

PADNELL GRANGE

GREAT CRESTED NEWT SURVEY REPORT

Prepared for Bellway Homes

by

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1 INTRODUCTION

1.1 Site location and summary description

1.1.1 This report describes a Great Crested Newt survey carried out of waterbodies associated with approximately 2.7ha of land off Padnell Road, Cowplain hereinafter referred to as 'the site'. The centre of the site is located by National Grid Reference SU 698 110. The study was commissioned by Bellway Homes in two phases in June 2017 and May 2018.

1.1.2 The site is located on the eastern edge of the settlement of Cowplain in southern Hampshire and forms the grounds of Padnell Grange which comprises a number of buildings in residential and commercial use together with associated hardstanding and formally landscape grounds. The site is bordered to the south and west by residential development; to the north by woodland and to the east by Waterloooville Golf Course. The wider area generally comprises residential development, grassland fields and areas of woodland. A more detailed description of the habitats within the site is given in the *Ecological Appraisal* (HDA, 2017). The extent of the site is shown on the plan in *Appendix A*.

1.2 Background and legislative context

1.2.1 Five species of amphibian are widespread in England; the Common Frog *Rana temporaria*, Common Toad *Bufo bufo*, Smooth Newt *Lissotriton vulgaris*, Palmate Newt *Lissotriton helveticus* and Great Crested Newt *Triturus cristatus*. A sixth species of amphibian, the Natterjack Toad *Bufo calamita*, also occurs in England but this species has special habitat requirements that limit its range to certain sand dune and heathland sites.

1.2.2 Amphibians require aquatic habitat within which to breed and suitable terrestrial habitat to forage and hibernate. Suitable breeding waterbodies are usually well vegetated with still, shallow water that is not heavily shaded or very exposed. Terrestrial habitat includes woodland, scrub, field edges and gardens. Hibernation can occur under stone or log piles, in crevices or leaf litter and under the soil. Occasionally amphibians may be found hibernating in their breeding pools.

1.2.3 Over the last few decades all amphibians have suffered a decline in numbers. This is due to a combination of many factors, which include habitat destruction and fragmentation, loss of breeding pools through unsympathetic management and neglect, introduction of fish (which eat amphibian larvae) and pollution.

1.2.4 The Great Crested Newt is protected under the 2017 Conservation of Habitats and Species Regulations, which implements the EC Habitats Directive 92/43/EEC in the United Kingdom. In relation to European Protected Species (EPS), the 2017 Regulations make it an offence to:

- Deliberately capture, injure or kill any wild animal of an EPS;

- Deliberately disturb wild animals of any such species, in particular any disturbance which is likely to: (i) impair their ability to survive, to breed or reproduce, or to rear or nurture their young; or to hibernate or migrate; (ii) affect significantly the local distribution or abundance of the species to which they belong;
- Damage or destroy a breeding site or resting place of such an animal; or
- To (a) be in possession of, or to control; (b) to transport any live or dead animal or any part of an animal; (c) to sell or exchange or (d) offer for sale or exchange any live or dead animal or part of an animal of an EPS.

1.2.5 In addition, Great Crested Newts are protected under the 1981 Wildlife and Countryside Act (as amended). The Great Crested Newt is listed on Schedule 5 of the Act and is subject to the provisions of Sections 9.4b and 9.4c, which make it an offence to:

- Intentionally or recklessly disturb a Great Crested Newt while it is occupying a structure or place which it uses for shelter or protection; or
- Intentionally or recklessly obstruct access to any structure or place used for shelter or protection by a Great Crested Newt.

1.2.6 Where works are planned that may result in an offence under the current legislation then works should be carried out under an appropriate licence from Natural England.

1.2.7 The Great Crested Newt, Natterjack Toad and Common Toad are also listed as priority species for conservation action under the UK Biodiversity Action Plan (BAP) and are listed as Species of Principal Importance under Section 41 of the 2006 Natural Environment and Rural Communities (NERC) Act. Section 40 of the NERC Act requires that these species are a material consideration in the planning process.

1.3 Development proposals

1.3.1 The site is to be the subject of a planning application for residential development, with associated car parking and landscaping.

1.4 Scope and purpose of the report

1.4.1 The Ecological Appraisal (HDA, 2017) identified no standing water within the site with potential to support breeding Great Crested Newts¹. However a review of mapping and satellite imagery from the surrounding area indicated the presence of three waterbodies within 300m of the site within the adjacent golf course.

1.4.2 In view of the above it was considered possible that Great Crested Newts could use the site during terrestrial phases and a series of Great Crested Newt surveys including a Habitat Suitability Index (HSI) assessment, Great Crested Newt presence/absence eDNA

¹ Two small waterbodies are however present (a small shallow pond and a ditch) which provide highly sub-optimal habitat for this species.

survey and Great Crested Newt population estimate survey were subsequently undertaken.

The purpose of this work was:

- i. To establish the suitability of waterbodies within and in proximity to the site for Great Crested Newts;
- ii. To establish the likely presence/absence of Great Crested Newts breeding in suitable waterbodies within and in proximity to the site;
- iii. To determine requirements for further surveys to provide an estimate of Great Crested Newt populations that could be using the site;
- iv. To record other amphibian populations occurring in the vicinity of the site; and
- v. To predict likely impacts of the proposed development on Great Crested Newts and give recommendations for impact avoidance, minimisation and/or mitigation, and identify opportunities for the enhancement of the local habitat resource for this species.

2 METHODOLOGY

2.1 Great Crested Newt Habitat Suitability Index (HSI) Assessment

2.1.1 HSI assessments provide a mechanism by which the suitability of a pond to support Great Crested Newts can be objectively assessed in order to assist in the identification of ponds potentially supporting this species (Oldham *et al.*, 2000).

2.1.2 For the HSI assessment the locations of waterbodies within a 300m radius of the site were identified from online aerial photographs, a 1:10,000 scale Ordnance Survey map and from other waterbodies encountered during the survey. Where necessary, relevant landowners were contacted in advance of the survey in order to gain access to off-site waterbodies. Use of a 300m radius reflects the findings of studies into the movement of Great Crested Newts during terrestrial phases which indicate that the maximum routine migratory distance of Great Crested Newts away from breeding ponds during terrestrial phases is less than 250m (Cresswell and Whitworth, 2004).

2.1.3 The HSI assessment was conducted by Michael Berwick of HDA on 22nd June 2017 and 10th May 2018. All accessible waterbodies identified within the survey area were visited and, where appropriate, assessed against each of the following ten suitability indices:

- i. Geographic location;
- ii. Pond area;
- iii. Pond permanence;
- iv. Water quality;
- v. Shading;
- vi. Presence of waterfowl;
- vii. Presence of fish;
- viii. Pond density in the area;
- ix. Terrestrial habitat quality; and
- x. Macrophyte cover in pond.

2.1.4 Details of the pond characteristics (depth, margin profile, etc.) and bankside, marginal and aquatic vegetation were also recorded during the assessment.

2.2 Great Crested Newt Environmental DNA (eDNA) survey

2.2.1 Great Crested Newt eDNA sampling surveys were conducted on all accessible waterbodies that had been identified as having suitability to support Great Crested Newts during the HSI survey. The eDNA survey methodology is recognised by Natural England as a reliable technique for determining the presence/likely absence of Great Crested Newts within a waterbody through detection of traces of Great Crested Newt DNA within the water.

2.2.2 The eDNA sampling survey was conducted by Michael Berwick of HDA on 22nd June 2017. The field survey involved taking samples of pond water at each of the surveyed waterbodies in line with the recognised methodology established by Biggs *et. al.* (2014). The samples were then despatched to a recognised laboratory for polymerase chain reaction (qPCR) analysis.

2.3 Great Crested Newt population estimate survey

2.3.1 Full Great Crested Newt population estimate surveys were conducted on all accessible waterbodies that had been identified during the eDNA sampling survey as supporting Great Crested Newts. Great Crested Newt population estimates were also undertaken of Waterbodies 6 and 7 located within the site, which were dry during surveys undertaken in 2017 however held water at the start of the Great Crested Newt population estimate survey in 2018.

2.3.2 The population estimate survey methodology has been devised to accord with the requirements of all relevant legislation, guidelines and good practice guidance, including the 1981 Wildlife and Countryside Act, the Herpetofauna Worker's Manual (Gent and Gibson, 1998), the Great Crested Newt Mitigation Guidelines (English Nature, 2001) and subsequent research (Cresswell and Whitworth, 2004). The survey was conducted by Michael Berwick and Hayley Snowdon GradCIEEM of HDA, assisted by Shannon Davies, Sam Shepherd and Sarah Williams, between May and June 2018.

2.3.3 Where access was permitted, waterbodies were surveyed on at least four separate visits in suitable climatic conditions. Dates of survey visits, weather conditions and personnel are shown in the table below:

Table 1: Survey times and weather conditions

Date	Weather conditions	Personnel
10.05.2018	Dry and clear	Michael Berwick and Shannon Davies
14.05.2018	Dry and clear	Michael Berwick and Shannon Davies
16.05.2018	Dry, scattered cloud, light breeze	Hayley Snowdon and Sarah Williams
23.05.2018	Overcast and light showers	Michael Berwick and Sam Shepherd
07.06.2018	Dry and overcast	Hayley Snowdon and Shannon Davies
14.06.2018	Dry and scattered cloud	Hayley Snowdon and Shannon Davies

2.3.4 A combination of four survey methods were used:

- i. Sweep-netting: A hand held net, fitted with 2mm amphibian mesh, was used around waterbody margins with a survey effort of at least 15 minutes per 50m of shoreline.
- ii. Egg searching: Submerged and floating vegetation and leaf litter was inspected for newt eggs at each waterbody.
- iii. Torch surveys: These were carried out after dark using 1,000,000 candlepower torches. Each waterbody was circumnavigated and searched by torchlight for amphibians.
- iv. Bottle trapping: Traps, assembled from bamboo canes and plastic bottles, were placed overnight around waterbody margins with a survey effort of one every 2m of shoreline and checked early the following morning for the presence of newts.

At least three recognised methodologies were employed on each occasion in order to determine the presence/likely absence of Great Crested Newts in the waterbodies in accordance with Natural England guidelines.

2.3.5 A further two survey visits were carried out on those waterbodies that were found to contain Great Crested Newts (either during eDNA surveys or population estimate surveys) in order to establish a population size class estimate. Where possible, at least two recognised 'population estimate' methodologies (i.e. torch surveys and bottle trapping) were used on these occasions.

2.3.6 The size of amphibian populations within the waterbodies surveyed was estimated using the scoring system given in the Herpetofauna Workers Manual (Gent and Gibson, 1998).

3 RESULTS

3.1 Two waterbodies are located within the site and a further five waterbodies with potential to support Great Crested Newts were identified within the wider survey area during the desk study. The locations of the waterbodies are shown in *Appendix A*.

3.2 The results of the HSI assessment, eDNA survey and population estimate survey, together with descriptions of the surveyed waterbodies and any limitations encountered, are provided below. Full findings of the HSI assessment, the laboratory results from the eDNA analysis and population estimate survey results are given in *Appendices B, C and D* respectively.

3.3 Waterbody 1

Location: Approximately 75m to the east of the site.

HSI assessment: 0.717

- 3.3.1 Waterbody 1 comprises a medium-sized pond within Waterloo Golf Course located approximately 75m to the east of the site. The waterbody has a silt base with shallow earth banks. The pond supports marginal, submerged and floating aquatic species including water-lilies, reeds, rushes and Waterweed *Elodea* sp.. The pond is bordered by well managed grassland and scattered trees which result in shading of approximately 25% of the perimeter of the waterbody. The water quality was assessed as moderate and it is assumed that the waterbody rarely dries.
- 3.3.2 The HSI for Waterbody 1 was calculated as 0.717, which indicates that the pond has 'good' suitability for Great Crested Newts.
- 3.3.3 An eDNA sampling survey of Waterbody 1 was subsequently carried out and the samples were sent to the Surescreen Scientifics laboratory for analysis. The analysis returned a positive result for Great Crested Newt eDNA which indicates that Great Crested Newts are highly likely to have been present within the waterbody at the time of survey. The results of the eDNA analysis are provided in *Appendix C*.
- 3.3.4 Evidence of Great Crested Newts was recorded during the population estimate survey. The survey of Waterbody 1 recorded a maximum count of 3 adult Great Crested Newts and larvae and eggs were recorded confirming use of the pond for breeding. Other species recorded included Smooth Newt, which was also recorded breeding in the waterbody.
- 3.3.5 No limitations were encountered during the survey of Waterbody 1.

3.4 Waterbody 2

Location: Approximately 300m to the south-east of the site.

HSI assessment: 0.487

- 3.4.1 Waterbody 2 comprises a medium-sized pond within Waterloo Golf Course, located approximately 300m to the south-east of the site. The waterbody has a silt base with shallow earth banks. The pond supports marginal, submerged and floating aquatic species including water-lilies, iris, reeds, rushes and Waterweed *Elodea* sp. The pond is bordered by well managed grassland and scattered trees which result in shading of approximately 10% of the perimeter of the waterbody. At the time of the survey, the water level was relatively low and a population of Carp were present. The water quality was assessed as moderate and it appears that the waterbody rarely dries.

3.4.2 The HSI for Waterbody 2 was calculated as 0.487, which indicates that the pond has 'poor' suitability for Great Crested Newts.

3.4.3 An eDNA sampling survey of Waterbody 2 was subsequently carried out and the samples were sent to the Surescreen Scientifics laboratory for analysis. The analysis returned a negative result for Great Crested Newt eDNA which indicates that Great Crested Newts are highly likely to have been absent from the waterbody at the time of survey. The results of the eDNA analysis are provided in *Appendix C*.

3.4.4 No significant limitations were encountered during the survey of Waterbody 2.

3.5 Waterbodies 3 and 4

Location: Waterbodies 3 and 4 are located approximately 80m and 140 to the east of the site, respectively.

HSI assessment: N/A

3.5.1 Waterbodies 3 and 4 comprise dry drains within Waterloooville Golf Course and are bordered by areas of managed grassland and woodland.

3.5.2 It was not possible to conduct an HSI assessment, eDNA survey or population estimate survey on Waterbodies 3 and 4 due to the absence of water. In view of the absence of standing water it is considered that these waterbodies are highly unlikely to support Great Crested Newts.

3.6 Waterbody 5

Location: Approximately 200m to the north-east of the site.

HSI assessment: N/A

3.6.1 Waterbody 5 comprises a fast flowing, steep-sided ditch that connects to two large ponds beyond the survey area. The ditch is located within the grounds of Waterloooville Golf Course and is surrounded by well managed grassland and scattered trees. The flowing ditch is considered unsuitable for breeding Great Crested Newts having a fast and strong flow which are avoided by this species.

3.7 Waterbody 6

Location: On-site.

HSI assessment: N/A

3.7.1 Waterbody 6 comprises a small steep-sided ditch within managed amenity grassland in the north-west of the site. The ditch was dry during surveys of the site undertaken in 2017 and was dry by the second survey visit in 2018. The ditch is bordered by scattered trees and shrubs, which result in shading of approximately 10% of the perimeter of the waterbody.

- 3.7.2 It is not possible to undertake full HSI surveys of ditches, and an eDNA survey was not undertaken due to the absence of water in 2017.
- 3.7.3 A single population estimate survey of Waterbody 6 was undertaken prior to the waterbody drying up. During this survey, no evidence of Great Crested Newts or any other amphibians were recorded. In view of the waterbody drying up during the survey period, the waterbody is considered highly sub-optimal to support breeding Great Crested Newts.
- 3.7.4 On the first survey water levels were too shallow to undertake netting or bottle trap surveys effectively, to mitigate for this constraint additional effort was input into the available survey methodologies, in particular torching.

3.8 Waterbody 7

Location: On-site.

HSI assessment: 0.485

- 3.8.1 Waterbody 7 comprises a small, low lying ephemeral pond located within well-managed amenity grassland, with no shading of the pond perimeter. The waterbody has an earth base with shallow earth banks. The pond was dry during surveys of the site undertaken in 2017 and the pond became progressively drier during the population estimate survey undertaken in 2018. No aquatic plant species were recorded and it is anticipated that the pond dries annually.
- 3.8.2 The HSI for Waterbody 7 was calculated as 0.485, which indicates that the pond has 'poor' suitability for Great Crested Newts. An eDNA survey was not undertaken due to the absence of water in 2017.
- 3.8.3 During the population estimate survey, no evidence of Great Crested Newts or any other amphibians were recorded. In view of the waterbody drying up during the survey period, the waterbody is considered highly sub-optimal to support breeding Great Crested Newts.
- 3.8.4 The water levels within Waterbody 7 were too shallow to undertake netting or bottle trap surveys effectively, to mitigate for this constraint additional effort was input into the available survey methodologies, in particular torching.

3.9 Incidental encounters

- 3.9.1 During the reptile surveys carried out at the site in August and September 2017 an adult Great Crested Newt was recorded under one of the reptile mats, located in the western area of the site (HDA, 2018).

4 SUMMARY

- 4.1 The results of the Great Crested Newt survey are summarised in *Table 2* below, with recorded amphibians and lifestage shown and the findings are summarised on the plan in *Appendix A*.

Table 2: Summary of Great Crested Newt survey results

Waterbodies	Great Crested Newt	Smooth Newt
Waterbody 1	eDNA, adults, larvae and eggs	Adults, larvae, eggs
Waterbody 2	-	-
Waterbody 6	-	-
Waterbody 7	-	-

* *Waterbodies 3, 4 and 5 comprise ditches which were discounted for their potential to support breeding Great Crested Newts and subsequently not subject to further survey.*

- 4.2 Great Crested Newts were recorded in one pond within the survey area (Waterbody 1). The survey of Waterbody 1 recorded a maximum count of 3 adult Great Crested Newts and larvae and eggs were recorded confirming use of the pond for breeding.
- 4.3 The numbers of Great Crested Newts (excluding newt eggs and larvae) recorded from each pond during torch and bottle trap surveys (which can be used to estimate population size) are given in *Table 3*. Where applicable, the maximum count for each survey method is indicated by shaded boxes.

Table 3: Maximum counts of Great Crested Newts

Date	Waterbody 1*		Waterbody 6		Waterbody 7	
	Torch survey	Bottle trap survey	Torch survey	Bottle trap survey	Torch survey	Bottle trap survey
10.05.2018	3	0	0	-	0	-
14.05.2018	0	0			0	-
16.05.2018	3	1			0	-
23.05.2018	1	1			0	-
07.06.2018	0	2				
14.06.2018	1	2				

* *Great Crested Newt presence recorded during eDNA survey.*

- 4.4 The population size class assessment criteria given in the Great Crested Newt Mitigation Guidelines (English Nature, 2001) suggests that maximum counts of up to 10 individuals constitute a 'low' population of Great Crested Newts. Waterbody 1, which was subject to 6 separate visits during the survey, had a maximum count of 3 adult individuals recorded by any one population estimate survey method, therefore indicating a 'low' population.
- 4.5 No evidence of Great Crested Newts was recorded within the other waterbodies subject to survey (Waterbodies 2, 6 and 7).

- 4.6 Waterbody 1 within the survey area was also found to support a population of Smooth Newts, which is a common and widespread native amphibian species in England. Based on the scoring system given in the Herpetofauna Worker's Manual (Gent and Gibson, 1998), Waterbody 1 supports a low population of Smooth Newts.

5 EVALUATION

- 5.1 Great Crested Newts were recorded within one waterbody within the survey area (Waterbody 1). A low population was recorded in Waterbody 1 located 75m to the east of the site and breeding was confirmed through the presence of eggs and larvae.
- 5.2 A maximum routine migratory range of 250m from breeding ponds has been estimated for Great Crested Newts during terrestrial phases, and more recent studies suggest that 95% of newt summer refuges are within 63m of breeding ponds (Cresswell and Whitworth, 2004). Waterbody 1 is located greater than 63m from the site, but less than 250m from the site. The site is dominated by intensively managed garden habitats including extensive areas of mown lawn, hardstanding and buildings which provide poor quality habitat for Great Crested Newts during terrestrial phases. Limited areas of suitable terrestrial habitat are however present in the form of ornamental borders, hedgerow bases, ditches and small areas of rough grassland/tall ruderal habitat. In consideration of the distance of Waterbody 1 from the site, the low population of newts present, the presence of suitable terrestrial habitat in the immediate vicinity of the pond and the dominance of sub-optimal terrestrial habitats present on site, the site is highly unlikely to be of importance to the Great Crested Newt population associated with Waterbody 1. However, in view of the proximity of Waterbody 1 to the site and the presence of a terrestrial phase Great Crested Newt recorded at the site during a reptile survey, it is considered likely that individual/low numbers of terrestrial phase Great Crested Newts may use the site on at least an occasional or transitory basis.
- 5.3 In view of the potential for the site to support individual/very low numbers of Great Crested Newts during terrestrial phases, a licence would need to be applied for, and granted, prior to works potentially affecting Great Crested Newts commencing. Unless otherwise agreed with Natural England, this would require implementation of measures to protect individual Great Crested Newts during construction and maintenance of opportunities at the site and/or its surrounds for this species in the long-term. Outline measures to avoid adverse effects on individual Great Crested Newts and to maintain the favourable conservation status of the local population in accordance with UK and European legislation, along with measures to enhance the overall value of the site and/or its surrounds for Great Crested Newts in accordance with the 2012 National Planning Policy Framework (NPPF) and 2006 NERC Act, are therefore provided in *Section 6* below.

6 MITIGATION AND SITE SAFEGUARDING

6.1 This section identifies measures to be implemented during development of the site in order to avoid and mitigate potential impacts on Great Crested Newts. In addition, measures for enhancement of the site for Great Crested Newts are recommended in accordance with the 2012 NPPF and the 2006 NERC Act.

6.2 The results of the field surveys indicate that Great Crested Newts may be present in very low numbers within the site during terrestrial phases. Unless otherwise agreed with Natural England it would therefore be necessary to:

- Protect individual Great Crested Newts through removal and exclusion from the site prior to and during construction works; and
- Provision of replacement habitat within the landscape scheme of the proposed development to ensure that opportunities remain at the site for Great Crested Newts, thereby protecting the favourable conservation status of the local population in the long-term.

These works would need to be carried out under a Natural England European Protected Species (EPS) licence. It is anticipated that the outline mitigation strategy described below would provide the basis for a detailed Method Statement to be submitted to Natural England as part of an EPS licence application unless an alternative approach is agreed with Natural England at an appropriate stage.

6.3 Great Crested Newt capture and translocation

6.3.1 Proposals for the site include construction of residential dwellings with associated access, car parking and soft landscaping which is expected to result in loss of a substantial proportion of the limited area of suitable Great Crested Newt terrestrial habitat within the site, including rough grassland, ornamental shrubs and hedgerows. In order to protect individual Great Crested Newts in accordance with nature conservation legislation it will be necessary to translocate Great Crested Newts to a receptor area prior to the commencement of works. This should follow the procedure outlined below and could be undertaken in conjunction with the recommended reptile mitigation at the site (HDA, 2018):

Identification and preparation of the receptor site

- A suitable receptor area should be identified to receive translocated Great Crested Newts from the development area. Priority should be given to the sourcing and use of potential receptor areas within or in close vicinity to the site.
- In order to ensure the receptor area has capacity to support the translocated Great Crested Newts it may be necessary to carry out further survey and habitat enhancement works to the receptor area to increase its capacity to support Great Crested Newts.

- Measures to maintain the long-term integrity of the receptor site should also be secured.
- The receptor area could be located within the site or within the wider area and should comprise habitats of high value to Great Crested Newts such as scrub, rough grassland, tall ruderal and woodland habitats. In addition, it should include features suitable for hibernation such as purpose built hibernacula and refuge piles, and where possible waterbodies suitable for breeding. Any new wildlife ponds should be sensitively designed to provide high quality aquatic habitat through provision of gently shelving margins and native aquatic and marginal planting. The receptor area should be connected to Waterbody 1 and other areas of suitable habitat in the wider area.
- The landscape strategy for the proposed development (Thrive Architects Dwg. No. BELL170217 SKL-01 Rev. H) includes the conversion of an area of amenity grassland in the north-east of the site into an area of informal public open space to include an attenuation pond. It is recommended that this area comprises a selection of rough and meadow grassland and shrub habitats to mitigate for the limited areas of suitable terrestrial habitat lost to development (see *Section 6.4*). These works are expected to result in an enhancement to an area of the site that is currently of limited suitability for amphibians and it is expected that this could form receptor habitat for translocated Great Crested Newts. Alternatively the woodland to the north of the site is understood to be under the same land ownership and would be similarly suitable.

6.3.2 In order to allow for translocation of Great Crested Newts from the site and prevent newts from dispersing into the site during construction, exclusion fencing should firstly be erected around the boundary of the development area prior to the commencement of works. Pitfall traps should then be installed at 10m intervals along the inside of the fencing and artificial refugia placed along the fenceline and within suitable terrestrial habitat (rough grass, hedgerow bases etc.) within the interior of the exclusion zone at a density of 50-100 refugia per hectare. Trapping and translocation should follow the general methodology set out below:

Installation of fencing and pitfall traps

- Fencing and pitfall traps should only be installed under the supervision of a suitably qualified ecologist at a time of year when night time temperatures are consistently above 5°C;
- The proposed fence line should first be searched and cleared of amphibians. Any amphibians found should be translocated to the receptor site outside of the exclusion area (detailed above);

- Any vegetation that requires removal for fence installation should be removed using hand tools in a two stage cutting regime (firstly cut down to 15cm above ground level, followed by a second cut to ground level), taking care to avoid risk of injury to resting amphibians;
- Pitfall traps should be installed flush with the newt fencing and ensure no top lip is present;
- Each pitfall trap should remain closed until the translocation commences; and
- Pitfall traps should be complemented by installation of carpet tile refugia (or similar) along the fence lines and within the interior of the capture area, installed at a density of 50 - 100 mats per hectare of suitable habitat.

Translocation exercise

- Translocation works should be carried out in suitable climatic conditions between March and early November inclusive;
- Once the translocation has started, the pitfall traps should be opened and equipped with a mammal ramp, float and vegetation for trapped newts to hide under;
- Each pitfall trap should be checked daily before 11am and weather conditions monitored and traps closed if necessary;
- Refugia should be lifted and any amphibians beneath captured;
- All amphibians captured should be translocated to the pre-established receptor area outside of the exclusion fencing;
- The pitfall trapping and artificial refugia searches should be undertaken for a minimum of 30 nights (with 5 clear days at the end of the translocation) unless trapping results suggest other as appropriate (in agreement with Natural England);
- Once capture rates decline in any given compartment, ground level vegetation should be progressively removed in order to encourage movement of newts and increase chances of capture; and
- Fencing should be monitored on a weekly basis and any damaged repaired until all newts have been cleared from the area of search, after which any drift fencing within the interior of the capture area removed.

6.3.3 Once capture rates decline, vegetation manipulation described below would commence to encourage capture of any remaining newts. Any remaining naturally occurring refugia should also be dismantled by hand and searched for newts. In the event that vegetation clearance is likely to be counterproductive to the capture of newts (e.g. by encouraging newts to go to ground) this work should not be carried out.

Vegetation manipulation

- Vegetation manipulation to encourage capture of newts would require clearance of remaining vegetation to no less than 100mm by hand;

- Vegetation should be cut using hand tools under the supervision of a suitably qualified ecologist;
- Again, any newts encountered within the area of works during vegetation clearance should be captured and moved to the receptor site outside the exclusion area; and
- A further 5 days with night time temperatures of >5°C should then be allowed to elapse to enable capture of any remaining newts prior to a destructive search (see below).

Destructive search

- In order to be certain that no newts are present within the area of works, once five suitable trapping nights have passed with no captures from terrestrial habitats, vegetation should be cleared from areas of suitable habitat to ground level and topsoil disturbed by scraping back to a depth of up to 10cm where the possibility of newts being present remains. This should be carried out under the direct supervision of a suitably qualified ecologist where it is expected Great Crested Newts might still be present. Topsoil should not be stripped from the root protection areas of retained trees, scrub and hedgerows, or where translocation results and vegetation clearance to ground level allows satisfactory inspection to confirm likely absence of newts.
- In the event that the destructive search is delayed following newt capture, the vegetation should be maintained at ground level until the destructive search is carried out.

6.3.4 Once the translocation, vegetation clearance and destructive search measures have been completed within any given compartment in accordance with the methodology outlined above, development works would be able to go ahead within the cleared area.

6.4 Site safeguards and habitat creation

6.4.1 The exclusion fencing should be retained and maintained until completion of works and the condition of the fencing monitored and repairs made as required. Following the completion of development the exclusion fencing should be removed allowing newts to disperse back into newly created habitat within the site.

6.4.2 Development proposals should seek to maintain and where possible enhance opportunities for Great Crested Newts at the site. This could be achieved through the retention, enhancement and creation of Great Crested Newt habitats as part of the landscape strategy for the site in addition to those required for receptor site provision in relation to the development works. Consideration should be given to:

- Creation of new open water wetland habitats suitable for breeding amphibians planted with a range of native aquatic and marginal vegetation, either as stand-alone features or as part of the site surface water drainage strategy;

- Inclusion of high quality terrestrial habitats within the landscape scheme in the form of scrub, hedgerows, swales and ditches and rough, meadow and wet grassland;
- Provision of opportunities for hibernation and refuge through provision of log/brush piles and purpose built hibernacula; and
- Securing the long-term integrity of new and retained Great Crested Newt habitats through inclusion within a long-term management plan.

6.4.3 In order to protect any newts entering the site during the operational phase of the development, any gully pots within the development should be suitably designed with a stand-off from the kerb and/or use of 'wildlife friendly' kerbs'² to avoid entrapment of any newts and other wildlife passing over hard landscaped areas. Where appropriate, dropped kerbs should also be used where Great Crested Newts are likely to cross roads and other areas of hardstanding. Detailed drainage and infrastructure proposals for the development should be reviewed at appropriate design stages by a suitably qualified ecologist.

7 CONCLUSION

7.1 The results of the Great Crested Newt surveys indicate a low population of Great Crested Newts is present within a pond 75m to the east of the site. The findings of the survey suggest that individual/very low numbers of Great Crested Newts may use the site during terrestrial phases.

7.2 The proposed construction and ground works have the potential to result in a small loss of Great Crested Newt terrestrial habitat and affect any individual newts present, and in absence of mitigation development of the site may constitute an offence under UK and European nature conservation legislation. Measures to maintain the favourable conservation status of the local Great Crested Newt population and avoid direct injury or mortality of individual newts, through sympathetic design of hard landscaping, maintenance of habitat linkages, approach to works and suitable timing of activities, are subsequently described in *Section 6* of this report. In the event that planning permission is granted, the measures described should form the basis of a detailed Method Statement to accompany an application to Natural England for a licence to permit development works affecting Great Crested Newts.

7.3 Subject to implementation of the proposed mitigation and enhancement works described in *Section 6*, it is considered that the favourable conservation status of the local Great Crested Newt population present would be maintained. This would ensure compliance with the nature conservation objectives of the EC Habitats Directive, the 2006 NERC Act and the guidance underpinning the 2012 National Planning Policy Framework.

² Wildlife friendly kerbs - www.wildlifefencing.co.uk/product.php?productid=477&cat=68&page=1

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Document Title: Great Crested Newt Survey Report
Commissioning Party: Bellway Homes

Issue	Description	Date of Issue	Signed
1	Great Crested Newt Survey Report	July 2018	AM

	Personnel	Position
Author	Clare Bird MCIEEM	Senior Ecologist
Approved for issue	Adrian Meurer MCIEEM	Director

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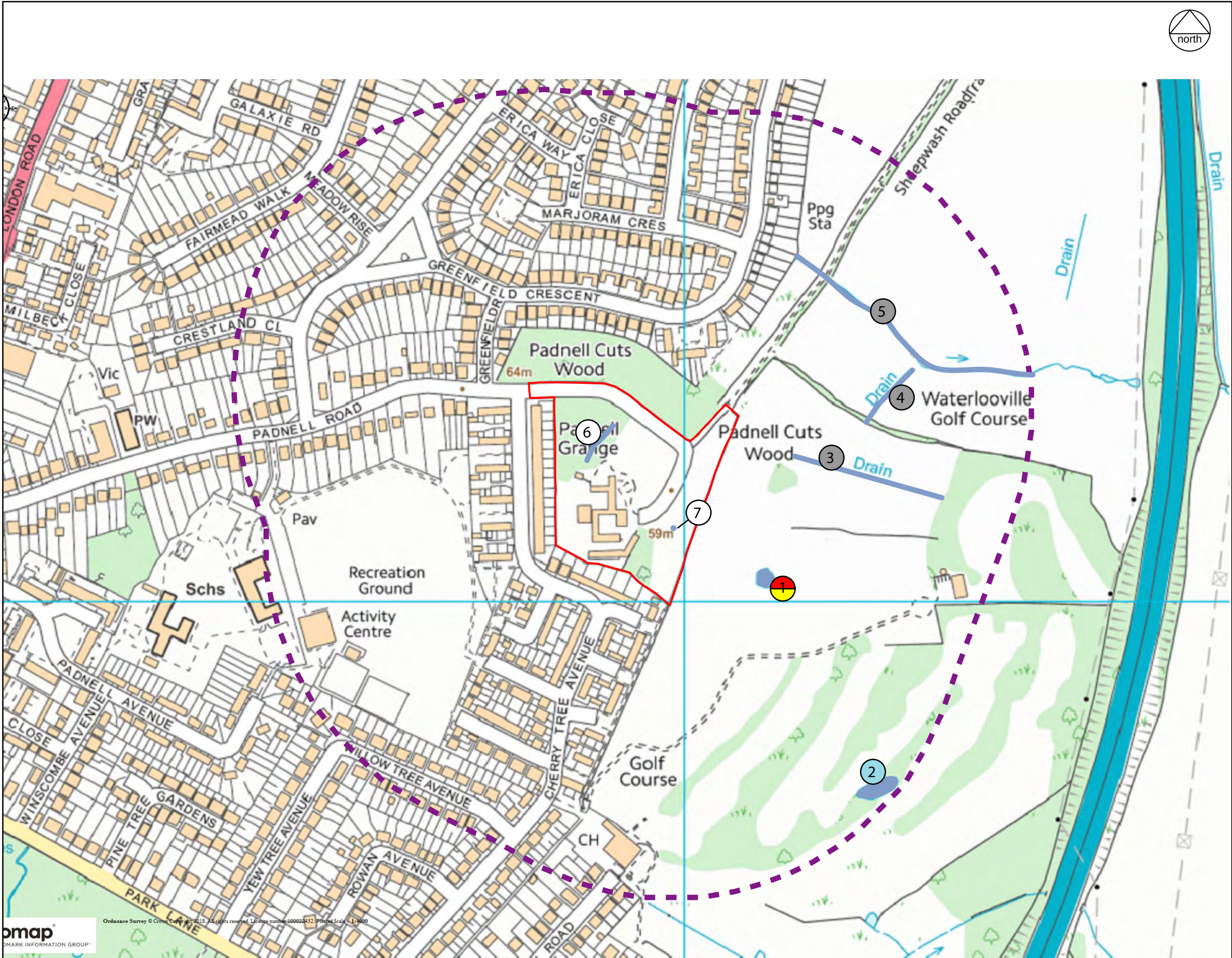
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APPENDIX A

Great Crested Newt Survey Summary Plan



- KEY**
- Site boundary
 - 300m radius of site
 - Waterbody reference
 - Great Crested Newt record
 - Great Crested Newts confirmed absent by eDNA analysis
 - Smooth Newt record
 - Waterbody unsuitable for breeding Great Crested Newts

CLIENT:
Bellway Homes

PROJECT:
Padnell Grange

TITLE:
Great Crested Newt Survey Summary Plan

SCALE AT A3:
1:4000

DATE:
July 2018

2080.6 / 08

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Landscape Architecture
Masterplanning
Ecology



APPENDIX B

Full HSI assessment results

		Waterbody 1		Waterbody 2		Waterbody 7	
SI Ref	Description of Index	Measure/Comment	SI score	Measure/Comment	SI score	Measure/Comment	SI score
SI1	Geographic location	Zone A	1	Zone A	1	Zone A	1
SI2	Pond area (m ²)	200m ²	0.4	540m ²	1	70m ²	0.1
SI3	Pond permanence	Rarely dries	1	Never dries	0.9	Dries annually	0.1
SI4	Water quality	Moderate	0.67	Moderate	0.67	Moderate	0.67
SI5	Shading (%)	25%	1	25%	1	0%	1
SI6	Presence of waterfowl	Minor	0.67	Minor	0.67	Minor	0.67
SI7	Presence of fish	Possible	0.67	Major	0.01	Absent	1
SI8	Pond density in area	9	0.9	6	0.8	6	0.8
SI9	Terrestrial habitat quality	Poor	0.33	Poor	0.33	Moderate	0.67
SI10	Macrophyte cover in pond (%)	75%	1	40%	0.7	0%	0.3
	Overall HSI for pond		0.717		0.487		0.485
Overall suitability		Good		Poor		Poor	

APPENDIX C

eDNA sampling analysis results

Folio No: E1289
Report No: 1
Order No: 2080.6
Client: HDA
Contact: Michael Berwick
Contact Details: mb@hda-enviro.co.uk
Date: 07/07/2017

TECHNICAL REPORT

ANALYSIS OF ENVIRONMENTAL DNA IN POND WATER FOR THE DETECTION OF GREAT CRESTED NEWTS

Date sample received at Laboratory: 23/06/2017
Date Reported: 07/07/2017
Matters Affecting Results: None

RESULTS

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
33588	Padnell Grange P2	-	Pass	Pass	Pass	Negative	0
33594	Padnell Grange P1	-	Pass	Pass	Pass	Positive	12

SUMMARY

When Great Crested Newts (GCN); *Triturus cristatus* inhabit a pond, they deposit traces of their DNA in the water as evidence of their presence. By sampling the water, we can analyse these small environmental DNA (eDNA) traces to confirm GCN habitation, or establish GCN absence.

The water samples detailed below were submitted for eDNA analysis to the protocol stated in DEFRA WC1067 (Latest Amendments). Details on the sample submission form were used as the unique sample identity.

RESULTS INTERPRETATION

Lab Sample No.- When a kit is made it is given a unique sample number. When the pond samples have been taken and the kit has been received back in to the laboratory, this sample number is tracked throughout the laboratory.

Site Name- Information on the pond.

O/S Reference - Location/co-ordinates of pond.

SIC- Sample Integrity Check. Refers to quality of packaging, absence of tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to results errors. Inspection upon receipt of sample at the laboratory. To check if the Sample is of adequate integrity when received. Pass or Fail.

DC- Degradation Check. Analysis of the spiked DNA marker to see if there has been degradation of the kit since made in the laboratory to sampling to analysis. Pass or Fail.

IC- Inhibition Check- PCR inhibitors can cause false results. Inhibitors are analysed to check the quality of the result. Every effort is made to clean the sample pre-analysis however some inhibitors cannot be extracted. An unacceptable inhibition check will cause an indeterminate sample and must be sampled again.

Result- NEGATIVE means that GCN eDNA was not detected or is below the threshold detection level and the test result should be considered as no evidence of GCN presence. POSITIVE means that GCN eDNA was found at or above the threshold level and the presence of GCN at this location at the time of sampling or in the recent past is confirmed. Positive or Negative.

Positive Replicates- To generate the results all of the tubes from each pond are combined to produce one eDNA extract. Then twelve separate analyses are undertaken. If one or more of these analyses are positive the pond is declared positive for the presence of GCN. 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.

METHODOLOGY

The laboratory testing adheres to strict guidelines laid down in WC1067 Analytical and Methodological Development for Improved Surveillance of The Great Crested Newt, Version 1.1

The analysis is conducted in two phases. The sample first goes through an extraction process where all six tubes are pooled together to acquire as much eDNA as possible. The pooled sample is then tested via real time PCR (also called q-PCR). This process amplifies select part of DNA allowing it to be detected and measured in 'real time' as the analytical process develops. qPCR combines PCR amplification and detection into a single step. This eliminates the need to detect products using gel electrophoresis. With qPCR, fluorescent dyes specific to the target sequence are used to label PCR products during thermal cycling. The accumulation of fluorescent signals during the exponential phase of the reaction is measured for fast and objective data analysis. The point at which amplification begins (the Ct value) is an indicator of the quality of the sample. True positive controls, negatives and blanks as well as spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared so they act as additional quality control measures.

The primers used in this process are specific to a part of mitochondrial DNA only found in GCN ensuring no DNA from other species present in the water is amplified. The unique sequence appropriate for GCN analysis is quoted in DEFRA WC 1067 and means there should be no detection of closely related species. We have tested our system exhaustively to ensure this is the case in our laboratory. We can offer eDNA analysis for most other species including other newts.

Analysis of eDNA requires scrupulous attention to detail to prevent risk of contamination. Kits are manufactured by SureScreen

Scientifics to strict quality procedures in a separate building and with separate staff, adopting best practice from WC1067 and WC1067 Appendix 5. Kits contain a 'spiked' DNA marker used as a quality control tracer (SureScreen patent pending) to ensure any DNA contained in the sampled water has not deteriorated in transit. Stages of the DNA analysis are also conducted in different buildings at our premises for added

SureScreen Scientifics Ltd also participate in Natural England's proficiency testing scheme and we also carry out inter-laboratory checks on accuracy of results as part of our quality procedures.

Reported by: Harry Neal

Approved by: Sam Humphrey

End Of Report

APPENDIX D

Population estimate survey results

Waterbody*	Date	Air Temp (°C)	Water Temp (°C)	Turbidity	Vegetation cover	Egg search	Netting	Torch survey	Bottle survey	Notes
Waterbody 1	10.05.2018	8	15	1	0	Tc eggs Lv eggs	NC	3 Tc female 2 Lv female	6 Lv male 5 Lv female	Egg search no longer carried out due to the confirmed presence of Great Crested Newt eggs.
	14.05.2018	15	-	1	2	NC	3 Lv male 3 Lv female	3 Lv male 3 Lv female	8 Lv male 4 Lv female	
	16.05.2018	11	14	2	3	NC	1 Tc female	1 Tc male 2 Tc female 1 Lv male 4 Lv female	1 Tc female	
	23.05.2018	14	-	2	4	NC	1 Lv male	1 Tc female 1 Lv male 1 Lv female	1 Tc male 2 Lv male 2 Lv male	
	07.06.2018	15	17	3	3	NC	1 Lv male	1 Lv female	2 Tc female 1 Lv female 3 Tc larvae 7 Lv larvae	
	14.06.2018	14	15	2	4	NC	1 Lv female	1 Tc female 1 Lv female	2 Tc female 14 Tc larvae 19 Lv larvae	
Waterbody 6	10.05.2018	11	-	1	2	None	NC	None	NC	Too shallow to carry out bottle trapping or netting.
	14.05.2018	Pond dry								
Waterbody 7	10.05.2018	11	-	4	0	None	NC	None	NC	Too shallow to carry out bottle trapping or netting.
	14.05.2018	15	18	3	0	None	NC	None	NC	
	16.05.2018	10	13	4	0	None	NC	None	NC	
	23.05.2018	10	13	4	0	None	NC	None	NC	

* Waterbodies 2, 3, 4 and 5 were not subject to population estimate surveys due to either the likely absence of Great Crested Newts proved by eDNA survey (Waterbody 2) or waterbody assessed as not suitable for breeding Great Crested Newts (Waterbodies 3, 4 and 5).

Turbidity scale: 0=clear; 5= Very murky

Vegetation cover scale: 0=none, 5=obscured

Species: Great Crested Newt *Triturus cristatus* (Tc), Smooth Newt *Lissotriton vulgaris* (Lv)

NC: Methodology not carried out