A417 Missing Link
TR010056

6.4 Environmental Statement
Appendix 8.15 Great Crested Newt Survey Report

Planning Act 2008

APFP Regulation 5(2)(a)
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A417 Missing Link

Development Consent Order 202[x]

6.4 Environmental Statement
Appendix 8.15 Great Crested Newt Survey Report

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Table of contents

Executive Summary

The proposed A417 Missing Link scheme (hereafter referred to as 'the scheme') aims to provide a dual carriageway to a stretch of single carriageway between the Cowley roundabout and Crickley Hill in Gloucestershire; the 5.5km section is the only remaining section of single carriageway. The scheme would increase capacity by creating a free-flowing link between the Brockworth Bypass and Cowley roundabout and remove the at-grade junction with the A436, resulting in a continuous flow between the M4 Junction 15 (Swindon) and the M5 Junction 11a (Gloucester/Cheltenham).

Great crested newts (GCN) are afforded full protection under the Conservation of Habitats and Species Regulations 2017 and the Wildlife and Countryside Act 1981 (as amended). Great crested newts are widely distributed throughout the lowland areas of Great Britain but are absent from Ireland. Their populations have declined over the last century across Europe, including Britain, mainly as a result of pond loss and deterioration.

Mott Macdonald have undertaken GCN surveys in the 2018 and 2019 survey seasons to assess the presence or likely absence of this European protected species from within the Zone of Influence of the scheme. Surveys in 2018 included Habitat Suitability Index (HSI) surveys, to assess suitability of waterbodies to support GCN. These HSI surveys were followed up by eDNA surveys of suitable waterbodies in June 2018. Further HSI surveys and eDNA surveys were undertaken in May 2019 on additional ponds that could not be accessed in 2018. In addition, population estimate surveys were undertaken on two ponds during the 2019 season.

The surveys identified the presence of GCN within three ponds. Pond 2a is located 227m from the construction footprint of Option 30. This pond had a positive eDNA result and population estimate surveys identified a small population, with a maximum of 2 GCN. Positive eDNA results were also returned for Pond 15 and Pond 26a. Pond 26a is located 668 meters from the construction footprint of Option 30 and Pond 15 is located 500 metres from the construction footprint. Due to the distance of these ponds from the scheme, no population estimate surveys were undertaken.

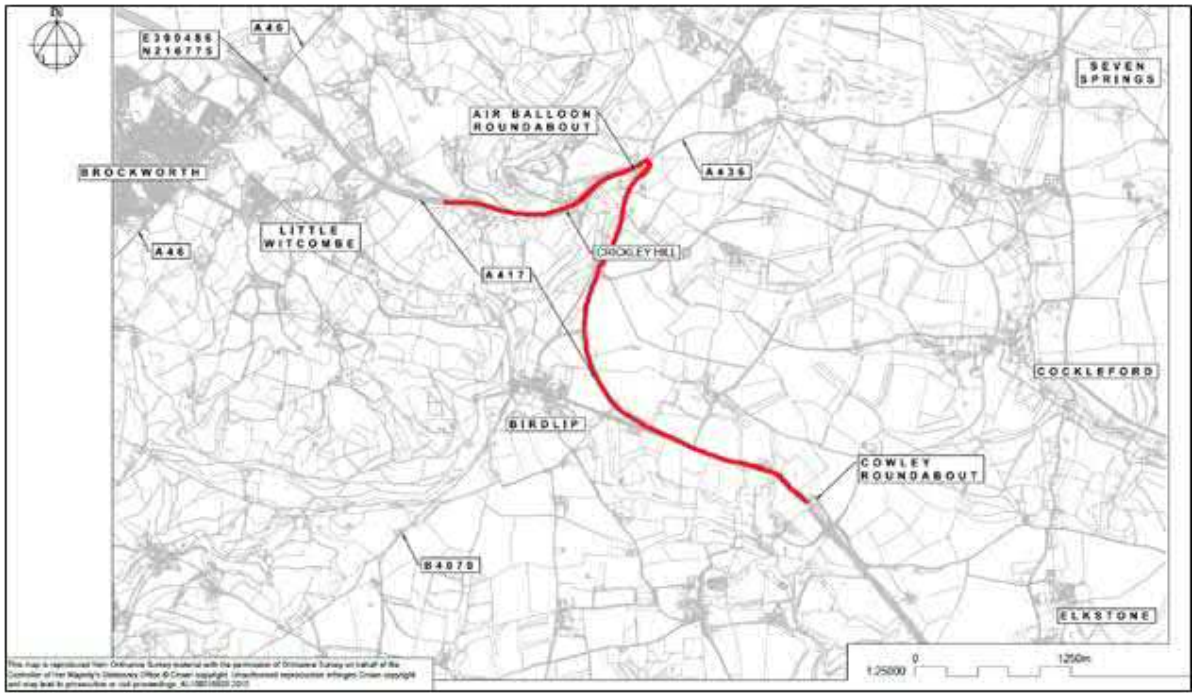
At the time of writing, the project is still within the design phase. Therefore, the full extent of potential impacts of the Scheme on the great crested newt populations is yet to be confirmed. Impacts and mitigation to alleviate them will be detailed within the ecology and nature conservation chapter of the project Environmental Statement, when published.

1. Introduction

1.1. Background

1.1.1. The A417/A419 provides an important link between the Midlands/North and South of England, between Gloucester and Swindon, and as an alternative to the M5/M4 route via Bristol. The section of the A417 near Birdlip, known as the 'missing link', forms the only section of single carriageway along the route, with an at-grade junction located at the 'Air Balloon' public house. The single carriageway is located between the Cowley roundabout and the base of Crickley Hill, a 5.5km stretch shown on Figure 1.1 below.

Figure 1.1: A417 Missing Link Scheme Location Plan



Source: GiGi GIS Portal. Crown Copyright 2016 100030649

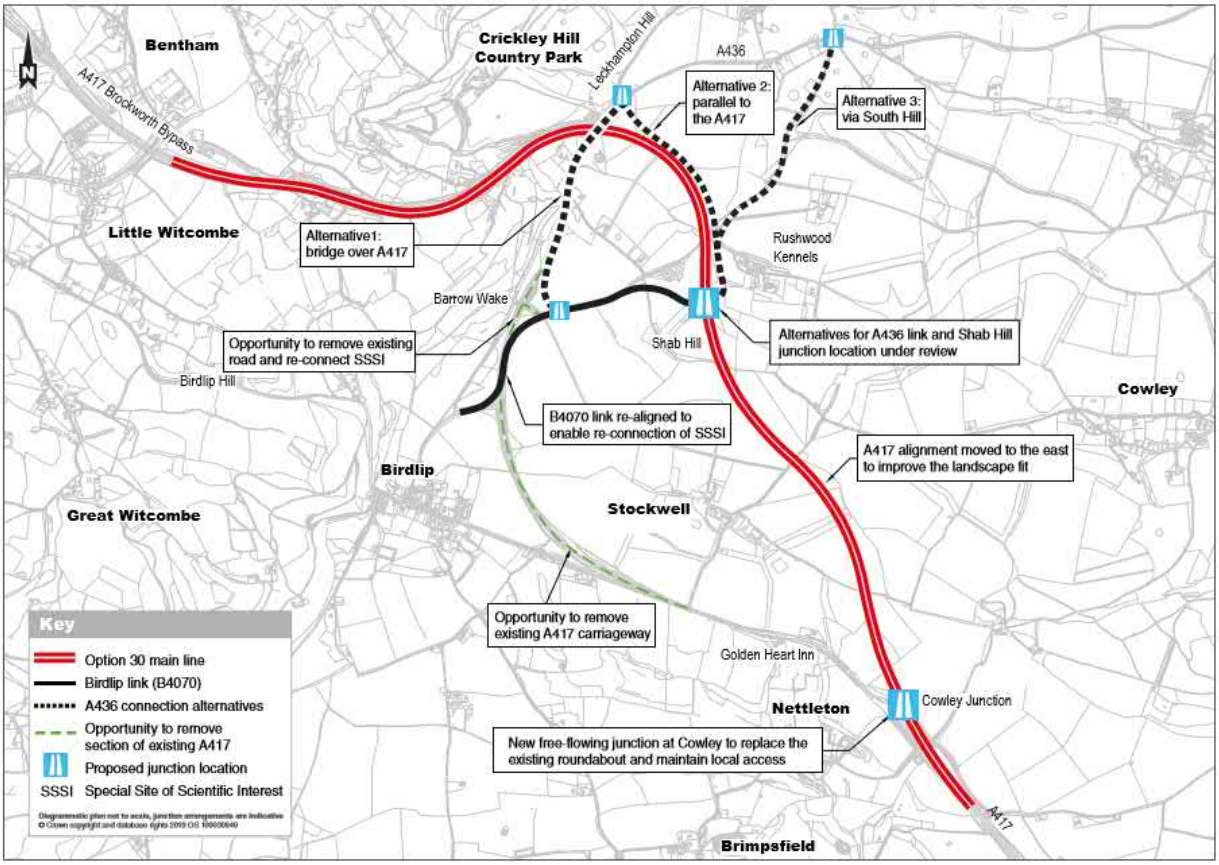
1.2. Scheme Proposal

1.2.1 The proposed scheme would provide a dual carriageway to improve the current Missing Link section of single carriageway of the A417 between Cowley roundabout and Crickley Hill.

1.2.2 Any proposed scheme would aim to increase capacity by creating a free-flowing link between the Brockworth Bypass and the Cowley roundabout and remove the at-grade junction with the A436 (Air Balloon roundabout). This Missing Link will provide a free flowing journey between Swindon (M4 Junction 15) and Gloucester / Cheltenham (M5 Junction 11a).

1.2.3 The preferred route for the Scheme was confirmed as Option 30 by the Secretary of State in March 2019 (see Figure 2.1 below). The Scheme comprises the construction of a new dual carriageway to replace the existing single carriageway section between Brockworth bypass and Cowley Roundabout. It is predominately an “offline” Scheme but approximately a third of the route follows the existing A417 route corridor at Crickley Hill.

Figure 1.2: A417 Preferred Route Announcement



1.2.4 Figure 1.2 above shows three A436 link road alternative connections. Alternative 2, paralell to the A417, is the option taken forward for assessment in the Environmental Statement.

1.3. Scope of report

1.3.1. The objectives of the report are:

- to present the methodology used and any identify any constraints during the GCN surveys
- to present the results of the Habitat Suitability Index (HSI) assessment for all ponds and other potentially suitable waterbodies
- to present the results of the eDNA and presence/absence and population assessment surveys

- to present the relative abundance of the GCN populations
- to provide a high-level initial assessment of the potential impacts of the scheme on GCN

1.3.2. The report does not provide any detailed impact assessment or recommendations for mitigation as this aspect will be developed by Arup during PCF Stage 3 of the scheme.

1.4. Legislation

1.4.1. Great crested newts (GCN) are afforded full protection under the Conservation of Habitats and Species Regulations 2017 (as amended) and the Wildlife and Countryside Act 1981 (as amended).

1.4.2. Under Regulation 43 of the Conservation of Habitats and Species Regulations it is illegal to:

- Deliberately capture, injure or kill a GCN
- Deliberately disturb a GCN (in particular, disturbance which is likely to impair their ability to survive, to breed or reproduce, or to rear or nurture their young, to hibernate or migrate or to affect significantly the local distribution or abundance of the species to which they belong)
- Deliberately take or destroy the eggs of GCN
- Damage or destroy a breeding site or resting place of GCN

1.4.3. Under Schedule 5 of the Wildlife and Countryside Act 1981 it is illegal to:

- Intentionally or deliberately kill, injure or take any GCN
- Possess or control any live or dead specimen or anything derived from GCN
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protected by GCN
- Intentionally or recklessly disturb GCN whilst they are occupying a structure or place used for that purpose

1.4.4. Great crested newt are also listed as an Annex II species of the EU Habitats Directive, meaning they meet the criteria for site selection of Special Areas of Conservation to specifically conserve this species. Site selection is based on evidence of a large and robust population of GCN.

1.5. Status of great crested newt at national level

1.5.1. Great crested newts are widely distributed throughout the lowland areas of Great Britain but are absent from Ireland. Their populations have declined over the last century across Europe, including Britain, mainly because of habitat loss and deterioration.

1.5.2. Historically, GCN were listed as a UK Biodiversity Action Plan (BAP) species and are now listed as a species of 'principal importance for the conservation of biodiversity in England' under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Following the production of Biodiversity 2020, the national strategy for England, actions were identified by experts to help in the recovery of populations of the S41 listed species. Actions identified for the recovery of GCN include the following:

I. Create, restore and manage ponds to provide breeding sites for Great Crested Newts, and manage surrounding terrestrial habitats sympathetically

II. Develop and implement methods and policies to remedy reversible adverse impacts at the population level, notably introduction of fish and invasive plants

III. Develop and implement a surveillance plan to meet data needs at all spatial scales, for all appropriate stakeholders

IV. Review land use regulation and propose changes to improve outcomes for great crested newts

1.6. Status of great crested newt at county level

1.6.1. The Amphibian and Reptile Conservation Group (ARG) UK describe the status of GCN within the county as widespread, with South Gloucestershire as a stronghold for the species[1].

1.7. Great crested newt ecology

1.7.1. The GCN annual cycle commences on emergence from hibernation. They will move from their hibernation sites between February and April toward breeding ponds. Great crested newt breed, and live during breeding season, in a wide range of natural, semi-natural and man-made aquatic habitats including marshes, reed beds, wet ditches and ponds. They spend the spring and summer

[1] The South Gloucestershire Biodiversity Action Plan. (2006). (https://www.southglos.gov.uk/documents/pte080091.pdf)

moving between water and land to satisfy feeding and shelter needs, as well as to find mates. Most adult newts move away from ponds and into terrestrial habitat between May and July. Suitable terrestrial habitat typically includes woodland, scrub, hedgerows and less intensively manged grassland. They seek out crevices and holes in the ground to spend the autumn, and regularly emerge to disperse and forage in warmer, wetter conditions. They will hibernate over winter once temperatures regularly fall below 5ºC overnight.

1.7.2. Great crested newts are known to range typically up to 500m from breeding ponds in search of feeding and hibernation sites. Some great crested newts have been found to move over considerable distances (up to 1.3km from breeding sites) however the majority inhabit an area much closer to the pond. The quality of the terrestrial habitat near to breeding ponds is important, as are the lack of barriers to dispersal (such as watercourses or busy roads).

1.7.3. Great crested newts often exist in metapopulations. A metapopulation is a group of associated populations. That is, a metapopulation is made up from newts which breed in, and live around, a cluster of ponds. There will be some interchange of newts between ponds, although most adults consistently return to the same pond to breed. Metapopulations are much less vulnerable to habitat changes than populations based on single breeding ponds[2].

[2] Langton, T.E.S., Beckett, C.L. and Foster, J.P. (2001). Great Crested Newt Conservation Handbook, Froglife, Halesworth.

2. Methodology

2.1. Desk Study

2.1.1. A desk study was undertaken to identify records of GCN within the study area and wider surrounds up to a distance of two kilometres from the route options. At the time of the desk study and subsequent surveys, there were two scheme options under consideration (Option 12 and Option 30). Records were acquired from the Gloucestershire Centre for Environmental Records (GCER) in 2017. The results can be found within Appendix A.

2.1.2. A similar A417 scheme was subject to environmental assessment in 2006. The 2006 Stage 2 Assessment[3] included GCN surveys including detailed surveys of three ponds (referenced as Pond 9, Pond 13 and Pond 14 in 2018/19 surveys). No evidence of GCN was identified during these surveys.

2.1.3. All ponds and other potentially suitable waterbodies within 500m of both scheme options were identified using the MAGIC online viewer tool (Defra, 2017) and the use of 1:10,000 Ordnance Survey Mapping and aerial photography. These were recorded and given a unique identifier. Additional ponds were also identified during initial scoping walkovers of land parcels. These were typically small ponds that were not shown on Ordnance Survey Mapping. Appendix B details the locations of all waterbodies.

2.2. Habitat suitability index assessment

2.2.1. All ponds and potentially suitable water bodies identified within the desk study were assessed for their potential to support GCN using the standardised Habitat Suitability Index (HSI) methodology (Oldham et al, 2000). The HSI is a measure of suitability and incorporates ten indices, all of which are environmental factors known to affect this species.

2.2.2. The results are expressed as an HSI score between 0 and 1, with 0 being unsuitable habitat and 1 representing optimal habitat, as shown in Table 2.1. It is considered that ponds with a higher overall HSI score are more likely to support GCN than those with a lower score. The method is not sufficiently precise to conclude that ponds with a high score will support newts, or that any pond with a low score will not. It is therefore a tool to support, rather than a substitute for, GCN surveys.

[3] WSP (March 2006) A417 Cowley to Brockworth Bypass Improvement Scheme Stage 2 Ecology and Nature Conservation Report

Table 2.1 Habitat Suitability Index Score

HSI Score	HSI Category	Predicted presence
<0.50	Poor	3%
0.50 – 0.59	Below Average	20%
0.60 – 0.69	Average	55%
0.70 – 0.79	Good	79%
>0.80	Excellent	93%

2.3. eDNA Survey

2.3.1. Following the HSI surveys, suitable waterbodies were then subject to eDNA survey. The eDNA survey was undertaken on all waterbodies which supported suitable habitat to support GCN. This included waterbodies with HSI scores between Poor and Excellent, i.e. the HSI score was not used to rule out any waterbodies. Waterbodies that were not subject to eDNA included those that were either dry or otherwise unsuitable to support breeding GCN. Unsuitable waterbodies included ephemeral springs with little or no water, wells with no surface water and swimming pools.

2.3.2. When Great Crested Newts (GCN) inhabit a pond, cells containing their DNA are continually sloughed off into the water. The eDNA survey involves the collection of 20 water samples from around the perimeter of a waterbody, which are then subject to laboratory analysis of the environmental DNA present in the water column to assess presence or absence of GCN.

2.3.3. eDNA test kits were obtained from SureScreen Scientific Ltd in order to collect water samples to enable tests to be carried out of the waterbodies to determine the presence of Great Crested Newt. The methods used for water sample collection and eDNA analysis were those described by Biggs et. al. 2014[4].

2.3.4. eDNA surveys were undertaken in June 2018 and May 2019. Detailed survey dates are provided in Appendix D. Surveys were undertaken by experienced ecologists holding a Natural England GCN Class Licence (Level 1 CL08).

2.3.5. The location of waterbodies which were subject to eDNA survey is shown in Appendix D.

[4] Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F (2014). Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA. Freshwater Habitats Trust, Oxford.

2.4. Population Estimate Survey

2.4.1. Following a positive eDNA survey result in May 2019, pond 2a was subject to population estimate surveys in the same month. Additionally, pond 2 was subject to further surveys due to its proximity to pond 2a, despite a negative eDNA survey result. The surveys were undertaken in accordance with the guidelines outlined in the Great Crested Newt Mitigation Guidelines (English Nature, 2001). Each survey was undertaken by a Natural England GCN Class Licence holder and assistant. At least three survey methods were utilised for each visit. These included:

I. *Bottle trapping*: bottle traps are 2 litre plastic bottles with inverted funnels, which are set in the water at approximately 2m intervals all around the pond's edge using canes. They are set in the evening ensuring an air bubble is present and left overnight to allow amphibians to explore and get caught inside. They are removed the next morning after no more than 17 hours (English Nature, 2001).

II. *Torching*: shortly after dusk, the pond is systematically searched from the bank using a high power (1000,000 candle power) torch and counts made of any newts present.

III. *Egg searching*: examination of potential egg laying substrate such as marginal vegetation, dead leaves and litter. Great crested newts lay their eggs singularly in folds of substrate and can be identified by their colour and size. Once a confirmed GCN egg is identified (confirming the presence of a breeding pond) no more egg searching is undertaken.

IV. *Netting*: Using a long-handled dip-net, great crested newts can be captured by sampling the area around the pond edge. The edge of the pond is systematically sampled, with at least 15 minutes of netting per 50m of shoreline. Netting is not a suitable indication of population size.

In accordance with the Great Crested Newt Mitigation Guidelines, Pond 2a was subject to a total of 6 surveys. Surveys of Pond 2 were stopped after 4 surveys as no evidence of GCN was recorded. Surveys of Pond 2a and 2 were undertaken between 9th May 2019 and 30th May 2019. Details of survey dates and weather conditions are shown in table 2.2.

Table 2.2 Great crested newt survey dates

Pond Surveyed	Date	Weather Conditions	Methods
2a, 2	09.05.2019	Dry, Still, 6-10ºC	Bottle Trap, Torch (2 only), Egg Search, Refuge Search (2a only)
2a, 2	15.05.2019	Dry, Still, 8-13ºC	Bottle Trap, Torch (2 only), Egg Search, Refuge Search (2a only)
2a, 2	20.05.2019	Occasional light rain, humid with almost complete cloud cover, 7-12ºC	Bottle Trap, Egg Search, Netting (2 only), Refuge Search
2a, 2	23.05.2019	Dry, Still, 11-15ºC	Bottle Trap, Torch (2 only), Egg Search, Refuge Search (2a only)
2a	28.05.2019	Dry, Still, 10-15ºC	Bottle Trap, Egg Search, Refuge Search
2a	30.05.2019	Dry, Still, 8-13ºC	Bottle Trap, Egg Search, Refuge Search

2.5. Estimating population size class

2.5.1. Population size class estimates were calculated according to the Great Crested Newt Mitigation Guidelines (2001). It is the peak adult count per survey visit that is significant, with juveniles not included for population estimates. Although these are very broad classifications, they can inform licensing and mitigation requirements. Table 2.3 summarises its application.

Table 2.3 Population size class estimates

Peak adult count in a single survey visit	Population size class
Maximum counts up to 10	Small
Maximum counts between 11 and 100	Medium
Maximum count >100	Large

2.6. Site status assessment

2.6.1. Following the completion of the surveys an assessment of the status of the site was then made. The importance of the site takes into account the population size class estimate but also several other factors:

- The quality and rarity of the habitat and population
- How connected the population is to the wider area
- The local significance of the population

- The size of the meta-population

2.7. Survey constraints

2.7.1. Where GCN were not identified as occupying a pond or pond cluster, this does not guarantee their absence. There is always the risk of GCN being over-looked due to timing of surveys and scarcity of GCN on site.

2.7.2. Estimating population can be fraught with issues due to the detectability of GCN, the complex population dynamics and mobility between ponds amongst other factors. As a result, where licensing is required a maximum estimate is implemented.

2.7.3. All suitable ponds within the 500m buffer of the scheme had HSI surveys completed. Ponds 1,1a,3,4,5,6,7,10,11,12,17,19,21a,22,23,25,26,27,28,30,32 and 34 were deemed unsuitable for HSI surveys; they were either entirely desiccated or man-made structures such as swimming pools. However, this is not considered to be a constraint as waterbodies that dry regularly during the breeding season are unlikely to support breeding populations of GCN.

2.7.4. Population surveys of Pond 2a were not commenced until 9th May due to access restrictions. Natural England's Standing Advice for GCN surveys recommend that for population surveys, at least 3 of the 6 surveys should be undertaken in peak season (usually mid-April to mid-May). Two of the surveys of Pond 2a were undertaken in this peak season, with the third survey undertaken on the 20th May, just outside the typical peak season. However, this is not considered to have had a significant impact on the results.

2.7.5. A pond marked on the OS at SO 95345 12613 is located 460 meters southeast of the extent of the Option 30. However, there are no works affecting potentially suitable terrestrial habitat within 500 metres of this pond. Therefore, this pond was not subject to any surveys. However, this is not considered a constraint due to the lack of impact on terrestrial habitat within 500 metres of this pond.

3. Results

3.1. Desk study results

3.1.1. The data search results from GCER returned four records of great crested newt within 2km of the scheme, three of which are in the Bentham area, with the closest pond 530 metres north of the scheme and one in Brockworth 1.36 kilometres west of the scheme to the southwest of the Brockworth roundabout. A map of these results is provided in Appendix A. No GCN were found during the 2006 Stage 2 Assessment surveys (ponds 9, 13 and 14).

3.2. Description of waterbodies

3.2.1. A description of the waterbodies identified within the Zone of Influence (ZoI) of the scheme along with their distance from the proposed construction footprint is provided in Appendix B. The waterbodies consist mainly of garden ponds; there are also ponds within woodland habitat and ponds within arable and grazed farmland. One waterbody consisted of a large concrete trough with palmate newts visible at the time of HSI survey. Many of the waterbodies identified during the desk study were ephemeral springs which held little or no standing water at the time of the surveys.

3.3. Habitat suitability index

3.3.1. A total of 43 waterbodies were identified within 500m of Options 12 and 30. Of these waterbodies 33 are located within 500m of Option 30. A total of 21 had an HSI survey completed, the others were assessed as unsuitable for supporting breeding GCN due to either being dry ephemeral springs with no suitable standing water, or manmade features such as swimming pools. No HSI was undertaken where a waterbody was assessed as unsuitable.

3.3.2. The detailed results of the HSI surveys can be found within Appendix C. Ponds 1,1a,3,4,5,6,7,10,11,12,17,19, 21a, 22, 23, 25, 26, 27, 28, 30, 32 and 34 did not receive an HSI assessment as detailed above (Section 2.7.3).

3.4. eDNA Presence/ likely absence

3.4.1. Following the HSI surveys, 16 of the 21 that received an HSI were deemed suitable for eDNA surveys. Ponds 8 and 21 did not have enough water in at the time of eDNA survey to collect enough samples; pond 21 was also heavily disturbed by cattle. Pond 16 was over 500m from the scheme alignment, having originally been inside one of the option boundaries when the HSI was undertaken. Ponds 33 and 37 are small ornamental ponds with pond 33 being very small with vertical sides and was deemed unsuitable. Pond 37 was stocked with many large

carp and assessed as being unsuitable for GCN. A summary of eDNA surveys is presented in table 3.1.

3.4.2. Three ponds resulted in positive eDNA results; ponds 2a, 15, and 26a. Pond 15 is 500 meters from Option 30 and so no further population estimate surveys were carried out. Pond 26a is over 668 metres from Option 30 and so no further surveys were carried out. The results for the eDNA surveys can be viewed in Appendix D.

Table 3.1 Summary of eDNA results.

Pond number	Land parcel	Distance from Option 30 (metres)	eDNA result
2	GR95689	185m	Negative
2a	GR95689	227m	Positive
9	GR329311	63m	Negative
13	GR159309	436m	Negative
14	GR159562	345m	Negative
15	GR308763	500m	Positive
18	GR405759	480m	Negative
20	U00120	420m	Negative
24	GR136598	470m	Negative
29	GR383328	128m	Negative
31	GR159309	620m	Negative
35	GR354154	366m	Negative
35a	GR346313	90m	Negative
36	U00125	190m	Negative
38	GR138283	180m	Negative
26a	U00112	668m	Positive

3.5. Population class size and metapopulations

3.5.1. Pond 2a was subject to 6 great created newt surveys using three survey methods to provide an estimate of population size. The maximum number of GCN found during any one survey was two female adults. The lowest maximum count for any one pond was one male adult. These were found in the bottle trap surveys. No GCN eggs were found during the surveys. The population class size is classified as small. A map showing the results of these surveys is provided in Appendix E and detailed survey results are provided in Appendix F.

3.5.2. Pond 2 had no GCN recorded however it is close to pond 2a with suitable connecting habitat between the two ponds and there is potential that this waterbody may be used by GCN in the future. Only 4 surveys were undertaken at pond 2 due to the negative results of the first 4 surveys.

3.5.3. In addition to GCN, the surveys found populations of palmate newt *Lissotriton helveticus* in ponds 2 and 2a and smooth newt *Lissotriton vulgaris* in pond 2a. A common frog *Rana temporaria* was also found on pond 2a.

3.5.4. A second population of GCN has been identified within the Birdlip area, associated with Pond 15 and Pond 26a (identified through eDNA surveys), both of which are within 500m of each other and likely to be associated with the same metapopulation. This population is over 500m from Option 30.

3.5.5. A third metapopulation has been identified from desk study records within the Bentham area. The records indicate that there is a medium population associated with three ponds, the closest of which is 530 metres north of the scheme.

3.6. Site status

South Gloucestershire is a strong hold for GCN[1] and they are widespread across the county; therefore, populations may be defined as locally important. However, the surveys found only one pond with a small population within 500m of scheme. Two additional populations are located just over 500m from the scheme, indicating that the species is relatively widespread in the local area.

4. Potential Impacts

4.1.1. The impact assessment will be covered within the ecology and nature conservation chapter of the Environmental Statement for the project. At the time of writing, the Scheme is still being designed and firm conclusions on impacts will be detailed in the aforementioned document.

5. Mitigation and enhancement recommendations

5.1.1. Full details of ecological mitigation measures will be included within the ecology and nature conservation chapter of the Environmental Statement for the project.

5.1.2. Positive measures should be considered that may offer benefits to Great crested newts including habitat reconnection and enhancement.

6. Conclusion

6.1.1. A small population of great crested newts has been identified within 250m of Option 30. Impacts on terrestrial habitat associated with this population are likely to be relatively minor and not anticipated to have an impact on the viability of the population. Two other GCN populations have been identified within proximity of the scheme, but both of which are over 500m from the footprint of the works and are not anticipated to be adversely affected by the scheme.

6.1.2. The impact assessment and any mitigation measures required will be fully detailed within the Scheme Environmental Statement.

Appendix A – Biological Records

Notes

Legend

Records

- amphibian, Common Frog
- amphibian, Common Toad
- amphibian, Great Crested Newt
- amphibian, Smooth Newt

Rev	Date	Amendment Details	Drawn	Chk'd	App'd
P01	26/06/19	FIRST REVISION	SB	VH	SM

Mott MacDonald Sweco

Client: highways england

Drawing Status: S01

Suitability: S4

Project Title: A417 MISSING LINK

Drawing Title: Preivous Biological Records - Amphibians and Reptiles

Scale	Designed	Drawn	Checked	Approved
1:20,000	SB	SB	VH	SM
Original Size	**Date**	**Date**	**Date**	**Date**
A3	26/06/2019	26/06/2019	26/06/2019	26/06/2019

Drawing Number: HE PIN | Originator | Volume
551505 - MMSJV - EBD -
000 - DR - LB - 00042
Location | Type | Role | Number

Project Ref. No.: 551505

Revision: P01

FILE LOCATION: P:\Southampton\HWA\GIS\Projects\353982 - A417\Ecology\GIS 2018\Biological records\Biological records - Reptile and Amphibians SB Update.mxd

Appendix B - Description of waterbodies

Pond reference	Description of waterbody	Distance from Option 30 (metres)
1	Swimming pool	45.5
2	Man-made pond with lining, woodland and grassland habitat, low water level.	185
2a	Pond with lining, high level of duckweed cover. Fed by spring, habitat is woodland and garden.	227
3	Spring - no pooling of water, no suitable GCN habitat	214
4	Spring - no pooling of water, no suitable GCN habitat	528
5	Spring - no pooling of water	543
6	Spring - no pooling of water, no suitable GCN habitat	530
7	Spring - no pooling of water	303
8	Pond with very little water, heavily shaded, log piles nearby for terrestrial refuge	263
9	Small pond next to Wildlife Trust reserve including woodland and grassland. Plenty of egg laying vegetation.	63
10	Spring - no pooling of water, no suitable GCN habitat	476
11	Spring - no pooling of water, no suitable GCN habitat	489
12	Spring - no pooling of water	493
13	Pond in arable land area, complete duckweed cover, terrestrial refuge areas in form of log piles present	436
14	Old storage pond, tall vegetation with tree shading in surrounding habitat	345
15	Garden pond with lining, mown grassland surrounding pond	500
16	Over 500m from scheme	55
17	Dry pond – over 500m from scheme	561
18	Large pond with suitable surrounding habitat for GCN	480
19	An old drainage field pond, currently muddy and used by livestock	497
20	A series of pools that join in winter to be one large pond. Surrounded by woodland	420
21	Spring emptying onto concrete pan and free flowing out of field. Heavily disturbed by cattle.	435
21a	Dry swimming pool	283
22	Spring - some rushes indicate damp ground but no pond and no standing water	684
23	Dry - no sign of pond within dry broadleaved woodland	500
24	Garden pond surrounded by amenity grassland, woodland and arable land	470
25	Pond very dry - no signs of recently holding	226
26	Spring not visible on surface, no water.	469
27	Dry - Becoming scrubbed over	1070
28	Very small spring	17
29	Shallow pond lined surrounded with decking	128
30	Over 500m from scheme - no survey required	717

31	Pond with vegetation present that is suitable for egg laying. Surrounded by mixed woodland	620
32	Dry pond	44
33	Small garden pond, surrounded by amenity grassland, hedgerow and arable land	709
34	Dry reed bed	15
35	New pond created in winter of 2017, pond located in woodland with log piles present for terrestrial refuge area.	366
35a	Recently constructed pond in woodland	90
36	Small garden pond with stone base, surrounded by mown lawn, arable land and woodland nearby	190
37	Small ornamental garden pond, high numbers of large fish observed, no egg laying material, no macrophyte cover, pond pump present.	20
38	Woodland pond with stone wall on banks, some suitable egg laying material present, surrounded by woodland	283
1a	Dry pond	469
21a	Dry swimming pool	45
26a	Concrete lined reservoir, palmate newts observed during HSI	668

Appendix C - HSI Results

Notes

Legend

- Option 30 Scheme Outline (at time of survey)
- 500m Scheme Buffer

HSI Score

- Average
- Below Average
- Excellent
- Good
- Poor
- Unsuitable

Rev	Date	Amendment Details	Drawn	Chk'd	App'd
P02	28/10/19	Minor amendments	JW	VH	SM
P01	26/06/19	First Revision	TW	VH	SM

Mott MacDonald Sweco

Client: highways england

Drawing Status	Suitability
For Information	S2

Project Title: A417 Missing Link

Drawing Title: Great Crested Newt Ponds HSI Score

Scale	Designed	Drawn	Checked	Approved
1:8,000	TW	TW	VH	SM
Original Size	**Date**	**Date**	**Date**	**Date**
A1	12/06/19	28/10/19	28/10/19	28/10/19

Drawing Number: HE PIN | Originator | Volume
551505 - MMSJV - VOL - EBD
000 - DR - LB - 00043
Location | Type | Role | Number

Project Ref. No.: 551505

Revision: P02

0 0.125 0.25 0.5 Kilometres

FILE LOCATION: P:\Southampton\HWA\GIS\Projects\353982 - A417\Ecology\GIS_2019\SURVEY_MAPS\GCN\MXD\GCN_HSI_Edna_Presence_V3.mxd

Pond No.	Distance from Option 30	Description of waterbody	Pond area (m^2)	Permanence	Water quality	Shade	Waterfowl	Fish	Pond Count	Terrestrial Habitat	Macrophytes	HIS Score	Category
1	45.5	Swimming pool											
2	185	Pond	28.26	Frequently	Moderate	45	Absent	Absent	5	Good	85	0.56	Below average
2a	227	Pond	16.9	Rarely	Moderate	30	Absent	Absent	5	Good	20	0.67	Average
3	214	Dry spring											
4	528	Dry spring											
5	543	Dry spring											
6	530	Dry spring											
7	303	Dry spring											
8	263	Pond	30	Frequently	Good	55	Absent	Absent	5	Good	5	0.53	Below average
9	63	Pond	9.42	Sometimes	Good	100	Absent	Absent	2	Good	70	0.55	Below average
10	476	Dry spring											
11	489	Dry spring											
12	493	Dry spring											
13	436	Pond	50	Sometimes	Poor	60	Minor	Possible	12	Moderate	70	0.59	Below average
14	345	Pond	500	Rarely	Moderate	80	Minor	Absent	3	Poor	10	0.69	Average
15	500	Pond	50	Never	Moderate	70	Absent	Absent	5	Moderate	70	0.73	Good
16	55	Pond	<50	Rarely	Good	10	Absent	Absent	2	Moderate	25	0.63	Average
17	561	Dry pond											
18	480	Pond	200	Never	Good	40	Absent	Possible	2	Good	50	0.8	Excellent
19	497	Dry pond											
20	420	Pond	50	Rarely	Moderate	100	Absent	Absent	1	Good	95	0.59	Below average
21	435	Spring	50	Never	Bad	100	Absent	Absent	1	Poor	0	0.32	Poor
21a	283	Dry swimming pool											
22	684	Dry pond											
23	500	Dry pond											

24	470	Pond	50	Never	Good	50	Minor	Possible	0	Poor	40	0.5	Poor
25	226	Dry pond											
26	469	Dry spring											
27	1070	Dry pond											
28	17	Dry pond											
29	128	Pond	50	Never	Good	10	Absent	Absent	7	Good	75	0.79	Good
30	717	Not surveyed – over 500m											
31	620	Pond	40	Frequently	Poor	90	Minor	Absent	1	Good	40	0.41	Poor
32	44	Dry pond											
33	709	Pond	<50	Never	Good	100	Absent	Absent	4	Poor	40	0.52	Below average
34	15	Dry pond											
35	366	Pond	16	Never	Moderate	50	Absent	Absent	4	Good	20	0.63	Average
35a	90	Pond	<50	Rarely	Good	75	Absent	Absent	4	Good	30	0.66	Average
36	190	Pond	<50	Never	Poor	30	Absent	Possible	1	Moderate	40	0.54	Below average
37	20	Pond	<50	Never	Poor	0	Absent	Major	1	Poor	0	0.3	Poor
38	283	Pond	5.5	Sometimes	Good	50	Minor	Absent	2	Good	10	0.74	Good
1a	469	Dry pond											
21a	45	Dry swimming pool											
26a	668	Pond	121	Never	Good	20	Minor	Absent	5	Moderate	75	0.68	Average

Appendix D - eDNA Results

Pond Number	Land Parcel	Distance from Scheme (m) Option 30	Date HSI Undertaken	HSI Score	eDNA Survey Required Y/N	Date of eDNA Survey	eDNA surveyors	eDNA lab reference	eDNA Result
1	GR387647	45.5	06/05/2018	Swimming pool	N				
2	GR95689	185.1	29/03/2019	0.56	Y	13.05.2019	NB & DL	2140	Negative
2a	GR95689	227.1	29/03/2019	0.67	Y	13.05.2019	NB & DL	2149	Positive
3	GR95689	213.9	29/03/2019	Spring - no pooling of water and no suitable GCN habitat	N				
4	GR265344	528.1	Over 500m - not required	Spring - no pooling of water and no suitable GCN habitat	N				
5	GR265344	543.3	Over 500m - not required	Spring - no pooling of water and no suitable GCN habitat	N				
6	Gr274497	530.5	06/05/2018	Spring - no pooling of water and no suitable GCN habitat	N				
7	GR95689	303.4	29/03/2019	Spring - no pooling of water and no suitable GCN habitat	N				
8	GR95689	263.3	09/05/2019	0.53	N - not enough water				

9	GR329311	63.1	06/05/2018	0.55	Y	06/06/2018	JD & JDD & RW	1921	Negative
10	GR168463	475.8	06/05/2018	Spring - no pooling of water and no suitable GCN habitat	N				
11	GR382246	489.2	06/05/2018	Spring - no pooling of water and no suitable GCN habitat	N				
12	GR382246	492.8	06/05/2018	Spring - no pooling of water and no suitable GCN habitat	N				
13	GR159309	436.5	04/05/2017	0.67	Y	05/06/2018	JD & AC	1926	Negative
14	GR159562	344.9	05/06/2018	0.69	Y	05/06/2018	JD & AC	1925	Negative
15	GR308763	514.8	27/06/2018	0.73	y	27/06/2018	CD JDD	3110	Positive
16	U00014	552.2	07.06.2017	0.63	N – over 500m				
17	GR223691	561.1	03.08.2018	0.52	N – over 500m				
18	GR405759	480	07.06.2017	0.8	Y	27/06/2018	JD & AC	3741	Negative
19	GR405759	496.8	27/06/2018	N/A-Dry & Unsuitable	N				
20	U00120	420.3	26/06/2018	0.59	Y	26/06/2018	CD & TS	1920	Negative
21	U00123	435.3	27/06/2018	0.31	N – very poor water quality				
22	GR159309	684.1	03.05.2017	N/A - Dry & Unsuitable	N				
23	GR199134	500.3	03.05.2017	N/A - Dry & Unsuitable	N				
24	GR136598	470	27/06/2018	0.5	Y	27/06/2018	JD & AC	3750	Negative

25	U00053/U00054	226.5	19.04.2017	N/A - Dry & Unsuitable	N				
26	GR175821	469.3	27/06/2018	N/A - Dry & Unsuitable	N				
27	GR159309	1070.8	03.05.2017	N/A - Dry & Unsuitable	N				
28	U00037	16.8	23/05/2018	N/A - no pond - small spring with minor pooling of water in woodland	N				
29	GR383328	128	27/06/2018	0.79	Y	27/06/2018	CD & JDD	1927	Negative
30	GR109711	717.6		N/A - over 500m from scheme	N				
31	GR159309	620	05/06/2018	0.41	Y	06/06/2018	CD & JDD	1929	Negative
32	GR170711	44.6	01/07/2018	Dry and Unsuitable	N				
33	GR201299	709	19/07/2018	0.52	N – over 500m				
34	GR237479	15	01/07/2018	Dry and Unsuitable	N				
35	GR354154	366	24/07/2018	0.63	y	16/05/2019	JD PN	1649	Negative
35a	GR346313	90	17/05/2019	0.66	Y	17/05/2019	JD PN DL	2143	Negative
36	U00125	190	24/07/2018	0.54	y	16/05/2019	JD PN DL	1645	Negative
37	GR150931	20	08/08/2018	0.3	N – small ornamental pond with significant fish presence.				
38	GR138283	180	15/05/2019	0.74	Y	29/05/2019	JD JDD	1644	Negative
1A	GR387647		06/05/2018	0.51	N				
21a	U00120	283	26/06/2018	N/A Dry and Unsuitable swimming pool	N				
26a	U00112	500	27/06/2018	0.68	y	27/06/2018	CD & JDD	1910	Positive

Notes

Legend

- Option 30 Scheme Outline (at time of survey)
- 500m Scheme Buffer
- Positive eDNA Result 500m Buffer

eDNA Result

- No result yet
- Negative
- None
- Positive

Rev	Date	Amendment Details	Drawn	Chk'd	App'd
P02	28/10/19	Minor amendments	JW	VH	SM
P01	26/06/19	First Revision	TW	VH	SM

Mott MacDonald Sweco

Client: highways england

Drawing Status	Suitability
For Information	S2

Project Title: A417 Missing Link

Drawing Title: Great Crested Newt Ponds eDNA Survey

Scale	Designed	Drawn	Checked	Approved
1:8,000	TW	JW	VH	SM
Original Size	**Date**	**Date**	**Date**	**Date**
A1	12/06/19	28/10/19	28/10/19	28/10/19

Drawing Number: HE PIN | Originator | Volume
551505 - MMSJV - VOL - EBD
000 - DR - LB - 00044
Location | Type | Role | Number

Project Ref. No.: 551505

Revision: P02

0 0.125 0.25 0.5 Kilometres

FILE LOCATION: P:\Southampton\HWA\GIS\Projects\353982 - A417\Ecology\GIS_2019\SURVEY_MAPS\GCN\MXD\GCN_HSI_Edna_Presence_V3.mxd

Appendix E - Presence/Absence Survey Results Map

Notes

Legend

- Option 30 Scheme Outline (at time of survey)
- 500m Scheme Buffer
- Positive GCN Result 500m Buffer

Likely Presence

- Unknown
- likely absence
- present

Rev	Date	Amendment Details	Drawn	Chk'd	App'd
P02	28/10/19	Minor amendments	JW	VH	SM
P01	26/06/19	First Revision	TW	VH	SM

Mott MacDonald Sweco

Client: highways england

Drawing Status	Suitability
For Information	S02

Project Title: A417 Missing Link

Drawing Title: Great Crested Newt Population Survey Results

Scale	Designed	Drawn	Checked	Approved
1:8,000	TW	JW	VH	SM
Original Size	**Date**	**Date**	**Date**	**Date**
A1	12/06/19	28/10/19	28/10/19	28/10/19

Drawing Number: HE PIN | Originator | Volume
551505 - MMSJV - VOL - EBD
000 - DR - LB - 00045
Location | Type | Role | Number

Project Ref. No.: 551505

Revision: P02

0 0.125 0.25 0.5 Kilometres

FILE LOCATION: P:\Southampton\HWA\GIS\Projects\353982 - A417\Ecology\GIS_2019\SURVEY_MAPS\GCN\MXD\GCN_HSI_Edna_Presence_V3.mxd

Appendix F - Presence/Absence Survey Results

AA1 AMPHIBIAN POND SURVEY

Ecology ID	A417	**Land Parcel Reference**	GR95689	**Date**	09/05/2019	**Visit Number**	1
Pond Ecology ID	Pond 2	**Easting (X)**	392409	**Northing (Y)**		215940	
Surveyor(s)	DL RW						

Weather Conditions (Description)	still, dry, overcast, rain during the day	**Cloud Cover**	3	**Wind**	2
		Rain	0		
Air Temperature at Time of Torching (°C)	10	**Minimum Overnight Temperature** (°C)	6	**Torch Power**	1,000,000
Turbidity	3	**Vegetation Cover**	2	**Pond Margin Inaccessible** (%)	0

Survey Methods Used	**Torching**		**Bottle-trapping**		**Netting**		**Egg Search**	**Refuge Search**
	Yes		Yes					
3	**Start time** (24 hours)	22:00	**Number of traps used**	2	No		Yes	No
	Finish time (24 hours)	22:05						

Species	**Sex/life stage**			**Sex/life stage**			**Sex/life stage**			(using any method) **Larvae**		
	Male	**Female**	**Unknown sex**	**Male**	**Female**	**Immature**	**Male**	**Female**	**Immature**			
Great Crested Newt												
Smooth Newt												
Palmate Newt												
Smooth or Palmate Newt			**3**									

Species	**Adults**	**Juveniles**	**Tadpoles**	**Spawn**
Common Frog	1			
Common Toad				
Other Amphibian (state)				

Comments (incl. justification for deviation from torch, bottle-trap, egg search)

Very small lined-pond, reduced in size by vegetation and silt over recent years. Only a small area of two square metres suitable for bottle trapping.

Photo References

Are further surveys needed?	Yes

AA1 AMPHIBIAN POND SURVEY

Ecology ID	A417	**Land Parcel Reference**	GR95689	**Date**	15/05/2019	**Visit Number**	2
Pond Ecology ID	Pond 2	**Easting (X)**	392409	**Northing (Y)**		215940	
Surveyor(s)	DL NB						

Weather Conditions (Description)	still, dry, sunny, recent days very warm	**Cloud Cover**	1	**Wind**	2
		Rain	0		
Air Temperature at Time of Torching (°C)	13	**Minimum Overnight Temperature** (°C)	8	**Torch Power**	1,000,000
Turbidity	3	**Vegetation Cover**	2	**Pond Margin Inaccessible** (%)	0

Survey Methods Used	**Torching**		**Bottle-trapping**		**Netting**		**Egg Search**	**Refuge Search**
	Yes		Yes		No		Yes	No
3	**Start time** (24 hours)	22:00	**Number of traps used**	2				
	Finish time (24 hours)	22:05						

Species	**Sex/life stage**			**Sex/life stage**			**Sex/life stage**			(using any method) **Larvae**
	Male	**Female**	**Unknown sex**	**Male**	**Female**	**Immature**	**Male**	**Female**	**Immature**	
Great Crested Newt										
Smooth Newt										
Palmate Newt										
Smooth or Palmate Newt			1							

Species	**Adults**	**Juveniles**	**Tadpoles**	**Spawn**
Common Frog	1			
Common Toad				
Other Amphibian (state)				

Comments (incl. justification for deviation from torch, bottle-trap, egg search)

Very small lined-pond, reduced in size by vegetation and silt over recent years. Only a small area of two square metres suitable for bottle trapping. Netting difficult in shallow water

Photo References

Are further surveys needed?	Yes

AA1 AMPHIBIAN POND SURVEY

Ecology ID	pond 2	**Land Parcel Reference**	GR95689	**Date**	20/05/2019	**Visit Number**	3
Pond Ecology ID	pond 2	**Easting (X)**	392398	**Northing (Y)**		215944	
Surveyor(s)	JD MC						

Weather Conditions (Description)	humid, wet overcast conditions	**Cloud Cover**	7	**Wind**	2
		Rain	2		
Air Temperature at Time of Torching (°C)	11	**Minimum Overnight Temperature** (°C)	7	**Torch Power**	1,000,000
Turbidity	5	**Vegetation Cover**	5	**Pond Margin Inaccessible** (%)	0

Survey Methods Used	**Torching**		**Bottle-trapping**		**Netting**	**Egg Search**	**Refuge Search**
	No		Yes				
4	**Start time** (24 hours)	21:25	**Number of traps used**	2	Yes	Yes	Yes
	Finish time (24 hours)	21:35					

Species	**Sex/life stage**			**Sex/life stage**			**Sex/life stage**			(using any method) **Larvae**		
	Male	**Female**	**Immature**	**Male**	**Female**	**Immature**	**Male**	**Female**	**Immature**			
Great Crested Newt												
Smooth Newt												
Palmate Newt				**1**	**2**		**1**					
Smooth or Palmate Newt											**2**	

Species	**Adults**	**Juveniles**	**Tadpoles**	**Spawn**
Common Frog			No	No
Common Toad			No	No
Other Amphibian (state)			No	No

Comments (incl. justification for deviation from torch, bottle-trap, egg search)

No torching undertaken as turbidity high.

Photo References

Are further surveys needed?	Yes

AA1 AMPHIBIAN POND SURVEY

Ecology ID	pond 2	**Land Parcel Reference**	GR95689	**Date**	23/05/2019	**Visit Number**	4
Pond Ecology ID	pond 2	**Easting (X)**	392344	**Northing (Y)**		215944	
Surveyor(s)	BG MC						

Weather Conditions (Description)	dry	**Cloud Cover**	4	**Wind**	2
		Rain	0		
Air Temperature at Time of Torching (°C)	15	**Minimum Overnight Temperature** (°C)	11	**Torch Power**	1,000,000
Turbidity	3	**Vegetation Cover**	5	**Pond Margin Inaccessible** (%)	0

Survey Methods Used	**Torching**		**Bottle-trapping**		**Netting**	**Egg Search**	**Refuge Search**
	Yes		Yes				
3	**Start time** (24 hours)	21:45	**Number of traps used**	2	No	Yes	No
	Finish time (24 hours)	21:50					

Species	**Sex/life stage**			**Sex/life stage**			**Sex/life stage**			(using any method) **Larvae**
	Male	**Female**	**Immature**	**Male**	**Female**	**Immature**	**Male**	**Female**	**Immature**	
Great Crested Newt										
Smooth Newt										
Palmate Newt										
Smooth or Palmate Newt										

Species	**Adults**	**Juveniles**	**Tadpoles**	**Spawn**
Common Frog	0	0	No	No
Common Toad	0	0	No	No
Other Amphibian (state)	0	0	No	No

Comments (incl. justification for deviation from torch, bottle-trap, egg search)

Shallow water makes netting difficult

Photo References

Are further surveys needed?	No

AA1 AMPHIBIAN POND SURVEY

Ecology ID	A417	**Land Parcel Reference**	GR95689	**Date**	09/05/2019	**Visit Number**	1
Pond Ecology ID	2a	**Easting (X)**	392349	**Northing (Y)**		215979	
Surveyor(s)	DL RW						

Weather Conditions (Description)	dry still evening, cool	**Cloud Cover**	3	**Wind**	4
		Rain	0		
Air Temperature at Time of Torching (°C)	10	**Minimum Overnight Temperature** (°C)	6	**Torch Power**	1,000,000
Turbidity	2	**Vegetation Cover**	3	**Pond Margin Inaccessible** (%)	0

Survey Methods Used	**Torching**		**Bottle-trapping**		**Netting**		**Egg Search**	**Refuge Search**
	No		Yes		No		Yes	Yes
3	**Start time** (24 hours)	21:50	**Number of traps used**	5				
	Finish time (24 hours)	22:00						

Species	**Sex/life stage**			**Sex/life stage**			**Sex/life stage**			(using any method) **Larvae**
	Male	**Female**	**unknown sex**	**Male**	**Female**	**Immature**	**Male**	**Female**	**Immature**	
Great Crested Newt										
Smooth Newt										
Palmate Newt	**2**	**3**		**1**	**5**					
Smooth or Palmate Newt			**1**							**1**

Species	**Adults**	**Juveniles**	**Tadpoles**	**Spawn**
Common Frog				
Common Toad				
Other Amphibian (state)				

Comments (incl. justification for deviation from torch, bottle-trap, egg search)

covered 95% by duckweed, water only deep enough around 25% of margin, allowing 5 bottles

Photo References

Are further surveys needed?	Yes

AA1 AMPHIBIAN POND SURVEY

Ecology ID	A417	**Land Parcel Reference**	GR95689	**Date**	15/05/2019	**Visit Number**	2
Pond Ecology ID	2a	**Easting (X)**	392349	**Northing (Y)**		215979	
Surveyor(s)	DL NB						

Weather Conditions (Description)	dry still evening, warm recent days	**Cloud Cover**	1	**Wind**	2
		Rain	0		
Air Temperature at Time of Torching (°C)	13	**Minimum Overnight Temperature** (°C)	8	**Torch Power**	1,000,000
Turbidity	2	**Vegetation Cover**	3	**Pond Margin Inaccessible** (%)	0

Survey Methods Used	**Torching**		**Bottle-trapping**		**Netting**		**Egg Search**	**Refuge Search**
	No		Yes		No		Yes	Yes
3	**Start time** (24 hours)	21:45	**Number of traps used**	4				
	Finish time (24 hours)	21:55						

Species	**Sex/life stage**			**Sex/life stage**			**Sex/life stage**			(using any method) **Larvae**
	Male	**Female**	**unknown sex**	**Male**	**Female**	**Immature**	**Male**	**Female**	**Immature**	
Great Crested Newt					**2**					
Smooth Newt				**1**						
Palmate Newt				**4**	**4**					
Smooth or Palmate Newt			**5**							

Species	**Adults**	**Juveniles**	**Tadpoles**	**Spawn**
Common Frog				
Common Toad				
Other Amphibian (state)				

Comments (incl. justification for deviation from torch, bottle-trap, egg search)

covered 95% by duckweed, water only deep enough around 25% of margin. Water level dropped several inches from last week, limiting open water even more.

Photo References

Are further surveys needed?	Yes

AA1 AMPHIBIAN POND SURVEY

Ecology ID	pond 2a	**Land Parcel Reference**	GR95689	**Date**	20/05/2019	**Visit Number**	3
Pond Ecology ID	pond 2a	**Easting (X)**	392344	**Northing (Y)**		215990	
Surveyor(s)	JD MC						

Weather Conditions (Description)	light rain, humid with almost completely cloud cover. intervals of drizzle to light rain didn't prevent survey	**Cloud Cover**	7	**Wind**	2
		Rain	2		
Air Temperature at Time of Torching (°C)	12	**Minimum Overnight Temperature** (°C)	7	**Torch Power**	1,000,000
Turbidity	4	**Vegetation Cover**	4	**Pond Margin Inaccessible** (%)	0

Survey Methods Used	**Torching**		**Bottle-trapping**		**Netting**		**Egg Search**	**Refuge Search**
	No		Yes		No		Yes	Yes
3	**Start time** (24 hours)	21:25	**Number of traps used**	5				
	Finish time (24 hours)	21:35						

Species	**Sex/life stage**			**Sex/life stage**			**Sex/life stage**			(using any method) **Larvae**
	Male	**Female**	**Immature**	**Male**	**Female**	**Immature**	**Male**	**Female**	**Immature**	
Great Crested Newt				**1**	**1**					
Smooth Newt										
Palmate Newt	**2**	**1**		**6**	**2**					
Smooth or Palmate Newt										

Species	**Adults**	**Juveniles**	**Tadpoles**	**Spawn**
Common Frog	1	0	No	No
Common Toad	3	0	No	No
Other Amphibian (state)	0	0	No	No

Comments (incl. justification for deviation from torch, bottle-trap, egg search)

Common frog observed 15 m from pond 2a. Two roman snails were recorded. Water turbid and duckweed cover prevents torching. Shallow water difficult for neting

Photo References

pond 2a general photo

Are further surveys needed?	Yes

AA1 AMPHIBIAN POND SURVEY

Ecology ID	pond 2a	**Land Parcel Reference**	GR95689	**Date**	23/05/2019	**Visit Number**	4
Pond Ecology ID	pond 2a	**Easting (X)**	392344	**Northing (Y)**		215944	
Surveyor(s)	BG MC						

Weather Conditions (Description)	dry	**Cloud Cover**	4	**Wind**	2
		Rain	0		
Air Temperature at Time of Torching (°C)	15	**Minimum Overnight Temperature** (°C)	11	**Torch Power**	1,000,000
Turbidity	3	**Vegetation Cover**	5	**Pond Margin Inaccessible** (%)	0

Survey Methods Used	**Torching**		**Bottle-trapping**		**Netting**		**Egg Search**	**Refuge Search**
	No		Yes		No		Yes	Yes
3	**Start time** (24 hours)	21:45	**Number of traps used**	2				
	Finish time (24 hours)	21:50						

Species	**Sex/life stage**			**Sex/life stage**			**Sex/life stage**			(using any method) **Larvae**		
	Male	**Female**	**Immature**	**Male**	**Female**	**Immature**	**Male**	**Female**	**Immature**			
Great Crested Newt												
Smooth Newt												
Palmate Newt	**5**			**1**								
Smooth or Palmate Newt												

Species	**Adults**	**Juveniles**	**Tadpoles**	**Spawn**
Common Frog			No	No
Common Toad			No	No
Other Amphibian (state)			No	No

Comments (incl. justification for deviation from torch, bottle-trap, egg search)

Duckweed cover prevents torching; shallow water difficult for netting

Photo References

Are further surveys needed?	Yes

AA1 AMPHIBIAN POND SURVEY

Ecology ID	Palmer A417	**Land Parcel Reference**	GR95689	**Date**	28/05/2019	**Visit Number**	5
Pond Ecology ID	2a	**Easting (X)**	392349	**Northing (Y)**		215979	
Surveyor(s)	DL &JDD & BC						

Weather Conditions (Description)	dry still evening, warmer nights	**Cloud Cover**	8	**Wind**	2
		Rain	0		
Air Temperature at Time of Torching (°C)	15	**Minimum Overnight Temperature** (°C)	10	**Torch Power**	1,000,000
Turbidity	2	**Vegetation Cover**	3	**Pond Margin Inaccessible** (%)	0

Survey Methods Used	**Torching**		**Bottle-trapping**		**Netting**		**Egg Search**	**Refuge Search**
	No		Yes		No		Yes	Yes
3	**Start time** (24 hours)	22:00	**Number of traps used**	5				
	Finish time (24 hours)	22:10						

Species	**Sex/life stage**			**Sex/life stage**			**Sex/life stage**			(using any method) **Larvae**
	Male	**Female**	**Unknown sex**	**Male**	**Female**	**Immature**	**Male**	**Female**	**Immature**	
Great Crested Newt										
Smooth Newt										
Palmate Newt	**1**	**1**		**5**	**4**					
Smooth or Palmate Newt			**2**							

Species	**Adults**	**Juveniles**	**Tadpoles**	**Spawn**
Common Frog				
Common Toad				
Other Amphibian (state)				

Comments (incl. justification for deviation from torch, bottle-trap, egg search)

Still largely covered by duckweed, torching not effective method.

Photo References

Are further surveys needed?	Yes

AA1 AMPHIBIAN POND SURVEY

Ecology ID	A417	**Land Parcel Reference**	GR95689	**Date**	30/05/2019	**Visit Number**	6
Pond Ecology ID	2a	**Easting (X)**	392349	**Northing (Y)**		215979	
Surveyor(s)	NB CD						

Weather Conditions (Description)	dry still evening, warm recent dates	**Cloud Cover**	4	**Wind**	2
		Rain	0		
Air Temperature at Time of Torching (°C)	13	**Minimum Overnight Temperature** (°C)	8	**Torch Power**	1,000,000
Turbidity	4	**Vegetation Cover**	3	**Pond Margin Inaccessible** (%)	0

Survey Methods Used	**Torching**		**Bottle-trapping**		**Netting**		**Egg Search**	**Refuge Search**
	No		Yes					
3	**Start time** (24 hours)	21:45	**Number of traps used**	4	No		Yes	Yes
	Finish time (24 hours)	21:55						

Species	**Sex/life stage**			**Sex/life stage**			**Sex/life stage**			(using any method) **Larvae**		
	Male	**Female**	**unknown sex**	**Male**	**Female**	**Immature**	**Male**	**Female**	**Immature**			
Great Crested Newt												
Smooth Newt					**2**							
Palmate Newt				**5**	**9**							
Smooth or Palmate Newt												

Species	**Adults**	**Juveniles**	**Tadpoles**	**Spawn**
BIAN PON				
Common Toad				
Other Amphibian (state)				

Comments (incl. justification for deviation from torch, bottle-trap, egg search)

covered 95% by duckweed, water only deep enough around 25% of margin. Water level dropped several inches from last week, limiting open water even more.

Photo References

Are further surveys needed?	No