

Havant Thicket Reservoir Project

Environmental Statement Volume 4 - Appendices
Appendix A9 Biodiversity
A9.11 Great Crested Newt Survey Report

Portsmouth Water Ltd.



**HAVANT THICKET WINTER STORAGE RESERVOIR,
ROWLAND'S CASTLE, HAMPSHIRE**

**APPENDIX 9.11
GREAT CRESTED NEWT ASSESSMENT**

Final Document (Revision 3)

January 2020

Preliminary Ecological Appraisals • Protected Species Surveys and Licensing • NVC • EclA • HRA • Management Plans
Habitats • Badger • Bats • Hazel Dormouse • Birds • Reptiles • Amphibians • Invertebrates • Riparian and Aquatic Species

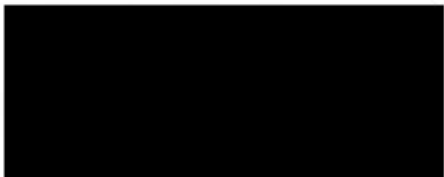
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ECOSA Quality Assurance Record

This report has been produced in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Report Writing 2017 (CIEEM, 2017). Survey work has been undertaken in line with references within CIEEM's Source of Survey Guidance (CIEEM, 2017).

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HAVANT THICKET WINTER STORAGE RESERVOIR, ROWLAND'S CASTLE, HAMPSHIRE

GREAT CRESTED NEWT SURVEY REPORT

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1.0 INTRODUCTION

1.1 Background

Ecological Survey & Assessment Limited (ECOSA) have been appointed by Portsmouth Water Limited (Portsmouth Water) to undertake a great crested newt survey and report of their land at Havant Thicket, Rowland's Castle, Hampshire. The site is centred on National Grid Reference (NGR): SU 715 097 (**Map K1**).

The great crested newt report is required as a result of Portsmouth Water's plan to construct a winter storage reservoir, Havant Thicket Winter Storage Reservoir (HTWSR), for public water supply in the centre of the site. At the time of survey, the final designs were not confirmed, although the extent of the development was proposed to be approximately 1.6 kilometres from east to west and 800 metres from north to south with a storage capacity of approximately 8,700 million litres. It was understood water would be pumped into the reservoir from Portsmouth Water sources at Havant and Bedhampton Springs, providing a sustainable supply of water with no requirement to change the existing abstraction licence.

At the time the surveys were undertaken the planning application red line boundary (see Figure 2.1 in ES Volume 3) had not been defined and therefore the Site Boundary (the site) and Ecological Enhancement Area (wider site) boundaries referred to in this report were provisional boundaries available at that time. Within this report where mention is made of 'the site' this refers to the reservoir footprint and other areas used for built development and habitat creation. This area is referred to as the 'Reservoir Footprint' in the Environmental Statement (as the Site includes the reservoir footprint, the pipeline corridor as well as land around the reservoir footprint being used for ecological mitigation and compensation). Where reference is made in this report to the 'wider site' this includes the reservoir and the area proposed for ecological enhancement within Forestry England's (FE) Havant Thicket woodland to the north and Bell's Copse to the west of the site and Staunton Country Park (SCP) to the south of the site. This area is similar to the area referred to as the 'Reservoir Site' in the Environmental Statement. The areas covered by 'the site' and 'wider site' in this report are shown in **Map K1** and the key ecological and landscape features mentioned in this report are shown in **Map K2**.

1.2 Aims and Scope of Report

The information within this report is based on a desktop study and great crested newt surveys carried out between April and June 2018 and between April and May 2019. The report provides a detailed summary of the ecological survey work undertaken and an evaluation of the site in relation to great crested newt.

2.0 METHODS

2.1 Introduction

This section details the methods employed during the great crested newt survey undertaken for the HTWSR site during 2018 and 2019. Any significant limitations to the survey methods are also discussed. This section also includes information on the desktop study data from relevant great crested newt surveys undertaken between 2005 and 2017.

2.2 Zone of Influence

To define the total extent of the study area for this appraisal (Zone of Influence¹), the proposed scheme was reviewed to establish the spatial scale at which great crested newt could be affected. The appropriate survey radii for the various elements of the appraisal (i.e. desktop study and field survey) have been defined in the relevant sections below. These distances are determined based on the professional judgement of the ecologist leading the appraisal, taking into account the characteristics of the site subject to appraisal, its surroundings and the nature and scope of the development proposals and the ecology of the species of focus within this report.

2.3 Desktop Study²

2.3.1 Biological Records Centre

Hampshire Biodiversity Information Centre (HBIC) was consulted on 30th April 2018 for records of great crested newt and other notable amphibian species located within two kilometres of the site boundary.

2.3.2 Multi-Agency Geographic Information for the Countryside

The Multi-Agency Geographic Information for the Countryside (MAGIC)³ database was reviewed on 28th May 2019 to establish the location of statutory designated sites located within the vicinity of the site which were either designated for great crested newt or include this species within their citation for a reason for designation. This included a search for all internationally and nationally designated sites such as Special Areas of Conservation (SACs), Wetlands of International Importance (Ramsar sites), Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs) and Local Nature Reserves (LNRs) within two kilometres of the site.

Sites within two kilometres of the site boundary where great crested newt European Protected Species Mitigation (EPSM) licences have been granted were also reviewed.

¹ The Zone of Influence (Zoi), as defined by CIEEM, is the area over which ecological features may be subject to significant effects as a result of the proposed project and associated activities.

² Due to the age of this data and updated desk study has been undertaken in 2020 and details are included in Appendix 9.1.

³ www.defra.magic.gov.uk

This information allows a greater understanding of the potential for great crested newt to be present in the local area.

2.3.3 Other Sources of Information

Online mapping resources, including aerial photography, were used to identify the presence of habitats such as woodland blocks, ponds, watercourses and hedgerows, in the vicinity of the site. These habitats may offer resources and connectivity between the site and suitable habitat in the local area, which may be exploited by great crested newt populations.

The presence of waterbodies within a 500 metre radius of the site is particularly important in relation to great crested newt. The 500 metre radius is a standardised search radius to assist in the assessment of the suitability of a site and its surrounding habitat to support this species, based on current Natural England guidance (English Nature, 2001).

A number of great crested newt surveys have been undertaken of waterbodies both on the site and also within the surrounding landscape between 2005 and 2017, in relation to other schemes, survey work and the previous reservoir proposal. The information from these surveys has been used to support this assessment and is presented in **Table K7** and **Appendix K1**.

- ECOSA undertook great crested newt surveys at the site and within 500 metres of the boundary during 2005 and 2006 (ECOSA, 2013). This was in relation to when the scheme was previously proposed.
- White Young and Green (WYG, 2014) undertook a great crested newt survey during 2014 in relation to an outline planning application for new homes at land east of Horndean (East Hampshire District Council planning reference: 55562/001). These ponds were revisited in 2017 by EPR (EPR, 2018). This area is located to the north-west of the HTWSR site.
- RPS (RPS, 2017) undertook a great crested newt survey on behalf of Hampshire County Council (HCC) in relation the proposed restoration of the Staunton Country Park. This area is located immediately south of the HTWSR site.
- Forestry England (per comms.) undertook great crested newt surveys on Pond 9a associated with the group of waterbodies in the south-east corner of Havant Thicket.

2.4 Great Crested Newt Survey

2.4.1 Survey Methods

The great crested newt survey and assessment was designed and co-ordinated by Simon Boswell, Principal Ecologist of ECOSA (Natural England great crested newt licence no. 2015-16929-CLS-CLS).

Field Survey

Between 16th April 2018 and 1st May 2018, and on 16th April 2019 a series of field surveys were undertaken by ECOSA to undertake environmental DNA (eDNA) surveys of known ponds. During these surveys the ecologists also searched for additional ponds which may not have been identified by the desk-based assessment. Two previously unidentified ponds, Pond 23 and Pond 27 were visited by Tracey Viney of Portsmouth Water on 8th May 2019. Details of these surveys is presented below.

Habitat Suitability Index (HSI) Assessment

Waterbodies located within a 500 metre radius of the site were subject to a Habitat Suitability Index (HSI) assessment (Oldham, et al., 2000). HSI is a numerical index between 0 and 1, derived from an assessment of ten habitat variables known to influence the presence of great crested newt such as geographical location, waterbody size and permanence, presence of predatory fish and wildfowl, availability of suitable terrestrial habitat and proximity to other ponds. Each factor is scored based on its level of suitability for great crested newt. An HSI of 1 is optimal habitat (high probability of occurrence), while an HSI of 0 is very poor habitat (minimal probability of occurrence). The HSI is calculated on a single waterbody basis and takes into account surrounding terrestrial habitat and local waterbody density. If a waterbody has a very low HSI score (<0.5) there would typically be a minimal chance of great crested newt presence.

This qualitative score can then be used, with caution, to indicate whether further detailed investigations are necessary or whether a particular waterbody can be 'scoped out' as unsuitable for great crested newts. However, professional judgement should be used rather than simply relying on the HSI to eliminate waterbodies from further assessment. Further detailed investigations would involve targeted surveys carried out between mid-March and mid-June to determine presence/likely absence of great crested newt, and if present an assessment of population status.

In total, 39 waterbodies were identified from within the site or within 500 metres of the site boundary. Of these, 35 were subject to a full HSI assessment. Three of the remaining waterbodies were surveyed previously by RPS or WYG and were either dry or were subject to eDNA analysis which indicated the absence of great crested newt (see **Map K3**). The final waterbody (22a) is a garden pond to the south-east of the site,

where the homeowner indicated that the waterbody contained a population of fish. As a result there was considered to be no requirement to survey these waterbodies.

eDNA Survey

In addition to the HSI assessment, 24 waterbodies were subject to eDNA sampling to establish the presence/likely absence of great crested newt; the eDNA survey was undertaken following current best practice guidelines (Biggs, et al., 2014).

The field sampling entailed the collection of 20 samples of 30 millilitres of water from pre-selected sub-sampling sites from around the margin of each of the 24 waterbodies. Sub-sampling sites are chosen to include areas where great crested newts are likely to be present such as areas of aquatic vegetation where they may be egg laying and areas of open water where they may be displaying.

The 20 samples are then mixed into a single sterile bag from which six samples of water of 15 millimetres are taken each of which is preserved in 35ml of ethanol. The samples are then refrigerated until analysis at the lab. The samples were sent to SureScreen Scientifics eDNA testing service for analysis which were analysed in line with current guidance (Biggs, et al., 2014). The samples were taken within the required season (15 April to 30 June) when great crested newt eDNA is likely to be present within waterbodies and therefore, the analysis result indicates the presence or likely absence of the species from a given waterbody.

The following waterbodies were subject to sampling by ECOSA in 2018; Pond 1, Pond 5, Pond 6, Pond 7, Pond 8, Pond 9a, Pond 10, Pond 11, Pond 12, Pond 13, Pond 14, Pond 15, Pond 16, Pond 17, Pond 20a, Pond 20b, Pond 20c, Pond 20d, Pond 20e, Pond 20f, Pond 21a, Pond 21b and Pond 22. A single additional waterbody, Pond 23, was subject to eDNA analysis by ECOSA on 16th April 2019.

Ponds 3 and 4 were not sampled by ECOSA in 2018 as they had been previously sampled on 25th April 2017 by RPS on behalf of HCC as part of the Staunton Country Park Heritage Lottery Fund Scheme, Ecology Survey Report (RPS, 2017). The 2017 eDNA survey results were negative for both Ponds 3 and 4.

Presence/Likely Absence and/or Population Size Class Assessment Surveys

The ECOSA 2018 great crested newt survey was undertaken in line with current best practice guidelines (English Nature, 2001).

Following the results of the eDNA analysis, further great crested newt surveys were undertaken (where appropriate) to establish the population size class present for those ponds with a positive eDNA result and associated nearby (within 20 metres) waterbodies confirmed as supporting great crested newt.

In accordance with best practice survey guidelines for great crested newt, a minimum of three survey methods were employed on each survey between the months of April and June 2018.

Great crested newt survey guidelines state that at least half of the surveys should be completed within the peak breeding season which runs from mid-April to mid-May. The third survey at the site was completed on 24th and 25th May 2018, and therefore did not fulfil this requirement. However, the spring of 2018 was extremely cold, which is considered likely to have delayed the great crested newt breeding season. As a result, the delay in undertaking the third survey is not considered to be a significant limitation and, therefore, the data collected is robust.

Consideration has also been given to the cold spring in relation to eDNA and the potential for water samples collected at the beginning of the survey window for eDNA surveys (i.e. 15th April) to be affected by cold spring weather⁴ reducing activity, and hence the chances of recording a positive eDNA result. The fact that positive eDNA results were obtained during the early part of the eDNA survey season indicates that eDNA samples taken on 16th April 2018 are valid. Furthermore, the waterbodies that were subject to eDNA surveys on 16th April 2018 mainly comprised waterbodies within the FE cluster (**Map K4**, Ponds 6, 7, 8, 9, 10, 11, 12, 13 and 14), which were subject to subsequent full great crested newt surveys in 2018. Three waterbodies, 15, 16 and 17, were tested for eDNA in the early part of the season but were not subject to further surveys. These waterbodies were previously surveyed in 2006 without recording great crested newt, and as already mentioned positive eDNA survey results from elsewhere on site came from the early part of the season indicating that the eDNA results for Ponds 15-17 are valid.

The survey methods employed industry accepted methods of torching, egg searching, sweep netting and bottle trapping. The survey methods employed in each waterbody were determined by factors such as the nature of the pond (substrate/water clarity/presence of aquatic vegetation) and access. The most appropriate and effective survey methodology was used to ensure a robust set of data was obtained.

The torch searches consisted of an investigation of the ponds after dark using a one million candlepower torch to search for adult great crested newt. All amphibians encountered were counted and sexed, where possible.

The egg search consisted of a methodical inspection of all suitable marginal vegetation for folded leaves that may indicate great crested newt egg laying activity. If great crested newt eggs were encountered during the survey this methodology was

⁴ <https://www.metoffice.gov.uk/climate/uk/summaries/2018/spring>

abandoned since exposure of eggs increases their risk of predation. This survey technique is only used to confirm presence and therefore, once presence has been confirmed other methods are utilised to determine population size class.

The sweep netting survey consisted of an investigation of each waterbody using a long-handled net. All newts encountered were counted and sexed, where possible. This survey technique is only used to confirm presence and, therefore, once presence has been confirmed other methods are utilised to determine population size class.

The bottle trapping methodology involved submerging plastic bottle traps into the waterbodies at dusk. During the night newts swim into the traps and are unable to exit until released. The traps are then checked the following morning and all newts are recorded and released, and the traps removed from the waterbodies. The traps were set at a density of one trap per two metres of waterbody margin where access was possible. **Table K1** provides details of the number of bottle traps set within waterbodies identified as potentially supporting breeding great crested newt.

Table K1: Waterbodies subject to presence/likely absence surveys

Waterbody Number	Number of Bottle Traps
Pond 6	10
Pond 7	1
Pond 8	10
Pond 8a	4
Pond 8b	10
Pond 9a	20
Pond 9b	10
Pond 9c	10
Pond 9d	5
Pond 10	10
Pond 10a	20
Pond 11	20
Pond 12	10
Pond 13	10
Pond 14	10

2.4.2 Survey Details

eDNA Survey and Habitat Suitability Index (HSI) Assessment

The eDNA sampling and HSI was carried out over three survey visits during 2018, the first survey was undertaken by Hugh Turner, Ecologist of ECOSA (Great Crested Newt Licence No. 2016-24123-CLS-CLS) and Lucy Grable, Ecologist of ECOSA on 16th April 2018. The weather conditions were mild with low cloud cover, an ambient temperature of 12°C and a moderate breeze.

The second survey was undertaken by Joanne Richmond, Ecologist of ECOSA (great crested newt licence no. 2018-33053-CLS-CLS) and Jack Medley, Field Ecologist of ECOSA (great crested newt licence no. 2018-33078-CLS-CLS) on 20th April 2018. The weather conditions were mild with low cloud cover, an ambient temperature of 12°C and light breeze.

The final survey was undertaken by Jack Medley, Field Ecologist of ECOSA (great crested newt licence no. 2018-33078-CLS-CLS), and Helen Butt, Assistant Ecologist of ECOSA on 1st May 2018. The weather conditions were mild and partly cloudy, an ambient temperature of 11 °C and moderate breeze.

During 2019 the eDNA survey of Pond 23 was undertaken by Helen Butt, Assistant Ecologist of ECOSA (great crested newt licence no. 2018-36760-CLS-CLS), and John Hunt, Field Ecologist of ECOSA on 16th April 2019. The weather conditions were mild and mostly cloudy, an ambient temperature of 11 °C and light breeze.

Presence/Absence and/or Population Size Class Assessment Surveys

A total of six surveys were undertaken between April and June 2018. **Table K2** provides details of each great crested newt survey.

Table K2: Great crested newt presence/absence and/or population size class assessment survey details

Survey Date	Survey Techniques	Pond Numbers	Air Temperature (°C)	Weather Conditions
3 th - 4 th May 2018	Torch, egg search, sweep netting, bottle trapping.	Ponds 6-14	Evening: 9°C Morning: 9°C	Evening and morning - Still and overcast
8 th - 9 th May 2018	Torch, egg search, sweep netting, bottle trapping.	Ponds 6-14	Evening: 13°C Morning: 8°C	Evening - Dry and warm with 40% cloud cover Morning - Rain overnight, 50% cloud cover

Survey Date	Survey Techniques	Pond Numbers	Air Temperature (°C)	Weather Conditions
24 th - 25 th May 2018	Torch, egg search, sweep netting, bottle trapping.	Ponds 6-14	Evening: 16°C Morning: 12°C	Evening - Humid, drizzly and overcast Morning - Cool and still
31 st May - 1 st June 2018	Torch, egg search, sweep netting, bottle trapping.	Ponds 6-14	Evening: 16°C Morning: 14°C	Evening - Dry, warm and still Morning - Foggy and overcast
7 th - 8 th June 2018	Torch, egg search, sweep netting, bottle trapping.	Ponds 8, 9a, 10	Evening: 17°C Morning: 16°C	Evening - Warm, still and overcast Morning - Still and overcast
12 th - 13 th June 2018	Torch, egg search, sweep netting, bottle trapping.	Ponds 8, 9a, 10	Evening: 16°C Morning: 14°C	Evening - Mild, still and overcast Morning - warm, still and clear

The great crested newt survey was organised by Simon Boswell of ECOSA and led by, Jack Medley, Stuart Venables (great crested newt licence no. 2015-16400-CLS-CLS), Hugh Turner, Joanne Richmond and Kathryn Steele (great crested newt licence no. 2018-34009-CLS-CLS). The above lead surveyors were assisted by suitably qualified and experienced ECOSA surveyors.

2.4.3 Survey and Desk Study Limitations

The HBIC desk study data mainly originates from ad-hoc surveys by volunteers and other records from members of the public. Therefore, the data search results cannot be taken as an exhaustive list of species present in the area.

There were no significant limitations to the great crested newt survey.

2.5 Discussion

Discussion of great crested newt survey results has been undertaken with reference to selection criteria for designated sites at various geographic scales as detailed in **Table K3**.

Table K3: Criteria for geographic scale of importance for great crested newt

Importance	Criteria
Site	Supports habitat that is likely to provide a resource for amphibians, but this resource is not considered to be significant to the local population.
Local	Supports habitat that is likely to provide a significant resource for great crested newt in the local area but would not qualify for Local Wildlife Site status in accordance with 'Criteria for the Selection of Local Wildlife Sites in Hampshire' (Hampshire County Council, 1996).
County	Supports a great crested newt population that would qualify for Local Wildlife Site status in accordance with 'Criteria for the Selection of Local Wildlife Sites in Hampshire' (Hampshire County Council, 1996). The HBIC criteria (unpublished data) provide a size class of <i>'Five or more adults seen in peak count of a multiple visit survey, or the presence of eggs or larvae (breeding pond)'</i> for a site to be considered for selection as a Local Wildlife Site for great crested newt.
National	Supports great crested newt population that would qualify for SSSI status in line with criteria set out in <i>'Guidelines for the Selection of Biological SSSIs'</i> (JNCC, n.d.)
European	Supports a great crested newt that would qualify for SAC status in line with criteria set out in <i>'The Habitats Directive: Selection of Special Areas of Conservation in the UK'</i> (JNCC, 2018)

Evaluation of the site for great crested is based on ECOSA's best professional judgement considering the following factors:

- **Population size class of populations present** - It is difficult to establish the true size of a population of great crested newt, due to variations in sampling efficiency and the complex population dynamics involved. Hence, population estimation methods can only give an indication of whether the population is small, medium or large in terms of the number of newts present in the breeding waterbody.

In accordance with Natural England's 'Great Crested Newt Mitigation Guidelines' (English Nature, 2001), survey results should be expressed as peak adult counts per waterbody per night gained through field survey methods, and a total site count, if appropriate.

Populations can then be classed as:

- 'small' for maximum counts up to 10;
- 'medium' for maximum counts between 11 and 100; or
- 'large' for maximum counts over 100.

Some waterbodies may support great crested newt based on historic records, but could not be subject to population size class assessment surveys and it is, therefore, not possible to estimate the population size class of any populations which may be present.

- **Ecological function of habitats present (i.e. breeding or resting place)** - Great crested newt breeding waterbodies provide a key ecological function they are

accorded a higher ecological value than terrestrial habitat which may provide shelter for great crested newt in their terrestrial phase.

- **Habitat quality and connectivity** - The assessment of habitat quality is based on information within a number of publications including the Great Crested Newt Mitigation Guidelines (English Nature, 2001), the Great Crested Newt Conservation Handbook (Langton, et al., 2001) and the Herpetofauna Worker's Manual (Gent & Gibson, 2003). Online mapping resources are referenced to assess the habitat quality and connectivity in the wider area. Habitats which may provide connectivity between breeding waterbodies are accorded a higher ecological value.

3.0 BASELINE ECOLOGICAL CONDITIONS

3.1 Introduction

This section details the results of the 2018 and 2019 great crested newt survey work undertaken for the HTWSR site, including survey data from previous years. It assesses the baseline ecological conditions of the site at the time the desktop study was completed and based on the findings of the field survey and subsequent further presence/likely absence/population surveys. The baseline draws on a wealth of historical and present data, relevant data from historic surveys carried out by ECOSA and others has been included in the report to increase the understanding of the site in terms of great crested newt.

3.2 Baseline Ecological Conditions

Desktop Study Results

The HBIC data returned no records for the species within or adjacent to the site. The nearest records of great crested newt in the local area are from Hazleton Common Pond Complex with a maximum of 24 great crested newt recorded in 2006, and the former brickworks, The Drift, Rowlands Castle where a maximum count of two great crested newts were recorded during 2013. Hazleton Common is located approximately 1.1 kilometres to the north-west of the site. The former brickworks at Rowlands Castle are located approximately 600 metres to the south-east of the site boundary. The locations of great crested newt records returned from HBIC within the vicinity of the site are shown on **Map K3**.

A review of the MAGIC website revealed two Natural England EPSM licences issued in respect of great crested newt located within approximately one kilometre of the site boundary. The first of which relates to land adjacent to Red Hill Farm, located approximately 560 metres to the east-north-east of the site. This licence was issued on 21st August 2015 (Ref: 2014-3400-EPS-AD2) and was issued for the destruction and disturbance of great crested newt terrestrial habitat (**Map K3**). The second EPSM licence (Ref: EPSM 2009-795), issued on 26th June 2012, is associated with Blendworth Common, located approximately 400 metres from the northern site boundary. This licence relates to the impact to great crested newt breeding waterbodies (**Map K3**).

The MAGIC search revealed that there are no internationally and nationally designated sites for nature conservation within two kilometres of the site. An LNR, Hazleton Common LNR, is located approximately 1.1 kilometres to the north-west of the site

(**Map K3**), and Natural England designation citation⁵ states that alongside ancient woodland species plants, terrestrial and aquatic invertebrates and bird interest the '...main pond has great crested newts'.

The ECOSA great crested newt surveys carried out in 2005 and 2006 surveyed all waterbodies identified within 500 metres of the development footprint. A combination of bottle trapping, egg searching, netting and torching was used. Although bottle trapping was restricted to two dates during 2005 and only covered the Upper Lake (Pond 5), more extensive bottle trapping was not undertaken due to the likelihood of vandalism. It should be noted that the development footprint has altered in the interim between these surveys and 2018/2019 and, therefore, the scope of the works was altered for the more recent survey work. The location of the waterbodies surveyed in 2005 and 2006 are shown in **Map K3** and are as follows:

- Pond 5 - Upper Lake, situated at northern end of The Avenue;
- Pond 2 - Leigh Water, situated within Staunton Country Park to south of site;
- Waterbodies associated with Pond 1, 4, and 20 - several ponds and brick pits situated within Staunton Country Park to the south of the site;
- Ponds 17 and 18 - situated within Bell's Copse to the west; and
- Pond Group 6 to 16 - situated within Havant Thicket FE woodland.

The 2005 and 2006 ECOSA surveys recorded no great crested newt from any of the above waterbodies. However, it was noted that Pond 5 supported a population of palmate newt, with a maximum count of 38 animals recorded on 18th May 2005. Palmate newt were common in Pond Group 6-16 within Havant Thicket to the north of the development footprint, with these waterbodies having amalgamated counts of over 50 animals on regular occasions.

A maximum count of 10 smooth newt were recorded in former brickworks waterbodies in woodland to the south-east of the site (Ponds 1, 4 and 20). Pond 2, Leigh Water, within Staunton Country Park located to the south of the site is stocked with a high density of fish and there were no records of amphibians from this waterbody. Pond 17 located within Bell's Copse contained a maximum count of ten palmate newt.

Consultation with Forestry England⁶ provided a record of one female great crested newt in Pond 9a during April 2009.

⁵ <https://designatedsites.naturalengland.org.uk/SiteLNRDetail.aspx?SiteCode=L1009410&SiteName=&countyCode=19&responsiblePerson=&SeaArea=&IFCAAarea=>

⁶ Personal Communication with Forestry England during site meeting held on 2nd July 2018.

Surveys were undertaken on some of the waterbodies within 500 metres of the site by WYG in 2014, and RPS and EPR in 2017. The results of the waterbody surveys relevant to the site are provided in **Appendix K1** and **Table K4**.

WYG also carried out HSI assessments on Pond 25 and 26 during 2014, the details of which are presented in **Table K7 (Appendix K1)**.

Table K4: RPS (2017) / EPR (2017) / WYG (2014) / FE (2009) pond survey data

ECOSA Waterbody Reference	RPS/ WYG / FE Waterbody Reference	Survey Year	Survey Method	Survey Result
3	2	2017	eDNA	Likely absence
4	1	2017	eDNA	Likely absence
9a	n/a	2009	Unknown	Present (one adult female)
19	3	2017	Dry 25 th April 2017 – no survey	N/A
24	P7	2014 /2017	Dry April 2014 – no survey Dry June 2017 – no survey	N/A
25	P8	2014 / 2017	Netting and Torching Dry June 2017 – no survey	Likely absence
26	P30	2014/2017	Netting and Torching Dry June 2017 – no survey	Likely absence

Great Crested Newt HSI and eDNA Assessment Results

The results for the HSI and eDNA assessment for each waterbody are provided in **Appendix K1**. In summary, three waterbodies were returned positive eDNA results, Pond 8, 9a and 10, all are located within Havant Thicket, outside of the development footprint of the proposed reservoir but within the ecological enhancement area (wider site).

Presence/Likely Absence and/or Population Size Class Assessment Results

Table K5 presents the results of the great crested newt survey by ECOSA during 2018, with location of surveyed waterbodies shown on **Map K4**. Waterbodies with a negative eDNA result which are not close to a waterbody with positive eDNA results were not

subject to further survey work, hence these waterbodies have been omitted from the presence/likely absence surveys (e.g. Pond 5).

Table K5: Summary of the 2018 great crested newt presence/likely absence survey results

Waterbody No.	Peak Count				Other Amphibians
	Great Crested Newt	Smooth Newt	Palmate Newt	Unidentified Small Newt ⁷	
6	0	2	44	7	0
7	0	0	0	0	0
8	0	0	11	0	0
8a	0	2	1	1	0
8b	0	0	1	1	0
9a	0	3	43	4	Common frog (1) common toad (2), tadpoles
9b	0	1	9	8	Common frog (2)
9c	0	0	4	6	0
9d	0	0	0	0	0
10	0	0	5	4	0
10a	0	6	16	13	Common frog (1) common toad (7)
11	0	1	2	4	Common frog (3) common toad (2)
12	0	0	4	4	Common frog (4) common toad (2)
13	0	9	8	4	Common frog (1) common toad (2), tadpoles
14	0	15	22	8	Common toad (3)

⁷ A "Unidentified Small Newt" is an unidentified smooth or palmate newt identified by torch light but where it was not possible to distinguish between the two species

3.3 Discussion

A summary of the HSI, eDNA, presence/likely absence and population assessment survey results is presented in **Table K6**. Pond 5 is located within the development footprint and a further 38 waterbodies were recorded within a 500 metre radius of the site. The development footprint mainly comprises grassland and broadleaved woodland, providing suitable terrestrial habitat for great crested newt.

A combination of HSI, eDNA, presence/likely absence and population assessment surveys were undertaken during 2018 and 2019, further supported by a suite of historical data from HBIC and other consultant's reports prepared in association with other schemes present locally.

The results indicated that a low population of great crested newt is present within three waterbodies in Havant Thicket FE woodland located to the north of the site. No other evidence of great crested newt was recorded. The nearest waterbody to the development footprint with a confirmed population is Pond 8 located approximately 122 metres north, the other waterbodies with positive records are located approximately 297 metres north (Pond 9a) and approximately 367 metres north (Pond 10). All three waterbodies with confirmed great crested newt populations are located outside of the development footprint ('the site').

Table K6: Overall great crested newt survey summary

Pond Number	Survey Techniques	Year	Result
1	HSI, eDNA	2018	Negative eDNA
2	HSI	2018	Considered unsuitable
3	eDNA	2017 (RPS)	Negative eDNA
4	eDNA	2017 (RPS)	Negative eDNA
5	HSI, eDNA	2018	Negative eDNA
6	HSI, eDNA, presence / likely absence	2018	Negative eDNA
7	HSI, eDNA, presence / likely absence	2018	Negative eDNA
8	HSI, eDNA, population assessment	2018	Low population
8a	HSI, presence / likely absence	2018	Likely absence
8b	HSI, presence / likely absence	2018	Likely absence
9a	HSI, eDNA, population assessment	2009 (FE) and 2018	Low population
9b	HSI, presence / likely absence	2018	Likely absence

Pond Number	Survey Techniques	Year	Result
9c	HSI, presence / likely absence	2018	Likely absence
9d	HSI, presence / likely absence	2018	Likely absence
10	HSI, eDNA, population assessment	2018	Low population
10a	HSI, presence / likely absence	2018	Likely absence
11	HSI, eDNA, presence / likely absence	2018	Negative eDNA
12	HSI, eDNA, presence / likely absence	2018	Negative eDNA
13	HSI, eDNA, presence / likely absence	2018	Negative eDNA
14	HSI, eDNA, presence / likely absence	2018	Negative eDNA
15	HSI, eDNA	2018	Negative eDNA
16	HSI, eDNA	2018	Negative eDNA
17	HSI, eDNA	2018	Negative eDNA
18	N/A	2018	Considered unsuitable
19	N/A	2017 (RPS)	Not sampled – dry
20a	HSI, eDNA	2018	Negative eDNA
20b	HSI, eDNA	2018	Negative eDNA
20c	HSI, eDNA	2018	Negative eDNA
20d	HSI, eDNA	2018	Negative eDNA
20e	HSI, eDNA	2018	Negative eDNA
20f	HSI, eDNA	2018	Negative eDNA
21a	HSI, eDNA	2018	Negative eDNA
21b	HSI, eDNA	2018	Negative eDNA
22	HSI, eDNA	2018	Negative eDNA
22a	N/A	2018	Considered unsuitable
23	HSI, eDNA	2018/2019	Considered unsuitable / negative eDNA
24	N/A	2014 (WYG) / 2017 (EPR) / 2019	Not sampled – dry
25 ⁸	Presence / likely absence	2014 (WYG)	Likely absence
26 ⁸	Presence / likely absence	2014 (WYG)	Likely absence
27	N/A	2019	Considered unsuitable

⁸ Ponds 25 and 26 visited again by EPR in June 2017 when both were recorded as dry

4.0 REFERENCES

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Map K1 Site Location Plan

Map K2 Key Site Features

Map K3 Great Crested Newt Survey – Desktop Study Data

Map K4 Great Crested Newt Survey - Location of Ponds Surveyed and Results

Appendix K1 HSI and eDNA Survey Data

Table K7: HSI and eDNA survey results for Ponds 1 - 26 located within 500 metres of site boundary

Pond No.	NGR	Location in Relation to Site Boundary ⁹	HSI Score	HSI Suitability	Waterbody Description	Figure	eDNA Result	Further Survey
1	SU 72400 09553	57 metres south east of site boundary	0.64	Average	Small (c.230m ²), relatively shaded pond in woodland with limited macrophyte coverage and poor water quality.	 Figure 1: Pond 1	Negative	None
2	SU 71918 09122	224 metres south of site boundary	0.31	Poor	SCP Lower Lake. Large fishing lake (c.15,000m ²) with limited shade. Moderate water quality, no macrophyte cover and fish present.	 Figure 2: Pond 2	Not sampled	None

⁹ Site boundary as illustrated in Map K1

Pond No.	NGR	Location in Relation to Site Boundary ⁹	HSI Score	HSI Suitability	Waterbody Description	Figure	eDNA Result	Further Survey
3	SU 72597 09536	243 metres south east of site boundary	0.72	Good	Relatively large waterbody surrounded by woodland. Small amount of floating sweetgrass <i>Glyceria fluitans</i> present.	 Figure 3: Pond 3	RPS Negative Result	None
4	SU 72448 09364	233 metres south east of site boundary	Unknown	Unknown	Unknown	No figure available	RPS Negative Result	None
5	SU 71428 10021	Within site boundary	0.79	Good	Large (c.7,000m ²), shaded pond within woodland clearing. Good water quality and low macrophyte coverage (20%)	 Figure 4: Pond 5	Negative	None

Pond No.	NGR	Location in Relation to Site Boundary ⁹	HSI Score	HSI Suitability	Waterbody Description	Figure	eDNA Result	Further Survey
6	SU 72239 10289	91 metres north of site boundary	0.73	Good	Small pond (c.130m ²) in woodland, shallow with high turbidity, moderate water quality and limited macrophyte cover.	 Figure 5: Pond 6	Negative	Presence/likely absence survey

Pond No.	NGR	Location in Relation to Site Boundary ⁹	HSI Score	HSI Suitability	Waterbody Description	Figure	eDNA Result	Further Survey
7	SU 72245 10275	104 metres north of site boundary	0.59	Below average	Small pond (c.20m ²) surrounded by trees, with low macrophyte cover (5%) and moderate water quality.	 Figure 6: Pond 7	Negative	Presence/ likely absence survey
8	SU 72230 10309	122 metres north of site boundary	0.68	Average	Shaded pond (c.350m ²) surrounded by trees with low macrophyte cover (10%) and moderate water quality.	 Figure 7: Pond 8	Positive	Presence/ likely absence survey

Pond No.	NGR	Location in Relation to Site Boundary ⁹	HSI Score	HSI Suitability	Waterbody Description	Figure	eDNA Result	Further Survey
8a	SU 72200 10286	118 metres north of site boundary	0.58	Below average	Small shaded pond within woodland (c.85m ²), on macrophyte cover and moderate water quality.	No figure available	Negative	Presence/likely absence survey
8b	SU 72257 10299	126 metres north of site boundary	0.58	Below Average	Small shaded pond within woodland (c.85m ²), on macrophyte cover and moderate water quality.	No figure available	Negative	Presence/likely absence survey
9a	SU 72128 10433	267 metres north of site boundary	0.68	Average	Shaded pond (c.580m ²), with moderate water quality and no macrophyte cover.	 Figure 8: Pond 9a	Negative	Presence/likely absence survey

Pond No.	NGR	Location in Relation to Site Boundary ⁹	HSI Score	HSI Suitability	Waterbody Description	Figure	eDNA Result	Further Survey
9b	SU 72110 10460	297 metres north of site boundary	0.62	Average	Small, shaded pond (c.190m ²) surrounded by trees with low macrophyte cover (15%) and moderate water quality.	 Figure 9: Pond 9b	Negative	Presence/ likely absence survey
9c	SU 72130 10473	313 metres north of site boundary	0.64	Average	Medium sized (c.280m ²), shallow, shaded pond with leaf litter, low macrophyte cover (5%) and moderate water quality	 Figure 10: Pond 9c	Negative	Presence/ likely absence survey

Pond No.	NGR	Location in Relation to Site Boundary ⁹	HSI Score	HSI Suitability	Waterbody Description	Figure	eDNA Result	Further Survey
9d	SU 72106 10483	323 metres north of site boundary	0.59	Below Average	small (c.145m ²), shallow, shaded pond, limited macrophyte cover and moderate water quality	No figure available	Negative	Presence/ likely absence survey
10	SU 72079 10531	367 metres north of site boundary	0.60	Average	Small, shaded pond (c.150m ²) with no macrophyte cover and moderate water quality	 Figure 11: Pond 10	Positive	Presence/ likely absence survey
10a	SU 72076 10569	406 metres north of site boundary	0.60	Average	Small, shaded pond (c.150m ²) with no macrophyte cover and moderate water quality	No figure available	Negative	Presence/ likely absence survey

Pond No.	NGR	Location in Relation to Site Boundary ⁹	HSI Score	HSI Suitability	Waterbody Description	Figure	eDNA Result	Further Survey
11	SU 72051 110575	415 metres north of site boundary	0.70	Good	Shallow, shaded pond (c.200m ²) with good water quality and 60% macrophyte cover	 Figure 11: Pond 11	Negative	Presence/likely absence survey
12	SU 72052 10543	382 metres north of site boundary	0.65	Average	Medium sized, shaded pond (c.300m ²) with lots of leaf litter and moderate water quality, 10% macrophyte cover	 Figure 12: Pond 12	Negative	Presence/likely absence survey

Pond No.	NGR	Location in Relation to Site Boundary ⁹	HSI Score	HSI Suitability	Waterbody Description	Figure	eDNA Result	Further Survey
13	SU 72034 10532	372 metres north of site boundary	0.66	Average	Shaded pond (c.250m ²), no macrophyte cover and moderate water quality	 Figure 13: Pond 13	Negative	Presence/likely absence survey
14	SU 72045 10513	353 metres north of site boundary	0.64	Average	Medium sized pond (c.250m ²) with moderate water quality and low macrophyte cover (5%), in shaded woodland	 Figure 14: Pond 14	Negative	Presence/likely absence survey

Pond No.	NGR	Location in Relation to Site Boundary ⁹	HSI Score	HSI Suitability	Waterbody Description	Figure	eDNA Result	Further Survey
15	SU 71505 10675	293 metres north of site boundary	0.78	Good	Medium sized waterbody (c.250m ²), with 10% macrophyte cover, poor water quality. Bank erosion and water disturbance by swimming dogs.	 Figure 15: Pond 15	Negative	None
16	SU 71451 10413	30 meters north of site boundary	0.62	Average	Medium sized (c.185m ²), completely shaded waterbody with moderate water quality and no macrophyte cover	 Figure 16: Pond 16	Negative	None

Pond No.	NGR	Location in Relation to Site Boundary ⁹	HSI Score	HSI Suitability	Waterbody Description	Figure	eDNA Result	Further Survey
17	SU 70342 09789	405 metres north of site boundary	0.61	Average	Small pond (c.60m ²), very shaded with moderate water quality and 60% macrophyte cover. Surrounded by trees.	 Figure 17: Pond 17	Negative	None
18	SU 70480 09769	266 metres west of site boundary	N/A	N/A	Not surveyed	 Figure 18: Pond 18	Not sampled – part of river	None

Pond No.	NGR	Location in Relation to Site Boundary ⁹	HSI Score	HSI Suitability	Waterbody Description	Figure	eDNA Result	Further Survey
19	SU 72346 09159	346 metres south east of site boundary	N/A	N/A	An ad hoc visit to this pond after a prolonged period of heavy rain in December 2019 revealed that the plastic liner had failed and therefore no water was present. The waterbody is therefore likely to be dry throughout the year.	 Figure 19: Pond 19	Not sampled – dry (RPS)	None
20a	SU 72465 09546	116 metres south east of site boundary	0.60	Average	Shaded pond (c.150m ²), no macrophyte cover and moderate water quality.	 Figure 20: Pond 20a	Negative	None

Pond No.	NGR	Location in Relation to Site Boundary ⁹	HSI Score	HSI Suitability	Waterbody Description	Figure	eDNA Result	Further Survey
20b	SU 72430 09545	83 metres south east of site boundary	0.60	Average	Small (c.140m ²), shaded pond with no macrophyte cover and moderate water quality.	No figure available	Negative	None
20c	SU 72420 09522	85 metres south east of site boundary	0.54	Below Average	Small (c.30m ²) pond with high levels of shade, moderate water quality and no macrophyte coverage.	No figure available	Negative	None
20d	SU 72444 09542	105 metres south east of site boundary	0.63	Average	Small (c.140m ²) pond with lots of shade, moderate water quality and 20% macrophyte coverage.	 Figure 21: Pond 20d	Negative	None
20e	SU 72442 09526	136 metres south east of site boundary	0.57	Below Average	Small (c75m ²) pond, shaded, with moderate water quality and 20% macrophyte coverage.	No figure available	Negative	None

Pond No.	NGR	Location in Relation to Site Boundary ⁹	HSI Score	HSI Suitability	Waterbody Description	Figure	eDNA Result	Further Survey
20f	SU 72459 09501	129 metres south east of site boundary	0.61	Average	Small (c.150m ²) pond, shaded, with moderate water quality and no macrophyte coverage	 Figure 22: Pond 20f	Negative	None
21a	SU 72341 09421	128 metres south east of site boundary	0.66	Average	Medium sized (100m ²) pond with moderate levels of shade, moderate water quality and no macrophyte cover.	 Figure 23: Pond 21a	Negative	None

Pond No.	NGR	Location in Relation to Site Boundary ⁹	HSI Score	HSI Suitability	Waterbody Description	Figure	eDNA Result	Further Survey
21b	SU 72337 09466	88 metres south east of site boundary	0.68	Average	Medium sized, shaded pond (670m ²), with moderate water quality and no macrophyte cover.	 Figure 24: Pond 21b	Negative	None
22	SU 72536 09279	352 metres south east of site boundary	0.57	Poor	Very small pond (10m ²), prone to drying out, no macrophyte cover and moderate water quality. Surrounded by aquatic vegetation	 Figure 25: Pond 22	Negative	None

Pond No.	NGR	Location in Relation to Site Boundary ⁹	HSI Score	HSI Suitability	Waterbody Description	Figure	eDNA Result	Further Survey
22a	SU 7254 0932	376 metres south east of site boundary	n/a	n/a	Garden pond considered unsuitable for great crested newt due to the presence of fish.	n/a	Not sampled	None
23	SU 70838 10314	On north west side site boundary	0.41	Poor	Small pond (15m ²) located in Bells Copse, surrounded by trees and shaded with no macrophyte cover and poor water quality	 Figure 26: Pond 23	Negative	None

Pond No.	NGR	Location in Relation to Site Boundary ⁹	HSI Score	HSI Suitability	Waterbody Description	Figure	eDNA Result	Further Survey
24	SU 71395 11701	272 metres north-north-west	Dry	-	Pond with scrub encroaching, heavily shaded. Outlet drains into a ditch so unlikely to store much water. Base of waterbody contained ivy at the time of the survey in early May 2019, suggesting the waterbody has not be full for some time.	 Figure 27: Pond 24	Not sampled – dry	None
25	SU 71151 11483	295 metres north-west	0.51	Below average	Waterbody along drainage ditch, lined with scrub and trees (WYG description).	No figure available	Not sampled	Presence/ likely absence survey (WYG)
26	SU 71078 11349	260 metres north-west	0.56	Below average	Small pond located along stream; no aquatic vegetation (WYG description)	No figure available	Not sampled	Presence/ likely absence survey (WYG)

Pond No.	NGR	Location in Relation to Site Boundary ⁹	HSI Score	HSI Suitability	Waterbody Description	Figure	eDNA Result	Further Survey
27	SU 72518 09979	90 metres east	Dry	-	Small very shaded pond, apparently natural. No aquatic vegetation present, or indications that aquatic vegetation has been present in the past. Pond dry during early May 2019.	 Figure 28: Pond 27	Not sampled, dry	None