



Consultancy Services

Sevenoaks Wildlife Reserve, Bradbourne Vale
Road, Sevenoaks, Kent TN13 3DH

Great Crested Newt Survey



KWT Consultancy Services



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This report has been prepared in accordance with British Standard 42020:2013 “Biodiversity, Code of practice for planning and development”.

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1 SUMMARY

INTRODUCTION

Kent Wildlife Trust is seeking to obtain planning permission for improvements to the existing visitor experience at its Sevenoaks Wildlife Reserve. The land subject to development proposals comprises a c.1.75ha area located in the south-west of Sevenoaks Wildlife Reserve and Site of Special Scientific Interest (SSSI).

The site is dominated by bare ground with adjacent areas of semi-natural broadleaved woodland and dense scrub.

A Preliminary Ecological Appraisal undertaken by KWT Consultancy Services identified potential for great crested newt *Triturus cristatus* in waterbodies within the site and the immediate surrounding area, and the potential for newts to use terrestrial habitats and features within the site for rest or shelter. Presence / absence surveys for great crested newts were therefore recommended.

Presence / Likely absence surveys for great crested newts were undertaken of all suitable waterbodies within 500m of a site proposed for development within Sevenoaks Wildlife Reserve. The surveys were undertaken during April-May 2020.

RESULTS

A total of 18 waterbodies were first subject to a Habitat Suitability Index assessment. Of these, 10 were deemed suitable for great crested newts and were subject to presence/likely absence surveys in accordance with the methodology detailed within the Great Crested Newt Mitigation Guidelines.

Great crested newts were not recorded within any of the waterbodies. Smooth newt, common frog and common toad were recorded in low numbers and the survey area is assessed as being of Local importance for amphibians.

RECOMMENDATIONS

Recommendations have been made with regard to Reasonable Avoidance Measures during pre-works clearance and construction to minimise impacts on the local amphibian populations.

In accordance with NPPF, recommendations for the enhancement of the site and wider reserve have been made – it is proposed that overgrown ponds be restored, to provide opportunities for amphibians in the absence of fish and wildfowl.

2 INTRODUCTION

2.1 Background

Kent Wildlife Trust is seeking to obtain planning permission for improvements to the existing visitor experience at its Sevenoaks Wildlife Reserve. The land subject to development proposals comprises a c.1.75ha area located in the south-west of Sevenoaks Wildlife Reserve and Site of Special Scientific Interest (SSSI) – herein termed as ‘the site’.

The site is dominated by bare ground with adjacent areas of semi-natural broadleaved woodland and dense scrub. The central OS grid reference for the development area is TQ51942 56702.

The current proposals are understood to include the following:

- Demolition of five structures, several containers and limited areas of dense scrub and trees to facilitate new access and parking areas.
- Removal of a limited area of trees and scrub in the vicinity of the existing visitor centre building and the enlarged parking areas and one way road system.
- Extension and renovation of the existing visitor centre building.
- Recladding and improved thermal performance of the visitor centre, requiring the temporary removal of all roof tiles and timber weatherboarding from all elevations.
- Installation of air sourced heat pumps within the visitor centre and photo voltaic panels on the visitor centre roof.
- Resurfacing of all access routes and parking areas.
- New play area to east of visitor centre.
- New areas of tree planting and soft-landscaping in the north, east and west of the site.

2.2 Scope of Work

KWT Consultancy Services was commissioned to undertake a Preliminary Ecological Appraisal (PEA) of the site in November 2019 (KWT CS, 2020). The PEA identified potential for great crested newts *Triturus cristatus* in waterbodies within the site and the immediate surrounding area, and the potential for newts to use terrestrial habitats and features within the site for rest or shelter. Presence/absence surveys for great crested newt were therefore recommended.

KWT Consultancy Services was commissioned to undertake great crested newt presence/absence surveys of all suitable waterbodies within 500m of the site. This report provides the results and findings of the great crested newt surveys which were commissioned and undertaken in 2020.

2.3 Survey Area

Sevenoaks Wildlife Reserve is situated on the northern periphery of Sevenoaks town (see Figure 1). The village of Dunton Green is located to the west, the A25 to the South, residential and commercial areas to the west and open agricultural land to the north. It is accessed from Bradbourne Vale Road at OS grid reference TQ5218 5636.

The Reserve is owned by Tarmac and leased / managed by Kent Wildlife Trust and comprises a 73ha area including five lakes and surrounding areas of broadleaved woodland with dense

scrub, numerous smaller ponds, wet woodland and reedbed, with a number of bird hides and trails for public use. The river Darent flows through the north of the reserve. The Reserve is all designated as SSSI for its breeding wetland bird assemblage and Downy Emerald dragonfly. The reserve also sits in an area identified in the Sevenoaks District Plan as: Area of Archaeological Potential, and Metro Greenbelt.

The site subject to development proposals lies within the south-west corner of the Reserve; habitats within the site comprise amenity grassland, broadleaved woodland edge, scattered scrub and trees, and areas of unsurfaced bare ground and hard-standing. The site also includes the existing Jeffrey Harrison visitor centre building and an outdoor education/sensory garden area.

Figure 1 shows the extent of the Reserve and the general location of the site. Figure 2 shows the development proposals.

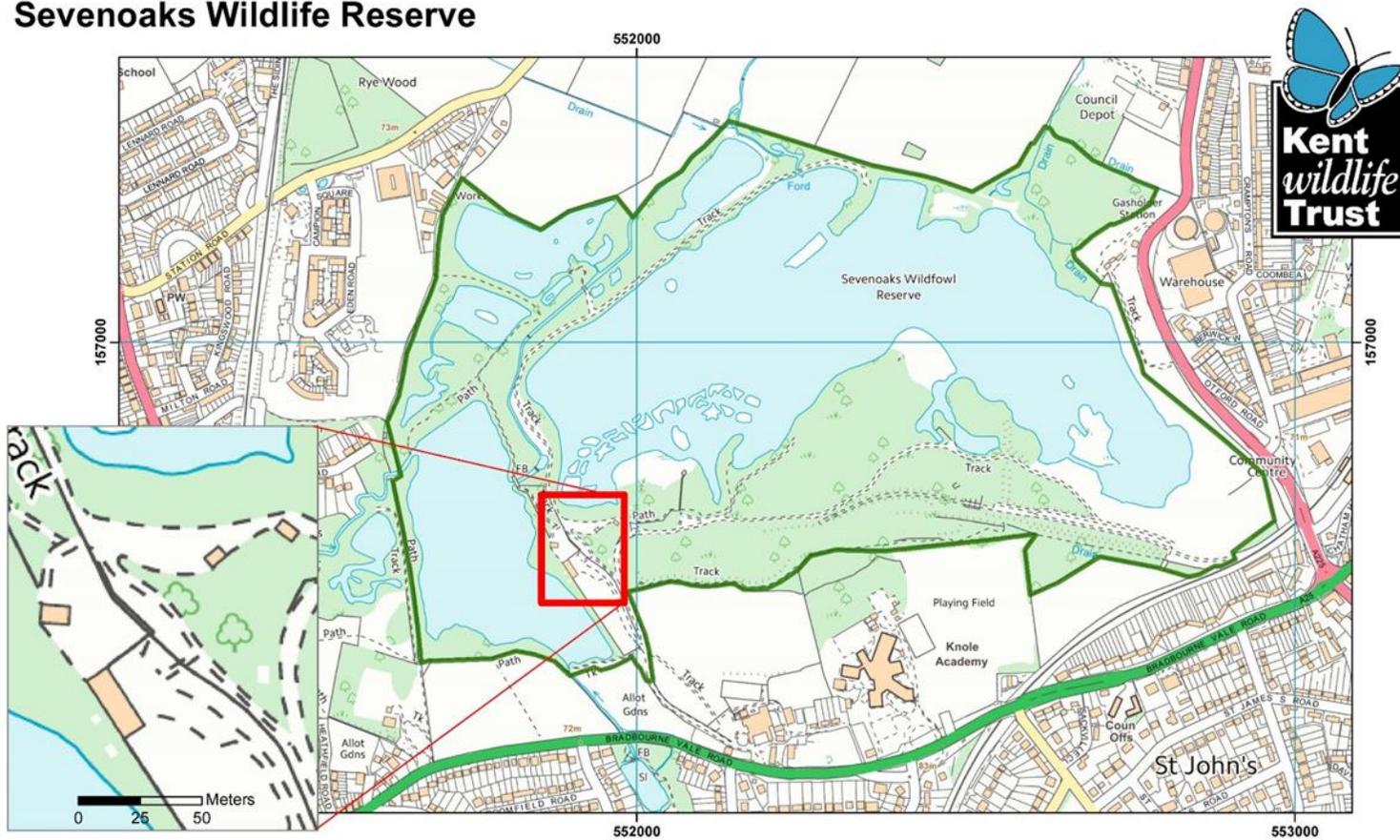
2.4 Objectives

The aims of the surveys and desktop evaluation were to:

- Establish presence / absence of great crested newts within the Reserve
- Evaluate the relative size and importance of any great crested newt population within the Reserve.
- Suggest appropriate mitigation and compensation for great crested newts with regard to the site and proposed development works.

Figure 1: Site Location / Boundary Map. Map provided by Kent Wildlife Trust showing extent of Sevenoaks Wildlife Reserve (outlined in green), and the general location of the site (outlined in red)

Sevenoaks Wildlife Reserve



Kent Wildlife Trust 2017

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Figure 2: Development proposals



3 METHODOLOGY

3.1 Great Crested Newt Habitat Suitability Index (HSI) Survey Methodology

All waterbodies within 500m of the site were identified using the MAGIC¹ mapping website and subsequently assessed in the field using the great crested newt Habitat Suitability Index (HSI), following guidance published by the Amphibian and Reptile Groups of the UK (ARG UK) in 2010. Figure 3 shows the location of the 18 ponds within 500m which were subject to a Habitat Suitability Index (HSI) assessment, which was undertaken on 2nd April 2020 by Dr Clair Thackray (GCN Survey Licence no. 2016-19968-CLS-CLS).

The HSI is a measure of habitat suitability, which involves a field and desk based assessment of waterbodies for their potential to support great crested newts. It involves examining the following ten “Factors” which are subsequently calculated to give Suitability Index (SI) values:

- Location (in Britain);
- Pond area;
- Desiccation rate (years out of ten that pond dries);
- Water quality;
- Percentage of pond shaded;
- Number of waterfowl;
- Fish population;
- Number of ponds within 1km;
- Terrestrial habitat quality; and
- Percentage macrophyte cover.

Once each factor and accompanying suitability indices are ascertained, a simple geometric mean is calculated to give a final HSI value between 0.00 and 1. The resulting value is then used against the following categorical scale to establish the suitability of the pond for great crested newts:

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

In general, waterbodies/ponds with high HSI scores are more likely to support great crested newts than those with low scores. However, the system is not sufficiently precise to allow the conclusion that any particular pond with a high score will support newts, or that any pond with a low score will not do so. Therefore, professional judgement and consideration of the surrounding habitat and location of the pond are all factors in deciding the suitability of the pond to support great crested newt and potential impacts.

3.2 Great Crested Newt Pond Survey Methodology

All amphibian surveying followed methodology and guidance identified within the Great Crested Newt Mitigation Guidelines (English Nature, 2001) and detailed under Natural

¹ <https://magic.defra.gov.uk/>

England's Standing Advice for great crested newts (Natural England, 2015). A minimum of four survey visits must be undertaken, with a further two if the presence of great crested newt is confirmed in order to establish a population size class estimate. The guidance recommends that at least two of the initial four surveys be conducted between mid-April and mid-May, with a third during this period if the presence of great crested newts is identified.

The guidelines recommend that wherever possible at least three of the following four survey methods are used on each survey visit:

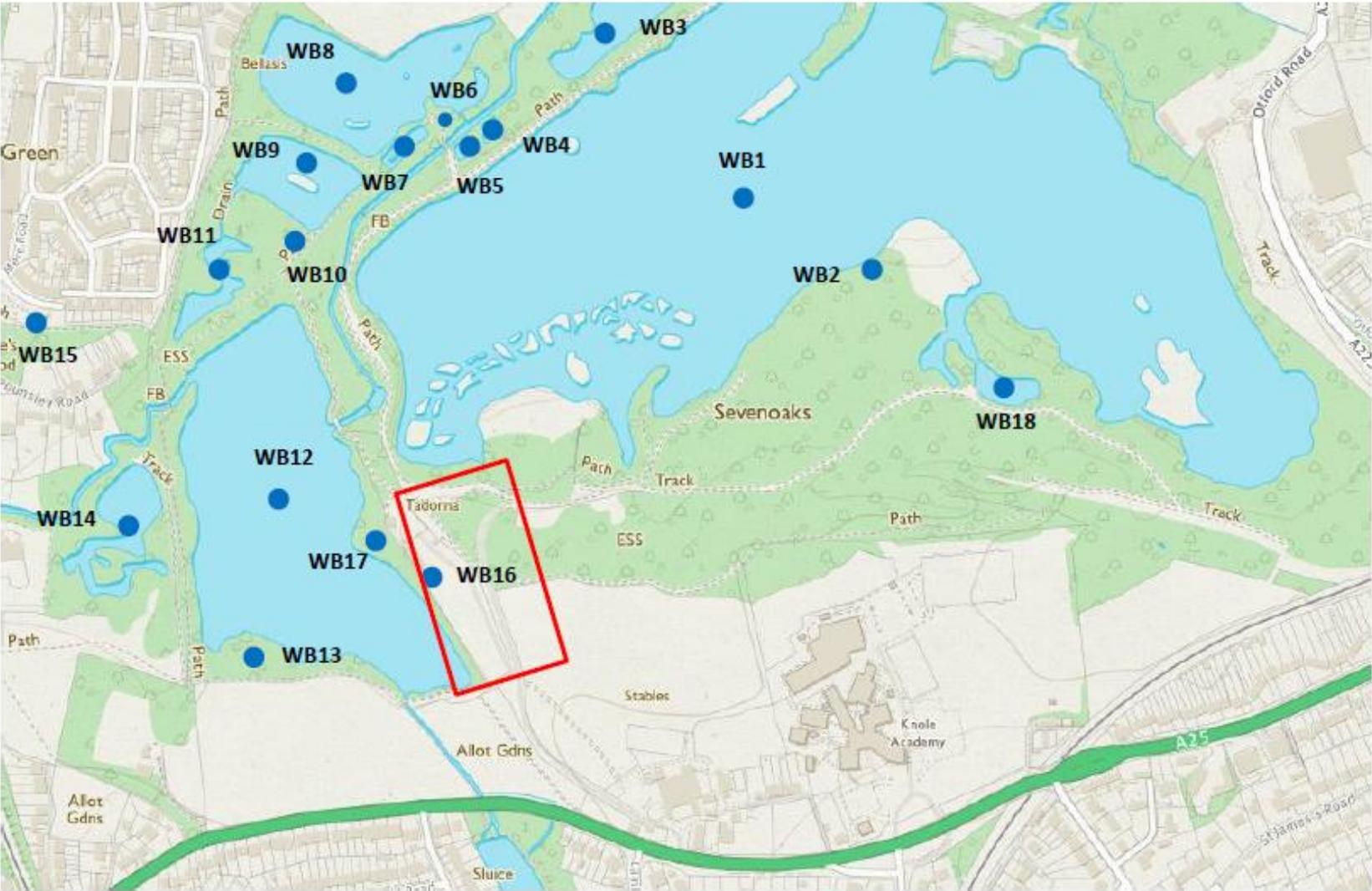
- bottle trapping;
- torchlight searches;
- egg searches; and/or
- hand netting.

The surveys were all completed between 15th April and 24th May 2020. All were undertaken in suitable weather conditions, i.e. night-time air temperature $>5^{\circ}\text{C}$, no/little wind and no rain, and timed in accordance with standard guidelines as detailed above. Weather data for the night-time survey dates is shown in Table 1. All surveys were led by a licensed individual with non-licensed surveyors assisting. The licensed surveyor was Dr Clair Thackray (GCN Survey Licence no. 2016-19968-CLS-CLS).

Table 1 – Weather data and survey dates

Survey Date	Temperature $^{\circ}\text{C}$	Rain	Wind (Beaufort Scale)	Cloud cover
15/4/20	10	None	2 – Light breeze	0%
29/4/20	11	None	3 – Gentle breeze	90%
6/5/20	11	None	2 – Light breeze	30%
7/5/20	17	None	2 – Light breeze	100%
11/5/20	8	None	4 – Moderate breeze	95%
13/5/20	7	None	3 – Gentle breeze	80%
18/5/20	17	None	2 – Light breeze	90%
24/5/20	18	None	1 – Light air	50%

Figure 3: Map showing 18 waterbodies within 500m of the proposed development area at Sevenoaks Wildlife Reserve (shown by red line boundary)



3.3 Amphibian Assemblage Evaluation Methodology

The methodology applied for evaluating species populations and assemblages of County Importance is based upon the Criteria for Selection and Delineation for Local Wildlife sites in Kent (KWT, 2005). These guidelines are aimed at identifying important amphibian sites and are based on estimates of population size as well as presence and absence of species.

The criteria used to designate County Importance are based on a scoring system, which forms the basis of the selection of Sites of Special Scientific Interest for amphibians. The use of a scoring system allows sites with exceptional populations to be identified, as well as sites with good assemblages of a range of species. This scoring system is based on the peak adult count of each species recorded on a single survey visit, as set out in the table below.

Table 2 – Amphibian Assemblage Evaluation Criteria

Species	Method	Small population Score 1	Medium population Score 2	Large population Score 3
Great crested newt	Seen or netted in day	<5	5-50	>50
	Counted at night	<10	10-100	>100
Smooth newt	Netted in day or counted at night	<10	10-100	>100
Palmate newt	Netted in day or counted at night	<10	10-100	>100
Common toad	Estimated	<500	500-5000	>5000
	Counted	<100	100-1000	>1000
Common frog	Spawn clumps counted	<50	50-500	>500

NB. If four species are present, add 1 point; if five species are present, add two points to the total

All sites with either exceptional populations of great crested newts or scoring 5 points or more based on their amphibian assemblage would be evaluated as being of County Importance under this criteria and qualify for consideration as Sites of Special Scientific Interest.

3.4 Limitations

Covid-19

The survey work took place during the Covid-19 pandemic. During this period KWT Consultancy Services has followed closely the advice and guidance of the Government, NHS and Public Health England, supplemented by guidance provided by CIEEM, which indicated that some site-based work could still be undertaken, but should only be done so where necessary and where there is no clear risk to the ecologists, other workers or the wider public.

In this instance, KWT Consultancy services adopted a dynamic risk assessment approach to assess whether a survey visit was necessary and could be undertaken in accordance with government guidelines. The dynamic risk assessment concluded that:

- The amphibian surveys could not be completed without visiting the site and wider reserve.

- Work could be undertaken safely in compliance with the current government requirements for social distancing.

The following measures were taken to ensure both adequate social distancing and the safety of surveyors due to some anti-social behaviour which occurred within the Sevenoaks Wildlife Reserve during the April/May lockdown period:

- Surveyors worked as a team of four, divided into two pairs; surveyors maintained social distancing and were paired with the same person for every survey wherever possible;
- Both pairs worked in the same area of the reserve;
- The survey team had left the survey area by 22.30.

Accessibility of Ponds

Access to the larger waterbodies (WB1, WB3, WB12, and WB18) was restricted by very dense scrub around the majority of the shoreline and deep water with steep banks. Where required following the HSI assessment, the surveys were focussed on the accessible, shallower areas of the shoreline. Fish and wildfowl are present in all of these waterbodies; the shallower, vegetated areas provide potential refuge for amphibians and it is considered that the surveys were effective in sampling the most suitable areas of the waterbodies and that the results are reliable.

4 RESULTS

4.1 Desk Study

The desk study revealed 21 ponds within a 500m radius of the site. One pond, WB16, lies within the site boundary. Three of the 21 ponds to the south of the A25 road were excluded – the A25 represents a significant barrier to dispersal and the ponds are also known to support a high density of wildfowl. Table 3 shows the distance and direction of all remaining 18 waterbodies relative to the site.

Table 3 - Distance of waterbodies from site

Pond	Distance from site (m)	Direction from site
1	24	N
2	470	NE
3	432	NE
4	363	N
5	334	N
6	369	N
7	336	N
8	350	N
9	302	N
10	276	NW
11	278	NW
12	43	W
13	181	W
14	273	W
15	429	NW
16	Within site	-
17	35	W
18	464	E

4.2 Results of the Habitat Suitability Index Assessment (HSI)

Table 4 includes summary data from the HSI assessment. The full HSI survey results are provided in Appendix 2.

Table 4 – Summary of Great Crested Newt Habitat Suitability Index assessment

Waterbody No.	HSI Score	HSI Value
1	Poor	0.3
2	Good	0.64
3	Poor	0.46
4	Good	0.72
5	Good	0.71
6	Good	0.73
7	Good	0.75
8	Poor	0.47
9	Poor	0.35
10	Below Average	0.56
11	Poor	0.4
12	Poor	0.27
13	Good	0.7
14	Below Average	0.59
15	Average	0.61
16	Average	0.66
17	Average	0.67
18	Good	0.72

4.3 Waterbody Descriptions

WB1 is a large 277,270m² (27.73ha) lake, including islands and spits, formed from flooded gravel workings. The lake is fish-stocked and is an important habitat for both resident and migratory wildfowl. The waterbody never dries; 50% of the shoreline is lined by semi-natural broadleaved woodland but much of the surface is unshaded due to its size. Macrophytes make up c.1% of the surface and the submergent vegetation is heavily impacted by the wildfowl population; the surrounding terrestrial habitat is of good suitability for great crested newts. The lake has an HSI value of 0.3, 'Poor'.

WB2 is a 250m² rectangular pond located on the southern edge of WB1. The pond sometimes dries and supports both fish and wildfowl. The shoreline is 90% shaded; macrophytes cover 50% of the surface and the surrounding woodland habitat is good for great crested newts. The HSI value for the pond was 0.64, 'Good'.

WB3 is a lake of 11,588m² (1.16ha) adjacent to the River Darent and beyond WB1. The waterbody is unlikely to become dry. Wildfowl have a major impact and fish are likely to be present as the lake is linked to the river during the wetter months of the year. The shoreline is 70% shaded and <5% of the water surface is covered by macrophytes. The surrounding

woodland provides good quality habitat for great crested newts. The HSI value for the lake is 0.46, 'Poor'.

WB4 is a large pond of 400m² located between the River Darent and WB1. The waterbody dries in some years. Wildfowl and fish appear to have a minor impact; the shoreline is 75% shaded and 60% of the water surface is covered by macrophytes. The surrounding woodland provides good quality habitat for great crested newts. The HSI value for the pond is 0.72, 'Good'.

WB5 is a large, shallow and overgrown pond of 400m² located adjacent to WB4 between the River Darent and WB1. The waterbody dries annually. Wildfowl and fish were not evident and the shallow depth is likely to restrict their use of this pond. The shoreline is 80% shaded and 80% of the water surface is covered by macrophytes. The surrounding woodland provides good quality habitat for great crested newts. The HSI value for the lake is 0.71, 'Good'.

WB6 is a small 128m² pond to the north of the River Darent, with land bridges linking it to the ponds and land to the south of the river. The waterbody is likely to dry in some/most years. Wildfowl and fish were not evident. The shoreline is 30% shaded and 30% of the water surface is covered by macrophytes. The surrounding woodland provides good quality habitat for great crested newts. The HSI value for the lake is 0.73, 'Good'.

WB7 is a large, shallow rectangular pond of 720m² to the north of the River Darent, with land bridges linking it to the ponds and land to the south of the river. The southern shoreline of the pond is highly accessible and it is used as an educational resource for pond-dipping. Wildfowl have a minor impact on the pond due to its larger size and proximity to large lakes. Fish were not seen but may be present due to connectivity to the large lake to the north (WB8); however the pond is considered likely to dry in some years. The shoreline is 70% shaded and 15% of the surface is covered with macrophytes. . The surrounding woodland provides good quality habitat for great crested newts. The HSI value for the lake is 0.75, 'Good'.

WB8 is a large, steep-sided and deep lake of 18,314m² (1.83ha) located to the north of the River Darent and WB7. Wildfowl have a major impact and fish are also considered likely to be present. The lake is not likely to become dry. The shoreline is 50% shaded and <5% of the surface is covered with macrophytes. The surrounding woodland provides good quality habitat for great crested newts. The HSI value for the lake is 0.47, 'Poor'.

WB9 is a medium-sized, steep-sided and deep lake of 7,082m² (0.71ha) located to the north of the River Darent and immediately west of WB8. Wildfowl have a major impact (including pairs of nesting herons) and fish are very likely to be present. The lake is not likely to become dry. The shoreline is 90% shaded and 10% of the surface is covered with macrophytes. The surrounding woodland provides good quality habitat for great crested newts. The HSI value for the lake is 0.35, 'Poor'.

WB10 is a shallow, overgrown pond of 128m² located to the north of the River Darent and immediately west of WB9. Wildfowl and fish were not evident and the pond dries annually. The shoreline is 100% shaded and 40% of the surface is covered with macrophytes. The surrounding woodland provides good quality habitat for great crested newts. The HSI value for the pond is 0.56, 'Below Average'.

WB11 is a medium-sized, deep and steep-sided lake of around 3,169 m² (0.32ha) to the north of the River Darent. Wildfowl have a major impact on the waterbody and fish are likely to be present. The lake is deep and unlikely to become dry. The shoreline is 100% shaded but much of the surface is unshaded due to its size; the sides of the lake shelve steeply and only 5% of the surface is covered with macrophytes. The surrounding woodland provides good quality habitat for great crested newts. The HSI value for the pond is 0.40, 'Poor'.

WB12 is a large 61,742m² (6.17ha) lake formed from flooded gravel workings. The lake is fish-stocked and is an important habitat for both resident and migratory wildfowl. The waterbody never dries and is linked to the River Darent; 90% of the shoreline is lined by semi-natural broadleaved woodland but much of the surface is unshaded due to its size. The sides are steeply shelving and macrophytes make up c.1% of the surface; the surrounding terrestrial habitat is of good suitability for great crested newts. The lake has an HSI value of 0.27, 'Poor'.

WB13 is a pond of 160m² and upto c.1m depth located to the south-west of WB12. Wildfowl were not evident; the pond is linked to WB12 and fish are present – the pond is expected to dry in some years which will limit the size of the fish population. The shoreline is 100% shaded; 40% of the surface is covered with macrophytes offering good microhabitat. The surrounding woodland provides good quality habitat for great crested newts. The HSI value for the pond is 0.70, 'Good'.

WB14 is a medium-sized lake of 6,465m² (0.65ha) located outside of the Reserve to the south of the River Darent and west of WB12. The lake has both shallow overgrown areas and open, steep-sided, deeper areas. Wildfowl have a minor impact; fish are likely to be present in the deeper areas due to the proximity to the River Darent. The northern section of the lake is deep and rarely dry. The shoreline is 100% shaded and no macrophyte growth was recorded. The surrounding woodland provides good quality habitat for great crested newts. The HSI value for the pond is 0.59, 'Below Average'.

WB15 is a small pond of 44m² located outside of the Reserve to the north of the River Darent and west of WB11. The pond lies within a recent residential development and appears to have been recreated or managed for amenity purposes; the pond is fenced and the immediate surroundings comprise paved areas with seating and mown lawn. The wider area supports good quality habitat for great crested newts. The pond is unlikely to dry, the shoreline is 30% shaded and macrophyte cover is <5%. Wildfowl and fish were not evident although fish may have been introduced for amenity purposes. The HSI value for the pond is 0.61, 'Average'.

WB16 is a small lined pond of 12m² within the Elemental Garden of the Reserve. The pond has a depth of less than 0.5m and dries annually - the pond is therefore not suitable for wildfowl or fish. The shoreline is 50% shaded and macrophyte growth covers 80% of the surface. The immediate surrounding area supports good quality habitat for great crested newts. The HSI value for the pond is 0.66, 'Average'.

WB17 is a small, artificial pond of 12m² within the garden of the Tadorna Education centre within the Reserve. The pond has a depth of c.0.5m; drying is unlikely as the pond is topped up. The pond comprises a steep-sided square structure raised off the ground with a wire-mesh covered lid. There is no impact of wildfowl or fish. The shoreline is 50% shaded and

macrophyte growth covers 30% of the surface. The immediate surrounding area supports good quality habitat for great crested newts. The HSI value for the pond is 0.67, 'Average'.

WB18 is a medium-sized, steep-sided lake of 1,771m² (0.177ha) in the east of the Reserve. Wildfowl and fish are both present as the lake is linked to the larger waterbody WB1, however WB18 is shallow and likely to dry in some years. The shoreline is 80% shaded and 75% of the surface is covered with macrophytes. The surrounding woodland provides good quality habitat for great crested newts. The HSI value for the pond is 0.72, 'Good'.

4.4 Great Crested Newt Presence / Absence Surveys

Following the HSI assessment, great crested newts presence / absence surveys were undertaken at ten of the waterbodies: WB2, WB4, WB5, WB6, WB7, WB10, WB13, WB16, WB17 and WB18.

Table 5 shows a summary of the survey data with peak counts for each amphibian species, together with the population score in accordance with the amphibian assemblage criteria (Table 2). Full survey data is provided in Appendix 3 and photos are provided in Appendix 4.

Following the HSI assessment, eight waterbodies - WB1, WB3, WB8, WB9, WB11, WB12, WB14 and WB15 were discounted from the surveys due to the presence of large fish and wildfowl populations, isolation from the works area in terms of distance, and/or containing flowing water with direct connection to the River Darent. All of the discounted waterbodies had an HSI value of below average or poor, with the exception of WB15 which had an HSI value of average. WB15 is located within a recent residential development and managed for amenity purposes; it is 429m from the site and lies beyond both the River Darent and the large fishing lake WB12. There is good quality terrestrial habitat for great crested newts within the immediate surrounds of the pond in the form of semi-natural broadleaved woodland and it is considered highly unlikely that any great crested newts using the pond would disperse into the works area.

WB10 was dry by the date of the second survey and was discounted from the remaining survey dates. Smooth newt and fish larvae were confirmed within the pond prior to its drying.

great crested newts were not observed in any of the waterbodies on any survey date. Smooth newts, common frog and common toad were recorded on several occasions.

The use of trapping was restricted due to many waterbodies having hard gravel sediments. Three methods were used in all waterbodies except in WB4 – this was subject to bottle-trapping and torching but no egg search or netting was conducted as this waterbody was discounted following the first survey night in mid-April due to moderately fast flowing water and connectivity with the river Darent being confirmed. No amphibians were recorded within WB4 during the first survey and stickleback fish were confirmed present (see Appendix 2).

Smooth newts were recorded in WB5, WB6, WB7, WB10, WB13, WB16 and WB17. The highest counts were recorded in WB5 and WB7 in the north of the reserve and WB17 in the Tadorna garden where the highest peak count of 24 was recorded - this is equivalent to a Medium population score under the Amphibian Assemblage Evaluation Methodology (Section 3.2).

Common toads were confirmed in WB2, WB5 and WB6, and possibly WB13 where a tadpole was observed but not identified to species level. Common frog was recorded in WB2, WB6, WB16 and WB17.

Fish populations were confirmed in WB2, WB4, WB6, WB7, WB10 and WB18. Species recorded were medium-sized carp (>30cm in length) and stickleback.

Table 5. Peak count data for each waterbody surveyed

Waterbody	Method	GCN	Palmate newt	Smooth newt	Common toad	Common frog	Fish confirmed?
2	Torch	0	0	0	1	1	Yes
	Egg search	0	0	0			
	Netting	0	0	0			
4	Torch	0	0	0			Yes
	Trap	0	0	0			
5	Torch	0	0	22	3		No
	Trap	0	0	18			
	Egg search	0	0	1			
6	Torch	0	0	8	1	2	Yes
	Trap	0	0	3			
	Egg search	0	0	0			
7	Torch	0	0	16	0	0	Yes
	Egg search	0	0	3			
	Netting	0	0	1			
10	Torch	0	0	1	0	0	Yes
	Trap	0	0	1			
	Egg search	0	0	0			
13	Torch	0	0	11	1 tadpole		No
	Trap	0	0	7			
	Egg search	0	0	1			
16	Torch	0	0	10	0	1	No
	Egg search	0	0	0			
	Netting	0	0	1			
17	Torch	0	0	24	0	2	No
	Egg search	0	0	2			
	Netting	0	0	4			
18	Torch	0	0	0	0	0	Yes
	Trap and net	0	0	0			
	Egg search	0	0	0			

5 EVALUATION AND RECOMMENDATIONS

5.1 Summary

Great crested newts have been confirmed as likely absent from all potentially suitable waterbodies within the survey area and there are no mitigation or EPS licensing requirements with regard to great crested newts and the proposed development. The survey data is valid for two survey seasons; should works be delayed beyond March 2022 then the great crested newt surveys will need to be updated.

Established populations of carp and stickleback limit the suitability of many of the waterbodies within the survey area. The smaller, shallower ponds which are not linked to larger lakes, support the largest smooth newt populations and breeding by smooth newt was confirmed in WB5, WB7 and WB17. Palmate newt was not recorded.

Common frog were recorded in low numbers however the larger fishing lakes were not included within the great crested newt survey due to the large fish and wildfowl populations present. Toad tadpoles are unpalatable to fish and there is potential for the larger lakes to support populations of common toad.

While three species and a medium population of smooth newt was recorded, the number of animals recorded was relatively low when the total area of waterbodies is taken into account. Given the high quality of the terrestrial habitat in terms of opportunities for shelter, hibernation and foraging, it is likely that the widespread fish and wildfowl populations are limiting the breeding success of amphibians.

5.2 Evaluation of Amphibian Assemblage

The peak count for smooth newt, when summed across all waterbodies for the same date, was 56, equivalent to a Medium population and a score of 2 points under the evaluation criteria in Table 2. The peak counts of 1-3 common toad and common frog are equivalent to a Low population, with a score of 1 point for each species although no frog spawn was recorded. This equates to a total score of 3-4 points with no additional points to be added. The survey area is therefore of Local rather than County importance in terms of its amphibian assemblage.

5.3 Reasonable Avoidance Measures during Development Works

In order to minimise impacts on the amphibian assemblage during clearance and construction works the following measures are recommended, which will also protect any reptiles and small mammals present in the vicinity of the site:

- Any areas of tall grassland, ruderal or scrub vegetation within the site should be reduced in height for the duration of the works period. The vegetation should be cut in two stages - a first cut to 150mm, followed by a second cut to ground level after 7 days and ongoing management as required to maintain this low sward height until the completion of works.
- Clear all existing log and rubble piles within the site by hand or small excavator.
- Locate works compounds, storage areas and machinery tracking routes within areas of hardstanding or short mown grassland, maintaining a buffer between the works and all areas of tall grassland, scrub and tree-lines.

- Raise all stored materials off the ground e.g. on pallets.
- Isolate spoil piles from areas of dense vegetation.
- Backfill trenches and other excavations before nightfall, or leave a ramp to enable animals to easily escape.

5.4 Recommendations with Regard to NPPF

The National Planning Policy Framework (NPPF) replaced the Planning Policy Statement 9 (2005) Biodiversity and Geological Conservation in March 2012 and sets out planning policies on the protection of biodiversity and geological conservation through the planning system. It is Section 11 of the National Planning Policy Framework which sets out the Government's current planning policy in relation to conserving and enhancing the natural environment. The NPPF states that "the planning system should contribute to and enhance the natural and local environment by:

- Protecting and enhancing valued landscapes, geological conservation interests and soils;
- Recognising wider benefits of ecosystem services;
- Minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.

Regarding NPPF it is recommended that the proposals include restoration of existing overgrown and 'Below Average' ponds (eg. WB10). The surrounding woodland of WB10 provides good quality habitat for amphibians and clearance works should aim to increase depth, prevent the inflow of water and sediments from the adjacent lake, and reduce both shading and macrophyte cover.

6 REFERENCES

ARG 2010. *Advice Note 5. Great Crested Newt Habitat Suitability Index.*

English Nature. 2001. *Great Crested Newt Mitigation Guidelines. Version August. 2001.*
English Nature. Peterborough.

KWT Consultancy Services. 2020. *Sevenoaks Wildlife Reserve: Preliminary Ecological Appraisal.* KWT Consultancy Services, Tyland Barn, Sandling, Maidstone, Kent, ME14 3BD.

Kent Wildlife Trust. 2005. *Local Wildlife Sites in Kent. Sites of Nature Conservation Interest Criteria for Selection and Delineation.*

Appendix 1 – Legislation Relating to Amphibians in the UK

All British amphibian species receive legal protection in the United Kingdom though the degree to which different species are protected varies. The Wildlife and Countryside Act 1981 (WCA) (as amended) transposes into UK law the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention). The 1981 Act was recently amended by the Countryside and Rights of Way (CRoW) Act 2000 and the more recent Conservation Regulations (2017).

The **great crested newt** is listed under Schedule 5 of the 1981 Act, and is therefore subject to the provisions of Section 9, which make it an offence to:

- Intentionally kill, injure or take a great crested newt [Section 9(1)];
- Possess or control any live or dead specimen or anything derived from a great crested newt [Section 9(2)]
- Intentionally or recklessly disturb a great crested newt while it is occupying a structure or place which it uses for shelter or protection [Section 9(4)(b)];
- Intentionally or recklessly obstruct access to any structure or place which a great crested newt uses for shelter or protection [Section 9(4)(c)] Sell, offer for sale, possess or transport for the purpose of sale or publish advertisements to buy or sell a great crested newt [section 9(5)]

The other more common amphibian species are protected against sale (Section 9(5)) only. In all cases, the legislation applies to all life stages including spawn, eggs, juveniles and adults.

The great crested newt is also included on Annex IV of Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora (known as the Habitats Directive). As a result of the UK ratifying this directive, the great crested newt is protected under The Conservation of Habitats and Species Regulations 2010 (The Conservation Regulations). Annex IV of the Habitats Directive requires member states to construct a system of protection as outlined in Article 12, this is done through Part 3 of the Regulations whereby Regulation 41 makes it an offence to:

- Deliberately capture or kill a great crested newt [Regulation 41(1)(a)];
- Deliberately disturb great crested newts in such a way as to be likely to significantly affect i) the ability of any significant group of animals of that species to survive, breed or rear or nurture their young, OR ii) the local distribution of that species. [Regulation 41(1)(b) and 41(2)];
- Damage or destroy a breeding site or resting place of a great crested newt [Regulation 41(1)(d)].

APPENDIX 2. Habitat Suitability Index assessment results for 18 waterbodies within 500m of the development area at Sevenoaks Wildlife Reserve. April, 2020.

WB1	East Lake			WB2		
Location	1	1.00		Location	1	1.00
Pond area	277,270			Pond area	250	0.50
Pond drying	Never	0.90		Pond drying	Sometimes	0.50
Water quality	Moderate	0.67		Water quality	Moderate	0.67
Shade	50	1.00		Shade	90%	0.40
Fowl	Major	0.01		Fowl	Minor	0.67
Fish	Major	0.01		Fish	Minor	0.33
Ponds	18 (5,7/km)	1.00		Ponds	18	1.00
Terr'l habitat	Good	1.00		Terr'l habitat	Good	1.00
Macrophytes	1%	0.30		Macrophytes	50%	0.80
HSI	Poor	0.30		HSI	Good	0.64

WB3				WB4		
Location	1	1.00		Location	1	1.00
Pond area	11,588.40			Pond area	400	0.80
Pond drying	Never	0.90		Pond drying	Sometimes	0.50
Water quality	Moderate	0.67		Water quality	Moderate	0.67
Shade	70	0.80		Shade	75%	0.70
Fowl	Major	0.01		Fowl	Minor	0.67
Fish	Possible	0.67		Fish	Minor	0.33
Ponds	18	1.00		Ponds	18	1.00
Terr'l habitat	Good	1.00		Terr'l habitat	Good	1.00
Macrophytes	<5%	0.30		Macrophytes	60%	0.90
HSI	Poor	0.46		HSI	Good	0.72

WB5				WB6		
Location	1	1.00		Location	1	1
Pond area	400	0.80		Pond area	128	0.3
Pond drying	Annually	0.10		Pond drying	Sometimes	0.5
Water quality	Moderate	0.67		Water quality	Moderate	0.67
Shade	80%	0.60		Shade	30	1
Fowl	None	1.00		Fowl	Minor	0.67
Fish	Absent	1.00		Fish	Absent	1
Ponds	18	1.00		Ponds	18	1
Terr'l habitat	Good	1.00		Terr'l habitat	Good	1
Macrophytes	80%	1.00		Macrophytes	30%	0.6
HSI	Good	0.71		HSI	Good	0.73

WB7			WB8		
Location	1	1.00	Location	1	1.00
Pond area	720	1.00	Pond area	18,313.90	
Pond drying	Sometimes	0.50	Pond drying	Never	0.90
Water quality	Moderate	0.67	Water quality	Moderate	0.67
Shade	70	0.80	Shade	50%	1.00
Fowl	Minor	0.67	Fowl	Major	0.01
Fish	Possible	0.67	Fish	Possible	0.67
Ponds	18	1.00	Ponds	18	1.00
Terr'l habitat	Good	1.00	Terr'l habitat	Good	1.00
Macrophytes	15%	0.45	Macrophytes	<5%	0.30
HSI	Good	0.75	HSI	Poor	0.47

WB9			WB10		
Location	1	1.00	Location	1	1.00
Pond area	7,082		Pond area	128	0.30
Pond drying	Never	0.10	Pond drying	annually	0.10
Water quality	Mod	0.67	Water quality	Moderate	0.67
Shade	90%	0.40	Shade	100%	0.20
Fowl	Major	0.01	Fowl	Absent	1.00
Fish	Possible	0.67	Fish	Absent	1.00
Ponds	18	1.00	Ponds	18	1.00
Terr'l habitat	Good	1.00	Terr'l habitat	Good	1.00
Macrophytes	10%	0.40	Macrophytes	40%	0.70
HSI	Poor	0.35	HSI	Below Average	0.56

WB11			WB12		
Location	1	1.00	Location	1	1.00
Pond area	3,169		Pond area	61,742	
Pond drying	Never	0.90	Pond drying	Never	0.90
Water quality	Moderate	0.67	Water quality	Moderate	0.67
Shade	100%	0.20	Shade	90%	0.40
Fowl	Major	0.01	Fowl	Major	0.01
Fish	Possible	0.67	Fish	Major	0.01
Ponds	18	1.00	Ponds	18	1.00
Terr'l habitat	Good	1.00	Terr'l habitat	Good	1.00
Macrophytes	5%	0.30	Macrophytes	5%	0.30
HSI	Poor	0.40	HSI	Poor	0.27

WB13				WB14		
Location	1	1.00		Location	1	1.00
Pond area	160	0.40		Pond area	6,465	
Pond drying	Sometimes	0.50		Pond drying	Rarely	1.00
Water quality	Moderate	0.67		Water quality	Moderate	0.33
Shade	70%	0.80		Shade	100%	0.20
Fowl	Absent	1.00		Fowl	Minor	0.67
Fish	Minor	0.33		Fish	Possible	0.67
Ponds	1	1.00		Ponds	18	1.00
Terr'l habitat	Good	1.00		Terr'l habitat	Good	1.00
Macrophytes	50%	0.80		Macrophytes	0%	0.30
HSI	Good	0.70		HSI	Below Average	0.59
WB15				WB16		
Location	1	1.00		Location	1	1.00
Pond area	44	0.05		Pond area	12	0.05
Pond drying	Rarely	1.00		Pond drying	Annually	0.50
Water quality	Moderate	0.67		Water quality	Moderate	0.67
Shade	30%	1.00		Shade	50%	1.00
Fowl	Absent	1.00		Fowl	None	1.00
Fish	Absent	1.00		Fish	None	1.00
Ponds	18	1.00		Ponds	18	1.00
Terr'l habitat	Moderate	0.67		Terr'l habitat	Good	1.00
Macrophytes	<5%	0.30		Macrophytes	80%	1.00
HSI	Average	0.61		HSI	Average	0.66
WB17				WB18		
Location	1	1.00		Location	1	1.00
Pond area	12	0.05		Pond area	1,771	0.85
Pond drying	Never	0.90		Pond drying	Sometimes	0.50
Water quality	Moderate	0.67		Water quality	Moderate	0.67
Shade	50%	1.00		Shade	80%	0.60
Fowl	None	1.00		Fowl	Minor	0.67
Fish	None	1.00		Fish	Minor	0.33
Ponds	18	1.00		Ponds	18	1.00
Terr'l habitat	Good	1.00		Terr'l habitat	Good	1.00
Macrophytes	30%	0.60		Macrophytes	75%	1.00
HSI	Average	0.67		HSI	Good	0.72

APPENDIX 3. Full GCN presence/absence survey results for Sevenoaks Wildlife Reserve, April-May 2020.

SITE SEVENOAKS WB2																					
Visit	Surveyor	Date	Methodology	Great Crested Newt				Palmate Newt				Smooth Newt				Smooth / Palmate Newt			Other	Obscuring Veg	Turbidity
				Male	Female	Juv	Peak	Male	Female	Juv	Peak	Male	Female	Juv	Peak	Count	Juv	Peak			
1	CT,MD,NC,CM	15/04/2020	Torch				0					0							1 Common frog; 5+ carp fish	2	0
			Trap																		
			Egg search				0						0								
			Net				0						0								
Notes			No traps due to hard sediments along west/north and eastern edges. Southern shoreline deep leaf litter, shallow water <5cm. Medium size (30cm long) carp sp. noted.																		
2	CT, MD, NC, CM	07/05/2020	Torch				0				0								2	2	
			Trap																		
			Egg search				0						0								
			Net				0						0								
Shoreline access and Notes			70% accessible. Water levels reduced along eastern shoreline v shallow. No eggs.																		
3	CT, CM, MD, AM	13/05/2020	Torch				0				0							Netting - water woodlouse, freshwater shrimp, mosquito and mayfly larvae	2	1	
			Trap																		
			Egg search				0						0								
			Net				0						0								
Notes			70% accessible. Netting and Egg search in morning - none seen.																		
4	CT, CM	18/05/2020	Torch				0				0							Common toad	5 (algae)	1	
			Trap																		
			Egg search				0						0								
			Net				0						0								
Notes			70% accessible. Algae 99% coverage. Netting and Egg search in morning - none seen.																		

SITE SEVENOAKS WB4																					
Visit	Surveyor	Date	Methodology	Great Crested Newt				Palmate Newt				Smooth Newt				Smooth / Palmate Newt			Other	Obscuring Veg	Turbidity
				Male	Female	Juv	Peak	Male	Female	Juv	Peak	Male	Female	Juv	Peak	Count	Juv	Peak			
1	CT,MD,NC,CM	15/04/2020	Torch				0				0							Stickleback fish	3	0	
			Trap				0						0								
			Egg search																		
			Net																		
Notes			5 traps set. Access restricted to eastern end only. Water noted to be flowing and linked to river along eastern shoreline. Sticklebacks seen. Pond discounted from further surveys.																		

SITE SEVENOAKS WB5																					
Visit	Surveyor	Date	Methodology	Great Crested Newt				Palmate Newt				Smooth Newt			Smooth / Palmate Newt			Other	Obscuring Veg	Turbidity	
				Male	Female	Juv	Peak	Male	Female	Juv	Peak	Male	Female	Juv	Peak	Count	Juv				Peak
1	CT,MD,NC,CM	15/04/2020	Torch				0						2	3		5					
			Trap				0										0				
			Egg search				0										0				
			Net																		
Notes			60% accessed. 5 traps set.																		
2	CT, CM, CM	06/05/2020	Torch				0					14	8		22			0			
			Trap				0					15	3		18			0			
			Egg search				0									0			0		
			Net																		
Notes			60% accessed. 10 traps set. Egg search in morning - None found.																		
3	CT, MD, CM, AM	11/05/2020	Torch				0						3		3			0			
			Trap				0					3			3			0			
			Egg search				0									0			0		
			Net																		
Shoreline access and Notes			60% accessed. 10 traps set. No eggs																		
4	CT / CM	18/05/2020	Torch				0					6	12		18			0			
			Trap				0					2	4		6			0			
			Egg search				0									1			0		
			Net																		
Notes			60% accessed. 10 traps set. 1 egg found.																		

SITE SEVENOAKS WB6																						
Visit	Surveyor	Date	Methodology	Great Crested Newt				Palmate Newt				Smooth Newt				Smooth / Palmate Newt			Other	Obscuring Veg	Turbidity	
				Male	Female	Juv	Peak	Male	Female	Juv	Peak	Male	Female	Juv	Peak	Count	Juv	Peak				
1	CT,MD,NC,CM	15/04/2020	Torch				0					0	4	4		8			0	Water scorpion. Sticklebacks.	2	0
			Trap				0					0	1			1			0			
			Egg search				0					0				0			0			
			Net																			
Notes			5 traps set. 50% access. Stickleback fish noted.																			
2	CT, AM, CM, MD	06/05/2020	Torch				0					0	3	4		7			0		2	2
			Trap				0					0	3			3			0			
			Egg search				0					0				0			0			
			Net																			
Notes			5 traps set. 50% access. No eggs.																			
3	CT,MD,NC,CM	11/05/2020	Torch				0					0		1		1			0	1 Common toad	2	0
			Trap				0					0				0			0			
			Egg search				0					0				0			0			
			Net																			
Notes			50% access. 5 traps set. Morning egg search - none.																			
4	CT/CM	18/05/2020	Torch				0					0				0			0	2 x Common frog	2	0
			Trap				0					0				0			0			
			Egg search				0					0				0			0			
			Net																			
Notes			50% access. 5 traps set. Morning egg search - none.																			

SITE SEVENOAKS WB7																							
Visit	Surveyor	Date	Methodology	Great Crested Newt				Palmate Newt				Smooth Newt				Smooth / Palmate Newt			Other	Obscuring Veg	Turbidity		
				Male	Female	Juv	Peak	Male	Female	Juv	Peak	Male	Female	Juv	Peak	Count	Juv	Peak					
1	CT,MD,NC,CM	15/04/2020	Torch				0					7	9		16			0				1	2 (1 up to 1m from shore)
			Trap																				
			Egg search																				
			Net																				
Notes			No traps due to hard sed. 50% access.																				
2	CT, MD, AM, CM	06/05/2020	Torch				0					3	1		4			0				Small fish and fish larvae. High invert density; Damselfly and dragonfly larvae; both waterboatmen; mayfly larvae. Freshwater shrimp, water	
			Trap																				
			Egg search				0								0			0					
			Net				0					1	1		2			0					
Notes			No traps due to hard sed. 50% access. Morning netting and Egg search																				
3	CT,MD,NC,CM	11/05/2020	Torch				0					0	4	0	4			0				1	2
			Trap																				
			Egg search				0								1			0					
			Net				0						1		1			0					
Shoreline access and Notes			50% accessed. Morning Netting and Egg search.																				
4	CT, CM	18/05/2020	Torch				0					2	10		12			0				1	1
			Trap																				
			Egg search				0								3			0					
			Net				0						1		1			0					
Notes			No traps due to hard sed. 50% access. Morning netting and Egg search																				

SITE SEVENOAKS WB10																									
Visit	Surveyor	Date	Methodology	Great Crested Newt				Palmate Newt				Smooth Newt				Smooth / Palmate Newt			Other	Obscuring Veg	Turbidity				
				Male	Female	Juv	Peak	Male	Female	Juv	Peak	Male	Female	Juv	Peak	Count	Juv	Peak							
1	CT,MD,NC,CM	15/04/2020	Torch				0							0			0			0		4 (algae)	Varies 1-4		
			Trap				0							0	1		1			0					
			Egg search																						
			Net																						
Notes			8 traps set. Shoreline access 75% - dense scrub. Shallow, max 10cm. Algae 60% covered. Link noted to Heron's lake, fish likely.																						
2	CT,AM,CM,MD	06/05/2020	Torch				0							0		1	1			0	Fish larvae	5 (algae)	1		
			Trap																						
			Egg search				0							0			0			0					
			Net																						

SITE SEVENOAKS WB13				Great Crested Newt				Palmate Newt				Smooth Newt				Smooth / Palmate Newt			Other	Obscuring Veg	Turbidity
Visit	Surveyor	Date	Methodology	Male	Female	Juv	Peak	Male	Female	Juv	Peak	Male	Female	Juv	Peak	Count	Juv	Peak			
1	CT,NC,CM	29/04/2020	Torch				0				0	1	6		7				0		
			Trap				0				0	1	1		2				0		
			Egg search				0				0					0				0	
			Net																		
Notes			15 traps set. 80% accessed.																		
2	CT, MD, NC, CM	07/05/2020	Torch				0				0	3	3		6				0		
			Trap				0				0	5	0		5				0		
			Egg search				0				0					0				0	
			Net																		
Notes			80% accessed. 14 traps set. Morning egg search - none found.																		
3	CT, CM, MD	13/05/2020	Torch				0				0	0	11	0	11				0		
			Trap				0				0	0	0	0	0				0		
			Egg search				0				0					1				0	
			Net																		
Notes			70% accessed. Drying at northern end with thick algae cover. 15 traps set. Morning egg search.																		
4	CT, CM	24/05/2020	Torch				0				0	0	4		4				0		
			Trap				0				0	3	4		7				0		
			Egg search				0				0					0				0	
			Net																		
Notes			Diving beetles, midge larvae, water scorpion,																		

SITE SEVENOAKS WB16 Bog garden																							
Visit	Surveyor	Date	Methodology	Great Crested Newt				Palmate Newt				Smooth Newt				Smooth / Palmate Newt			Other	Obscuring Veg	Turbidity		
				Male	Female	Juv	Peak	Male	Female	Juv	Peak	Male	Female	Juv	Peak	Count	Juv	Peak					
1	CT,NC,CM	29/04/2020	Torch				0						6	4		10			0	1 common frog	4	0	
			Trap																				
			Egg search																				
			Net																				
Notes			100% accessed. Too shallow for traps.																				
2	CT,MD,AM,CM	06/05/2020	Torch				0							5		5			0	1 common frog	4	0	
			Trap																				
			Egg search				0										0						0
			Net				0							1			1						0
Notes			Netting and egg search in morning - 1 male smooth, no eggs. 100% accessed.																				
3	CT,MD,NC,CM	11/05/2020	Torch				0									0			0	1 common frog	4	0	
			Trap																				
			Egg search				0										0						0
			Net																				
Notes			100% accessed. Morning: Too shallow for netting. No eggs found.																				
4	CT, CM, MD	18/05/2020	Torch				0						2		2				0	1 common frog	4	0	
			Trap																				
			Egg search				0										0						0
			Net				0										0						0
Notes			100% accessed. Morning: Netting none found. No eggs found.																				

SITE SEVENOAKS WB17 Tadorna																						
Visit	Surveyor	Date	Methodology	Great Crested Newt				Palmate Newt				Smooth Newt				Smooth / Palmate Newt			Other	Obscuring Veg	Turbidity	
				Male	Female	Juv	Peak	Male	Female	Juv	Peak	Male	Female	Juv	Peak	Count	Juv	Peak				
1	CT,NC,CM	29/04/2020	Torch				0					0	1	5		6			0	2	4	
			Trap																			
			Egg search																			
			Net								2	2		4				0				
Notes			100% access. No traps - risk of sinking as lined and raised pond. Morning: netting.																			
2	CT,MD,AM,CM	06/05/2020	Torch				0				0	2	2		4			0	2 common frog; Roman Snail on grass.	2	0	
			Trap																			
			Egg search				0				0					0						0
			Net				0				0	1		1				0				
Notes			100% access. Morning: netting and egg search.																			
3	CT, MD, CM, NC	11/05/2020	Torch				0				0	2	8		10			0	2	2		
			Trap																		0	
			Egg search				0				0					2					0	
			Net				0				0		1		1						0	
Shoreline access and Notes			100% accessed. Morning: netting and egg search.																			
4	CT, CM	18/05/2020	Torch				0				0	7	17		24			0	2	0		
			Trap																			
			Egg search				0				0					0					0	
			Net				0				0		3		3						0	
Notes			100% accessed. Morning: Netting and Egg search.																			

SITE SEVENOAKS WB18																					
Visit	Surveyor	Date	Methodology	Great Crested Newt				Palmate Newt				Smooth Newt				Smooth / Palmate Newt			Other	Obscuring Veg	Turbidity
				Male	Female	Juv	Peak	Male	Female	Juv	Peak	Male	Female	Juv	Peak	Count	Juv	Peak			
1	CT,MD,NC,CM	15/04/2020	Torch				0						0						Great diving beetle; stickleback fish.	1 - Northern shoreline; 4 rest of pond	0
			Trap				0							0							
			Egg search				0							0							
			Net																		
Notes			Sticklebacks noted. 6 traps set due to limited water depth. Northern shoreline accessible only.																		
2	CT, MD, AM, CM	07/05/2020	Torch				0						0							1 - Northern shoreline; 4 rest of pond	1
			Trap				0							0							
			Egg search				0							0							
			Net																		
Notes			Northern shoreline accessible only. Morning: Nothing in net, no eggs. No traps due to anti-social behaviour reported nearby.																		
3	CT, CM, MD	13/05/2020	Torch				0						0							1 - Northern shoreline; 4 rest of pond	1
			Trap				0							0							
			Egg search				0							0							
			Net																		
Notes			10 traps set. 20% shoreline access. Morning netting and egg search - nothing seen.																		
4	CT, CM	18/05/2020	Torch				0						0						Water scorpion	1 - Northern shoreline; 4 rest of pond	3
			Trap				0							0							
			Egg search				0							0							
			Net																		
Notes			7 traps set, water levels dropped. 20% shoreline access. Morning netting and egg search - nothing seen.																		

APPENDIX 4 – PHOTOS OF WATERBODIES

	
<p>Looking north over WB9</p>	<p>WB11 showing steep banks and dense scrub surrounds typical of the larger ponds and lakes</p>
	
<p>Looking east across WB7</p>	<p>View looking north across WB8 in the north of the site</p>
	
<p>WB13 with macrophyte cover providing microhabitat for shelter and foraging</p>	<p>WB14 showing shallower overgrown areas</p>



Overgrown pond WB10

WB15 – recreated and managed for amenity purposes