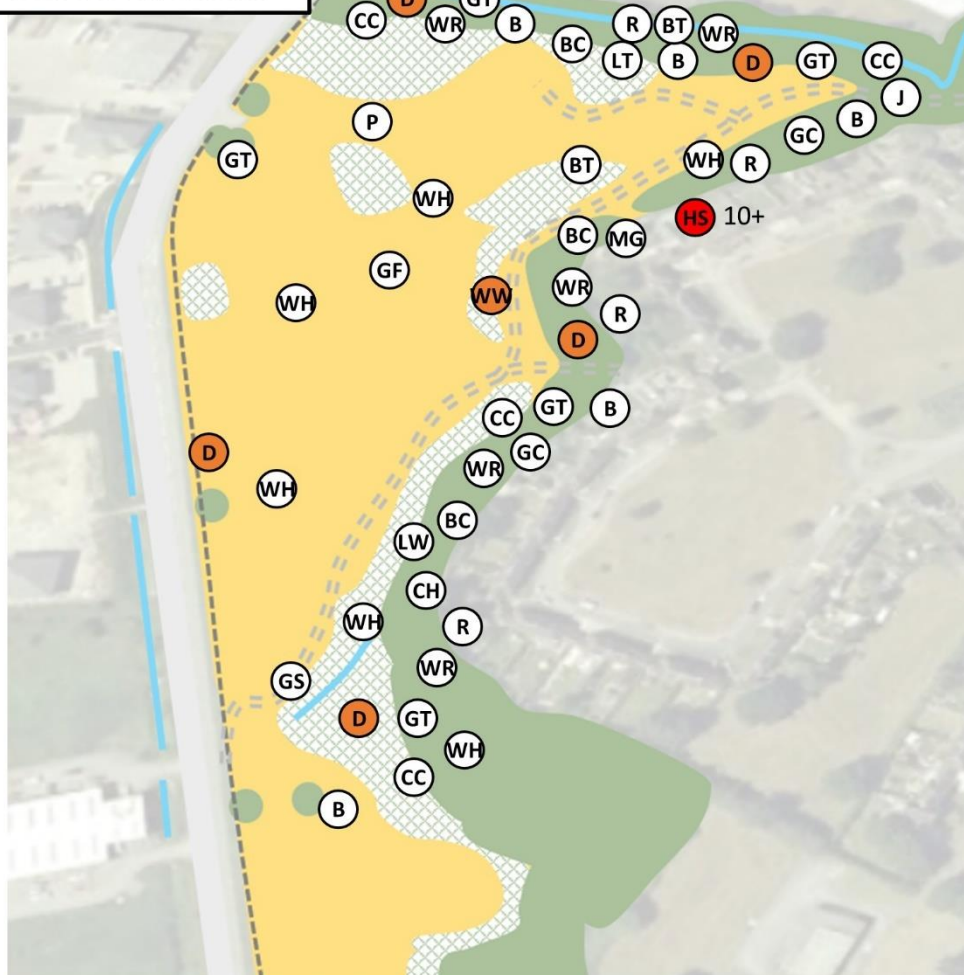
It is recommended that the overall ecological value of the wider Industrial Estate is enhanced where possible either through the implementation of a bat and bird box scheme or by taking opportunities to offer off-site habitat management and/or habitat creation.

7 Appendix





**FIGURE 3- Breeding
Bird Survey Results**



B	Blackbird	LT	Long-tailed tit
BC	Blackcap	P	Pheasant
BT	Blue tit	R	Robin
CC	Chiffchaff	S	Starling
CH	Chaffinch	WH	Whitethroat
D	Duncock	WW	Willow warbler
GC	Goldcrest	WR	Wren
GF	Goldfinch		
GS	G. Spotted w/pecker	●	Red list species
GT	Great tit	●	Amber list species
HS	House sparrow	●	Green list species
LW	Lesser whitethroat		





PHOTOGRAPHS

Photograph 1- Grassland/tall herb habitat at Target Note 1



Photograph 2- Woodland/scrub habitat at Target Note 3



Photograph 3- Woodland habitat at Target Note 4



Photograph 4- Grassland/tall herb habitat at Target Note 6



Photograph 5- Grassland/tall herb habitat at Target Note 8



Photograph 6- Drainage ditch at Target Note 9



Table 5- Reptile Survey Weather Conditions

Date	Temperature °C	Weather
12/06/18	18	Hazy sunshine, light breeze
13/06/18	19	Hazy sunshine, light breeze
20/06/18	17	Hazy sunshine, light breeze
03/07/18	18	Clear, light breeze
30/07/18	19	Intermittent sun after rain, calm.
04/08/18	21	Sunny, calm
15/08/18	17	Calm, clear, sunny

Table 6- Bird Species Recorded and Conservation Status

Species	Breeding Status	BOCC Status
Barn owl	NB	Amber
Blackbird	B	
Blackcap	B	
Blue tit	B	
Carrion crow	P	
Chaffinch	P	
Chiffchaff	B	
Collared dove	P	
Dunnock	B	Amber
Goldcrest	P	
Goldfinch	P	
Great spotted woodpecker	P	
Great tit	B	

Species	Breeding Status	BOCC Status
Herring gull	NB	Red
House sparrow	NB	Red
Jackdaw	P	
Jay	P	
Kestrel	NB	Amber
Lesser whitethroat	P	
Long-tailed tit	P	
Magpie	P	
Pheasant	B	
Robin	B	
Rook	NB	
Starling	NB	Red
Swallow	NB	
Whitethroat	B	
Willow warbler	P	Amber
Wood pigeon	P	
Wren	B	

B- Breeding/Probable Breeding, P- Possible Breeding, NB- Non-breeding

Table 7- Bat Activity Survey Results

Survey Results- 20/05/18

Point Count	Species	Circuit 1		Circuit 2	
		Time	Passes	Time	Passes
1		21.13	0	22.27	0
2	Myo	21.21	0	22.35	1
3	P55, Myo	21.28	0	22.42	2
4	P45	21.35	5	22.49	1

Survey Results- 12/06/18

Point Count	Species	Circuit 1		Circuit 2	
		Time	Passes	Time	Passes
1	P45, P55	22.08	1	23.10	1
2	P45	22.15	15	23.17	0
3	P45	22.20	0	23.23	1
4	P45, P55	22.27	20	23.29	2

Survey Results- 30/07/18

Point Count	Species	Circuit 1		Circuit 2	
		Time	Passes	Time	Passes
1		21.24	0	22.24	0
2		21.29	0	22.29	0
3	P45, Myo	21.35	0	22.34	3
4	P45, P55, Myo	21.40	1	22.40	8

Survey Results- 23/08/18

Point Count	Species	Circuit 1		Circuit 2	
		Time	Passes	Time	Passes
1		20.38	0	21.40	0
2	P55	20.43	5	21.47	0
3	P45	20.49	2	21.52	0
4	P45	20.55	1	21.58	1

Table 8- Activity Survey Results Summary

Point Count	Average Passes	Activity Index
1	0.25	Low
2	2.63	Low
3	1.00	Low
4	4.88	Moderate

Table 9- Bat Survey Weather Conditions

Date	Sunset	Weather	Temperature
20/05/2018	20.59	Dry, calm, high cloud	16°C
12/06/2018	21.38	Light breeze, clear, dry	16°C
30/07/2018	21.10	Dry, calm, 60% cloud	18°C
23/08/2018	18.33	Dry, calm, clear	14°C

Table 10- Butterfly Survey Weather Conditions

Date	Temperature °C	Notes
08/05/2018	19	Light winds, sunny
14/05/2018	17	Light winds, sunny

***Land at Clywedog Road South
Ecological Assessment***



19/05/2018	22	Light winds, sunny
23/05/2018	21	Light winds, sunny
13/06/2018	21	Light winds, sunny