

Lullington Solar Farm



Great Crested Newt Survey Report

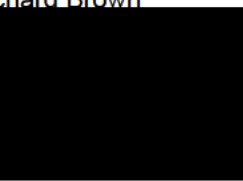
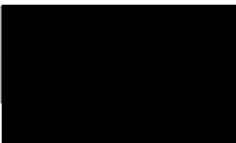
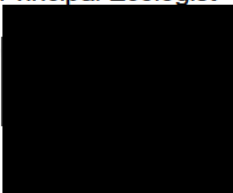
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EXECUTIVE SUMMARY

Contents	Summary
Site Location	The site is located on land north of Lullington, Derbyshire and is centred at Grid Reference SK 24750 13763.
Proposals	The development proposal is for the installation of a ground mounted solar farm within the c. 70 ha of agricultural land north of the village of Lullington.
Existing Site Information	An Ecological Appraisal of the site was conducted by WYG in 2019 (WYG is now part of Tetra Tech). This identified suitable habitats to support GCN within the site as well as nine ponds within the development boundary and 19 ponds within 500 m of the development boundary. Further surveys to establish the presence or likely or likely absence of GCN using eDNA water sample testing was therefore recommended. If present, population estimate surveys were also recommended.
Scope of this Survey(s)	Taking and testing of water samples for the presence of eDNA belonging to GCN was completed in April 2021. Population estimate surveys were undertaken of two ponds where GCN eDNA was detected in May and June 2021.
Results	Pond P5 and Pond P28 were positive for eDNA belonging to GCN. Population estimate surveys did not identify GCN in Pond P5 and Pond P28.
Recommendations	It is suggested that the eDNA sample testing was erroneous; or that GCN had visited Pond P5 and Pond P28 and left again prior to population estimate surveys were completed; or they are present in such low numbers that detection by traditional means was not possible. Based on these findings, it is considered that the risk to GCN from the development proposals is extremely low, as they are either absent or only present in very low numbers. It is therefore recommended that a precautionary method of works approach is adopted, and that no EPSML is required. The precautionary measures would include: • Amphibian-proof fencing should be installed around the island Pond P5 and adjacent suitable terrestrial habitat (3 m into arable crops) prior to construction works starting. • Amphibian-proof fencing should be installed along the southern boundary of the site, 50 m either side of the point that Pond P28 is closest to it. • All fencing installation would be supervised by an Ecological Clerk of Works (ECoW), licensed to survey for GCN. • The ECoW would complete a fingertip search ahead of works, checking hedgerow bases, and rubbish or rubble piles present. • In the extremely unlikely event that a GCN or suspected GCN is found, all works in that area must stop and an ecologist contacted for advice.

GLOSSARY

CEnv	Chartered Environmentalist
CIEEM	Chartered Institute of Ecology & Environmental Management
DEFRA	Department for Environment, Food & Rural Affairs
DWT	Derbyshire Wildlife Trust
ECOW	Ecological Clerk of Works
EPS	European Protected Species
EPSL	European Protected Species Licence
GCN	Great Crested Newt
Habitats Regulations	Conservation of Habitats and Species Regulations 2017 (as amended)
HAP	Habitat Action Plan
HPI	Habitat(s) of Principal Importance
JNCC	Joint Nature Conservation Committee
LBAP	Local Biodiversity Action Plan
LPA	Local Planning Authority
MCIEEM	Member of Chartered Institute of Ecology & Environmental Management
NE	Natural England
NERC Act	Natural Environment and Rural Communities Act 2006
NPPF	National Planning Policy Framework
PEA	Preliminary Ecological Appraisal
SAP	Species Action Plan
SER	Staffordshire Ecological Records
W&CA	Wildlife & Countryside Act 1981 (as amended)

1.0 INTRODUCTION

1.1 BACKGROUND

Tetra Tech (formally WYG) was commissioned by Lullington Solar Park Limited in April 2021 to undertake great crested newt *Triturus cristatus* (GCN) surveys of the site known as Lullington Solar Farm, Derbyshire. The location of the site is shown in Figure 1.

During the ecological appraisal (WYG, 2019) the ponds were identified as potentially suitable to support breeding GCN and suitable terrestrial habitat within and surrounding the site.

This report has been prepared by Senior Ecologist Richard Brown BSc (Hons) MSc and the conditions pertinent to it are provided in Appendix A.

1.2 SITE LOCATION

The site is located on land north of Lullington, Derbyshire and is centred at Grid Reference SK 24750 13763. The site is approximately c. 70 ha and comprises of arable fields with some improved grassland fields, associated ponds, hedgerows and field boundaries. A small block of woodland is also present within the site boundary.

The site is bordered partially by Garland Woods to the north and west and further arable and improved grassland fields to the north, south and east. The wider area consists largely of agricultural land, small settlements and several woodlands including Coton Wood 0.4 km to the north, the village of Lullington 0.5 km to the south, agricultural land to the east and Homestall Wood Local Wildlife Site (LWS) 0.4 km to the west.

1.3 DEVELOPMENT PROPOSALS

The development proposal is for the installation of a ground mounted solar farm within the c. 70 ha of agricultural land north of the village of Lullington.

1.4 PURPOSE OF THE REPORT

The purpose of the report is to:

- Present the findings from the eDNA and population estimate surveys;
- Assess the potential for impacts on GCN as a result of the development proposals; and
- Provide the details of a strategy to mitigate for potential impacts on GCN.

2.0 METHODOLOGY

2.1 DESK STUDY

2.1.1 Previous Reports

An Ecological Appraisal (WYG, 2019) for the site was reviewed for all information relating to GCN and the immediate habitats on site.

2.1.2 Local Ecological Records Centre

As part of the Ecological Appraisal (WYG, 2019), information was requested from Derbyshire Wildlife Trust (DWT) and Staffordshire Ecological Records (SER) on protected or notable species records, within 2 km of the site.

2.1.3 MAGIC Website

The MAGIC website (managed by DEFRA) was consulted for records of any granted GCN EPS licences within 2 km of the site and any designated sites within 2 km supporting GCN. The search was conducted in April 2021.

2.2 HABITAT SUITABILITY INDEX ASSESSMENT

A Habitat Suitability Index (HSI) Assessment was carried out on the waterbodies shown on Figure 2. The HSI approach provides an objective method for assessing the suitability of a waterbody as habitat for GCN (Oldham *et al.*, 2000; Herpetological Conservation Trust, 2008). The system provides an index between 0 and 1, with 0 indicating unsuitable habitat and 1 optimal habitat. Ten suitability indices are used to calculate the index score, each representing a factor considered to affect GCN. These factors are listed and briefly explained below:

1. *Location*: i.e. where the pond is located in the British Isles. Lowlands are generally thought to be most suitable; suitability declines with increases in altitude
2. *Pond area*: i.e., the water surface area of a pond. Suitability peaks at approximately 800 m²;
3. *Pond drying*: how often a particular pond dries out. Ponds which dry out more frequently are less suitable;
4. *Water quality*: an indication of water quality based on the invertebrate diversity present. High invertebrate diversity indicates high water quality and suitability;
5. *Shade*: an estimate of the total shaded perimeter of a pond. Shoreline shade below 60% is optimal;
6. *Fowl*: indication of impact by waterfowl. High waterfowl numbers are generally considered detrimental;
7. *Fish*: indication of fish abundance. High fish numbers are generally considered detrimental;
8. *Pond count*: based on the density of ponds occurring within 1km of a particular pond. Suitability is positively correlated with pond density;
9. *Terrestrial habitat*: based on the availability of suitable habitat in the pond vicinity, e.g. rough grassland, scrub and woodland. For this assessment, the categories provided in the NARRS Survey Pack (Herpetological Conservation Trust, 2008) were used. This differs from the assessment criteria by Oldham *et al.* (2000); and
10. *Macrophytes*: based on an estimate of the percentage cover by emergent and aquatic vegetation. Suitability peaks at between 70% and 80% cover.

The results are then compared against a categorical scale developed by Lee Brady (unpublished) to give an overall rating. Therefore, the result for each waterbody is categorised as follows:

- <0.5 = **Poor**
- 0.5 – 0.59 = **Below Average**
- 0.6 – 0.69 = **Average**
- 0.7 – 0.79 = **Good**
- >0.8 = **Excellent**

The HSI assessment was applied to the waterbodies shown on Figure 2, using data that was collected during site visits made in April 2021.

2.3 eDNA SURVEYS

2.3.1 Sample Collection Protocol

Surveyors attended site on 15th April 2021 to undertake eDNA sampling. Collection of the eDNA samples was undertaken by Project Ecologist Richard Brown (GCN NE licence 2017-28314-CLS-CLS) and Assistant Ecologist Tom Cumberland Grad CIEEM.

The eDNA sampling was carried out in accordance with the survey methodologies defined within Natural England's accepted protocol (Biggs *et al.*, 2014 - WC1067 Appendix 5. *Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA*).

The sampling was carried out using a Surescreen Scientifics eDNA testing kit, with the samples collected and handled in accordance with their approved methodology (Surescreen Scientifics Ltd., 2021).

2.3.2 eDNA Analysis

The eDNA testing was carried out by Surescreen Scientifics Ltd.

2.4 POPULATION ESTIMATE SURVEYS

The GCN surveys were conducted by Senior Ecologist Richard Brown (GCN NE licence 2017-28314-CLS-CLS) assisted by Assistant Ecologist Tom Cumber Grad CIEEM and Assistant Ecologist Sophie Lunn.

As an eDNA surveys of ponds confirmed likely presence of GCN within the site, six surveys were undertaken to allow an estimate of the population size-class to be made.

All waterbodies were surveyed at least four times (where possible, see Figure 2 & limitations below) in accordance with the *Great Crested Newt Mitigation Guidelines* (English Nature, 2001) methodology – i.e. by using three of the survey methods described in sections 2.4.1 to 2.4.5 below. All four surveys were undertaken within the GCN survey season (i.e. between mid-March and mid-June) with two of the four initial surveys undertaken during the 'peak period' for GCN activity (i.e. mid-April to mid-May) – see Table 1 for details.

The maximum adult count per night per waterbody as recorded using a single survey technique is the number used to inform the population size-class estimate for that waterbody. Where there is a reasonable certainty of a regular interchange of animals between waterbodies (typically those within 250 m of each other) counts can be summed across those waterbodies to derive the population size-class of that metapopulation. The populations are then classified as follows:

- Small for maximum counts up to 10
- Medium for maximum counts between 11 and 100
- Large for maximum counts over 100

The dates and weather conditions of each survey is detailed in **Table 1**.

Table 1: Survey Dates and Weather Conditions

Survey No.	Date	Time		Air Temperature (°C)		Wind Speed (Beaufort Scale)	Cloud Cover (%)	Precipitation (%)
		Start	End	Initial	Final			
1	27/04/21	20:00	22:00	8°C	7 °C	F0	80	20
2	10/05/21	20:51	22:25	9 °C	8 °C	F0	20	0
3	13/05/21	20:55	22:30	12 °C	10 °C	F1	70	0
4	18/05/21	21:00	22:30	9 °C	8 °C	F0	20	0
5	26/05/21	21:00	22:30	14 °C	11 °C	F0	50	0
6	03/06/21	21:00	22:30	16 °C	12 °C	F0	20	0

2.4.1 Bottle Trapping

Plastic bottle traps were set around the margins of the waterbodies approximately every 2-3 m where access allowed, shortly before dusk. The traps are left in-situ overnight and checked & removed the following morning before 10am (wherever possible) for welfare reasons. All surveys are undertaken when the predicted air temperature exceeded 5 °C but below 18 °C as per guidelines (English Nature, 2001).

2.4.2 Torchlight Survey

This technique involves a visual search for individual newts inhabiting each waterbody. High-powered torches are used to search the waterbodies after nightfall. Waterbody perimeters are walked taking care to count all the individuals seen. To maximise the reliability of this technique, all torch surveys are conducted on evenings where the air temperature exceeded 5°C, when newts are generally considered being most active. All torches used were 1 million candle power or above.

2.4.3 Egg Search

GCN eggs are searched for among submerged, floating and other aquatic vegetation to confirm breeding use of the ponds by GCN. When laying their eggs, this species folds leaves of aquatic plants around the egg, although dead leaves and a variety of artificial materials are also known to be used. This behavior is exploited to demonstrate that GCN are breeding in a particular waterbody. However, egg numbers cannot be used to estimate population size due to predation and high mortality rates. In order to limit disturbance, this method is ceased as soon as any eggs have been positively identified in a waterbody.

2.4.4 Limitations

Access to all ponds within 500 m of the site was limited for eDNA or presence / absence surveys as shown in Figure 2. Ponds P9, P19, P23, P24 and P25 although not assessed in the field with a HSI score or eDNA water sample are not deemed to be major limitations due to their distance from the site boundary around the 250 m buffer from the development boundary. The intervening landscape between on and off-site ponds is dominated by heavily grazed pastoral and arable land, with limited hedgerow connections between ponds. Ponds P22 and P26 were dry at the time of survey, with no water sample for eDNA been able to be taken from the pond. Due to the ponds been dry in April, it is likely that these ponds would be highly suitable for

breeding GCN, as they did not hold water at the start of the GCN breeding season. Due to this, they are not discussed further in the report.

Access to the edges of several ponds was limited due to dense scrub surrounding the pond (P27) or steep muddy sides of some banks which could not be safely accessed (P5, P7 and P28). The access of all pond was limited to between 75% to 60% of the pond edge, leaving small areas which could not be fully accessed to complete torch surveys or install bottle traps and as such it is possible that newts were missed. To make up for limited shoreline access, additional bottle traps were installed during the survey visits. Where bottle traps are generally installed every 2 m along a shoreline, where access was limited bottle traps were installed every 1 m to increase the density of the trapping effort.

Notwithstanding the limitations highlighted above, the survey effort applied is considered sufficient to meet the aims of the survey and this report, in accordance with the aforementioned guidelines.

The details of this report will remain valid for a period of one survey season (CIEEM, 2019) from the date of the survey, with updated surveys required in the 2023 GCN survey season, if required, after which the validity of this assessment should be reviewed to determine whether further updates are necessary. Note that the recommendations within this report should be reviewed (and reassessed if necessary) should there be any changes to the red line boundary or development proposals which this report was based on.

3.0 BASELINE CONDITIONS

3.1 DESK STUDY

3.1.1 Previous Survey Results

No GCN surveys relating to the site have been completed by any consultants that are known by Tetra Tech.

An Ecological Appraisal was undertaken by Tetra Tech (formally WYG) in August 2019 (WYG, 2019) which considered that further surveys for GCN would be required due to suitable breeding and terrestrial habitat been present on site.

3.1.2 Local Records Centre

The data provided by DWT and SER contained three records GCN within 2 km of the site. The closest record was from 2012 and was located 0.75 km north-west of the site. Connectivity between this location and the site is moderate due the surrounding landscape linked by hedgerows and plantation woodland, with only minor B-roads through the landscape between the record and the site. However, the pond is separated from the site by Pessall Brook and it is not known how much of a barrier to GCN dispersal this brook might be, especially in summer if water levels are lower and slower.

There are no known designated sites for nature conservation that list GCN as a citation feature within 2 km of the site.

3.1.3 MAGIC

The search of the MAGIC website identified no EPS licences granted for GCN within 2 km of the site.

3.2 HSI SCORES

Detailed descriptions of each waterbody surveyed are given below – see Figure 1 for their location. The purpose of these descriptions is to help determine the waterbodies' suitability as breeding habitat for GCN. Therefore, where available, information on water depth, water quality, bank profile, presence of aquatic,

emergent and surrounding vegetation, as well as suitability of the surrounding terrestrial habitat has been provided. A grid reference is provided for each waterbody; see Figure 1 for their locations.

Photographs of the waterbodies are provided in Appendix B and the full HSI calculations are provided in Appendix C.

Table 2: Waterbody Descriptions & HSI Score

#	OS grid Ref.	Approx. size	Approx. distance & direction from development	Description	HSI Score & Category
1	SK 24438 13877	1350 m ²	Within the north-western part of the development.	A large fishing pond surrounded by maturing scrub.	0.44 Poor
2	SK 24267 13562	250 m ²	Within the south-western part of the development.	A pond surrounded by willow scrub and mature oak and ash trees.	0.35 Poor
3	SK 24461 13473	700 m ²	On the southern boundary of the development.	A large fishing pond surrounded by maturing scrub and mature ash and willow trees.	0.38 Poor
4	SK 2475 1355	280 m ²	Within the development central southern boundary.	A pond surrounded by willow scrub and mature oak and ash trees.	0.61 Average
5	SK 2540 1405	100 m ²	Within the development towards north-east	A small pond that was largely choked by ruderal herbs and grasses. A main pool of water with mallard present.	0.68 Average
7	SK 2480 1361	200 m ²	Within the development central southern boundary.	Larger field pond surrounded by willow scrub, mature oak and ash trees.	0.63 Average
8	SK 23995 13747	300 m ²	50 m west of the development boundary.	A pond surrounded by willow scrub and mature oak and ash trees.	0.70 Good
20	SK 25559 13530	750 m ²	180 m south-east of the development boundary	A pond surrounded by willow scrub and mature oak and ash trees.	0.72 Good
27	SK 2482 1362	50 m ²	Within the development central southern boundary.	A small field pond which is totally shaded by willow trees. Likely to dry out annually due to its small size.	0.45 Poor

#	OS grid Ref.	Approx. size	Approx. distance & direction from development	Description	HSI Score & Category
28	SK 2491 1360	500 m ²	Within the development central southern boundary.	A shallow field pond completely covered by maturing willow scrub. Pond looks to dry annually by area of bare ground present.	0.49 Poor

3.3 ENVIRONMENTAL DNA RESULTS

The results of eDNA analysis are shown below in **Table 3** with the results of the laboratory tests in Appendix D.

Table 3: eDNA Survey Results

Waterbody Number	eDNA analysis result
1	Negative
2	Negative
3	Negative
4	Negative
5	Positive
6	Negative
7	Negative
8	Negative
20	Negative
27	Negative
28	Positive

3.4 POPULATION ESTIMATE RESULTS

Six survey visits were conducted to establish the population size of GCN within Ponds P4, P5, P7, P27 and P28. Pond P5, P7 and P27 were included in population estimate surveys due to their close proximity to those with positive results (Pond P5 and P28)

No GCN were found to be present in any of the ponds during the surveys.

During the surveys, other amphibians were also recorded on site. These are presented in Table 4.

Table 4: Other Amphibians Recorded During Surveying

Waterbody	Smooth Newt	Common Frog	Common Toad
4	2 (1 ♂, 1 ♀)	-	-
5	2 ♀	Frog tadpoles observed in pond on last three surveys.	-
7	-	-	-
27	2 (1 ♂, 1 ♀)	-	-
28	-	-	1
Key: male ♂, female ♀			

4.0 LEGISLATION

4.1 HABITATS REGULATIONS AND W&CA

The GCN is afforded protection under the Conservation of Habitats & Species Regulations 2017 (as amended), which applies to all of its life stages.

The GCN is also listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to:

- Deliberately, intentionally or recklessly kill, injure or take a GCN;
- Deliberately, intentionally or recklessly take or destroy GCN eggs;
- Possess or control any live or dead specimen or anything derived from a GCN;
- Deliberately, intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a GCN; and
- Deliberately, intentionally or recklessly disturb a GCN while it is occupying a structure or place which it uses for that purpose.

This species is also protected by the Protection of Animals Act 1911, which prohibits any acts of cruelty or mistreatment.

Where development will result in damage to suitable habitat where the species is known to be present or risk harming or significantly disturbing GCN, a European Protected Species Mitigation Licence (EPSML) is likely to be required from Natural England (NE) to allow the development to proceed.

4.2 NERC ACT

GCN are also afforded more general protection in England (and Wales) within the Natural Environment and Rural Communities Act (NERC) 2006. This imposes a duty on all public bodies, including local authorities and statutory bodies, in exercising their functions, *"to have due regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity"* [Section 40 (1)]. Section 41 (S41) of this Act requires the Secretary of State to publish a list (in consultation with Natural England) of habitats and species which are of principal importance for the conservation of biodiversity in England. The S41 list is used to guide decision-makers such as public bodies including local and regional authorities, when carrying out their normal (e.g. planning) functions. The S41 list includes 65 habitats of principal importance and 1,150 species of principal importance – including GCN.

5.0 DISCUSSION

5.1 INTERPRETATION OF THE RESULTS

The eDNA sample test returned positive results for Pond P5 and P28. However, the six population estimate surveys completed subsequently did not record any adult, larvae or eggs belonging to GCN.

The interpretation of this is either that GCN were present at the time of the sample being taken and subsequently left before population estimate surveys were started, there was a very low population present that was not detected, or the results were erroneous.

The causes of erroneous results are multiple and can be as a result of contamination of samples, or material being transported into ponds by birds that carries GCN eDNA. The result from Pond P5 is particularly suggestive of an erroneous result, as only one of the 12 replicants was found to have GCN eDNA in it.

As the results from all surveys were negative, it has therefore been assumed that GCN are absent from the site. However, it is recommended that precautionary measures of works are put in place during the construction and decommissioning phases of the project. As there is no population data to form an impact assessment or EPSML application, these works will not require a licence.

5.2 CONSTRUCTION PHASE PRECAUTIONARY MEASURES OF WORKS

The following precautionary measures of work are recommended during the construction phase, with the precautionary measures shown in Figure 3:

- Amphibian-proof fencing should be installed around the island Pond P5 and adjacent suitable terrestrial habitat (3 m into arable crops) prior to construction works starting.
- Amphibian-proof fencing should be installed along the southern boundary of the site, 50 m either side of the point that Pond P28 is closest to it.
- There would be no timing restrictions on the installation of fencing, as there would be a negligible risk of GCN would not be present in areas of habitat affected by intrusive works, i.e. trenching for fences.
- All fencing installation would be supervised by an Ecological Clerk of Works (ECoW), licensed to survey for GCN.
- The ECoW would give a tool-box talk to contractors at the start of each day giving information on the likelihood of finding a GCN present within the works area, what areas have been fingertip searched, what to do if a GCN is found during works.
- The ECoW would complete a fingertip search ahead of works, checking hedgerow bases, and rubbish or rubble piles present.
- The potential presence of GCN would be communicated to site staff via inclusion in any site inductions and on notice boards in site offices.
- In the extremely unlikely event that a GCN or suspected GCN is found, all works in that area must stop and an ecologist contacted for advice.
- The fencing must be maintained for the duration of the construction phase.
- The fencing must be checked on a monthly basis to ensure that it is not damaged to the extent that GCN could move through gaps.
- Removal of fencing could only be completed when all construction works on site have finished that have the potential to kill or injure GCN.

As described in Section 5.1, these precautionary methods have been conceived based on an absence of GCN. In this regard no habitat loss, disturbance, killing or injuring of GCN is predicted. Irrespective of the absence of a licence, it is considered highly likely that GCN would not be affected by the proposed construction works, as these are broadly limited to areas of sub-optimal habitats. Furthermore, if present, the fencing only excludes them from sub-optimal areas. This temporary effect will therefore only restrict (Pond P5)

or partially restrict (Pond P28) GCN of their respective core foraging areas, which is often optimal areas within 50 m of breeding ponds (English Nature, 2001)) .

In addition, the post-construction operational landscape design includes the creation of habitats that are likely to benefit GCN, should they be present. These are shown in Appendix D, and include wetland swales within woodland belts, and what will be a longer sward grassland of benefit to invertebrates that ultimately form terrestrial prey for GCN.

5.3 DECOMMISSIONING PHASE

Prior to decommissioning, it is recommended that eDNA testing of ponds is completed. This will need to include ponds within the site, and surrounding 250 m buffer zone in the same way they were completed in 2021. This will inform the impact assessment for the decommissioning works, and whether at that stage, a population is present with associated mitigation requirements under an EPSL.

6.0 SUMMARY

As a result of this GCN assessment it has been determined that:

- Two ponds were recorded to have GCN DNA present from environmental water sampling.
- The two ponds with positive GCN eDNA results and three ponds within 250 m of these were subject to population assessments but resulted in no GCN been recorded within any of the ponds.
- It is deemed an EPSL is not required for the proposed development to take place, however precautionary measures of working as per section 5.2 must be implemented.

7.0 REFERENCES

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FIGURES

Figure 1 – Waterbody Location Plan

Figure 2 – GCN eDNA results

Figure 3 – Proposed Precautionary Work Measures for GCN



Legend

Site boundary

Site boundary 250m buffer

Waterbody

Notes:

Drawn by: BB

Checked by: RB

Office: Southampton

Figure No. 1

Revision No. A

0120240360

Meters

Scale 1 8,000 @A3

02 July 2021

NGR: 424896E 313910N

The Pavilion, 1st Floor

Botleigh Grange

Office Campus

Hedge End

Southampton

Hampshire, SO30 2AF

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Maxar, Microsoft



Results of eDNA

Lullington Solar Farm

Island Green Power Ltd



Legend

- Site boundary
- Site boundary 250m buffer
- eDNA positive result
- eDNA negative result
- Pond dry
- No access

Notes:

Drawn by: BB
Checked by: RB
Office: Southampton

Figure No. 2
Revision No. A

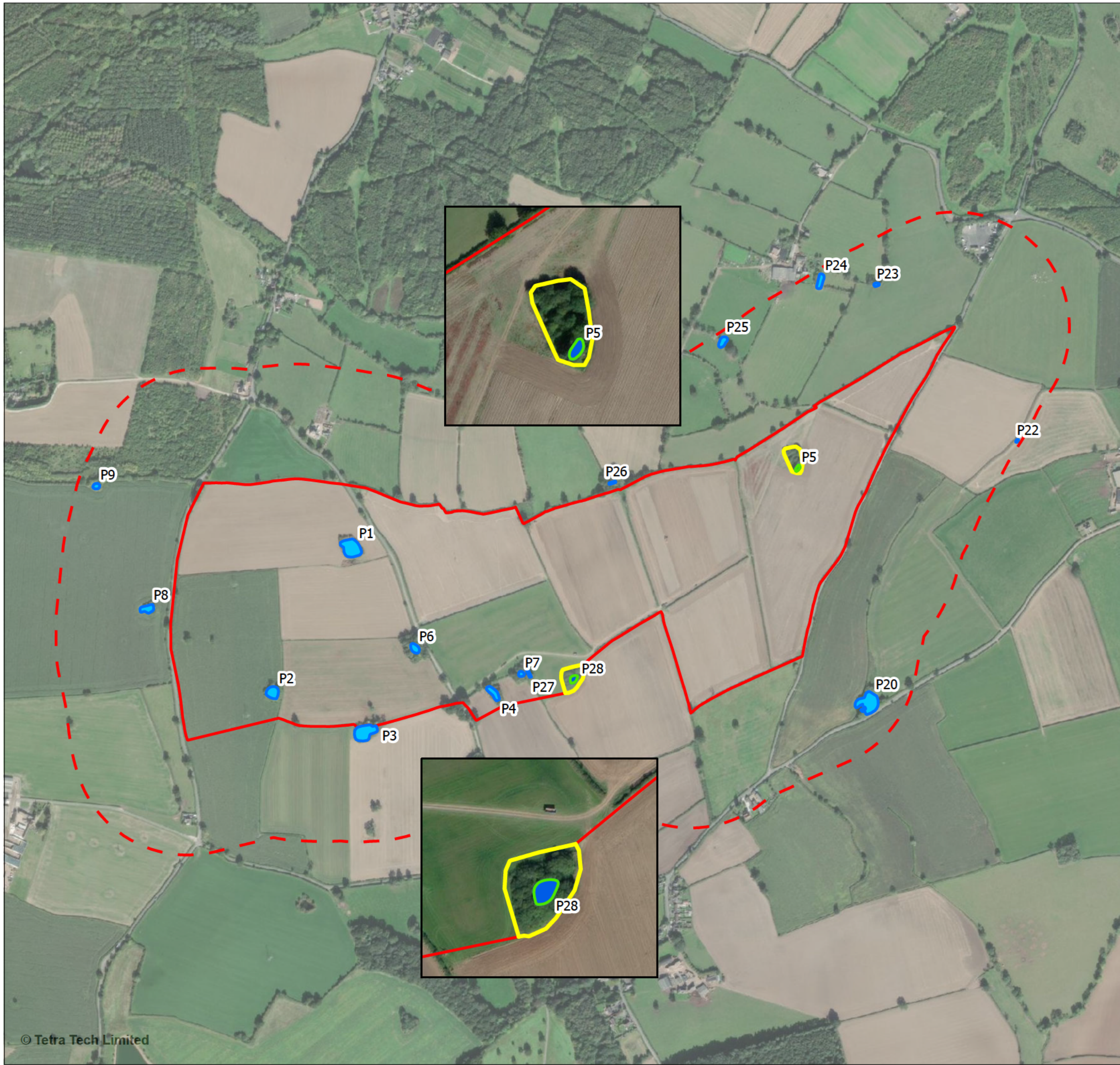
0 120 240 360 Meters
Scale 1:8,000 @A3

02 July 2021
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Office Campus
Hedge End
Southampton
Hampshire, SO30 2AF



Waterbody Location Plan
Lullington Solar Farm



Island Green Power Ltd

Legend

-  Site boundary
-  Site boundary 250m buffer
-  GCN Edna positive
-  Waterbody
-  Amphibian proof fencing

Notes:

Drawn by: MS
Checked by: RB
Office: Southampton

Figure No. 3
Revision No. A

0 120 240 360 Meters
Scale 1:8,113 @A3

02 July 2021
NGR: 424896E 313910N

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APPENDIX A – REPORT CONDITIONS

This Report has been prepared using reasonable skill and care for the sole benefit of Lullington Solar Park Limited (“the Client”) for the proposed uses stated in the report by [Tetra Tech Environment Planning Transport Limited] (“Tetra Tech”). Tetra Tech exclude all liability for any other uses and to any other party. The report must not be relied on or reproduced in whole or in part by any other party without the copyright holder’s permission.

No liability is accepted or warranty given for; unconfirmed data, third party documents and information supplied to Tetra Tech or for the performance, reliability, standing etc of any products, services, organisations or companies referred to in this report. Tetra Tech does not purport to provide specialist legal, tax or accounting advice.

The report refers, within the limitations stated, to the environment of the site in the context of the surrounding area at the time of the inspections’. Environmental conditions can vary and no warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times. No investigative method can eliminate the possibility of obtaining partially imprecise, incomplete or not fully representative information. Any monitoring or survey work undertaken as part of the commission will have been subject to limitations, including for example timescale, seasonal and weather-related conditions. Actual environmental conditions are typically more complex and variable than the investigative, predictive and modelling approaches indicate in practice, and the output of such approaches cannot be relied upon as a comprehensive or accurate indicator of future conditions. The “shelf life” of the Report will be determined by a number of factors including; its original purpose, the Client’s instructions, passage of time, advances in technology and techniques, changes in legislation etc. and therefore may require future re-assessment.

The whole of the report must be read as other sections of the report may contain information which puts into context the findings in any executive summary.

The performance of environmental protection measures and of buildings and other structures in relation to acoustics, vibration, noise mitigation and other environmental issues is influenced to a large extent by the degree to which the relevant environmental considerations are incorporated into the final design and specifications and the quality of workmanship and compliance with the specifications on site during construction. Tetra Tech accept no liability for issues with performance arising from such factors.

APPENDIX B – WATERBODY PHOTOS

Waterbody reference	Photo
1	
2	
3	

4	
5	
7	

8	
20	
27	

28



APPENDIX C – HSI CALCULATIONS

Suitability Index	P1	P2	P3	P4	P5	P6
Field location	1.00	1.00	1.00	1.00	1.00	1.00
Pond area	0.8	0.08	0.08	0.60	0.20	0.60
Pond drying	0.90	0.90	0.90	0.50	0.90	0.10
Water quality	0.67	0.67	0.67	0.67	0.67	0.33
Shade	1.00	1.00	1.00	0.30	1.00	0.40
Fowl	0.67	0.01	0.01	0.67	0.67	1.00
Fish	0.01	0.33	0.67	0.67	1.00	1.00
Ponds	1.00	1.00	1.00	1.00	1.00	1.00
Terrestrial habitat	0.33	0.67	0.67	0.67	0.33	0.67
Macrophytes	0.30	0.30	0.30	0.40	0.90	0.60
SCORE:	0.000319976	3.19976E-05	6.4965E-05	0.0072544	0.023998194	0.0031838
HSI SCORE	0.44721023	0.355231713	0.38130089	0.61102668	0.688680611	0.5627236
Pond Suitability	Poor	Poor	Poor	Average	Average	Below average

Suitability Index	P7	P8	P20	P27	P28
Field location	1.00	1.00	1.00	1.00	1.00
Pond area	0.40	0.95	0.80	0.10	1.00
Pond drying	0.90	0.50	0.90	0.10	0.10
Water quality	0.67	0.67	0.67	0.33	0.33
Shade	0.20	1.00	1.00	0.20	0.20
Fowl	0.67	1.00	0.67	1.00	0.67
Fish	0.67	1.00	0.33	1.00	1.00
Ponds	1.00	1.00	1.00	1.00	1.00
Terrestrial habitat	0.67	0.33	0.67	0.67	0.67
Macrophytes	0.70	0.30	0.60	0.90	0.30
SCORE:	0.010156	0.031507	0.042877	0.000398	0.0008882
HSI SCORE	0.631936	0.707686	0.729831	0.457074	0.495315
Pond Suitability	Average	Good	Good	Poor	Poor

APPENDIX D – EDNA SURVEY RESULTS

Folio No: E9204
 Report No: 1
 Purchase Order: PO 7001629
 Client: Tetra Tech
 Contact: Thomas Cumberland

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: 16/04/2021
Date Reported: 16/04/2021
Matters Affecting Results: None

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
1938	Lullington, P5		Pass	Pass	Pass	Positive	1
1939	Lullington, P4		Pass	Pass	Pass	Negative	0
1940	Lullington, P7		Pass	Pass	Pass	Negative	0
1941	Lullington, P28		Pass	Pass	Pass	Positive	9
1942	Lullington, P27		Pass	Pass	Pass	Negative	0
1943	Lullington, P3		Pass	Pass	Pass	Negative	0
1944	Lullington, P20		Pass	Pass	Pass	Negative	0
1946	Lullington, P2		Pass	Pass	Pass	Negative	0
1947	Lullington, P8		Pass	Pass	Pass	Negative	0
1948	Lullington, P6		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.

