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GREAT CRESTED NEWT IMPACT ASSESSMENT

At

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NGR: SJ 38806 49238

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EXECUTIVE SUMMARY

This report is written by Noah Fulton BSc, Graduate Ecologist for United Environmental Services (UES) Ltd. It provides an assessment of the potential impacts on great crested newts (GCNs) *Triturus cristatus* as a result of a proposed development at The Oaks, Wrexham Industrial Estate, Wrexham.

A GCN impact assessment of the onsite and offsite ponds and ditches was undertaken by UES on the 19th and 20th April 2023. The objective of the survey was to establish the suitability of the proposed development site for GCNs, and to provide an assessment of the likely impacts of the development on GCNs. All ponds and aquatic features on site and within 500m of the site boundary (where accessible), were assessed for their potential to support GCNs using the Habitat Suitability Index (HSI).

The site has an area of approximately 23ha and is generally dominated by dense scrub. Small stands of semi-improved grassland are present across the site including glades and pathways through the scrub. Other habitats present on site include hardstanding access tracks and small areas of marshy grassland, tall ruderal vegetation, bare ground, scattered broadleaved trees and ephemeral / short perennial vegetation. The southern section of the site contains stands of woodland.

Six waterbodies and a single ditch were identified on site during detailed habitat assessments undertaken by UES. A review of the aerial photographs and Ordnance Survey maps identified an additional 18 offsite waterbodies that lie within 500m of the survey boundary.

eDNA surveys of four onsite ponds were previously undertaken by Kingdom Ecology in May 2017 (Pond 4) and 2019 (Ponds 1-3). Ponds 1 and 2 were found to be dry at the time of the survey and could not be subject to eDNA analysis. The results for Pond 3 were negative, indicating no GCNs present. The results for Pond 4 were positive, indicating GCN presence.

Of the seven onsite waterbodies, only Ponds 2, 3, 3a and 4 returned positive eDNA results or are confirmed to be in use by suitable breeding GCNs by the presence of eggs. Of these, breeding has currently only been confirmed in Ponds 3 and 4.

Whilst positive eDNA results were returned, Ponds 2 and 3a and not considered to be suitable for use by breeding GCNs. Pond 3a is considered to be too small and lacks sufficient egg-laying opportunities. Pond 2 dries annually during the GCN breeding season, making it unsuitable to support GCN larval stages through their full metamorphosis cycle. It is considered that the very low positive eDNA replicants returned for both ponds indicate either a false positive result, or the use of the waterbodies by a single or very low number of GCNs in a temporary capacity, likely for foraging on an exploratory basis.

Given the confirmed presence of GCNs on site and confirmed breeding within two of the onsite ponds, further population size class assessment surveys should be undertaken of the four onsite ponds that returned positive eDNA results (Ponds 2, 3, 3a and 4). These surveys should include egg searches to further confirm which ponds are being used for breeding purposes. GCN population size class assessment surveys require six survey visits of each pond during the survey period of mid-March to June inclusive. At least three of the surveys of each pond should be undertaken during the peak survey period of mid-April to mid-May.

The results of population size class assessment surveys and further details of the proposed development are needed to inform the mitigation and compensation

measures required as part of the proposals and to determine whether a European Protected Species Mitigation Licence will be required for the development to proceed.

The report should be read in conjunction with appendices 1 to 7, which give visual representations of the survey results.

1 INTRODUCTION

1.1 Author, surveyors and qualifications

This report is compiled and written by Noah Fulton, UES Graduate Ecologist. Other surveyors included:

- Alasdair Grubb BSc ACIEEM, UES Ecologist. Alasdair is licenced by Natural Resources Wales to disturb, take and handle GCN in all counties of Wales under licence number S090926/1.

All surveyors have the knowledge, skills and experience identified within CIEEM's "Competencies for Species Survey: Great Crested Newt" (2013), or were under the supervision of a surveyor with the required competencies.

1.2 Survey objectives

UES was commissioned in December 2022 to conduct site surveys which include the following activities:

- To assess the potential of the proposed development area for use by GCNs
- Conduct an HSI assessment of ponds within 500m of site, where accessible
- Recommend further surveys, mitigation and compensation, where appropriate

1.3 Proposed development

At this stage, no detailed proposals have been submitted to UES.

1.4 Structure of the report

This report sets out the methodology, results, and recommendations in relation to a specific GCN survey. Recommendations are in line with statutory legislation and planning policy objectives.

The report should be read in conjunction with appendices 1 to 7, which give visual representations of the survey results.

2 METHODOLOGY

2.1 Desk study

Aerial photographs and Ordnance Survey maps were used to identify all waterbodies on the site and within a 500m radius of the site boundary.

As part of the Preliminary Ecological Appraisal (PEA) undertaken of the site in November 2022, UES were commissioned to undertake a record search, through COFNOD, of protected or otherwise notable species (including all amphibians species) within 2km of the proposed development site.

2.2 Field survey

2.2.1 Habitat suitability index (HSI)

A site visit was undertaken on 19th and 20th April 2023 by Noah Fulton and Alasdair Grubb. The purpose of the survey was to assess all ponds, ditches and aquatic features on site and within 500m of the site boundary for their potential to support GCNs using the HSI. The HSI is a tool used to provide a numerical indication of the quality of a waterbody in terms of GCN breeding and associated habitat requirements on a scale of 0-1 (0 indicating unsuitable habitat, 1 representing optimal habitat).

HSI scores incorporate ten Suitability Indices (SIs), all of which are factors thought to affect GCNs, namely:

SI 1: Site location
SI 2: Size of pond
SI 3: Pond permanence
SI 4: Water quality
SI 5: Perimeter shading
SI 6: Waterfowl presence
SI 7: Fish presence
SI 8: Number of ponds within 1km
SI 9: Terrestrial habitat
SI 10: Macrophyte cover

In some cases, a net may be used to assess certain SIs, such as water quality. Once a measurement or category has been given for each SI this can then be converted to a figure between 0 and 1 for use in the HSI calculation. This figure is either translated from an assigned category or measurement or read from a graph in the case of a percentage or number.

The HSI is then calculated from the following formula:

$$HSI = (SI1 \times SI2 \times SI3 \times SI4 \times SI5 \times SI6 \times SI7 \times SI8 \times SI9 \times SI10)^{1/10}$$

This will give a final HSI result between 0 and 1, providing a measure of habitat suitability for GCN.

The information gathered from the survey was used to provide a likelihood of GCNs and other amphibians being present on site, in both aquatic and terrestrial habitats.

All waterbodies on site and within 500m of the site are mapped on the pond plan at Appendix 1.

2.2.2 Environmental DNA (eDNA) testing

eDNA testing provides a GCN presence / absence result from water samples taken from a pond, following specific protocols detailed in Biggs *et al.,* 2014. These protocols have been approved as a method to determine GCN presence or absence in a waterbody, within the newt breeding season, from 15th April to 30th June. Using the sterile kit provided from a laboratory, 20 water samples were taken from intervals around a pond and then mixed together. From there, a 15ml sample was transferred into each of the 6 sample tubes, which contained a preserving fluid. The samples were kept refrigerated overnight and sent to the laboratory for analysis. This process was repeated for each pond / waterbody surveyed.

2.3 Survey limitations

The surveys were undertaken at an appropriate time of year. Access was not granted to all offsite waterbodies, however this has been taken into account within this assessment when making recommendations and is not considered to be a significant limitation given the number of waterbodies that have been accessed and the data available.

3 RESULTS

3.1 Desk Study

Records of GCNs were returned from within the site boundary itself. One record is from 2004 and details 13 adults within an unspecified pond. The other record dates from 2021 and details a single adult and an egg within an unspecified pond. The locations / grid references for the records do not correlate with the waterbodies on site and so it is presumed that the records are from ponds that have dried up and are no longer present, or they are lacking accuracy and could be from any of the waterbodies on site. Numerous offsite records of GCNs were also returned from all directions, the closest of which are located approximately 62m north and 162m east. A record of a common frog *Rana temporaria* was also returned from the site and records of smooth newt *Lissotriton vulgaris*, palmate newt *Lissotriton helveticus* and common toad *Bufo bufo* were returned from within 2km.

3.2 Previous survey information

3.2.1 HSI Assessment of onsite ponds

Ponds 1-4 onsite were identified by Kingdom Ecology during an Extended Phase 1 Habitat Survey in 2016 and revisited during an updated ecology walkover survey undertaken in 2019 (see report reference K1720.2). As part of these surveys, the four onsite ponds were assessed for their suitability to support GCN using the HSI in April and August 2016 and revisited in March 2019. The results of these assessments are provided below:

Pond 1 was observed to have a maximum depth of 40cm in 2016 and was assessed to have a HSI score of 0.51, indicating that the pond was of 'below average' auditability for GCN. The pond was found to be dry when re-visited in 2019.

Pond 2 was observed to have a maximum depth of 10cm in early May 2016 and was dry by late June 2016. The pond was assessed as having a HSI score of 0.46, indicating that it was of 'poor' suitability to support GCN. The pond was also found to be dry in March 2019.

Pond 3 was observed to have a maximum depth of 2m in 2016 and 2019. The pond was assessed as having a HSI score of 0.69, indicating that the pond was of 'average' suitability to support GCN. Smooth newt and common toad were observed within the pond in both 2016 and 2019.

Pond 4 was assessed as having a HSI score of 0.62 in 2019, indicating that the pond was of 'average' suitability to support GCNs.

3.2.2 eDNA of onsite ponds

eDNA surveys of the onsite ponds were undertaken by Kingdom Ecology in May 2017 (Pond 4) and 2019 (Ponds 1-3). Ponds 1 and 2 were found to be dry at the time of the survey and could not be subject to eDNA analysis. The results for Pond 3 were negative, indicating no GCNs present. The results for Pond 4 were positive, indicating GCN presence.

3.2.3 HSI Assessment of onsite ponds

A small number of offsite ponds within 500m of the proposed development site have previously been subject to a GCN Impact Assessment by UES in 2022, to inform a proposed development within the wider Wrexham Industrial Estate (see report reference UES03448/07 V2).

Pond 13 achieved a HSI score of 0.81 in 2022, indicating that the pond is of 'excellent' suitability to support GCN.

Pond 14 achieved a HSI score of 0.54, indicating that the pond is of 'average' suitability to support GCN.

Pond 15 achieved a HSI score of 0.59, indicating that the pond is of 'average' suitability to support GCN.

Pond 16 achieved a HSI score of 0.81, Indicating that the pond is of 'excellent' suitability to support GCN.

3.3 Terrestrial habitat assessment

3.3.1 Proposed development site

The site has an area of approximately 23ha and is generally dominated by dense scrub. Small stands of semi-improved grassland are present across the site including glades and pathways through the scrub. Other habitats present on site include hardstanding access tracks and small areas of marshy grassland, tall ruderal vegetation, bare ground, scattered broadleaved trees and ephemeral / short perennial vegetation. The southern section of the site contains stands of woodland.

Overall, the terrestrial habitats on site are broadly suitable for sheltering, foraging and commuting amphibians.

3.2.2 Surrounding habitats

The immediate surrounding area (within 0.5km) comprises agricultural and pasture fields to the south and east, with interconnecting field boundary hedgerows, interspersed with broadleaved trees. Wrexham Industrial Estate extends to the north and west, with numerous roads and urbanised areas. The surrounding fields and hedgerows will provide some foraging and commuting opportunities for amphibians and provide connectivity to higher quality habitat further afield. The wider surrounding area (2km) is similar in composition, with arable and pasture fields containing networks of field boundary hedgerows dominating the landscape to the south and east. Wrexham and Wrexham Industrial Estate lie to the north and west.

3.4 Aquatic habitat assessment

Six waterbodies and a single ditch were identified on site during detailed habitat assessments undertaken by UES. A review of the aerial photographs and Ordnance Survey maps identified an additional 18 offsite waterbodies that lie within 500m of the survey boundary. Most of these waterbodies are situated within the extended rural areas to the south and east and are well

connected to the site via the field boundary hedgerows and lines of broadleaved trees surrounding the arable and pasture fields. The field parcels themselves are large and open which may act as minor barriers to amphibian movement.

Details of the waterbodies surveyed by UES in 2023 as part of this assessment and the level of access available are detailed below:

Table 1 – Waterbody locations and access constraints

Waterbody number	Location	Fully accessible	Visible for HSI survey
P1	On site	Yes	Yes
P1A	On site	Yes	Yes
P2	On site	Yes	Yes
P3	On site	Yes	Yes
P3A	On site	Yes	Yes
P4	On site	Yes	Yes
D1	On site	Yes	Yes
P5	Offsite	Yes	Yes
P5A	Offsite	Yes	Yes
P6	Offsite	Yes	Yes
P6A	Offsite	No	Yes
P6B	Offsite	No	Yes
P7	Offsite	No	No
P8	Offsite	Yes	Yes
P9	Offsite	Yes	Yes
P10	Offsite	Yes	Yes
P11	Offsite	Yes	Yes
P12	Offsite	No	No
D2	Offsite	Yes	Yes
D3	Offsite	Yes	Yes

3.4.1 Onsite waterbody descriptions

Pond 1 – Grid reference: SJ 38537 49328

This pond is a small, shallow body of water located within an area of dense scrub in the western section of the site. The pond was found to be approximately 20cm deep at the time of the survey and measures approximately 35m^2. No submerged or emergent vegetation was observed. Surrounding and marginal vegetation consists of dense hawthorn *Crataegus monogyna,* bramble *Rubus fruticosus agg.,* glaucous sedge *Carecx flacca*, hard rush *Juncus inflexus*, meadowsweet *Filipendula ulmaria*, blackthorn *Prunus spinosa* and goat willow *Salix caprea*. The pond is heavily shaded by a steep bank on the south-eastern aspect and surrounding scrub.

Pond 1A - SJ 38562 49469

This pond is located in the north-wester section of the site, measuring approximately 76m^2. There was very little open water present at the time of the walkover survey, with a maximum depth of 10-20cm throughout. The pond is surrounded and heavily shaded by dense scrub and broadleaved trees on all aspects. No submerged or emergent vegetation is present. The marginal vegetation comprises broadleaved dock *Rumex obtusifolius,* remote sedge *Carex remota*, lords-and-ladies *Arum maculatum*, meadowsweet *Filipendula ulmaria* and wood avens *Geum urbanum*. Other typical woodland and scrub ground flora are also present.

Pond 2 – SJ 38616 49178

This pond is located in the central section of the site and measures approximately 216m^2. The pond is located within a sparsely vegetated woodland understorey that extends across numerous pools of standing water that are divided by wet mounds of earth. No submerged or emergent vegetation is present. The marginal species comprise hawthorn, broadleaved dock, stinging nettle *Urtica diotica*, bramble, creeping buttercup *Ranunculus repens*, meadowsweet, perforate St John's-wort *Hypericum perforatum,* primrose *Primula vulgaris*, hedge garlic *Alliaria petiolata,* and lords-and ladies.

Pond 3 – SJ 9007 48972

Is a large concrete lined and walled tank within the eastern section of the site. The pond measures approximately 138m^2 and is approximately 1m in depth. The tanks walls extend approximately 1m from the ground and it is surrounded by dense scrub on all aspects. Aquatic and emergent vegetation is abundant and includes broadleaved pondweed *Potamogeton natans,* common duckweed *Lemna minor*, brooklime *Veronica beccabunga*, floating sweet-grass *Glyceria fluitans,* soft rush *Juncus effusus*, hard rush*,* great reedmace *Typha latifolia*, branched bur-reed *sparganium erectum*. Marginal vegetation is limited given the raised concrete walls, however willow *Salix spp.* saplings are present where substrate has accumulated at the margins of the pond.

A small ephemeral pool is located between Ponds 3 and 4 at GR SJ 38933 48999 and contains species including great reedmace, hard rush, brooklime, creeping buttercup, floating sweet-grass, water-plantain *Alisma plantago-aquatica*, fool's-water-cress *Helosciadium nodiflorum,* soft rush*,* curled dock *Rumex crispus* and water figwort *Scrophularia auriculata.* This pool is very shallow at less than 5cm deep and is not a permanent aquatic feature as it dries annually and for most of the year.

Pond 3A – SJ 3880 749036

Is a small concrete tank within the southern section of the site that is sunk into the ground and is divided by walls into three compartments that are connected by small underwater pipes. The pond measures approximately 20m^2 and is suspected to be at least 1.5m deep with at least 1m of sediment. A dense mat of common duckweed is present across most of the pond and no other aquatic or emergent vegetation is present other than a small amount of water forget-me-not *Myosotis scorpioides.* Due to the concrete walls, marginal vegetation is limited to ground flora species from the surrounding woodland and scrub.

Pond 4 – SJ 38996 49158

This pond is located within the eastern section of the site and measures approximately 125m^2. The pond is dominated by emergent greater reedmace and is surrounded by dense scrub. Smooth or palmate newt eggs were observed on brooklime within the pond and GCN eggs were identified on both brooklime and wavy bittercress *Cardamine flexuosa*. Other aquatic and emergent species present includes duckweed, water starwort *Callitriche sp.* and branched bur-reed. Marginal vegetation comprises soft rush, water mint *Mentha aquatica*, lesser water-parsnip *Berula erecta,* floating sweet-grass*,* stinging nettle, great willowherb *Epilobium hirsutum,* bittersweet *Solanum dulcamara,* hard rush and meadowsweet.

Ditch 1 – SJ 38743 49405

This ditch is located within the northern section of the site and measures approximately 230m^2. The ditch is shallow and contained approximately 5cm of flowing water at the time of the survey. No submerged or emergent vegetation is present. The marginal species present include bramble, broadleaved dock, common hogweed *Heracleum sphondylium,* dandelion *Taraxacum sp.*, common nettle, scaly male-fern *Dryopteris affinis,* harts-tongue fern *Asplenium scolopendrium,* wavy bittercress, lords-and-ladies and spear thistle *Cirsium vulgare.* The western aspect of the ditch has been subject to recent vegetation clearance works.

3.4.2 Offsite waterbody descriptions

Pond 5 – SJ 39035 49336

This pond is located 60m north-east of the northern site boundary. The pond measures approximately 380m^2. This pond is located within the industrial estate and is surrounded by industrial buildings and areas of hardstanding with an area of scrub immediately surrounding the pond. GCN eggs were identified on water forget-me-not within the pond. Additional marginal species present include Yorkshire fog *Holcus lanatus,* water starwort, broadleaved dock, bramble, creeping thistle *Cirsium arvense,* grey willow*,* bittersweet, cleavers *Galium aparine,* goat willow, crack willow *Salix fragilis*.

Pond 5A – SJ 9155 49318

Is a small, sunken, concrete lined, ornamental pond located 185m north-east of the site and within the grounds of the industrial estate. The pond measures 16 m^2 and has concrete lined walls with 2ft drop to the water line. The aquatic vegetation comprises duckweed and a species of ornamental water lily *Nymphaeaceae sp.* The emergent vegetation consists of yellow iris *Iris pseudacorus* and fool's watercress*.*

Pond 6 – SJ39316 49094

This pond is located 250m east of the survey boundary. The pond measures 390m^2 and is located adjacent to Oak Road. The pond is located connects to a narrow ditch that runs to the east and west of the pond. The pond is surrounded by willow scrub to the north that overhands the majority of the waterbody. Aquatic vegetation includes water startwort, and water plantain. Emergent and marginal vegetation comprises soft rush, grey willow, broadleaved dock,

branched burr-reed, water mint, floating sweet-grass, bittersweet and greater willowherb, in addition to typical scrub ground flora species such as stinging nettle, broadleaved dock, creeping thistle, spear thistle, bramble, lesser celandine *Ficaria verna*, travellers'-joy *Clematis vitalba,* ground ivy, lords-and-ladies, common hogweed, cleavers, common ivy *Hedera helix,* dogs mercury *Mercurialis perennis* and cow parsley *Anthriscus sylvestris.*

Pond 6A – SJ 39451 49087

This pond is located at the margins of the industrial estate approximately 370m from the eastern site boundary and has an area of approximately 170m^2. The pond is surrounded by an intensively managed grassland and appears to have recently been created.

Pond 6B - SJ 39446 49099

This pond is located at the margins of the industrial estate approximately 370m from the eastern site boundary and has an area of approximately 225m^2. The pond is surrounded by an intensively managed grassland and appears to have recently been created.

Pond 7 – SJ 38752 48588

This pond is located within an offsite solar farm approximately 310m from the south-easternmost corner of the site and measures approximately 560m^2. Access to the pond was not granted.

Pond 8 – SJ 3877 48468

This pond is located 420m from the south-eastern site boundary and measures approximately 980m^2. The pond is located within a pasture field with an abundance of suitable commuting corridors for use by amphibians. No aquatic vegetation is present and emergent vegetation is limited to bittersweet. Marginal vegetation includes cock's-foot *Dactylis glomerata,* broadleaved dock, creeping buttercup, cleavers, bramble, gypsywort *Lycopus europaeus,* hard rush, soft rush, oak, goat and grey willow, false oat-grass *Arrhenatherum elatius* and Yorkshire fog.

Pond 9 – SJ 38241 48811

This pond is located 415m south-west of the survey boundary and measures approximately 500m^2. Areas of greenspace surround the pond on all aspects including pockets of broadleaved woodland that flank the River Clywedog which runs in close proximity to the pond, pasture fields and hedgerows.

Pond 10 – SJ 38134 48901

This pond is located 440m south-west of the development boundary and measures approximately 1230m^2. Dense scrub immediately surrounds the pond with areas of greenspace comprising pockets of broadleaved woodland, arable and pasture fields and hedgerows. Submerged species were limited to water starwort. Emergent species include

water plantain, greater reedmace and branched bur-reed. Marginal species include creeping cinquefoil, goat willow, grey willow, hard rush, cypress sedge *Carex pseudocyperus* and curled dock *Rumex crispus*. GCN eggs were identified on the wavy bittercress and brooklime within the pond.

Pond 11 - SJ 38113 49676

This pond is located 410m south-west of the proposed development site and measures approximately 100m2. The pond appears to have recently been created but was dry at the time of the walkover survey.

Ditch 2 – SJ 39498 49291

Is located 460m north-east of the survey boundary and measures approximately 3400m^2. The ditch is located at the base of a field boundary hawthorn and blackthorn hedgerow and was observed to be dry at the time of the survey.

Ditch 3 – SJ38073 48927

Is located 460m south-west of the survey boundary and measures approximately 982m^2. Immediately adjacent to the ditch are manicured strips of amenity grassland. The submerged vegetation comprises brooklime and floating sweet-grass. Emergent vegetation is limited to hard rush, curled dock and greater reedmace. Marginal vegetation comprises greater willowherb, common daisy *Bellis perennis,* creeping buttercup and broadleaved dock. The southern section of the ditch was observed to be wetter than the northern section that is damp but with no standing water. GCN eggs were identified on marginal vegetation within the ditch.

3.4.3 HSI results

Table 2 – HSI results for onsite ponds and ditches

Waterbody number	HSI score	Suitability rating	SIs that decreased the HSI score	SIs that increased the HSI score
P1	0.48	Poor	Pond area, macrophyte cover & pond permanence	Geographic location, waterfowl, fish and pond density
P1A	0.46	Poor	Pond area, shade, water quality, pond permanence and macrophyte cover	Geographic location, waterfowl, fish, pond density and terrestrial habitat
P2	0.47	Poor	Pond area, pond permanence, water quality, shade and macrophyte cover	Geographic location, waterfowl, fish and pond density
P3	0.83	Excellent	Pond area	Geographic location, shade, waterfowl, fish, pond density and terrestrial habitat
P3A	0.58	Below average	Pond area, water quality	Geographic location, shade, waterfowl, fish,

				pond density, terrestrial habitat
P4	0.76	Good	Pond area, pond permanence	Geographic location, shade, waterfowl
D1	0.66	Average	Water quality, macrophyte cover	Geographic location, shade, waterfowl, pond density, terrestrial habitat

Table 3 – HSI results for offsite ponds and ditches

Waterbody number	HSI score	Suitability rating	SIs that decreased the HSI score	SIs that increased the HSI score
P5	0.61	Average	Shade, macrophyte cover	Geographic location, pond area, pond density and terrestrial habitat.
P5A	0.52	Below average	Pond permanence, pond area, terrestrial habitat	Geographic location, pond density
P6	0.68	Average	Pond permanence, shade, macrophyte cover	Geographic location, waterfowl, pond density
P6A	0.65	Poor	Pond area, pond permanence, macrophyte cover	Geographic location, shade, pond density
P6B	0.65	Poor	Pond area, pond permanence, macrophyte cover	Geographic location, shade, pond density
P8	0.77	Good	Macrophyte cover	Geographic location, pond area, pond density, terrestrial habitat
P9	0.62	Average	Shade, macrophyte cover	Geographic location, pond area, pond density, terrestrial habitat
P10	0.85	Excellent	Pond permanence	Geographic location, pond density, terrestrial habitat, water quality, shade
P11	0.66	Good	Pond area, water quality, macrophyte cover	Geographic location, pond permanence, pond density, terrestrial habitat.
D2	0.50	Below average	Water quality, shade, macrophyte cover	Geographic location, pond area, shade, pond density terrestrial habitat
D3	0.79	Good	Pond permanence	Geographic location, shade, pond density, terrestrial habitat

3.4.4 eDNA results

GCN egg observations and the results of the eDNA surveys undertaken by UES and Kingdom Ecology are provided below.

Table 4 – eDNA results

Waterbody number	eDNA result (number of positive replicants)		
	2017	**2019**	**April / May 2023**
P1	N/A	Pond dry	Negative
P1A	N/A		Negative
P2	N/A	Pond dry	Positive (1)
P3	N/A	Negative	N/A – GCN presence confirmed by eggs
P3A	N/A		Positive (2)
P4	Positive	N/A	N/A – GCN presence confirmed by eggs
D1	N/A		Not suitable due to flowing water
P5	N/A		N/A – GCN presence confirmed by eggs
P6	N/A		Negative
P8	N/A		Positive (6)
P9	N/A		Negative

4 IMPACT ASSESSMENT & RECCOMENDATIONS

The terrestrial habitats on site predominantly comprise areas of scrub, woodland and grassland, all of which provide suitable terrestrial habitat for GCNs are other amphibian species. Of the seven onsite waterbodies, only Ponds 2, 3, 3a and 4 returned positive eDNA results or are confirmed to be in use by suitable breeding GCNs by the presence of eggs. Of these, breeding has currently only been confirmed in Ponds 3 and 4.

Whilst positive eDNA results were returned, Ponds 2 and 3a and not considered to be suitable for use by breeding GCNs. Pond 3a is considered to be too small and lacks sufficient egg-laying opportunities. Pond 2 dries annually during the GCN breeding season, making it unsuitable to support GCN larval stages through their full metamorphosis cycle. It is considered that the very low positive eDNA replicants returned for both ponds indicate either a false positive result, or the use of the waterbodies by a single or very low number of GCNs in a temporary capacity, likely for foraging on an exploratory basis.

Given the confirmed presence of GCNs on site and confirmed breeding within two of the onsite ponds, further population size class assessment surveys should be undertaken of the four onsite ponds that returned positive eDNA results (Ponds 2, 3, 3a and 4). These surveys should include egg searches to further confirm which ponds are being used for breeding purposes. GCN population size class assessment surveys require six survey visits of each pond during the survey period of mid-March to June inclusive. At least three of the surveys of each pond should be undertaken during the peak survey period of mid-April to mid-May.

The results of population size class assessment surveys and further details of the proposed development are needed to inform the mitigation and compensation measures required as part of the proposals and to determine whether a European Protected Species Mitigation Licence will be required for the development to proceed.

5 CONCLUSION

The terrestrial habitats on site predominantly comprise areas of scrub, woodland and grassland, all of which provide suitable terrestrial habitat for GCNs are other amphibian species.

Six waterbodies and a single ditch were identified on site during detailed habitat assessments undertaken by UES. A review of the aerial photographs and Ordnance Survey maps identified an additional 18 offsite waterbodies that lie within 500m of the survey boundary.

Given the confirmed presence of GCNs on site and confirmed breeding within two of the onsite ponds, further population size class assessment surveys should be undertaken of the four onsite ponds that returned positive eDNA results (Ponds 2, 3, 3a and 4). These surveys should include egg searches to further confirm which ponds are being used for breeding purposes. GCN population size class assessment surveys require six survey visits of each pond during the survey period of mid-March to June inclusive. At least three of the surveys of each pond should be undertaken during the peak survey period of mid-April to mid-May.

6 REFRENCES

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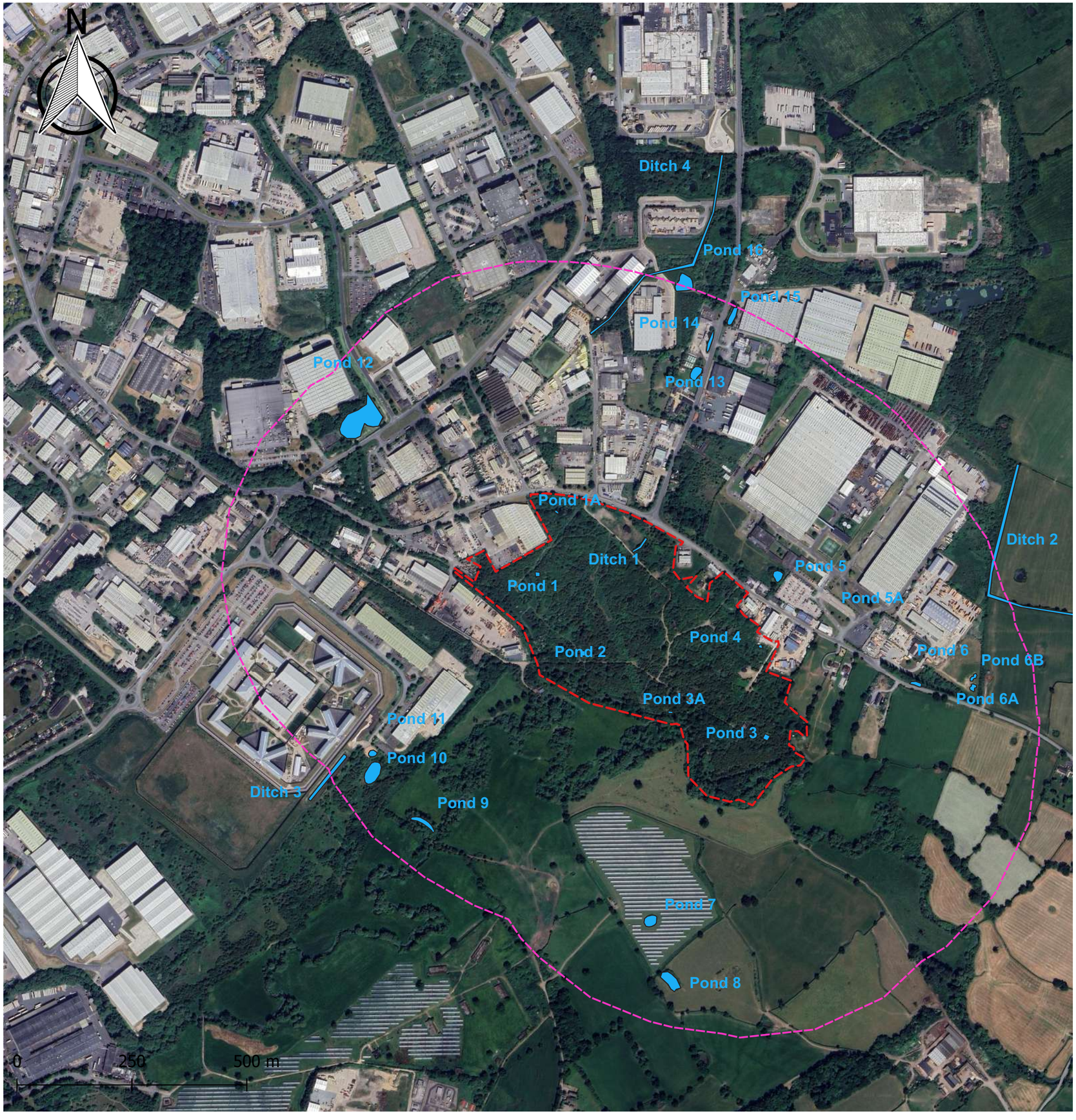
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APPENDICES

Appendix 1 – Pond plan

500m Pond Plan

Site: The Oaks, Wrexham
NGR: SJ 38699 49320
Author: Tom Kenwright
Date: 04/04/2023





KEY:

- Survey boundary
- Waterbodies
- 500m buffer zone to survey boundary

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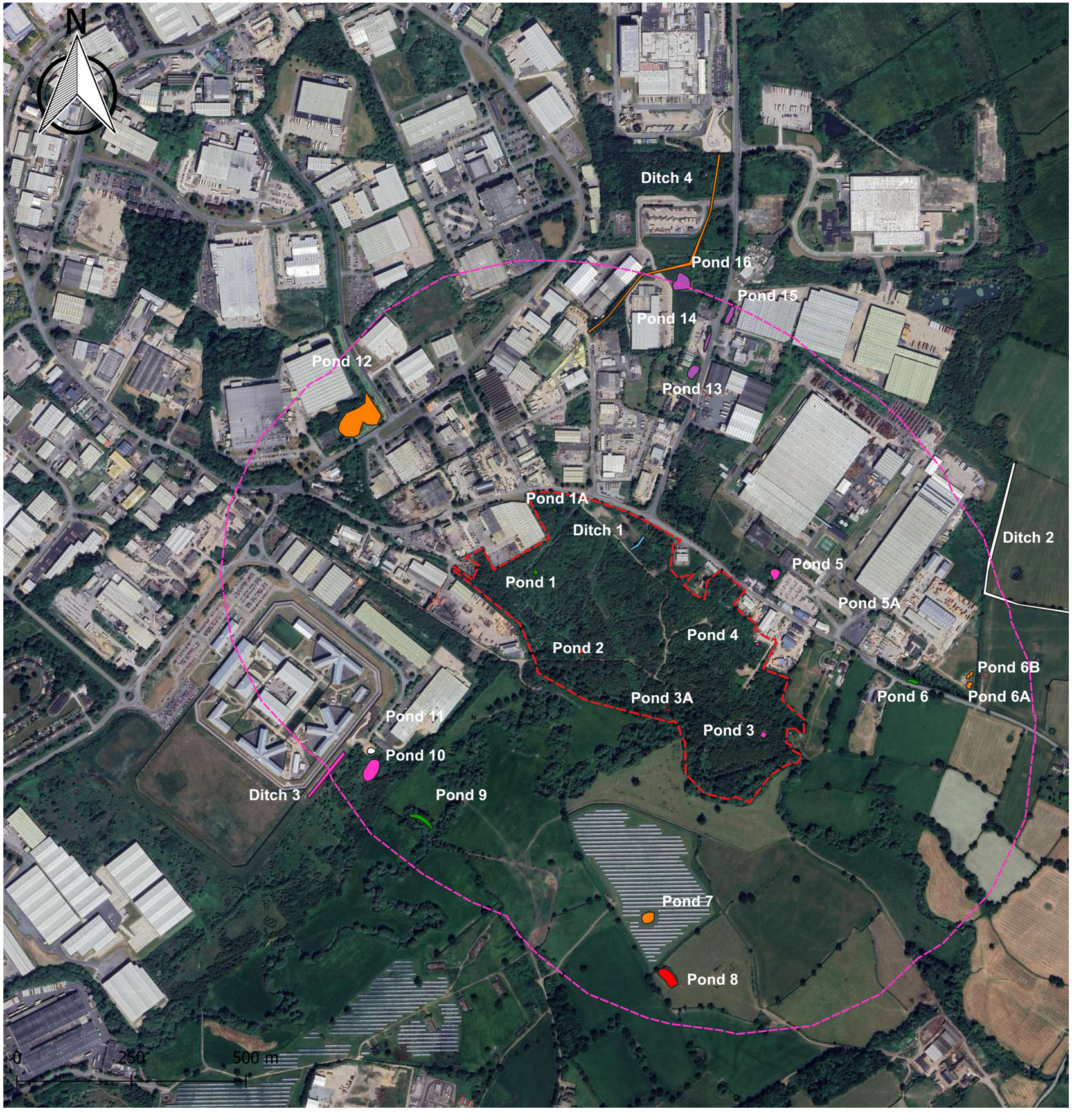
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Appendix 2 – Impact assessment and GCN eDNA results plan

GCN Impact Assessment & eDNA results

Site: The Oaks, Wrexham
NGR: SJ 38699 49320
Author: Tom Kenwright
Date: 04/04/2023





KEY:

- Survey boundary
- 500m buffer zone to survey boundary
- GCN eggs observed
- Positive eDNA
- Negative eDNA
- Assessed by UES in 2022
- No access to view
- No access but could be sufficently viewed
- Flowing water unsuitable for GCNs
- Pond dry

Map data © 2032 Google, Imagery © 2023 Google

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Appendix 3 – Aerial photographs


The Oaks, Wrexham Industrial Estate
Close aerial photograph
Survey boundary
Map data © 2023 Google, Imagery © 2023 Google


The Oaks, Wrexham Industrial Estate
Wide aerial photograph
Site location
Map data © 2023 Google, Imagery © 2023 Google

Appendix 4 – Photographs



Photograph 1 – Pond 1.



Photograph 2 – Pond 1A.



Photograph 3 – Pond 2.



Photograph 4 – Pond 3.



Photograph 5 – GCN eggs within Pond 3.



Photograph 6 – Pond 3A.



Photograph 7 – Pond 4.



Photograph 8 – Pond 5.



Photograph 9 – GCN eggs identified in Pond 5.



Photograph 10 – Pond 5A.



Photograph 11 – Pond 6.



Photograph 12 – Ponds 6A and 6B.



Photograph 13 – Pond 8.



Photograph 14 – Pond 9.



Photograph 15 – Pond 10.



Photograph 16 – Ditch 2.



Photograph 17 – Ditch 3.



Photograph 18 – GCN eggs identified within Ditch 3.

Appendix 5 – HSI results

GCN HSI Calculations

	Pond number	P1	P1A	P2	P3	P3A	P4	P5	P5A	P6	P6A	P6B	P8	P9	P10	P11	D1	D2	D3
	Grid reference	SJ 38537 49328	SJ 38562 49469	SJ 38616 49178	SJ 9007 48972	SJ 3880 749036	SJ 38996 49158	SJ 39035 49336	SJ 9155 49318	SJ39316 49094	SJ 39451 49087	SJ 39446 49099	SJ 3877 48468	SJ 38241 48811	SJ 38134 48901	SJ 38113 49676	SJ 38743 49405	SJ 39498 49291	SJ38073 48927
SI number	SI description	SI values																	
1	Geographic location	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	Pond area	0.05	0.2	0.4	0.3	0.05	0.3	0.8	0.05	0.8	0.2	0.2	0.95	1	0.925	0.5	0.5	0.8	0.95
3	Pond permanence	0.1	0.1	0.1	0.9	0.9	0.5	0.5	0.1	0.5	0.5	0.5	0.9	0.5	0.5	0.5	0.5	0.1	0.5
4	Water quality	0.67	0.33	0.33	0.67	0.33	0.67	0.67	1	0.67	0.67	0.67	0.67	0.67	1	0.33	0.33	0.33	0.67
5	Shade	0.6	0.2	0.2	1	1	1	0.2	1	0.4	1	1	1	0.2	1	1	1	0.2	1
6	Water fowl	1	1	1	1	1	1	0.67	1	1	0.67	0.67	0.67	0.67	0.67	0.67	1	1	0.67
7	Fish	1	1	1	1	1	0.67	0.67	1	0.67	1	1	0.67	0.67	0.67	0.67	0.67	1	0.67
8	Pond density	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9	Terrestrial habitat	1	1	0.67	1	1	1	1	0.33	0.67	1	1	1	1	1	1	1	0.67	1
10	Macrophyte cover	0.3	0.3	0.3	0.9	0.3	1.00	0.3	0.85	0.45	0.3	0.3	0.30	0.30	0.90	0.40	0.3	0.3	0.7
	HSI score:	0.48	0.46	0.47	0.83	0.58	0.76	0.61	0.52	0.68	0.65	0.65	0.77	0.62	0.85	0.66	0.66	0.50	0.79
	Pond suitability:	Poor	Poor	Poor	Excellent	Below average	Good	Average	Below average	Average	Poor	Poor	Good	Average	Excellent	Average	Average	Below average	Good

HSI Score	Pond Suitability
< 0.50	Poor
0.50 - 0.59	Below average
0.60 - 0.69	Average
0.70 - 0.79	Good
> 0.80	Excellent

Appendix 6 – eDNA results

SureScreen Scientifics

Folio No: E16747
Report No: 1
Purchase Order: UES03918
Client: UES Ltd
Contact: Noah Polton

TECHNICAL REPORT

ANALYSIS OF ENVIRONMENTAL DNA IN POND WATER FOR THE DETECTION OF GREAT CRESTED NEWTS (TRITURUS CRISTATUS)

SUMMARY

When great crested newts (GCN), *Triturus cristatus*, inhabit a pond, they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm GCN habitation or establish GCN absence.

RESULTS

Date sample received at Laboratory: 24/04/2023
Date Reported: 25/04/2023
Matters Affecting Results: None

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
1788	The Oaks, Wrexham - Pond 1	SJ 38537 49328	Pass	Pass	Pass	Negative	0
1789	The Oaks, Wrexham - Pond 2	SJ 38616 49178	Pass	Pass	Pass	Positive	1
1791	3A (3 Chambered Concrete tank)	SK 38807 49036	Pass	Pass	Pass	Positive	2
2551	The Oaks, Wrexham - Pond 6	SJ 39316 49094	Pass	Pass	Pass	Negative	0
2553	The Oaks, Wrexham - Pond 8	SJ 38776 48468	Pass	Pass	Pass	Positive	6

2557	The Oaks, Wrexham - Pond 9	SJ 38241 48811	Pass	Pass	Pass	Negative	0

If you have any questions regarding results, please contact us: ForensicEcology@surescreen.com

Reported by: Chris Troth **Approved by:** Chris Troth

METHODOLOGY

The samples detailed above have been analysed for the presence of GCN eDNA following the protocol stated in DEFRA WC1067 'Analytical and methodological development for improved surveillance of the Great Crested Newt, Appendix 5.' (Biggs et al. 2014). Each of the 6 sub-sample tubes are first centrifuged and pooled together into a single sample which then undergoes DNA extraction. The extracted sample is then analysed using real time PCR (qPCR), which uses species-specific molecular markers to amplify GCN DNA within a sample. These markers are unique to GCN DNA, meaning that there should be no detection of closely related species.

If GCN DNA is present, the DNA is amplified up to a detectable level, resulting in positive species detection. If GCN DNA is not present then amplification does not occur, and a negative result is recorded.

Analysis of eDNA requires scrupulous attention to detail to prevent risk of contamination. True positive controls, negative controls and spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared and reported. Stages of the DNA analysis are also conducted in different buildings at our premises for added security.

SureScreen Scientifics Ltd is ISO9001 accredited and participate in Natural England's proficiency testing scheme for GCN eDNA testing. We also carry out regular inter-laboratory checks on accuracy of results as part of our quality control procedures.

INTERPRETATION OF RESULTS

SIC: **Sample Integrity Check** [Pass/Fail]
When samples are received in the laboratory, they are inspected for any tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to inconclusive results.

DC: **Degradation Check** [Pass/Fail]
Analysis of the spiked DNA marker to see if there has been degradation of the kit or sample between the date it was made to the date of analysis. Degradation of the spiked DNA marker may lead indicate a risk of false negative results.

IC: **Inhibition Check** [Pass/Fail]
The presence of inhibitors within a sample are assessed using a DNA marker. If inhibition is detected, samples are purified and re-analysed. Inhibitors cannot always be removed, if the inhibition check fails, the sample should be re-collected.

Result: **Presence of GCN eDNA** [Positive/Negative/Inconclusive]

Positive: GCN DNA was identified within the sample, indicative of GCN presence within the sampling location at the time the sample was taken or within the recent past at the sampling location.
Positive Replicates: Number of positive qPCR replicates out of a series of 12. If one or more of these are found to be positive the pond is declared positive for GCN presence. It may be assumed that small fractions of positive analyses suggest low level presence, but this cannot currently be used for population studies. In accordance with Natural England protocol, even a score of 1/12 is declared positive. 0/12 indicates negative GCN presence.
Negative: GCN eDNA was not detected or is below the threshold detection level and the test result should be considered as evidence of GCN absence, however, does not exclude the potential for GCN presence below the limit of detection.

SureScreen Scientifics

Folio No: E17033
Report No: 1
Purchase Order: UES03918
Client: UES Ltd
Contact: Noah Polton

TECHNICAL REPORT

ANALYSIS OF ENVIRONMENTAL DNA IN POND WATER FOR THE DETECTION OF GREAT CRESTED NEWTS (TRITURUS CRISTATUS)

SUMMARY

When great crested newts (GCN), *Triturus cristatus*, inhabit a pond, they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm GCN habitation or establish GCN absence.

RESULTS

Date sample received at Laboratory: 02/05/2023
Date Reported: 03/05/2023
Matters Affecting Results: None

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
1771	The Oaks, Wrexham - Pond 1A	SJ 38562 49469	Pass	Pass	Pass	Negative	0

If you have any questions regarding results, please contact us: ForensicEcology@surescreen.com

Reported by: Gabriela Danickova **Approved by:** Chris Troth

METHODOLOGY

The samples detailed above have been analysed for the presence of GCN eDNA following the protocol stated in DEFRA WC1067 'Analytical and methodological development for improved surveillance of the Great Crested Newt, Appendix 5.' (Biggs et al. 2014). Each of the 6 sub-sample tubes are first centrifuged and pooled together into a single sample which then undergoes DNA extraction. The extracted sample is then analysed using real time PCR (qPCR), which uses species-specific molecular markers to amplify GCN DNA within a sample. These markers are unique to GCN DNA, meaning that there should be no detection of closely related species.

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Analysis of eDNA requires scrupulous attention to detail to prevent risk of contamination. True positive controls, negative controls and spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared and reported. Stages of the DNA analysis are also conducted in different buildings at our premises for added security.

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SIC: **Sample Integrity Check** [Pass/Fail]
When samples are received in the laboratory, they are inspected for any tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to inconclusive results.

DC: **Degradation Check** [Pass/Fail]
Analysis of the spiked DNA marker to see if there has been degradation of the kit or sample between the date it was made to the date of analysis. Degradation of the spiked DNA marker may lead indicate a risk of false negative results.

IC: **Inhibition Check** [Pass/Fail]
The presence of inhibitors within a sample are assessed using a DNA marker. If inhibition is detected, samples are purified and re-analysed. Inhibitors cannot always be removed, if the inhibition check fails, the sample should be re-collected.

Result: **Presence of GCN eDNA** [Positive/Negative/Inconclusive]
Positive: GCN DNA was identified within the sample, indicative of GCN presence within the sampling location at the time the sample was taken or within the recent past at the sampling location.
Positive Replicates: Number of positive qPCR replicates out of a series of 12. If one or more of these are found to be positive the pond is declared positive for GCN presence. It may be assumed that small fractions of positive analyses suggest low level presence, but this cannot currently be used for population studies. In accordance with Natural England protocol, even a score of 1/12 is declared positive. 0/12 indicates negative GCN presence.
Negative: GCN eDNA was not detected or is below the threshold detection level and the test result should be considered as evidence of GCN absence, however, does not exclude the potential for GCN presence below the limit of detection.

Appendix 7 – Statutory and planning context

STATUTORY AND PLANNING CONTEXT

Ecological assessments

Ecological assessments play an important part within the planning context; they include an initial assessment which highlights any specific interests of a site. From the initial site assessment, the surveyor assesses the suitability of habitats within the site to support protected species and makes recommendations for further survey works if required. The following paragraphs provide a brief interpretation of the legislative protection that is relevant to the findings of this report.

Habitats

Section 7 of the Environment Act (Wales) places a duty on Welsh Ministers to publish, review and revise lists of types of habitats and species in Wales which they consider are of key significance to sustain and improve biodiversity. The Welsh Ministers must also take all reasonable steps to maintain and enhance the habitats published in these lists, and encourage others to take such steps.

Amphibians

<u>Great crested newts</u>

Great crested newts (GCN) *Triturus cristatus* and their habitat (aquatic and terrestrial) are afforded full protection by the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017. If both national and international legislation are taken together, it is an offence to:

- Deliberately, intentionally or recklessly kill, injure or capture GCN
- Deliberately, intentionally or recklessly disturb GCN in such a way to be likely to significantly affect:
- their ability to survive, breed, reproduce, rear or nurture their young
- their ability to hibernate or migrate
- their local distribution or abundance
- Deliberately, intentionally or recklessly take or destroy the eggs of GCN
- Damage or destroy breeding sites or resting places of GCN
- Intentionally or recklessly disturb sheltering GCN, or obstruct access to their resting place
- Keep, transport, sell or exchange, or offer for sale or exchange any live or dead GCN, any part of GCN or anything derived from GCN

Penalties for offences include fines of up to £5000, plus up to six months imprisonment, for each offence committed.

GCN are also protected by the Protection of Animals Act 1911, which prohibits cruelty and mistreatment. Releasing a GCN in such a way as to cause undue suffering may be an offence under the Abandonment of Animals Act 1960.

In addition to the above, there are various statutory provisions relating to the transport of animals, designed to ensure their welfare. GCN are also listed under Section 7 of the Environment (Wales) Act 2016.

It is important to identify the presence of GCN individuals and also to identify suitable habitat on sites so that legal obligations regarding this species can be observed. If a survey identifies the presence of GCN on the site, an assessment of the population size class is required. This can then inform a mitigation scheme, which would need to be developed in liaison with the local Natural Resources Wales (NRW) team, and which minimises direct threats to newts and compensates for any loss of habitat. A licence issued by NRW is required for the legal implementation of a mitigation scheme.

An NRW mitigation licence application requires a Mitigation Method Statement and a Reasoned Statement of Application. The Mitigation Method Statement contains details of the proposed mitigation works. The Reasoned Statement needs to provide a rational and reasoned justification as to why the proposed development meets the requirements of the Conservation (National Habitats & c.) regulations 1994, namely Regulations 44(2)(e), (f) or (g), and 44(3)(a).

Other amphibians

More common British amphibians, such as common frog *Rana temporaria*, common toad *Bufo bufo*, smooth newt *Triturus vulgaris* and palmate newt *Triturus helveticus* are protected only by Section 9(5) of the Wildlife and Countryside Act 1981 (as amended). This section prohibits sale, barter, exchange, transporting for sale and advertising to sell or to buy.

The above named species are also listed as UK Species of Conservation Concern. Due to general declines in most British amphibian species in recent years, many local authorities require amphibian surveys as a planning condition, or as part of environmental information submitted as part of a planning application, even where the presence of GCN is ruled out.

Natterjack toad *Bufo calamita* and pool frog *Pelophylax lessonae* are also offered the same level of protection as GCN, through the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017.

Natterjack and common toad are also listed under Section 7 of the Environment (Wales) Act 2016.

Water bodies that support all five (more common) species of British amphibians in high numbers, may be afforded protection in local plans, as Sites of Importance for Nature Conservation (SINC), or a similar equivalent, for sites of local importance. A site may require statutory protection as a Site of Special Scientific Interest (SSSI).

Planning Policy

National planning guidance is issued in the form of Planning Policy Wales (PPW - 2018). The most relevant sections are included in Chapter 6: Distinctive and Natural Places. This chapter details the policies on issues such as the protection of trees, woodlands, species, and designated sites. The document is free and available to view online