



Land at The Oaks, Oak Road, Wrexham Ind Est
Further GCN Assessment- GCN Dispersal Corridors

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INTRODUCTION

Kingdom Ecology have completed a set of ecological assessments of approximately 7.6ha of land located on Oak Road, Wrexham Industrial Estate LL13 9PW (Ordnance Survey Grid SJ 386 494). Surveys were undertaken in 2016, 2017 and 2019.

As part of the assessments undertaken, the potential presence of great crested newt was considered. Findings of the assessment are provided in the original site assessment report (*'Land at Oak Road, Wrexham Industrial Estate- Ecological Assessment Report (Document Ref: KE1720.2) dated July 2019*). Surveys recorded great crested newt presence within one pond located at the northeast corner of the site.

The previous report considered the overall presence of great crested newt at the Oaks Site and within context of the nationally important great crested newt population contained within the wider environs of the Wrexham Industrial Estate.

This Ecology Addendum provides further information concerning potential dispersal routes for great crested newt between fragmented newt populations distributed around the wider Industrial Estate and passing through the Oaks. This has been undertaken by examining GCN records within the surrounding landscape, examining potential dispersal barriers and potential dispersal routes.

This addendum goes on to examine the impacts of development proposals and opportunities to enhance and strengthen dispersal corridors through the industrial estate.

This paper has been produced by Richard Roe (BSc, MSc, MIEEM, CEnv). Richard is a professional ecological consultant with over nineteen years' experience. Richard has extensive experience working with great crested newt in Wales and the wider UK and has held survey licenses since 2004.



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PREVIOUS SURVEY EVALUATIONS

The findings and evaluation of the 2019 report can be summarised as follows:-

'There are two permanent ponds present at the Oaks site. Great crested newt presence has been recorded in one of these ponds (Pond 4). It was not possible to safely complete a Population Size Class Assessment of this pond.

Nevertheless, it is understood that for developments within similar habitats at the Industrial Estate, there have been some inconsistencies between numbers of great crested newt recorded in ponds during survey and the ultimate numbers of great crested newt present within affected terrestrial habitats, with much larger numbers of great crested newt present than originally predicted.

Given the suitability of terrestrial habitats at the site, it is likely that the pond supports good numbers of great crested newt. It is likely that the greatest density of great crested newt are located within 100m of Pond 4.

Great crested newt are likely to be present within more distant habitats at the site albeit at lower densities.

In addition to supporting a great crested newt population in its own right, the Oaks site is located between good populations of great crested newt at the HMP Berwyn Prison Complex and further good populations located on Bryn Lane. There are some partial barriers to newt dispersal between all three of these sites but there is still the possibility of some movement between sites.

Consequently, given the oaks strategic location between these two newt populations, the presence of a breeding pond on the site itself and that the HMP Berwyn, Oaks and Bryn Lane newt populations are not entirely isolated from one another, the Oaks may form an important stepping stone providing a dispersal route between the three populations. The Oaks site may therefore represent a valuable feature within the overall Wrexham Industrial estate Great Crested Newt metapopulation.

A further assessment of the Oaks likely strategic importance has been undertaken by examining GCN records within the surrounding landscape, examining potential barriers and potential dispersal routes.



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STATUS OF GREAT CRESTED NEWT IN WREXHAM

Overview

Northeast Wales, including the County Borough of Wrexham and parts of neighbouring Flintshire, is one of the strongholds of the great crested newt within the UK (Jehle et al 2011¹). Due to the soil type, underlying geology and historical farming practices, lowland parts of Wrexham have a particularly high density of suitable ponds and the pondscape of northeast Wales has been identified as being of European importance. The high density of suitable ponds means that great crested newts are widespread across the county (Russell et al. 2017²).

Despite the prevalence of suitable ponds within the county, the decline of great crested newts within Wrexham has been acknowledged and a Great Crested Newt Species Biodiversity Action Plan was produced by Wrexham Borough Council in 2003 in order to maintain and enhance the status of the species within the county.

Great Crested Newt at the Industrial Estate

Wrexham Industrial Estate itself also supports important populations of great crested newt. Figure 2 in the Appendix shows historic pond records as provided by COFNOD for great crested newt in relation to the development site and the wider Industrial Estate.

This Figure shows a ring of occupied great crested newt ponds extending around the boundaries of the Industrial Estate with further populations located within the Industrial Estate itself including good populations around HMP Berwyn (to the southwest of the proposed development site); around Erlas Black Wood at the centre of the Industrial Estate and along Bryn Lane at the north of the Oaks site.

Habitats around each of these areas of high newt population have been recently enhanced through pond creation exercises and other habitat creation associated with the Village Bakery (creation of two new ponds at Erlas Black Wood in 2018 as part of wider measures to create a new nature reserve); creation of new ponds as part of the habitat mitigation area associated with the HMP Berwyn Site in 2016;

¹ Jehle R Thiesmeier B and Foster J. 2011. *The Crested Newt -A Dwindling Pond Dweller*. Laurenti-Verlag, Bielefeld, Germany

² Russell L, Starnes T and Wilkinson J (2017). *Spatial Action Plan for Great Crested Newts in Wrexham, A Manual for Achieving Favourable Conservation Status*. NRW Science Report Series. Report 77 pp 69, NRW, Bangor.



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plus creation of several ponds next to Bryn Lane as mitigation for development in 2008.

However, the Industrial Estate infrastructure of roads, industrial units and areas of hardstanding has resulted in some isolation and fragmentation of the pond clusters located within the industrial estate itself.

This means that the potential dispersal corridors that remain are of prime importance to the continuing function of the wider Wrexham Industrial Estate great crested newt metapopulation.

With regards to dispersal distances, great crested newt have been recorded travelling up to 1.3km in relatively unfragmented rural landscapes. However, such long-range migrations are typically rare with most studies indicating that shorter dispersal distances are more usual. Nevertheless, long-range dispersals are likely very important in maintaining local gene flow and allowing metapopulations to persist (Jehle et al 2011).

Potentially valuable wildlife corridors at the Industrial Estate are likely to include various blocks of broadleaved woodland and unimproved grassland habitats. Such habitats in proximity to the proposed development site include the oaks site itself and woodland habitats along River Clywedog.

The potential value and function of semi-natural habitats at the Industrial Estate acting as wildlife corridors has been recognised by Wrexham Borough Council who have provided a Green Network Plan for the Industrial Estate.

Previous GCN Modelling

A model of great crested newt habitat and likely presence has been developed by Amphibian and Reptile Conservation (ARC), in conjunction with Natural Resources Wales (NRW). This model has covered North East Wales including Wrexham.

To construct the model, Arnell & Wilkinson (2013³) gathered high resolution, recent great crested newt records and then used distribution modelling software, along with environmental layers to produce an estimated probability of presence output for great crested newts in North-East Wales at a 25m resolution across the study area.

³ A.P.Arnell & J.W.Wilkinson (2013) *Spatial Conservation Status Modelling of the Great Crested Newt in Anglesey and North-East Wales*. CCW Contract Science Report No. 1044



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The model has been used to create a number of maps and GIS layers to assist great crested newt conservation across Wrexham, including:

- **Habitat Suitability:** This maps the suitability of habitat for great crested newts across the county;
- **Habitat Value:** This maps the value of particular areas for great crested newts across Wrexham in a landscape context, based on the core habitat of the species within the county;
- **Survey Target Areas:** This maps priorities for great crested newt surveys, highlighting particular areas where knowledge is lacking; and
- **Pond Creation Target Areas:** This maps areas where the creation of new ponds would provide the most conservation benefit

The modelling data and maps are at a relatively coarse geographic resolution, but nevertheless, the Oaks Site and the surrounding areas of habitat are located within broad core habitat and pond creation target areas.

Wildlife Trusts Living Landscapes Project

The Wrexham Industrial Estate forms one of the Wildlife Trust's 'Living Landscapes Projects'. The Wildlife Trusts identify a living landscape as one that involves the creation of robust, resilient and connected landscapes on a large scale that are highly valued and accessible to people; full of wildlife and rich in opportunities for learning, health, well-being and economic development.

The Living Landscapes project identifies the Estate as being of importance for great crested newt but as also having a relatively low pond density. However, it confirms that there are three known great crested newt 'hot spots' located around the former firestone site (at the south of the estate and now the HMP Berwyn mitigation site), at the mitigation sites located along Bryn land (east of the site) and at Erlas Blackwood (at the centre of the site).

The Living Landscapes plan identifies a need to improve connectivity between these amphibian 'hotspots'. This includes a need to create new ponds between the identified areas.

FURTHER ASSESSMENT OF DISPERSAL ROUTES

Methodology

In order to predict potential great crested newt dispersal routes, a model has been produced using records of GCN obtained from COFNOD (See Figure 1). The model examines pond clusters and dispersal routes located at the southeast corner of the Industrial Estate and located within approximately 1km of the Oaks Study Site.



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The GCN data has been plotted on an aerial map of the Industrial Estate along with potential barriers to new dispersal. Barriers include buildings, extensive areas of hardstanding, roads and watercourses. Only GCN data recorded after 2000 has been used.

For each potential barrier, the resistance to great crested newt movement has been assessed based upon professional opinion, on-site knowledge and ground truthing of the features. Some barriers are considered likely to be more-or-less impervious to newt movements (buildings, the River Clywedog, extensive expanses of hardstanding); whilst other features have varying degrees of permeability (e.g. Roads with kerbs and gully pots, roads without kerbs, smaller watercourses etc).

In addition to confirmed great crested newt records, ponds without any survey data have also been plotted. These ponds lie principally to the east of the Industrial Estate. Although these ponds lack positive records of GCN, this is attributable to a lack of survey and so it is likely that a good proportion of these ponds support suitable GCN aquatic habitat and are likely to support GCN.

A buffer area of 250m has been plotted around each pond. These buffers indicate terrestrial habitats likely to support great crested newt. Where buffer areas intersect with neighbouring ponds these indicate areas where there is likely to be frequent movement of newts between ponds.

Groups of ponds have been identified as discreet Pond Clusters. These are numbered 1-6 on Figure 1.

By examining the distribution of ponds and pond clusters in relation to dispersal barriers, distance, and continuous areas of suitable GCN habitat, it has been possible to determine likely and/or potential dispersal newt corridors between the discrete pond clusters.

The Oaks Study Site along with the proposed development extent have been plotted over this Figure to show how the development could potentially impact upon the identified dispersal corridors.

This data is presented on Figure 1 in the Appendix and discussed below.

Analysis of Dispersal Routes and Pond clusters

Pond Cluster 1 comprises of two confirmed GCN ponds located either side of Oak Road. One pond is located within the Oaks Site the other within the grounds of an adjacent industrial estate.



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This cluster is relatively isolated from other pond clusters by both distance and by a series of barriers (see Figure 1) including Oak Road, areas of hardstanding and buildings located to the north of the cluster and by watercourses to the south (River Clywedog and Redwither Brook).

Oak Road itself is likely to act as a partial barrier to newt movements. The road is 8m in width and has a tarmacked pavement either side. The road is kerbed and has gully pots which would be likely to capture and trap some newts attempting to cross the road. However, there is likely to still be some movement of GCN across the road between the two ponds of Cluster 1.

There are also further areas of buildings and extensive hardstanding located directly between the two ponds, however there are some areas of semi-natural habitat with direct linkages to the two ponds and located opposite one another on either side of Oak Road where GCN may move between the two pond sites. This location is to the west of the two ponds. This potential crossing point is shown on Figure 1.

Redwither Brook is likely to present a partial barrier to movements between Ponds in Clusters 1 and 2 (Cluster 2 comprises of ponds located within the Ecology Mitigation Area of HMP Berwyn) with the two clusters further isolated from one another by distance. The brook is located within a trapezoidal, concrete channel and is relatively fast flowing. The closest ponds of Cluster 1 and Cluster 2 are located over 850m away from one another with no suitable ponds or GCN breeding habitat located within intervening habitat.

The River Clywedog is likely to act a barrier to movements between newts in Cluster 1 and Cluster 3 (Cluster 3 comprises of ponds located around the solar farm to the south of the River Clywedog).

The Industrial Estate buildings along Bryn Lane, Abbey Road South and Dunster Road along with their surrounding extensive hardstanding are likely to act as a more-or-less impermeable barrier between Cluster 1 and Pond Clusters 5 and 6 (ponds located either side of Bryn Lane).

It is possible that there may be an interchange of Newts between Pond Cluster 1 and Pond Cluster 4 with intervening habitats comprising of pasture and woodland/scrub habitats within the Oaks Site.

Movement between the two clusters would require GCN to cross Oak Road. However, to the east of the Industrial Estate, Oak Road is a much more permeable barrier to dispersal as the road is narrower (approximately 5.5m in width) and does not have kerbs or gully pots along its full length.



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The closest ponds of Cluster 1 and Cluster 4 are located approximately 600m away from one another with no suitable ponds or GCN breeding habitat located within intervening habitat.

Pond clusters 4, 5 and 6 are well connected to one another and there is likely to be frequent movement of newts between these ponds. If newts are moving between Cluster 1 and Clusters 2 and 4, this would represent a dispersal corridor linking all pond clusters north of the River Clywedog.

These potential dispersal routes, pond clusters and barriers to dispersal are shown on Figure 1.

Taken as a whole, and as indicated on Figure 1, there is potential broad GCN dispersal corridor between Clusters 1, 2, 4, 5 and 6 which runs along the Clywedog River corridor, passes into terrestrial habitats at the Oaks Site and extends to the east of the Industrial Estate, linking to GCN pond clusters located either side of Bryn Lane (Clusters 5 and 6).

Development Impacts and Mitigation Opportunities

As shown on Figure 1, the proposed development area is located within the north-western portion of the Oaks Site. This is located within a blind-ending area of habitat which is isolated to the north and west by surrounding buildings and development associated with the wider Industrial Estate.

As can be seen on Figure 1 the development area will not significantly impinge upon the potential GCN dispersal route along the Clywedog corridor and will still permit movement between the two ponds within Cluster 1 via the most likely existing dispersal route.

The majority of the development is located over 250m away from any GCN Ponds (approximately 1ha of the development land is located within 150m-250m of GCN ponds associated with Cluster 1) and so is away from the core areas of newt terrestrial habitat located around the ponds of Cluster 1, with approximately 5.9ha of land located between 250-500m from the pond. No land will be developed within 150m of the GCN ponds.

The mitigation measures which will form part of the development proposals will offer the opportunity to provide new pond habitat. Whilst the existing Oaks site offers extensive areas of suitable GCN terrestrial habitats, suitable aquatic breeding habitats at the site are limited. There are only two ponds present within the Oaks site: one comprises of a raised concrete tank and does not support GCN, the other is the confirmed GCN pond as described previously.



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It is likely that the absence of suitable aquatic habitats is a limiting factor on the overall viability of the Oaks site for GCN. The absence of multiple breeding habitats also leaves the GCN population susceptible to stochastic events which could destroy the only breeding pond at the site and so potentially wipe out the GCN population present.

Additional ponds at the site would create a more resilient population with GCN able to survive any periodic loss of individual ponds at the site.

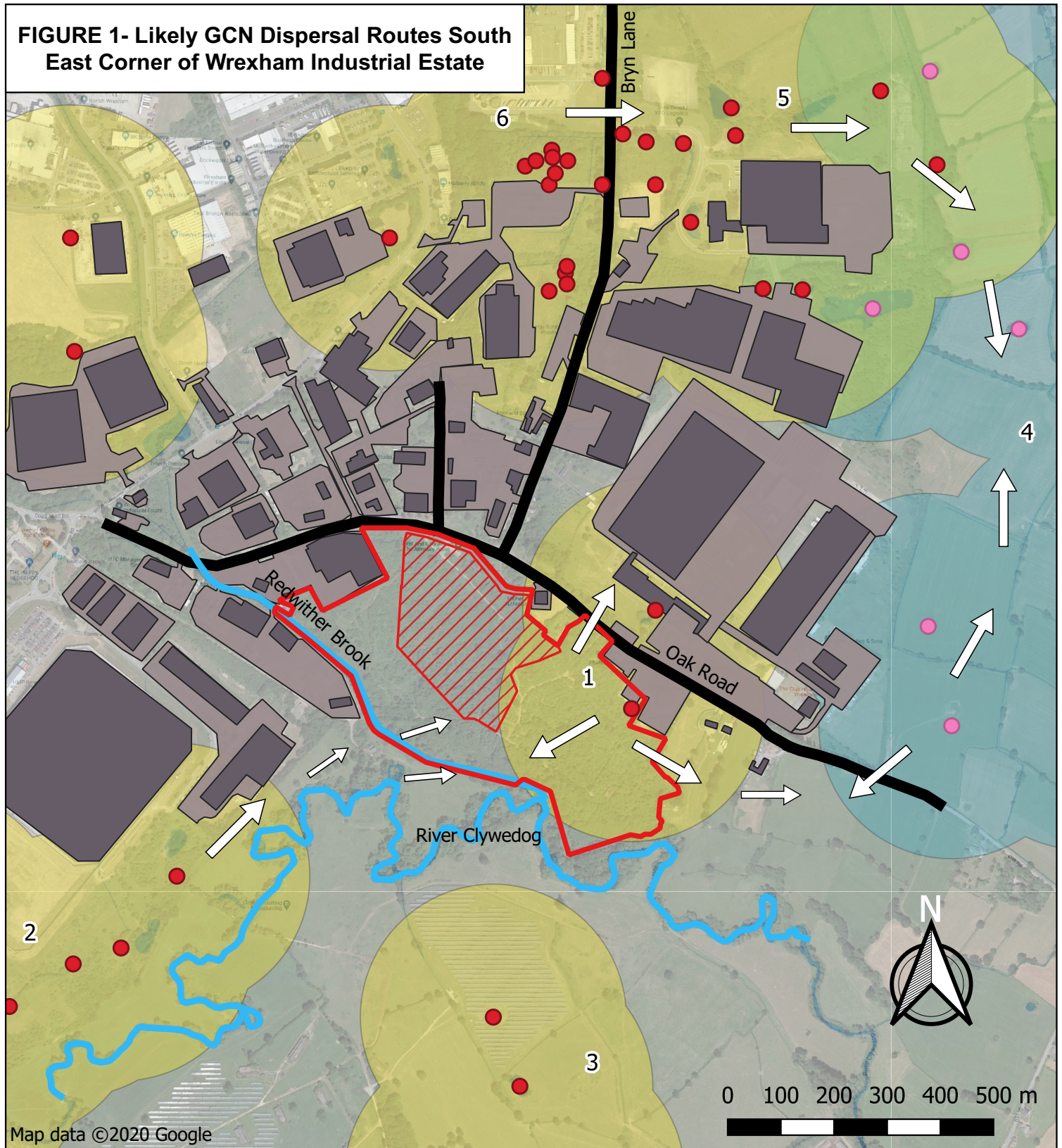
The mitigation ponds could also be strategically located to expand the range of the GCN population at the Oaks with ponds created closer to the southern and eastern boundaries of the site. Outline mitigation proposals with mitigation pond locations are shown in Figure 3 in the Appendix.

Clusters 2 and 4 are currently relatively isolated from Cluster 1 by distance. By expanding the network of ponds within Cluster 1 this would effectively move the edges of these neighbouring clusters closer to one another and so increase the chances of dispersing newts encountering ponds within a neighbouring pond cluster.

This can have the dual benefit of increasing genetic mixing between neighbouring clusters repressing any negative effects of inbreeding depression and can also provide recruitment and recolonisation of suitable habitats where these may have been affected by a localised extinction event.

As opposed to having a negative impact upon connectivity, the development with its associated opportunities to provide mitigation habitat (specifically new aquatic habitat), provides the opportunity to enhance connectivity and dispersal routes for GCN at the Wrexham Industrial Estate, thereby promoting the long-term persistence of the meta-population.

**FIGURE 1- Likely GCN Dispersal Routes South
East Corner of Wrexham Industrial Estate**



Oaks Study Site



Development Area



Existing Buildings



Existing Hardstanding



Watercourse



Pond Cluster



GCN Pond/Record



250m Buffer around GCN record



Ponds (no data)

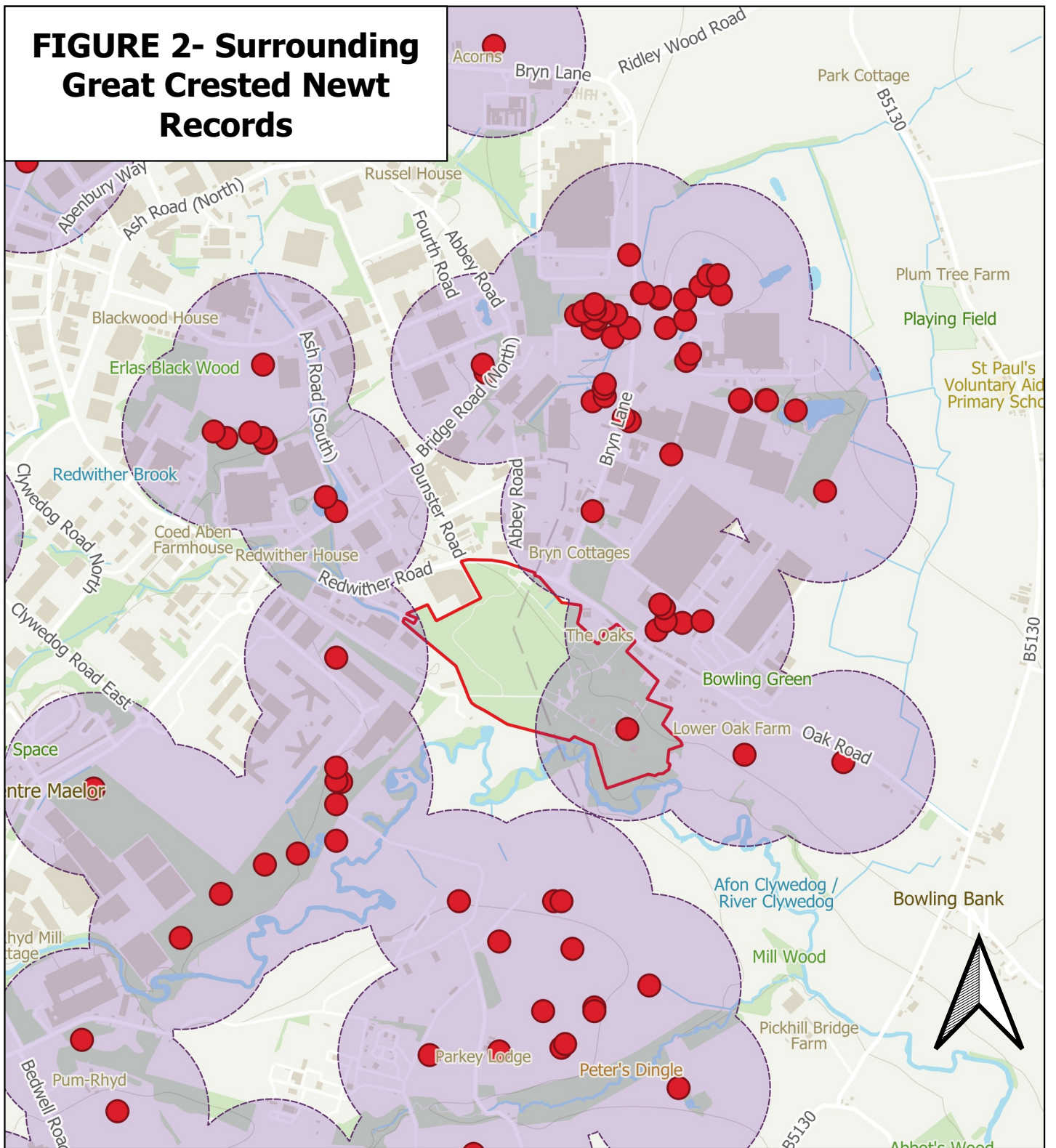


250m buffer around no data pond



Potential GCN dispersal route

FIGURE 2- Surrounding Great Crested Newt Records



KEY

- development boundary
- Great Crested Newt Pond
- 250m Buffer around Pond

0 250 500 750 1000 m



Habitat Management Plan

Areas

- 1- Open grassland habitat
- 2- Heritage/ Scrub Mosaic
- 3- Heritage/Woodland
- 4- Riparian Corridor

- Study Site
- Development Area
- Balancing Pond
- Existing Pond
- Proposed Wildlife Pond
- Proposed Grassland Habitats
- Heritage Buildings

0 50 100 150 m

