



Report Type: Ecological Appraisal

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Site Address: School House
Cinders
Ruabon
Wrexham
LL14 6LH

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Questions arising from the survey report should be directed to the author of the report who will be pleased to clarify any technical issues raised.

Whilst the surveyors make every reasonable effort, Greenscape Environmental Ltd cannot guarantee that all protected species have been identified and survey results are definitive. Many species are cryptic and transitional in habit.

Reports are considered valid for one year for planning purposes, after which time further survey information may be required.

Greenscape Environmental Ltd can provide advice and support for recommendations and planning conditions.

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1 Executive Summary

1.1 Purpose of the Report

Greenscape Environmental Ltd was commissioned by Carter Jonas on behalf of the client, the Wynnstay Estate, to undertake a preliminary ecological appraisal of land at School House to provide supporting information for a planning application for the construction of stables and a menage.

The survey report has these principal aims:

- To provide an initial assessment of the ecological value of the site in local context.
- To provide details supporting further surveys that may be required.
- To identify potential ecological constraints relating to the development, and recommend measures to avoid, reduce or manage negative effects, and to provide a net ecological gain.

1.2 Methodology

The appraisal included a desktop study and a site visit undertaken at the site, OS grid reference SJ32414336 on 30th July 2021 by C Sheil. The site was revisited on 4th March 2022 by C Sheil.

1.3 Key Impacts and Mitigation Measures

The desktop study included a search for nearby designated sites and previously recorded protected species. It was considered that the site would provide potential habitat for bat, bird and newt species, and these should be the main focus of the ecological appraisal.

The site comprises semi-improved grassland, hedges and trees. Only the semi-improved grassland is to be lost which is of low ecological value.

No habitats on site had any potential roost features for bats and no evidence was found. No further surveys are needed. A lighting plan is to be followed to retain dark corridors for foraging and commuting bats.

Pond 3 scored 0.68 – Average on the HSI assessment. There are two records of GCN in pond 3, though these are from 1992 and are outdated. Pond 2 and Pond 3 were subject to eDNA survey and both gave a negative result for the presence of great crested newts. This means the closest ponds are unlikely to contain newts and no core habitat is being affected. The work will be done under a method statement and watching brief from a suitably licenced ecologist. Conclusion

It is recommended that the biodiversity value of the site will be enhanced post-construction with the inclusion of bat and bird boxes. The landscaping will also be improved by planting new native species hedgerows and trees.

The method statements provided in section 6.3.2 and 6.6.2 of this report will be followed, and work will be conducted at a suitable time of year to minimise potential impacts. There are no other ecological constraints to the development as currently proposed.

Table 1.1. Timing of Works

Action	Timing	Justification
Update phase 1 survey	After 18 months from survey issue date	Ecological features can change and develop over time



2 Introduction

This report has been compiled by Chloe Sheil MZool (Conservation) who has 3 years' experience conducting ecological appraisals. It has been reviewed in line with Greenscape's Quality Management System.

For full details of surveyors and licences please see Appendix A.

2.1 Project Background

Greenscape Environmental Ltd was commissioned by Carter Jonas to conduct a survey to determine the presence of protected species and potential for the damage or destruction of habitats of value. This forms part of the planning application for the construction of a stables and menage at School House, Ruabon.

2.2 Purpose of the Report

This report aims to:

- Identify the key ecological constraints to the proposed development.
- Inform planning to allow significant ecological effects to be minimised or avoided where possible.
- Allow any necessary mitigation or compensation measures to be developed following the mitigation hierarchy.
- Identify any additional surveys that may be required to inform the assessment.
- Identify the opportunities offered by a project to deliver ecological enhancement under NPPF Section 15.

The Local Planning Authority will require further information regarding great crested newts due to a pond being within 50m of the development site.

2.3 Site Context and Location

The site is located to the east of Ruabon, OS grid reference SJ32414336. It is set in a rural environment surrounded by open fields and farmland. There is little connectivity to the surrounding countryside via hedgerows. Woodland is 200m to the west. The surrounds provide potential foraging, resting, and commuting opportunities for bats, birds, amphibians and badgers.



3 Methodology

Broad methodologies for data collection and interpretation were informed by guidance outlined in CIEEM (2017) – Guidelines for Preliminary Ecological Appraisals. Full details can be found in Appendix B.

3.1 Desk Study

The desk study provides contextual information such as the site's proximity to designated areas and known records of protected or notable species. A data search of previously recorded protected species within 1km was purchased from Cofnod on 16th August 2021.

3.2 Field Survey

3.2.1 Date and Survey Conditions

Table 3.1. Survey conditions

Date	Time Start	Equipment Used	Weather
30/07/2021	13:00	Camera, strong torch, net	14°C, light rain, overcast
Comments	PEA. One surveyor used: C Sheil		
04/03/2022	12:00	Camera	Mild wind, no rain, sunny
Comments	Pond Check. One surveyor used: C Sheil		

3.2.2 Habitats

The level of survey is aimed to identify field signs of, or habitats with the potential to support protected species and therefore assist in the determination of site value.

3.2.3 Hedgerows

The aim of the assessment is to ascertain whether the hedgerow could be classified as important according to the definitions listed in the Hedgerow Regulations (1997).

3.3 Species Survey

Features on site were assessed for potential for bat roosts, foraging and commuting. These were conducted in accordance with Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd Edition, BCT, Collins (ed.) (2016).

Badger surveys were conducted using guidance from Scottish Natural Heritage commissioned Report No. 096 (2003).

Features on site were assessed for potential for nesting birds.

The assessment of aquatic habitat for great crested newts is based on the Habitat Suitability Index. The terrestrial habitats at the application site were surveyed and assessed with respect to suitability and potential value for great crested newts.

3.4 Constraints of the Survey

All areas were accessible for the PEA, except the two ponds to the south as they are not on the client's land. This same constraint applied to the pond check.

The PEA was conducted at a suboptimal time of year for the assessment of great crested newts, but this was not considered a constraint because the HSI assessment can be conducted year-round.



4 Baseline Ecological Conditions

4.1 Nearby Features of Importance

4.1.1 Designated Sites

The map from Natural England presented in Figure 4.1 indicated that the site is not within 1km of any designated areas.

MAGiC

Magic Map

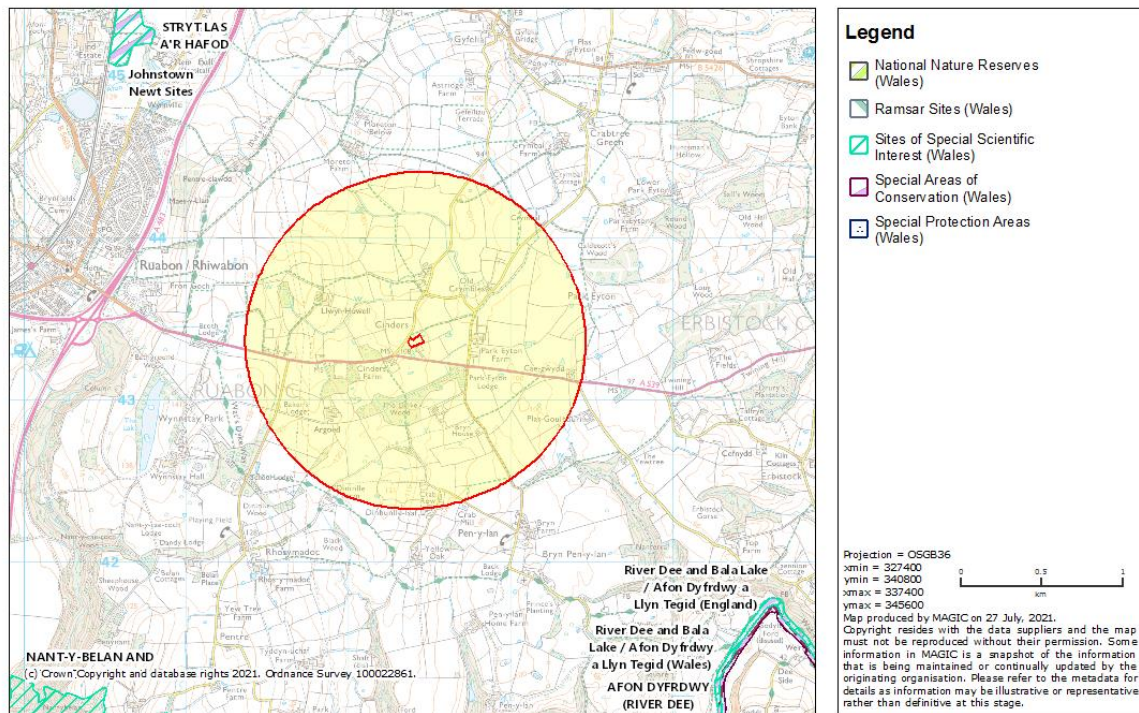


Figure 4.1. Identifying any designated areas near site, a 1km buffer is shown



4.2 Habitats on Site

The site comprises a field of semi-improved grassland (B6), a building (J3.6) and hardstanding and bare earth (J4) bound by hedgerows (J2.1.2) and hedgerows with trees (J2.3.2).

Grassland species in the field include, Yorkshire fog (*Holcus lanatus*), pineappleweed (*Matricaria discoidea*), broadleaved dock (*Rumex obtusifolius*), stinging nettle (*Urtica dioica*), greater plantain (*Plantago major*), meadow buttercup (*Ranunculus acris*), daisy (*Bellis perennis*) and dandelion (*Taraxacum officinale*).



Figure 4.2. Overview of field



Near the centre of the field is an area of bare earth and hardstanding where a building once stood. This extends towards the main road to the south, along the access track.



Figure 4.3. Bare earth and hardstanding

A small stable building also lies near the centre of the site. This is constructed of timber panelling with a roof of corrugated sheet metal.



Figure 4.4. Stable



The western boundary comprises an intact hedgerow 1.5m high and 1m deep. Species include holly (*Ilex aquifolium*) and hawthorn (*Crataegus monogyna*).



Figure 4.5. Western boundary

The southern boundary is an intact hedgerow with trees and a wooden post fence. Species in the hedge include holly, bramble (*Rubus fruticosus*), hawthorn and oak (*Quercus robur*).



Figure 4.6. Southern boundary



There is no formal boundary along the east.



Figure 4.7. Approximate Eastern boundary

The northern boundary is a hedgerow with trees. Species include oak, holly, bramble, hawthorn and elder (*Sambuca nigra*).



Figure 4.8. Northern boundary



4.3 Bats

4.3.1 Records

No records of bats were found within 2km.

4.3.2 Field Observations

None of the mature trees had any potential roost features for bats and the stable has negligible roost potential. No evidence of bats was found.

4.4 Other Mammals

4.4.1 Records

Records of other mammals within 2km include hedgehog (*Erinaceus europaeus*), hare (*Lepus europaeus*) and badger (*Meles meles*).

The nearest records of badger are within 500m, from 2002. The nearest record of hedgehog is 300m away, from 2018. Records of hare are historic.

4.4.2 Field Observations

No evidence of any mammals was found on site.

4.5 Birds

4.5.1 Records

Records of birds within 2km include kestrel (*Falco tinnunculus*) and barn owl (*Tyto alba*).

The nearest records of barn owl are within 200m, from 2016 and kestrel were recorded 200m away in 2019.

4.5.2 Field Observations

The hedgerows, stable and trees provide potential habitat for nesting birds although no evidence was seen.



4.6 Amphibians

4.6.1 Records

A data search from Cofnod returned records of amphibians within 2km include a small newt species (*Lissotriton* spp.) and great crested newt (*Triturus cristatus*). All records of these species provided by Cofnod are historic. Pond 3 has a historic record of great crested newts from 1992. The age of this data means it cannot be relied upon today, but the record is within 20m of the development site.

4.6.2 Field Observations

The site is mostly of low terrestrial value to newts as the semi-improved grassland offers no shelter. The stable provides no habitat of value. The concrete hardstanding shown in Figure 4.3 may provide good shelter for amphibians however. The hedges and trees offer high value habitat as they provide potential hibernation habitat among the roots. The southern section of the site was found to be regularly disturbed as a building outside the red line boundary is undergoing internal works.

There were five ponds mapped on OS maps within 250m.

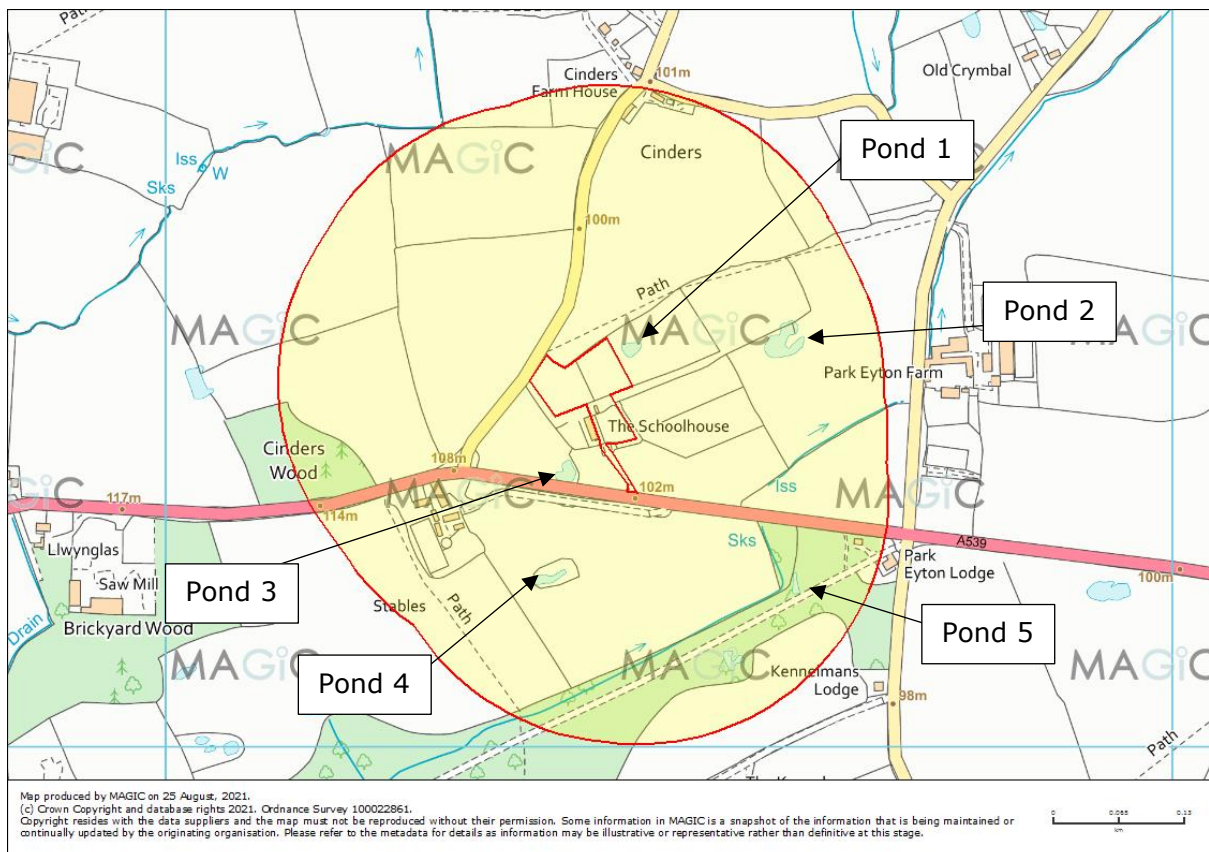


Figure 4.9. OS Map showing a 250m buffer around site, highlighting ponds



Pond 1

This was found to be dry.



Figure 4.10. Area where pond 1 used to be. Taken in 2021

The pond was still dry in March 2022.



Figure 4.11. Area where pond 1 used to be. Photo taken in March 2022



Pond 2

Most of this pond is not on the client's land and is in the neighbouring field. However, a small area of it can be seen from the client's field. Mallards were seen on the water and the pond seemed very well shaded.



Figure 4.12. Pond 2

Table 4.1. HSI score and justification for Pond 2

Pond 2 Grid reference: SJ32614339		
Geographic Location	1	Zone A
Pond Area	0.985	The pond is approximately 800m ²
Permanence	0.9	Never dries
Water Quality	0.33	Few macrophytes were seen. Poor water quality assumed as full netting was not possible.
Shade	0.2	There was estimated to be 100% shading of the area within 1m of the perimeter
Waterfowl	0.67	Waterfowl present but little indication of impact on pond vegetation Pond still supports submerged plants and banks are not denuded of vegetation
Fish	0.67	No evidence of fish but local conditions suggest they may be present
Pond Count	1	There are over 12 ponds within a 1km radius not separated by significant barriers
Terrestrial Habitat	0.33	Habitat with poor structure (semi-improved grassland and open farmland that offers limited opportunities for foraging and shelter (<25% of 250m ²). Woodland is found to the south but is separated by a busy road.
Macrophytes	0.4	There was very little floating or emergent vegetation in this pond, cover was estimated to be <10%
HSI Score	0.57 – Below Average	



The pond had a higher water level in March 2022 and the HSI assessment has been updated. Fewer leaves on the surrounding vegetation allowed for a better view of the pond from the client's land. Egg laying material was found but no indication of egg laying was found.



Figure 4.13. Pond 2 in 2022

Table 4.2. HSI score and justification for Pond 2 in March 2022

Pond 2 Grid reference: SJ32614339		
Geographic Location	1	Zone A
Pond Area	0.985	The pond is approximately 800m ²
Permanence	0.9	Never dries
Water Quality	0.33	Few macrophytes were seen. Poor water quality assumed as full netting was not possible.
Shade	0.2	There was estimated to be 100% shading of the area within 1m of the perimeter
Waterfowl	0.01	Muscovy duck seen on the pond. Banks of the pond overhang the water level, where fowl provisioning has taken place. Major impact.
Fish	0.67	No evidence of fish but local conditions suggest they may be present
Pond Count	1	There are over 12 ponds within a 1km radius not separated by significant barriers
Terrestrial Habitat	0.33	Habitat with poor structure (semi-improved grassland and open farmland that offers limited opportunities for foraging and shelter (<25% of 250m ²). Woodland is found to the south but is separated by a busy road.
Macrophytes	0.4	There was very little floating or emergent vegetation in this pond, cover was estimated to be <10%
HSI Score	0.37 - Poor	



Pond 3

This is adjacent to a very busy road and is very overgrown. Very little water was seen among the vegetation. It would not be possible to survey this pond with conventional bottle-trap techniques with the low water levels and vegetative choking as seen during this survey.



Figure 4.14. Pond 3

Table 4.3. HSI score and justification for Pond 3

Pond 3 Grid reference: SJ32394327		
Geographic Location	1	Zone A
Pond Area	0.2	The pond is approximately 100m ²
Permanence	0.5	Dries between three years in ten to most years
Water Quality	0.67	Not able to net the pond but abundance of vegetation found. Moderate water quality assumed.
Shade	0.4	There was estimated to be 90% shading of the area within 1m of the perimeter
Waterfowl	1	No evidence of waterfowl impact
Fish	1	No records of fish stocking and no fish revealed during survey
Pond Count	1	There are over 12 ponds within a 1km radius not separated by significant barriers
Terrestrial Habitat	0.33	Habitat with poor structure (semi-improved grassland and open farmland that offers limited opportunities for foraging and shelter (<25% of 250m ²). Woodland is found to the south but is separated by a busy road.
Macrophytes	0.8	The pond is completely covered in vegetation.
HSI Score	0.61 - Average	

In March 2022 the pond had a clear water level but this appears to be no more than an inch from the bottom of the pond. The HSI assessment was updated.



Figure 4.15. Pond 3 in 2022 as viewed from the west



Figure 4.16. Pond 3 in 2022 as viewed from the east


Table 4.4. HSI score and justification for Pond 3 in 2022

Pond 3 Grid reference: SJ32394327		
Geographic Location	1	Zone A
Pond Area	0.6	The pond is approximately 300m ²
Permanence	0.5	Dries between three years in ten to most years
Water Quality	0.67	Not able to net the pond but abundance of vegetation found. Moderate water quality assumed.
Shade	0.4	There was estimated to be 90% shading of the area within 1m of the perimeter
Waterfowl	1	No evidence of waterfowl impact
Fish	1	No records of fish stocking and no fish revealed during survey
Pond Count	1	There are over 12 ponds within a 1km radius not separated by significant barriers
Terrestrial Habitat	0.33	Habitat with poor structure (semi-improved grassland and open farmland that offers limited opportunities for foraging and shelter (<25% of 250m ²). Woodland is found to the south but is separated by a busy road.
Macrophytes	0.8	The pond is completely covered in vegetation.
HSI Score	0.68 - Average	

Ponds 4 and 5

These were not on the client's land and so access could not be gained. They are also of low concern as they are separated from the site by a busy road.

4.6.3 eDNA results

Ponds 2 and 3 were subject to eDNA survey on 22nd April 2022. Both ponds gave a negative GCN score, GCN are not likely to have been in these ponds in 2022. Full details can be seen in Appendix D.



Kit ID	Pond ID	Sampled	Arrived	Inhibition	Degradation	GCN Score
GCN-22-00560	'Pond 2 21-07 240'	22-Apr	27-Apr	Pass ✓	Pass ✓	(00)Negative ✗
GCN-22-00559	'Pond 3 21-07 240'	22-Apr	27-Apr	Pass ✓	Pass ✓	(00)Negative ✗

Figure 4.17. Summary of eDNA results



4.7 Reptiles

4.7.1 Records

No records of reptiles were found within 2km.

4.7.2 Field Observations

The site had no features for reptiles and no evidence was found.

4.8 Invasive Species

4.8.1 Records

No records of invasive species were found within 2km.

4.8.2 Field Observations

No evidence of invasive species was found.



5 Description of Proposed Development

The current plans are for the construction of a stables, a menage, horse walker and muck heap. Existing access will be improved and a turning circle will be created.





6 Impacts, Enhancements and Mitigation

6.1 Nearby Features of Importance

Figure 4.1 shows that the site is not within 1km of any designated site. No impact is expected.

6.2 Habitats on Site

6.2.1 Impacts

The development as proposed will result in the loss of semi-improved grassland only. The construction of the stables will create more nesting opportunities for birds. The hedgerows are not considered protected by the Hedgerow Regulations as they are not species rich and show no signs of being historic or previously laid.

Table 6.1. Summary of potential impacts on habitats recorded

Habitat	Value to Protected Species	Impact Without Consideration
Semi-improved grassland	Low ecological value	Low negative impact
Hedgerow	Potential habitat for nesting birds. No evidence found.	No negative impact
Hedgerow with trees	Potential habitat for nesting birds. No evidence found.	No negative impact
Building	Negligible roost potential for bats	No impact on bats
	Potential habitat for nesting birds. No evidence found	No impact on birds
Bare earth and hardstanding	No ecological value	No negative impact
Fence	No ecological value	No negative impact

As no priority habitats listed in Section 41 of the NERC Act (2006) are to be affected, mitigation will be delivered at a species level.

6.2.2 Mitigation and Enhancements

In order to obtain an ecological net gain for the site, the remaining green spaces and site boundaries will require enhancement for local wildlife.

Hedgerows

It is recommended that the landscaping around the site will include some hedge planting to enhance the area for biodiversity.

Plants to use for landscaping and gapping-up of existing boundaries will include locally sourced native species. These will be planted in accordance with BS3936 (part 1, 1992, Nursery Stock, Specifications for trees and shrubs). Planting will occur between November and April depending on the timing of the development.


Table 6.2. New hedge planting scheme

Common Name	Latin Name	Distribution (%)
Hawthorn	<i>Crataegus monogyna</i>	35%
Blackthorn	<i>Prunus spinosa</i>	35%
Hazel	<i>Corylus avellana</i>	10%
Holly	<i>Ilex aquifolium</i>	10%
Wild Service Tree	<i>Sorbus torminalis</i>	10%

Table 6.3. Fruiting plant enhancement

Common Name	Latin Name
Crab Apple	<i>Malus sylvestris</i>
Wild Cherry	<i>Prunus avium</i>
Wild Pear	<i>Pyrus communis</i>

Trees

Trees to be used should be from the list below. These should also be native species, locally sourced where possible. Oak should particularly be encouraged because it supports a large diversity of invertebrates.

Table 6.4. Trees proposed for enhancement

Common Name	Latin Name
English Oak	<i>Quercus robur</i>
Sessile Oak	<i>Quercus petraea</i>
Lime	<i>Tilia cordata</i>
Rowan	<i>Sorbus aucuparia</i>
Silver Birch	<i>Betula pendula</i>

6.2.3 Monitoring

All habitat enhancements will be monitored post-development and any failing plants or features will be addressed as appropriate to maintain the value of the enhancement.



6.3 Bats

6.3.1 Impacts

No habitats on site had any potential roost features for bats. No impact on roosting bats is expected. However, external lighting may cause a reduction in dark corridors used by foraging commuting bats.

6.3.2 Mitigation

Work can be conducted immediately once planning permission has been granted. A lighting plan must be followed to retain dark corridors for bats.

Lighting

Lighting needs to be designed to have minimal impact on bats and their commuting and foraging areas. This results in the recommended use of downlights and the horizontal spread of lighting to be kept to a minimum.

Where it is not possible to reduce the horizontal spread of light, a 2700°K to 3000°K LED light bulb is recommended, which will provide a warm white light. This range has the least impact on bats and invertebrates.

1. A lighting scheme will be drawn up in line with ILP and BCT Guidance Note 08/18.
2. All newly proposed external lighting will be directed away from any vegetated boundary features to retain dark corridors for commuting bats.
3. There will be no direct illumination of any enhancement features erected for bats.
4. All domestic lighting will be below 10 lux, orientated towards the ground and controlled by PIR (Passive Infra-red), set on a short timer.



Figure 6.1. Example external down light design



6.3.3 Enhancements

It is recommended that provision be made for roosting opportunities for bats with the erection of at least one woodcrete bat box suitable for day roosts on a nearby tree or on the new stables. These will be erected at a height of 3-4 m and in a southerly, westerly or easterly facing direction.



Figure 6.2. Example woodcrete bat box: Schwegler 1FF

6.3.4 Monitoring

Failing boxes or enhancements will be replaced at the cost of the developer if deterioration or damage is noted within five years post-development.

6.4 Other Mammals

No evidence of any mammals was found on site, so no negative impact is expected.

6.5 Birds

6.5.1 Impacts

Work at this site will not include any removal of buildings, trees or hedges. No negative impact is expected.

6.5.2 Enhancements

It is recommended that a range of woodcrete boxes are erected around the site to provide an enhancement for passerine birds, and a selection of the following would be appropriate.



Schwegler 1b Bird Box



Schwegler 2H Robin Box



Swallow Nest Cup

Figure 6.3. Bird boxes



6.6 Amphibians

6.6.1 Impacts

The area of the site to be developed is approximately 0.56ha, <0.01ha of which is within 100m of the nearest extant pond that has not been surveyed for great crested newts.

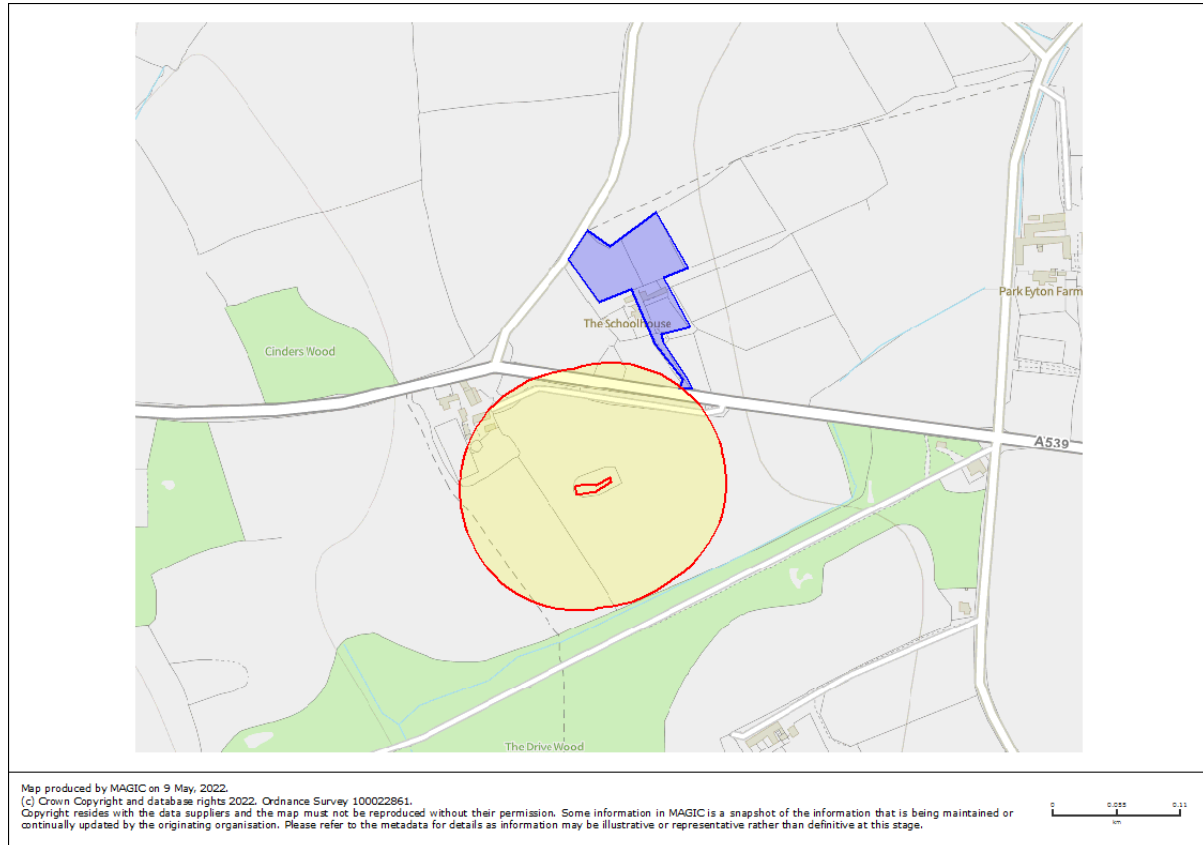


Figure 6.4. 100m buffer around pond 4

Pond 3 scored 0.68 – Average on the HSI assessment during the revisit in 2022. It contained a low level of water. There are two records of great crested newts in this pond from 1992. Although these records are old and no longer considered accurate today, the proximity of the record required additional information to be gained.

eDNA survey carried out on Ponds 2 and 3 in 2022 returned a negative result, GCN are not considered likely to be in these ponds.

Ponds 4 and 5 were not surveyed as access could not be gained and both ponds are on the opposite side of a busy road that could act as a barrier to dispersal. These ponds have better connectivity to The Drive Wood to the south that provides more suitable habitat for newts.



6.6.2 Mitigation and Enhancements

As the closest two ponds returned a negative result for GCN, no core habitat around a possible breeding pond is being impacted. The risk to individual newts can be adequately mitigated through the provision of Reasonable Avoidance Mitigation Measures, securing the protection of individual newts that might cross the site. This method statement will be followed and will create a scenario by which the risk to individual newts is negated.

Working Method Statement

Pre-Construction

1. The site will be kept under management prior to construction. This will reduce the potential for newts to cross the land and reduce the potential for the terrestrial features to improve. All plants will be kept short (<10cm) to ensure there is no shelter for great crested newts on the site.

Site Setup

2. A consultant will be employed as an ecological clerk of works (ECoW) to oversee the work in areas sensitive to great crested newts on site. This person will need to be licensed and an experienced surveyor for great crested newts.
3. The ECoW will provide contractors with a toolbox talk prior to work commencing. This will include information about the legal status of newts and responsibilities of the construction company to ensure no offence is committed. A document to assist with the identification of newts will be left on site.
4. The site will be checked thoroughly by the ECoW prior to construction commencing. This will confirm there are no newts present and that there are no potential places of shelter.
5. Soil and vegetation will be stripped prior to setting up the site compound to ensure the compound contains no vegetation which could potentially attract great crested newts.
6. All cabins and equipment will be located on firm compacted ground, preferably a stone or concrete base.
7. Contractors are advised not to handle newts at any time.

Construction Phase

8. The site foreman will be responsible for ensuring all contractors are aware of the potential to find newts, and that they are familiar with the appearance of newts. If in doubt the ECoW will be contacted.
9. Contractors are advised to avoid handling newts at any time.
10. Stored subsoil must not be tipped onto any tall vegetation. The location of the storage area will be checked by the ECoW before use.
11. Any plants around the site will be kept short (<10cm) to stop the development of an area of terrestrial habitat more suitable for newts.



12. All groundwork will be conducted during daylight hours as newts are least likely to move during this time.
13. Trenches will be dug and filled in on the day created or will be covered over with close-fitting boards at the end of each working day.
14. If it is not possible to cover the trench, a ramp will be placed from the edge of the trench to the base to allow newts and small mammals to escape.
15. Open or covered trenches will be checked the following morning. This is particularly important when newts are most active, between March and November.
16. If a newt is found, then work will stop immediately and the ecologist contacted for advice.
17. Any heavy machinery will be stored on an area of hardstanding to avoid refugia being created.
18. Stored material will be raised on pallets to reduce the potential they might act as a temporary resting place. This reduces the potential for damage or destruction of individual newts.
19. All waste will be placed straight into skips to reduce the potential of creating refugia.
20. Great crested newts will not be handled or moved without express permission from Natural Resources Wales as this would constitute an offence.

Enhancements for Newts

The landscaping features will be designed to enhance the terrestrial features for newts. This will include new hedges and trees.

6.7 Reptiles

No evidence of reptiles was found on site so no negative impact is expected.

6.8 Invasive Species

No evidence of any invasive species was found on site so no negative impact is expected.



7 Concluding Remarks

The survey has focussed on the potential habitats or protected species to be damaged or destroyed as part of this development.

No habitats on site had any potential roost features for bats and no evidence was found. No further surveys are needed. A lighting plan is to be followed to retain dark corridors for foraging and commuting bats. It is recommended that the site is enhanced with bat boxes.

Potential habitat for nesting birds was found in the stable, trees and hedgerows although no evidence was found. No trees or hedgerows are to be removed but it is recommended that the site is enhanced with bird boxes.

The two closest extant ponds were subject to eDNA survey and returned negative results for the presence of GCN. Two ponds could not be surveyed as access could not be gained, but these are over 100m from the site and separated by a busy road. The work will be done under a method statement and watching brief from a suitably licenced ecologist to further minimise the risk to individual newts.

No evidence of mammals, reptiles or invasive species was found so no negative impact is expected.

The development can proceed without the loss of habitat of significant value, and without the loss of the favourable conservation status of any protected species. As there is no evidence of protected species within and around the development site, there is no requirement to address the three tests under Regulation 55 of The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019.

The method statements provided in sections 6.3.2 and 6.6.2 of this report will be followed and works will be done at a suitable time of year. Other than those listed above, there are no ecological constraints to the development as currently proposed.



Appendix A – Surveyor Details

Table A.1. Details of surveyors' experience and licences held

Name	Membership of associations/ experience	Licenses
Chloe Sheil MZool (Conservation)	Chloe has a master's degree in Zoology with Conservation from Bangor University. She has 3 years' experience assisting with surveys.	Listed as an accredited agent on Ben Jones' NRW bat licence – S088669-2
Ben Jones BSc(hons) MSc	Lead Consultant Ben has a degree in Marine and Freshwater biology and a Master's degree in "Managing the Environment". He has 6 years' experience conducting environmental appraisals and phase 2 surveys for bats and newts in England and Wales.	Holder of survey licenses for bats and newts in England and Wales. <u>England:</u> Bats - 2017-29112-CLS-CLS GCN - 2016-25209-CLS-CLS <u>Wales:</u> Bats – S088669-2 GCN – S087992-1



Appendix B – Methodology

Desk Study

Table B.1. Data sources

Organisation/Resource	Information Assessed
Cofnod	Protected/UK BAP Species records (2km)
MAGIC website	International statutory designations (1km) • Special Protection areas (SPA) • Special Areas of Conservation (SAC) • RAMSAR sites National statutory designations (1km) • Sites of Special Scientific Interest (SSSI) • National Nature Reserves (NNR) EPS Licenses for protected species (2km)

A data search was purchased from Cofnod on 16th August 2021.

A search on Multi Agency Geographic Information for the Countryside (Magic Maps) determined nearby designated areas. The map is presented in Section 4.1.

Field Survey

An assessment of habitats was conducted broadly following the JNCC Handbook for Phase 1 Surveys 2010.

The level of survey is aimed to identify field signs of or habitats with the potential to support protected species and therefore assist in the determination for detailed phase 2 surveys.

Determination of Ecological Value is based on the general criteria provided by IEEM (IEEM 2006).

Table B.2. Criteria of ecological values

Ecological Value	Description and Examples
High	Habitats or features that have high importance for nature conservation, such as statutory designated nature conservation sites of international or national importance or sites maintaining viable populations of species of international or national importance (e.g. Red Data Book species; European protected species).
Medium	Sites designated at a county or district level, e.g. Local Wildlife Site (LWS), ancient woodland site, ecologically 'important' hedgerows or ecological features that are notable within the context of a region, county or district (e.g. a viable area of a Priority Habitat on the county BAP or a site that supports a viable population of a county BAP species).
Low	Sites of nature conservation value within the context of a parish or neighbourhood, low-grade common habitats, such as arable fields and improved grasslands and sites supporting common, widespread species.



The aim of the assessment is to ascertain whether the hedgerow could be classified as important according to the definitions listed in the Hedgerow Regulations 1997.

Species Surveys

Bats

Methodology used is in accordance with recommendations by BCT, Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd edition, Collins (2016).

Features on site were assessed for potential for bat roosts, foraging and commuting.

An external assessment of all structures on site was undertaken to determine potential roost features (PRF). The potential suitability of the structures assessed was assigned a rating of low to high in accordance with table 4.1 of Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd edition, Collins (2016).

An internal assessment of all structures was undertaken by a suitably licensed surveyor for evidence of roosting bats such as droppings, feeding remains and staining.

All trees were assessed from ground level. All trees examined were categorised on their potential roost features (PRF). These features include cracks, splits in limbs, cavities, loose bark and thick stemmed ivy. Where appropriate and accessible these features were assessed using binoculars and/or endoscopes.

Table B.3. Categorisation of trees for bats

Value for Bats	Example Features
Negligible	A tree that lacks the requisite features to support roosting bats
Low	A tree that contains a feature or features that clearly offer little roosting habitat for bats
Moderate/High	A tree that provides one or more potentially suitable roosting features for bats
Confirmed roost	Bat presence has been confirmed

Daytime surveys were conducted with the aid of a strong torch. Bat species may leave little evidence of their presence.

Evidence for the presence of bats includes:

- Holes, cracks and rot holes used as roosts, marked by streaks of urine and faeces.
- Smoothed, darkened edges where bats have rubbed and left natural body oils when entering and exiting a space.
- Faeces under a roof access point, a well-used feeding point or a resting spot.
- Feeding signs such as discarded insect wings under a feeding point.
- Lack of cobwebs around eaves, roof spaces, beams or ceilings where routes are kept clear by bats or presence of droppings in a cobweb.
- Presence of roosting or dead bats in or behind any object.



Badgers

Surveys were conducted using guidance from Scottish Natural Heritage commissioned Report No 096 (2003).

Daytime surveys for badgers involved looking for:

- Scrapings where badgers have dug for food or used as latrines.
- Signs of a sett, including signs of use such as presence of badger hair.
- Tracks and prints.

Birds

Searching for evidence of nesting birds, including barn owls, involved looking for:

- Presence of nests
- Collections of droppings and/or feathers
- Highly distinctive droppings or splats under roosting points.
- Presence of owl pellets/feathers
- Listening for bird song
- Recording bird activity

Amphibians and Reptiles

The assessment of aquatic habitat is based on the Habitat Suitability Index (HSI) and is applied according to guidance set out by the Oldham 2000, superseded by ARG in 2010, ARG UK Advice note 5. The HSI is a quantitative method of assessing the potential quality of a body of water in terms of its ability to sustain a population of great crested newts.

The terrestrial habitats at the application site were surveyed and assessed for their suitability and potential value for the support of GCN. The general topography, ground conditions and presence or absence of vegetation were recorded. A refugia search was conducted for amphibians and reptiles by looking under any logs, large stones and other debris.



Appendix C – Policy

The following areas of policy and legislation are of relevance to ecology and provide context to the surveys conducted. Findings presented in this report are in line with the following:

The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 – as listed in:

- Schedule 2. European protected species of animals
- Schedule 5. European protected species of plants

The Wildlife and Countryside Act (1981) – as listed in:

- Schedule 1. Birds protected by special penalties at all times
- Schedule 5. Protected animals
- Schedule 8. Protected plants

Countryside and Rights of Way Act (2000)

Hedgerow Regulations (1997)

The Protection of Badgers Act (1992)

Natural Environment and Rural Communities (NERC) Act (2006)

Planning Policy Wales 2002, updated Dec 2018

Section 6.4 – Biodiversity and Ecological Networks

The Nature Recovery Plan for Wales – Setting the course for 2020 and beyond (2015)

Environment Act (Wales) (2016)

Section 7

Wrexham Unitary Development Plan – EC6 Biodiversity Conservation



Hedgerows

All hedgerows are potentially protected by the Hedgerow Regulations 1997. Under these regulations it is against the law to remove or destroy certain hedgerows without permission from the LPA. These Regulations do not apply to any hedgerow within the curtilage of or marking the boundary of a dwelling house.

Permission is required before removing hedges that are least 20m in length and over 30 years old. Permission is gained by submitting a Hedgerow Removal Notice to the LPA as set out in Schedule 4 of the Regulations.

Permission is not required in the following instances:

- To make a new opening in substitute for an existing one which gives access to land.
- To obtain temporary access to any land in order to give assistance in an emergency.
- To gain access to land where another means of access is not available or is available at a disproportionate cost.
- For National Defence purposes.
- Where planning permission has been authorised except where permission has been granted by the Town and Country Planning General Permitted Development Order 1995.
- To carry out work for the purposes of flood defence or land drainage.
- To prevent spread of or ensure eradication of a plant or tree pest.
- For work undertaken by the Secretary of State in respect of any highway for which he is the highway authority or in relation to which he has the same powers as the Local Highway Authority.
- To prevent obstruction of or interference with electric lines and plant or prevent danger under the Electricity Act 1989.
- For the proper management of the hedgerow.

Hedgerows in areas covered by Historic Landscape Characterisation are often protected on the basis of historical importance and their wildlife value.

Hedgerows are listed as a habitat of principal importance under section 41 of the NERC Act (2004). This draws on the UK Biodiversity Action Plan (BAP) definition of priority habitats. Under the 2007 UK BAP, hedgerow priority habitat includes all hedgerows with at least 80% cover of at least one woody UK Native species (BRIG 2011).



Bats

All bat species are protected under The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 which implements the EC Directive 92/43/EEC in the United Kingdom. It is an offence, with certain exceptions, to:

- Deliberately capture or kill any wild animal of a European Protected Species.
- Deliberately disturb any such animal.
- Damage or destroy a breeding site or resting place of such a wild animal.
- Keep (possess), transport, sell or exchange, or offer for sale or exchange, any live or dead wild animal or plant of a European Protected Species, or any part of, or anything derived from such a wild animal or plant.

A person found guilty of an offence is liable on summary conviction to imprisonment for a term not exceeding six months or to an unlimited fine or to both.

Seven bat species are on the UK Biodiversity Action Plan and are listed as Species of Principal Importance under the provisions of the Natural Environment and Rural Communities (NERC) Act 2006. The National Planning Policy Framework (NPPF) states that to minimise impacts on biodiversity and geodiversity, *"planning policies should... promote the preservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species populations"*.

Badgers

Badgers and their setts are specifically protected under the Protection of Badgers Act 1992. The act was primarily brought into force to prevent the deliberate injury to or death of badgers. Some aspects of the act affect developers. It is important that developers are aware of any badger setts located on the land they intend to develop.

All personnel working on sites where there are badgers should be aware of the Protection of Badgers Act 1992. Under this legislation it is an offence to:

- Damage a badger sett or any part of it.
- Destroy a badger sett.
- Obstruct access to, or any entrance of a badger sett.
- Causing a dog to enter a badger sett.
- Disturbing a badger when it is occupying a badger sett.

Birds

Under Section 1 of the Wildlife and Countryside Act 1981 (as amended), birds, their nests and young are all protected from damage, particularly during the breeding season. The Act allows for fines or prison sentences for every bird, egg or nest destroyed. It makes it an offence to:

- Intentionally kill, injure or take any wild bird.
- Take, damage or destroy the nest of any wild bird whilst it is in use or being built.
- Take damage or destroy the egg of any wild bird.
- To have in one's possession or control any wild bird, dead or alive or egg or any part of a wild bird or egg.

Some bird species are included in the UK and local BAPS and are recognised as species of principal importance for nature conservation in accordance with section 41 of the NERC



Act 2006. Such species and their habitats receive protection through the provisions of the NPPF.

Barn Owls

Barn owls are listed on Schedule 1 which gives them special protection.

It is an offence to:

- Intentionally kill, injure or handle any wild barn owl.
- Intentionally take, damage or destroy any wild barn owl nest whilst in use or being 'built'.
- Intentionally take or destroy a wild barn owl egg.
- Have in one's possession or control a wild barn owl (dead or alive) or egg (unless one can show it was obtained legally).
- Intentionally or recklessly disturb any wild barn owl whilst 'building' a nest or whilst in, on, or near a nest containing young.
- Intentionally or recklessly disturb any dependent young of wild barn owls.

It is not an offence to:

- Take a disabled wild barn owl solely for the purpose of tending it until fully recovered and then returning it to the wild.
- Kill, injure, take or disturb barn owls if these were incidental results of a lawful operation and could not reasonably have been avoided.

Amphibians and Reptiles

All species of amphibians receive a measure of protection under legislation.

The Wildlife and Countryside Act 1981 has been amended by the Countryside and Rights of Way Act (CROW) 2000. This applies to England and Wales only. The key relevant fact is:

- Section 9(4) is amended to create an additional offence of reckless damage to, destruction of, or obstruction of access to, any structure or place used for shelter or protection; and reckless disturbance while occupying such a structure or place.

Great Crested Newts

Great crested newts are protected under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 which implements the EC Directive 92/43/EEC in the United Kingdom. It is an offence, with certain exceptions, to:

- Deliberately capture or kill any wild animal of a European Protected Species.
- Deliberately disturb any such animal.
- Deliberately take or destroy eggs of any such wild animal.
- Damage or destroy a breeding site or resting place of such a wild animal.
- Keep (possess), transport, sell or exchange, or offer for sale or exchange, any live or dead wild animal or plant of a European Protected Species, or any part of, or anything derived from such a wild animal or plant.

Great crested newts are listed as a priority species on the UK BAP and Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. The National Planning Policy Framework (NPPF) states that to minimise impacts on biodiversity and geodiversity,



"planning policies should... promote the preservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species populations".

A person found guilty of an offence is liable on summary conviction to imprisonment for a term not exceeding six months or to an unlimited fine, or to both.

Work can be conducted under derogation licence from Natural Resources Wales providing suitable compensation and mitigation is provided and the "three tests" can be met. These are:

- Regulation 55(2)(e) states: a licence can be granted for the purposes of "preserving public health or public safety" or other imperative reason of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment.
- Regulation 55(9)(a) States: the appropriate authority (Natural Resources Wales) shall not grant a licence unless they are satisfied "that there is no satisfactory alternative"
- Regulation 55(9)(b) states that the appropriate authority shall not grant a licence unless they are satisfied "that the action licensed will not be detrimental to the maintenance of the population of the species concerned at favourable conservation status in its natural range."



Appendix D – eDNA Results



GREAT CRESTED NEWT DETECTION RESULTS

Company: Greenscape Environmental

Order number: SO00374

Project code: 21-07 240 Cinders

Date of Report: 9 May 2022

Number of samples: 2

Thank you for sending your sample(s) for analysis by NatureMetrics. Your sample(s) have been processed in accordance with the protocol set out in Appendix 5 of Biggs et al. (2014).

Summary of the results

Results indicate GCN absence in 'Pond 2 21-07 240', and 'Pond 3 21-07 240'.

The extraction blank control and the qPCR negative controls were negative, and the qPCR positive controls and their replicates amplified as expected

Results are based on the samples as supplied by the client to the laboratory. Incorrect sampling methodology may affect the results. Note that a negative result does not preclude the presence of GCN at a level below the [limits of detection](#).

Methods

eDNA was precipitated via centrifugation at 14,000 x g and then extracted using Qiagen DNeasy Blood and Tissue extraction kits. qPCR amplification was carried out in 12 replicates per sample, using GCN specific [primers](#) and [probe](#) (developed by Thomsen et al. (2012) and adopted by Biggs et al. (2014)), in the presence of [extraction negative controls](#), [qPCR positive controls](#), and [qPCR negative controls](#). A score is given for the number of positive replicates out of 12.

The qPCR method follows the recommendations set out by NatureMetrics for Natural England in the qPCR validation project and helps improve the reliability of the interpretation of the data. Results from the GCN assay are considered to have a [high](#) confidence rating according to our [Validation Scale](#) (Harper et al. 2021).

The quality control methods exceed the requirements outlined in Appendix 5 of Biggs et al. (2014). These consist of the use of [kit blanks](#), additional [extraction negative controls](#) and [qPCR negative controls](#), and [qPCR positive controls](#). The qPCR positive controls are standards of known concentration amplified in triplicate to generate [limit of detection](#) and give confidence to any weak and late amplifications.

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Kit ID	Pond ID	Sampled	Arrived	Inhibition	Degradation	GCN Score
GCN-22-00560	'Pond 2 21-07 240'	22-Apr	27-Apr	Pass ✓	Pass ✓	(00)Negative ✗
GCN-22-00559	'Pond 3 21-07 240'	22-Apr	27-Apr	Pass ✓	Pass ✓	(00)Negative ✗

END OF REPORT

Report issued by: **Ben Jones**
Contact: **team@naturemetrics.co.uk**

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target is absent or that external factors such as ecology, seasonality, and spatial scales are influencing the detections.

- High

High rating assays have everything that a Medium assay has, in addition to site occupancy modelling and extensive testing of external effects such as ecological, temporal and spatial factors. Positive results can be conclusively interpreted, and negative results can be interpreted as meaning the target species' DNA is absent (assuming the correct sampling conditions). In some instances, a probability of target species presence at a site and in a sample can be given.

Glossary

controls

Controls are used to monitor both the performance of the assays but also any contamination. Controls are treated in the same way as a normal sample. This is particularly important given the sensitivity of eDNA qPCR methods. Our full complement of controls enables us to fully monitor the whole GCN eDNA process from kits to data.

- kit blank

Used to determine if the kits are contaminated but also to monitor the early stages of the pipelines, e.g. sample reception. These samples also act as uninhibited samples that can be used as a baseline to compare against. This is an additional control not specifically mentioned in the Biggs et al. (2014) protocol.

- extraction negative

Extraction blank. Used to monitor potential contamination during the DNA extraction process.

- qPCR negative

Template negative control. Used to monitor potential contamination during the qPCR setup process. For every qPCR reaction, we include more qPCR negative controls than are prescribed in the Biggs et al. (2014) protocol.

- qPCR positive

Used to determine whether the assay is working correctly. In addition to the 4 standard dilutions prescribed by the Biggs et al. (2014) protocol, we include an additional standard dilution and amplify all standards in triplicate. We can use this increased number of replicates and standards to generate standard curves that will allow us to calculate the **limit of detection (LOD)**.

-Limit of detection

Limit of detection. The lowest concentration of qPCR positive control DNA that amplifies. LOD is determined for every single qPCR plate. Target amplification below the LOD cannot automatically be considered as negative but should be further investigated as spurious amplifications are more prevalent at these low concentrations.

eDNA

Short for 'environmental DNA'. Refers to DNA deposited in the environment through excretions and secretions, such as mucus, skin cells, saliva, faeces, urine etc. This can be collected in environmental samples (e.g. water,

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Understanding your results

Positive	Target DNA has been detected in this sample, meaning that at least 1 of the 12 qPCR replicates has amplified. This is not a quantitative test, so you should not interpret a high eDNA score (e.g. 12/12) as necessarily indicating a larger population of GCN than a low eDNA score (e.g. 1/12).
Negative	No target DNA has been detected in this sample, but the internal and external controls worked as expected. This tells us that if there had been GCN DNA in the sample, we would have detected it, so we can be confident in its absence from the sample provided.
Inconclusive	No GCN DNA was detected in the sample, but the internal controls failed to amplify as expected. This means that any GCN DNA in the sample might also have failed to amplify properly, so we cannot have confidence in this negative result. Inconclusive results can be caused by the degradation of the DNA (as indicated by delayed or no amplification of the DNA marker contained in the ethanol in the kits) or by inhibition of the reaction (as indicated by delayed or no amplification of the DNA marker added in the lab) caused by certain chemicals or organic compounds that may be present in the water sample.
Validation Scale	We have developed our own confidence assessment tool for qPCR eDNA assays that builds upon the Thaler et al. (2021) validation scale and helps end-users to interpret the qPCR outputs but also contextualise these with the level of validation that the assay itself has gone through. Briefly, the level of confidence that can be assigned to results coming from an assay is derived from several validation steps: • Basic analysis - can the assay work in principle on the computer? • PCR protocol - has the protocol been optimised in the lab? • Specificity analysis - has the assay been tested in the lab against other co-inhabiting and/or closely related species? • How extensively has the assay been tested with natural samples? • Have the theoretical limits of detection been established? • Have detection probabilities been estimated with extensive site occupancy modelling? • Have external factors affecting detectability been extensively tested (e.g. seasonality, spatial heterogeneity)?
- Low	Results from these assays are difficult to interpret with confidence. It is impossible to conclusively tell if the target species is present or absent because of the limited amounts of <i>in silico</i> , <i>in vitro</i> , and <i>in vivo</i> testing.
- Medium	Assays with this rating have been tested <i>in silico</i> , have optimised lab protocols, specificity and sensitivity tested in and out of the lab, but with no estimates of detection probabilities or extensive testing of external factors that may affect the detectability of the target. Positive results can be interpreted as meaning the target species' DNA is present (assuming the correct sampling conditions), but negative results could mean that the

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sediment) and used to identify the organisms that it originated from. eDNA in water is broken down by environmental processes over a period of days to weeks. It can travel some distance from the point at which it was released from the organism, particularly in running water. eDNA is sampled in low concentrations and can be degraded (i.e. broken into short fragments), which limits the analysis options.

inhibitors	Chemicals/compounds that reduce or prevent DNA amplification, potentially resulting in false-negative results. Common inhibitors include tannins, humic acids and other organic compounds. Inhibitors can be overcome by either diluting the DNA (and the inhibitors), but dilution carries the risk of reducing the DNA concentration below the limits of detection.
qPCR	Stands for 'quantitative PCR'. A PCR reaction incorporating a coloured dye that fluoresces during DNA amplification, allowing a machine to track the progress of the reaction. Often used with species-specific primers and probe where amplification is used to infer the presence of the target species' DNA in the sample. If the species is not present in the sample, no fluorescence will be detected.
- primers	Short sections of synthesised DNA that bind to either end of the DNA segment to be amplified by qPCR.
- probe	A short section of synthesised DNA that binds to a specific section of the target species' DNA within the section flanked by the primers. The probe is designed to be totally specific to that species. The probe is labelled such that it fluoresces during amplification, which is used to infer the presence of the target species' DNA in the sample.

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