Greater Cambridge Partnership

CAMBOURNE TO CAMBRIDGE

Environmental Statement
Technical Report 5: Ecology, Appendix 5.9: Great Crested Newt Survey (Draft)

Greater Cambridge Partnership

Cambourne to Cambridge

Great Crested Newt Survey (Draft)

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WSP

62-64 Hills Road
Cambridge
CB2 1LA

Phone: +44 1223 558 050

Fax: +44 1223 558 051

WSP.com

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1 INTRODUCTION

1.1 Project Background

1.1.1. The Cambourne to Cambridge project (C2C) is a proposed new 13.6km public transport route linking Cambourne and Cambridge. It will include a dedicated busway serving communities in Cambourne and the proposed Bourn Airfield development, as well as in Hardwick, Coton and the West Cambridge campus. A service road, to be used as a path for active travel, particularly by cyclists and pedestrians, will run alongside the busway. A new travel hub will be provided at Scotland Farm.

1.1.2. Scheme details are provided in the main report to the Environmental Statement (ES).

1.2 Ecological Background

1.2.1. The requirement for Great Crested Newt Triturus cristatus surveys followed the identification of suitable terrestrial habitats within the Scheme boundary and potentially suitable aquatic breeding habitat within 250m of the Scheme boundary. These habitats were identified within the Ecology Constraints Report (Cambridge Ecology, 2017a).

1.2.2. Environmental DNA (eDNA) surveys undertaken in June 2017 identified a positive result for Great Crested Newt within one pond (water body 6 within the Cambridge University Sports Ground). This was further surveyed using traditional survey methods in April to June 2018. The results of these surveys were negative for Great Crested Newt (Cambridge Ecology, 2017b; 2018).

1.2.3. Further eDNA sampling surveys were repeated on eleven of the waterbodies in June 2019. A further five were dry at the time of the survey and three were inaccessible. The eDNA analysis determined ten of the eleven waterbodies sampled to be negative. One waterbody produced a positive result (water body 32) (Cambridge Ecology, 2019).

1.2.4. An update eDNA survey of eleven of the 20 suitable waterbodies/ponds identified within 250m of the C2C Scheme was undertaken in May 2021. Ten samples returned a negative result for Great Crested Newt eDNA. The two waterbodies (water bodies 6 and 32) that had resulted in positive Great Crested Newts eDNA samples in previous years were both negative in 2021. Three of the ponds surveyed returned inconclusive results.

1.2.5. A total of 36 water bodies were present within the 250m buffer from the Scheme boundary. Three of these waterbodies were scoped out of the assessment, as explained in **Section 2.1.4**. The results of the previous surveys undertaken for the Scheme are presented in **Table 1-1**.

Table 1-1 - Historical Survey Data

Water Body Ref.	Previous survey results			
	2017	2018	2019	2021
1	No surveys – not suitable for Great Crested Newts			
2	No previous surveys completed			
3	N/A	Negative	N/A	N/A
4	N/A	Negative	N/A	N/A
5	Negative	N/A	Negative	Negative
6	Positive	Negative	Negative	Negative
7	Negative	N/A	Negative	Negative
8	Negative	N/A	Negative	Negative
9	N/A	N/A	N/A	Negative
10	Negative	N/A	Negative	Inconclusive
11	Negative	N/A	Negative	Negative
12	No previous surveys completed			
13	No previous surveys completed			
14	No previous surveys completed			
15	N/A	Negative	N/A	N/A
16	N/A	N/A	N/A	N/A
17	No surveys – swimming pool/roof			
18	N/A	Negative	N/A	N/A
19	No previous surveys completed			
20	N/A	Negative	Negative	Dry
21	N/A	Negative	Negative	Inconclusive
22	Negative	N/A	Negative	Inconclusive
23	No previous surveys completed			
24	No previous surveys completed			
25	Negative	N/A	Negative	Negative
26	No Access	No Access	No Access	No Access
27	No Access			
28	N/A	N/A	Dry	Dry
29	Scoped out - unsuitable			
30	HSI below average no surveys undertaken			

Water Body Ref.	Previous survey results			
	2017	2018	2019	2021
31	No Access			
32	N/A	N/A	Positive	Negative
33	N/A	N/A	N/A	Negative

1.3 Brief and Objectives

1.3.1. WSP UK Ltd was commissioned by The Greater Cambridge Partnership (GCP) to complete Great Crested Newt surveys, with the following objectives:

- Complete a Habitat Suitability Index (HSI) assessment of water bodies within and up to 250m from the Scheme boundary, to assess their suitability as aquatic habitat for Great Crested Newts and determine if further survey was required and determine if further survey was required; and
- Complete Great Crested Newt eDNA surveys to determine the presence or likely absence of this species from water bodies within and up to 500m from the Scheme boundary.

1.3.2. The results of these surveys are included within this report. The survey findings will be used to inform the impact assessment and proposed mitigation for Great Crested Newts for the Scheme. Details of the impact assessment and mitigation will be included within the Biodiversity Chapter of the Environmental Statement.

2 METHODS

2.1 Overview

2.1.1. A total of 15 water bodies required HSI and eDNA surveys in the 2022 survey period. Surveys were required where access had not been granted during previous survey seasons, or where previous surveys had returned inconclusive results.

2.1.2. Cambridge Ecology identified seven ponds which were not surveyed in 2021 as a result of the pond being dry or due to access constraints. A further four ponds received inconclusive or mixed results (positive and negative) between 2017 and 2021 and so required further survey (Cambridge Ecology, 2017b; 2021).

2.1.3. WSP identified a further nine ponds that required survey that had not been identified by Cambridge Ecology. Five ponds were surveyed by Thomson Environmental Consultants in 2022 for the Bourn Airfield housing development and as such, were not surveyed by WSP. Ditches have not been included in the survey scope given that they were considered unlikely to support breeding Great Crested Newts during previous assessments (Cambridge Ecology, 2021).

2.1.4. Water bodies 34, 35 and 36 were not surveyed in the 2022 surveys. These water bodies were scoped out of the assessment due to the lower impact nature of the Scheme along Scotland Road. In addition, Great Crested Newt presence could be assumed within this area of the Scheme, with the closest water body (34) returning a positive survey result for Great Crested Newts through the desk study from 2015.

2.2 Desk Study

2.2.1. A biological records search was commissioned in March 2022 from Cambridgeshire and Peterborough Biological Records Centre (CPERC). The search was conducted up to 2km from the Scheme boundary for Great Crested Newt.

2.3 Habitat Suitability Index Assessment

2.3.1. All water bodies within and up to a 250m radius of the Scheme boundary (to which access was possible), were assessed for their suitability to support Great Crested Newts, using the standard HSI assessment method (ARG UK, 2010, based on Oldham *et al*. (2000)). Water bodies were identified using 1:25,000 OS mapping; this was also cross referenced against aerial photography.

2.3.2. Water bodies were assessed and scored on ten key variables which are known to influence breeding populations of Great Crested Newts. These variables were:

- Geographic location;
- Water body area;
- Water body permanence;
- Water quality;

- Water body shading;
- Impact of waterfowl;
- Fish stocks;
- Number of water bodies within 1km;
- Terrestrial habitat around the water body; and
- Macrophyte cover of the water body.

2.3.3. Scores for each of the above variables were used to calculate an overall HSI value for each water body. This was then cross referenced with the guidelines (ARG, 2010) to assign the pond to one of five categories, poor, below average, average, good or excellent. Index calculation is not a failsafe method of identifying whether a water body supports Great Crested Newts or not; therefore, professional judgement and availability of records of Great Crested Newt in the locality has also been used to inform the requirement for further survey.

Table 2-1 – Categorisation of HSI scores

HSI score	Waterbody suitability
<0.5	Poor
0.5 – 0.59	Below average
0.6 – 0.69	Average
0.7 – 0.79	Good
>0.8	Excellent

2.4 Environmental DNA Water Sampling

2.4.1. All water bodies found to provide suitable habitat for Great Crested Newts, e.g. those ranging from poor to excellent suitability, to which access was possible, were subject to further survey to determine the presence or likely absence of this species.

2.4.2. The survey comprised eDNA (environmental deoxyribonucleic acid) (Biggs *et al*., 2014) water sampling. Sampling of eDNA was undertaken concurrently with the HSI survey. Professional judgement gained from previous experience and knowledge of Great Crested Newts ecology, was exercised in selecting water bodies appropriate for sampling.

2.4.3. The surveys were undertaken following survey techniques described in Biggs *et al*. (2014):

- A single visit to each target waterbody was made between mid-April and late-June, during the newt breeding season.
- Twenty sub-samples of water were taken from each waterbody using sterile sampling equipment provided by the laboratory (Fera Science Ltd).

- The locations of the 20 sub-samples were spaced as evenly as possible around the waterbody margin, and where possible targeted areas of vegetation which could be used as egg laying substrate and open water areas which newts could use for displaying.
- The sub-samples were mixed and pipetted into six sample tubes containing an alcohol and pH buffer solution.
- The samples were sent to Nature Metrics for laboratory testing using real time Polymerase Chain Reaction (PCR) to amplify part of the cytochrome 1 gene found in mitochondrial DNA.
- The water samples from each waterbody were assigned a positive or negative result as well as a score between 0 and 12 representing the number of positive replicates from a series of 12.

2.4.4. Great Crested Newts release eDNA into the waterbodies in which they live when they deposit skin cells, faeces, mucus, sperm or eggs into the water. The DNA in this material can persist, and be detected, in the water for several weeks. A positive eDNA result concludes that Great Crested Newts DNA is present in the water sample, whilst a negative result concludes that the presence of Great Crested Newts is considered unlikely within that waterbody. Negative eDNA results cannot conclusively say that a Great Crested Newts are not present within the waterbody, rather that DNA from the species was not detected.

2.5 Dates of Survey and Personnel

2.5.1. Lead surveyors were competent and experienced in conducting these surveys and each hold a Natural England Level 1 Great Crested Newt Class Licence (licence numbers can be made available on request).

2.5.2. The date for each survey visit is displayed in **Table 2-2** below.

Table 2-2 – Survey Dates

Water Body Ref.	Date of eDNA Survey	Date of HSI	Comments
2	20/04/2022	22/04/2022	
3	N/A	N/A	Dry and not surveyed
4	20/04/2022	22/04/2022	
10	20/04/2022	22/04/2022	
12	20/04/2022	22/04/2022	
15	N/A	22/04/2022	Dry and not surveyed
16	N/A	N/A	No Access

Water Body Ref.	Date of eDNA Survey	Date of HSI	Comments
19	N/A	N/A	No Access
20	N/A	N/A	Dry and not surveyed
21	N/A	N/A	Dry and not surveyed
22	20/04/2022	22/04/2022	
23	20/04/2022	22/04/2022	
24	20/04/2022	22/04/2022	
28	N/A	22/04/2022	Dry and not surveyed
31	N/A	N/A	Pond surveyed by Thomson Environmental Consultants as part of the Bourn Airfield.

2.6 Notes and Limitations

2.6.1. It should be noted that there was no access to water bodies 16, 19 and 31 and therefore, this can be viewed as a limitation.

2.6.2. It should also be noted that water bodies 3, 15, 20, 21 and 28 were dry and therefore, this was not suitable for eDNA testing or HSI survey, therefore no further surveys were undertaken.

3 RESULTS

3.1 Overview

3.1.1 Of the 36 water bodies in total, 12 were visited as part of the HSI assessment. Of these, three were dry and one had no access and therefore, were not subject to eDNA testing. Nine water bodies attained results ranging from ‘poor’ to ‘excellent’. A total of seven of these water bodies were then subject to eDNA testing. The remaining water bodies either had no access or were dry and therefore, could not be eDNA tested.

3.1.2 All water bodies returned a negative result, indicating the likely absence of Great Crested Newts within those water bodies.

3.1.3 The habitat suitability survey indicated that water body 10 had excellent suitability, water body 2 and 22 had good suitability, water bodies 4, 12 and 15 had average suitability, while water bodies 23, 24 and 28 had a poor overall suitability in regard to suitable habitat for Great Crested Newts. eDNA testing was not conducted on water bodies 3, 15, 20, 21 and 28, due to them being dry, and on water bodies 16, 19 and 31 due to access restrictions.

3.2 Desk Study

3.2.1 The biological records search returned a total of 102 records for Great Crested Newt were returned within 2km of the Scheme boundary from the biological records search. One record was returned within 250m of the Scheme boundary within water body 34. A count of nine adults was recorded within this water body in 2015.

3.2.2 A review of aerial imagery was also undertaken and no ponds or other suitable aquatic habitat could be identified at the location of water body 19. It can therefore be concluded that this water body no longer exists.

3.3 Habitat Suitability Assessment (HSI) and eDNA results

3.3.1 A summary of the HSI results and location information for the water bodies is included in **Table 3-1**. A summary of the HSI and eDNA results are displayed in **Table 3-1**, and the full HSI results are shown in **Annex 5.9.2**. The water bodies in each category (of which the scores are categorised as displayed in **Table 2-1**) are as follows:

- **Poor** – three water bodies (23, 24, 28);
- **Average** – three water bodies (4, 12, 15);
- **Good** – two water bodies (2, 22);
- **Excellent** – one water body (10).

3.4 Environmental DNA Water Sampling

3.4.1 A summary of the eDNA results is provided alongside the HSI scores in **Table 3-1**. Full laboratory results are available in **Annex 5.9.2**.

3.4.2 Water sampling for eDNA analysis was undertaken immediately following the HSI assessment and of the 15 water bodies visited, seven, were able to be subject to eDNA sampling during the optimal period (mid-April – late-June). Five water bodies could not be sampled due to being dry (3, 15, 20, 21 and 28) and three water bodies (16, 19 and 31) could not be sampled as land access was not granted. A review of historical aerial imagery undertaken as part of the desk study confirmed that there are no ponds at the location of water body 19.

3.4.3 Of the seven water bodies sampled, all water bodies surveyed returned a negative result indicating the likely absence of Great Crested Newts and none returned a positive result indicating presence of Great Crested Newts (as shown in **Table 3-1**)**.** Therefore, none of the water bodies subject to eDNA survey required follow up population size class assessment surveys.

Table 3-1 – Summary of HSI and eDNA Survey Results

Water body Ref.	Grid Reference	Distance and Orientation to the site	Connectivity to Site	HSI Score	HSI Category	eDNA Results
2	TL 43885 58422	160	Good	0.72	Good	Negative
3	TL 43615 58343	22	Good	N/A	Dry	Dry
4	TL 43440 58299	2	Good	0.63	Average	Negative
10	TL 42706 58801	22	Good	0.84	Excellent	Negative
12	TL 42346 59266	230	Good	0.69	Average	Negative
15	TL 4168658695	152	Good	0.67	Average	Dry
16	TL 40953 59325	108	Good	N/A	No Access	N/A
20	TL 37229 59625	31	Good	N/A	Dry	Dry
21	TL 3717059634	24	Good	N/A	Dry	Dry
22	TL 3710559763	69	Good	0.79	Good	Negative
23	TL 36833 60319	172	Good	0.31	Poor	Negative
24	TL 36701 60195	201	Good	0.4	Poor	Negative
28	TL 3541359742	4	Good	0.45	Poor	Dry
31	TL 34762 59480	176	Good	N/A	No Access	N/A

4 SUMMARY

4.1.1 The standard HSI assessment method was followed when identifying and assessing all accessible water bodies within the Scheme boundary and within a 250m radius, for their suitability to support Great Crested Newts.

4.1.2 A total of nine water bodies, that were accessible within and up to a 250m radius of the Scheme boundary, were assessed for their suitability to support Great Crested Newts, using the standard HSI assessment method.

4.1.3 One water body was categorised as excellent, two water bodies were categorised as good (2, 22) and three waterbodies were categorised as average (4, 12, 15). The three remaining water bodies assessed were categorised as having poor suitability (23, 24, 28).

4.1.4 All eDNA surveys were undertaken between mid-April and late-June during the Great Crested Newt breeding season which follows published methodologies and field protocol (Biggs et al., 2014). All surveys were led by suitably experienced ecologists holding a Natural England Level 1 Great Crested Newt Class Licence.

4.1.5 All water bodies that eDNA testing was conducted on returned a negative result, indicating the likely absence of Great Crested Newts within those water bodies.

5 REFERENCES

5.1 Project References

- Cambridge Ecology. (2017a). Cambourne to Cambridge Better Public Transport: Protected Species Constraints Survey 2017 FINAL REPORT. Cambridge.
- Cambridge Ecology. (2017b). Cambourne to Cambridge Better Public Transport: Great Crested Newt eDNA Survey.
- Cambridge Ecology. (2018). Cambourne to Cambridge Better Public Transport: Great Crested Newt Survey Report.
- Cambridge Ecology. (2019). Cambourne to Cambridge Better Public Transport: Great Crested Newt eDNA Survey Report.
- Cambridge Ecology. (2021). Cambourne to Cambridge Better Public Transport: Great Crested Newt eDNA Survey, 2021 Update. Document reference: P0879-R-002a.

5.2 Technical References

ARG UK. (2010). *ARG UK Advice Note 5: Great Crested Newt Habitat Suitability Index.* UK: Amphibian and Reptile Groups of the United Kingdom.

Biggs, J., Ewald, N., Valentini, A., Gabouriaud, C., Griffiths, R., Foster, J., . . . Dunn, F. (2014). *Analytical and methodological development for improved surveillance of great crested newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA.* Oxford: Freshwater Habitats Trust.

Oldham, R., Keeble, J., Swan, M., & Jeffcote, M. (2000). Evaluating the suitability of habitat for the great crested newt. *Herpetological Journal*(10), 143-155.

Annex 5.9.1

Water Body Location Plan and Data Search Results

THIS DRAWING MAY BE USED ONLY FOR
THE PURPOSE INTENDED AND ONLY
WRITTEN DIMENSIONS SHALL BE USED

N

Legend

- C2C_Site_Boundary_RD_07032022
- C2C_250m buffer new RLB_JF_11052022

C2C_GCN_Combined_Ponds_RD19042022

- Not included in 2022 survey scope
- Included in 2022 survey scope
- Desk study record

Revision Details	By / Check	Date	Suffix

Drawing Status: DRAFT

Job Title: Greater Cambridge Partnership
Cambourne to Cambridge

Drawing Title: Figure 1: Water Body Locations and Desk Study Records (East)

Scale at A1: 1:9,500

Drawn	Stage 1 Check	Stage 2 Check	Originated	Date
UKMDP002	XX	XX	XX	23/11/2022

0 100 200 300 400 500 m

Drawing Number: 70086660-xx-0001

Path: \\uk.wspgroup.com\central data\Projects\70086xxx\70086660 - C2C TWAO Stage\03 WIP\Ecology\07 GIS & Mapping\QGIS Project\GCN\C2C GCN Report Maps 021122_ponds_re-labelled.qgz

THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Legend

- C2C_Site_Boundary_RD_07032022
- C2C_250m buffer new RLB_JF_11052022

C2C_GCN_Combined_Ponds_RD19042022

- Not included in 2022 survey scope
- Included in 2022 survey scope
- Desk study record

Revision Details	By / Check	Date	Suffix

Drawing Status: DRAFT

Job Title: Greater Cambridge Partnership Cambourne to Cambridge

Drawing Title: Figure 2: Water Body Locations and Desk Study Records (West)

Scale at A1: 1:11,449.75879

Drawn		
UKMDP002		

Stage 1 Check	Stage 2 Check	Originated	Date
XX	XX	XX	23/11/2022

0 100 200 300 400 500 m

Drawing Number: 70086660-xx-0001

Path: \\uk.wspgroup.com\central data\Projects\70086xxx\70086660 - C2C TWAO Stage\03 WIP\Ecology\07 GIS & Mapping\QGIS Project\GCN\C2C GCN Report Maps 021122_ponds_re-labelled.qgz

Annex 5.9.2

HSI Calculations

Table 5.9.2-1 - Survey Results: HSI Survey

Pond reference	Grid reference	Date of HSI	Geographic Location	Pond Area	Permanence	Water Quality	Shade	Fowl	Fish	Pond Count	Terrestrial	Macrophytes	HSI Score	HSI Category
2	TL 43885 58422	24/04/2022	1	1	0.9	1	1	0.67	0.33	0.72	0.33	0.75	0.72	Good
3	TL 43615 58343	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry
4	TL 43440 58299	24/04/2022	1	0.2	0.1	0.67	1	1	1	0.85	1	0.8	0.63	Average
10	TL 42706 58801	24/04/2022	1	0.9	0.9	1	1	0.67	0.67	0.75	0.67	0.95	0.84	Excellent
12	TL 42346 59266	24/04/2022	1	0.4	0.9	0.33	0.6	0.67	1	0.84	0.67	0.95	0.69	Average
15	TL 41686586 95	24/04/2022	1	0.05	0.5	1	1	1	1	0.75	1	0.95	0.67	Average
16	TL 40953 59325	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No Access
19	TL 38147 59269	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No Access

Pond reference	Grid reference	Date of HSI	Geographic Location	Pond Area	Permanence	Water Quality	Shade	Fowl	Fish	Pond Count	Terrestrial	Macrophytes	HSI Score	HSI Category
20	TL 37229 59625	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry
21	TL 3717059634	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry
22	TL 3710559763	24/04/2022	1	0.8	1	1	1	0.67	0.67	0.75	0.33	1	0.79	Good
23	TL 36833 60319	24/04/2022	1	0.9	0.9	0.67	1	0.01	0.01	0.6	0.67	0.4	0.31	Poor
24	TL 36701 60195	24/04/2022	1	0.8	0.9	0.33	1	0.01	0.67	0.6	0.33	0.35	0.4	Poor
28	TL 3541359742	24/04/2022	1	0.1	0.1	0.67	0.2	1	1	0.89	1	0.3	0.45	*Poor (Dry)
31	TL 34762 59480	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Surveyed by Thomson Environmental Consultants

62-64 Hills Road
Cambridge
CB2 1LA

wsp.com