# A46 Newark Bypass

# TR010065/APP/6.3

# 6.3 Environmental Statement

# Appendix 8.7 Great Crested Newt Technical Report

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

Volume 6

April 2024

Infrastructure Planning

Planning Act 2008

**The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009**

# A46 Newark Bypass

Development Consent Order 202[x]

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## ENVIRONMENTAL STATEMENT

## APPENDIX 8.7 GREAT CRESTED NEWT REPORT

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|---|---|
| **Regulation Number:** | Regulation 5(2)(a) |
| **Planning Inspectorate Scheme Reference** | TR010065 |
| **Application Document Reference** | TR010065/APP/6.3 |
| **Author:** | A46 Newark Bypass Project Team, National Highways |

| Version | Date | Status of Version |
|---|---|---|
| Rev 1 | April 2024 | DCO Application |

# Contents

# 1 Introduction

## 1.1 Background and scope of works

1.1.1 As part of the A46 Newark Bypass Scheme (the Scheme), great crested newt surveys *Triturus cristatus* (GCN) were undertaken to inform the biodiversity assessment reported in Chapter 8 (Biodiversity) of the Environmental Statement (ES) **(TR010065/APP/6.1)**.

1.1.2 Chapter 2 (The Scheme) of the ES **(TR010065/APP/6.1)** provides the background and a description of the Scheme. The information described in this appendix provides a baseline of GCN presence recorded within the survey area used to inform the Environmental Impact Assessment (EIA) for the Scheme.

1.1.3 This appendix reports on the surveys for GCN undertaken in 2022 and 2023. Suitable waterbodies for GCN were identified through a Phase 1 Habitat Survey undertaken for the Scheme in 2022 and 2023 (see Appendix 8.1 (Extended Phase 1 Habitat Technical Report) of the ES Appendices **(TR010065/APP/6.3)**). All suitable waterbodies, except those for which land access permission was not available, were surveyed with reference to the methods given in Section 3 of this report.

1.1.4 This report includes:

- Relevant legislation
- Methods for desk and field-based assessments
- Competencies of the ecologists involved in undertaking the above surveys
- Limitations to the surveys undertaken and any assumptions made as a result of incomplete data
- Survey results

# 2 Legislation, policy and licences

## 2.1 Legislation

2.1.1 Great Crested Newt (GCN) is strictly protected by UK legislation under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended)[1] and Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended).[2]

2.1.2 The above legislation makes it an offence to:

- Deliberately or recklessly injure, kill or take GCN.
- Deliberately or recklessly damage or destroy a breeding site or any other place being used for resting by GCN.
- Deliberately or recklessly obstruct access to the resting or sheltering place of GCN.
- Possessing, selling, controlling or transporting live or dead or parts of GCN.
- Deliberately take GCN eggs.

2.1.3 GCN is listed under Section 41 of the 'Natural Environment and Rural Communities (NERC) Act 2006[3], as a Species of Principal Importance for Conservation in England. Section 40 of the NERC Act requires that local and regional authorities have a duty to the conservation of biodiversity in England, when carrying out their normal functions.

## 2.2 European protected species licence

2.2.1 Any activity that would contravene the above legislation, such as the destruction or disturbance of a GCN breeding waterbody, would require an approved European Protected Species (EPS) licence issued via the Statutory Nature Conservation Organisation (SNCO), in this case Natural England, in order for the work to be conducted lawfully. Any works or mitigation activities involving the interference of GCN, or GCN breeding/resting locations, must only be carried out by a licenced ecologist.

2.2.2 In accordance with the requirements under Regulation 53 of the Conservation of Habitats and Species Regulations 2017 (as

[1] HMSO, The Wildlife & Countryside Act, 1981. Wildlife and Countryside (Service of Notices) Act 1985 (legislation.gov.uk). (Last accessed December 2023).

[2] HMSO, The Conservation of Habitats and Species Regulations, 2017. The Conservation of Habitats and Species Regulations 2017 (legislation.gov.uk). (Last accessed December 2023).

[3] HMSO, Natural Environment and Rural Communities (NERC) Act, 2006 Natural Environment and Rural Communities Act 2006 (legislation.gov.uk). (Last accessed December 2023).

amended) a licence can only be issued where the following are satisfied:

- There is no satisfactory alternative.
- The action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

## 2.3 Policy framework

2.3.1 National policies relevant to biodiversity are not provided here. These are provided in Chapter 8 (Biodiversity) of the Environmental Statement (ES) **(TR010065/APP/6.1)**.

2.3.2 As a protected species, the presence of GCN is a material consideration in the planning process through the application of relevant planning policy.

2.3.3 GCN are also a Priority Species within the Nottinghamshire Biodiversity Action Plan (BAP).[4]

[4] [redacted] (Last accessed December 2023).

# 3 Methodology

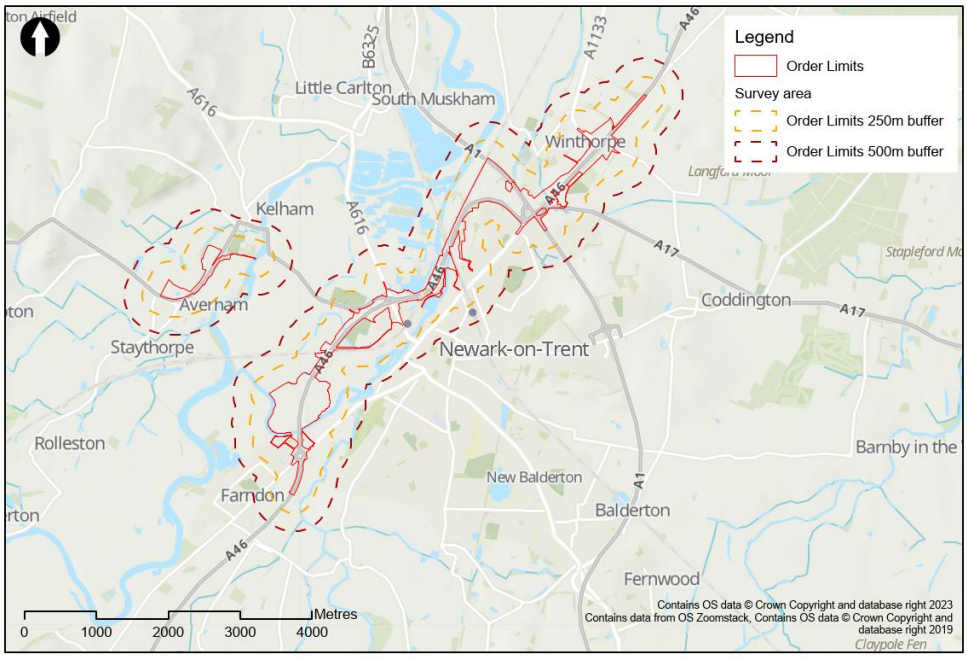
## 3.1 Survey area

3.1.1 Great Crested Newt (GCN) surveys were undertaken between January and September 2022, and February and April 2023 along the 'main alignment' of the proposed works. Surveys were undertaken in the Kelham and Averham Floodplain Compensation Area (FCA) in February and April 2023.

3.1.2 Surveys included both habitat suitability index (HSI) surveys, environmental DNA (eDNA) and traditional presence/likely absence surveys.

3.1.3 Surveys were conducted within a 250 metre buffer around the 'main alignment' of the Scheme, and a 500 metre buffer from the Kelham and Averham FCA shown in Figure 3-1 below. The justification for reducing the standard 500 metre buffer to 250 metre on the 'main alignment' of the Scheme was due to the areas of suitable terrestrial and aquatic habitat for GCN being highly fragmented and isolated due to significant barriers to dispersal within the survey area immediately adjacent to the A46. This methodology was presented to Natural England and was accepted as an acceptable deviation. Further details regarding this deviation are provided in Section 3.6.

**Figure 3-1: The survey areas of the main alignment and Kelham and Averham FCA**




Source: Mott MacDonald 2023

## 3.2 Desk study

3.2.1 A desk study was carried out in 2022 to identify any records of GCN within 2 kilometres of the Order Limits.

3.2.2 Nottinghamshire Biological and Geological Record Centre (NBGRC) was contacted in June 2022 to request protected species data within 2 kilometres of the Order Limits.

3.2.3 A search of freely available resources such as Department for Environment Food and Rural Affairs (Defra's) MAGIC (Multi-agency geographic information for the countryside) website (Magic.gov.uk) was undertaken for statutory and non-statutory sites designated for GCN within 2 kilometres of the Order Limits.

## 3.3 GCN Habitat Suitability Index

3.3.1 Waterbodies that were identified within the survey area and scoped in for HSI surveys were identified by a combination of the results of the extended Phase 1 Habitat Survey undertaken for the Scheme in 2022 and 2023 (Appendix 8.1 (Extended Phase 1 Habitat Technical Report) of the ES Appendices **(TR010065/APP/6.3)**) and a combination of reviewing the relevant 1:25,000 scale Ordnance Survey (OS) sheet and aerial photography.

3.3.2 HSI surveys of all accessible waterbodies within the survey area were conducted by licenced or accredited ecologists on:

- 18,19, 24, 25, 26 and 28 January 2022
- 11 February 2022
- 16 and 17 March 2022
- 20, 27 and 28 April 2022
- 14 June 2022
- 26 August 2022
- 2 September 2022
- 13 and 14 February 2023
- 17 April 2023

3.3.3 The HSI assessment is a standard approach (ARG 2010)[5] adopted for assessing a waterbodies potential to support GCN and comprises of ten indices of environmental variables:

- Geographic location (SI1)
- Pond/waterbody area (SI2)
- Pond/waterbody permanence (SI3)

[5] Amphibian and Reptile Groups of the United Kingdom (ARG) (2010) 'ARG UK Advice Note 5: Great Crested Newt Habitat Suitability Index', ARG UK. Available at: file (arguk.org). (Last accessed December 2023).

- Pond/waterbody quality (SI4)
- Pond/waterbody shading (SI5)
- Number of waterfowl (SI6)
- Occurrence of fish (SI7)
- Pond/waterbody density (SI8)
- Proportion of suitable habitat in the study area (SI9)
- Macrophyte cover of the target Pond/waterbody (SI10)

3.3.4 Indices $SI_1$ and $SI_8$ were gained from a desktop exercise using OS map and aerial photography and the remaining indices were recorded in the field. An index score of these variables was then calculated to measure habitat suitability (see Table 3-1). Waterbodies with higher scores are more likely to support GCN than those with lower scores. It should be noted that this method is indicative and any requirement for further surveys follows precautionary principles unless significant supporting evidence indicates the presence of GCN is unlikely.

**Table 3-1: Habitat suitability index categories for the assessment of waterbodies for GCN**

| HSI Score | Pond/waterbody suitability |
|---|---|
| <0.5 | Poor |
| 0.5 - 0.59 | Below average |
| 0.6 – 0.69 | Average |
| 0.7 – 0.79 | Good |
| >0.8 | Excellent |

Source: ARG UK, 2010

## 3.4 GCN environmental DNA surveys

3.4.1 Environmental DNA (eDNA) surveys were conducted on all waterbodies that returned an HSI score 'Below Average' or above. Following standard GCN eDNA methodology, surveys involved the collection of water samples from waterbodies identified as being suitable for GCN (as detailed by the HSI score). Collected water samples were sent for laboratory analysis to test the water for the presence of GCN eDNA. The full methodology for the eDNA surveys can be seen within Appendix 5 of Biggs et al. (2014).[6]

3.4.2 GCN eDNA surveys were conducted on all suitable water bodies within the 250 metre survey area of the main alignment between April and June 2022. All works were conducted by a suitably qualified ecologist, holding a GCN Class 1 licence from Natural England.

[6] Biggs J., Ewald N., Valentini A., Gaboriaud C., Griffiths R.A., 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.

Further eDNA surveys on waterbodies within 500 metres of the Kelham and Averham FCA and within 250 metres of areas that were previously inaccessible along the main alignment (for further details please see Appendix A (Land Access Constraints) of this report), were undertaken in April 2023 (with the exception of F018 which remained inaccessible due to health and safety concerns).

## 3.5 GCN traditional presence/likely absence surveys

3.5.1 Traditional presence/likely absence surveys were started on accessible waterbodies along the main alignment that had a HSI result of 'Average' or above, whilst awaiting the results of the eDNA testing.

3.5.2 Waterbodies that were of average suitability and above were chosen to reduce survey effort based on Oldham et al (2000)[7] "P*onds with relatively low HSI scores (poor - below average) typically only support great crested newt when they are located close to another occupied pond. Low scoring ponds are therefore only likely to support great crested newt in areas of high pond density*". See Sections 3.6 and 3.7 of this report for survey deviations and limitations, respectively.

3.5.3 Traditional presence/likely absence surveys used at least three of the standard surveying methodologies detailed in the GCN survey guidelines (English Nature, 2001),[8] which includes the use of:

- Bottle trapping
- Torch light surveys
- Egg searching
- Netting
- Terrestrial habitat/refuge searching

3.5.4 Records of any captured or identified amphibian species were recorded, including the sex and life stage of the species record identified. Any amphibians that were captured within bottle traps or during netting were handled, where necessary, to determine the sex of the individual and safely and promptly released back into the environment they were captured from. All works were conducted by a suitably qualified ecologist.

3.5.5 GCN presence/likely absence surveys were undertaken on the waterbodies along the main alignment between April and mid-June 2022. Only one tranche of presence/likely absence surveys were

[7] Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. (2000). Evaluating the suitability of habitat for the Great Crested Newt (*Triturus cristatus*). Herpetological Journal 10(4), 143-155.

[8] English Nature (2001). Great Crested Newt Mitigation Guidelines. English Nature, Peterborough.

undertaken on these waterbodies. After receiving the negative eDNA results the survey effort was halted.

3.5.6 Nine waterbodies were not subject to presence/likely absence surveys in 2022 (see Section 3.7 and Appendix A (Land Access Constraints) of this report); however, eDNA and presence/likely absence surveys were undertaken for seven of these waterbodies from April 2023, by an ecologist with a GCN Class licence from Natural England. Waterbody F018 remained inaccessible due to health and safety concerns.

## 3.6 Deviations of the methodology

3.6.1 Upon assessment of habitat suitability for eDNA and waterbody surveys for GCN, significant barriers to dispersal between 250 and 500 metres were identified along the main alignment. These include the River Trent; a deep, typically fast flowing river, which supports various species of fish, which is considered to be unsuitable for GCN. Further barriers considered include busy roads, it is stated that any road with more than 20 vehicles per hour are a serious threat.[9] The existing A46 and other busy main roads including the A1, A616, A17 and A617 which support significant volumes of traffic (see Table 3-2) and often have kerbed edges, which would likely result in a high GCN mortality rate should they attempt to cross these roads. There is also a significant area of unsuitable terrestrial habitat for GCN located along the route including, but not limited to, industrial estates with buildings, hardstanding car parks and other hardstanding habitats.

**Table 3-2: Traffic flow of busy roads as a barrier to GCN distribution**

| Area | Barrier | Total Flow[a] |
|---|---|---|
| Friendly Farmer Roundabout | A1 | 1169 |
| | A46 | 725 |
| Cattle Market Roundabout | A46 N | 725 |
| | A46 S | 668 |
| | A616 | 270 |
| | A617 | 400 |
| Farndon Roundabout | A46 | 668 |
| Kelham and Averham FCA | A617 | 434 |
| Winthorpe Roundabout | A1133 | 196 |

Source: Mott MacDonald, 2023.

a Total flow calculated by flow of vehicles per hour in both directions, where only one direction was recorded it was assumed an equal amount of traffic continued in the other direction.

3.6.2 There was also a limited number of suitable waterbodies that were likely to support GCN identified between the 250 and 500 metre

[9] Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. (2000). Evaluating the suitability of habitat for the Great Crested Newt (Triturus cristatus). Herpetological Journal 10(4), 143-155

buffers from the Order Limits. eDNA surveys were carried out on 14 waterbodies within 250 metres of the proposed main alignment in 2022. Of these, 13 tested 'Negative' and one was inconclusive in 2022. On return to undertake a supplementary eDNA survey in April 2023, waterbody F022 was scoped out of further surveys (the justification is detailed in Sections 3.7 and 4.3 of this report). Due to the likely absence of GCN within these 13 waterbodies, as indicated by the eDNA results, and the relatively high degree of fragmentation, due to the presence of a number of significant barriers to dispersal within the main alignment site, it is considered likely that any waterbodies within the buffer between 250 metres to 500 metres from the Order Limits are also likely absent of populations of GCN.

3.6.3 Due to the reasoning outlined above, a reduction of the standard 500 metre survey buffer to a 250 metre buffer was proposed for the main alignment and agreed with Natural England. This reduction was proposed only for the main alignment of the proposed works. Due to a record of GCN within the Kelham and Averham FCA and more suitable habitat available in the immediate surrounding areas, the survey buffer remained as 500 metres from the Order Limits at the Kelham and Averham FCA.

## 3.7 Limitations

3.7.1 Access for eDNA and GCN presence/likely absence field surveys in 2022 was limited to areas of the National Highways soft-estate and third-party land where access had been agreed with the landowner. In some cases, landowner permissions to access land were not granted and some areas of land could not be surveyed. One of the 27 identified waterbodies (Pond F018) totaling 3.7% of the total waterbodies, could not be accessed for eDNA and presence/likely absence surveys in 2022 or 2023. It is anticipated that Pond F018 will not be accessible for survey prior to construction, due to safety issues.

3.7.2 Waterbodies F014 and F015 were deemed unsafe to access at night so were subjected to HSI and eDNA surveys only. For areas of land that were inaccessible in 2022 and 2023 see Appendix A (Land Access Constraints) of this report.

3.7.3 A third party undertook maintenance work in March 2023, clearing vegetation from the channel and up to the top of the ditch embankment. This action resulted in an aborted eDNA survey at pond F022 in April 2023 as possible false positive results could not be ruled out as historic DNA, if present, would likely have been released into the water column following disturbance of the sediment during dredging. Furthermore, Pond F022 was no longer a distinct pool under the disused railway bridge and instead was found to be a

continuation of the ditch (WV09). Presence/likely absence surveys were ruled out due to the following:

- pollution and turbidity of the water (inhibiting torching)
- shallow water (preventing the use of bottle traps)
- absence of macrophytes (preventing egg searches)
- barbed wire fencing, steep banks and uneven depth of deep sediment within the channel meant only a quarter of the previous footprint of the pond was accessible for netting (this method has low detectable for presence)
- the west bank comprised bare earth and the east bank was not accessible due to deep sediment in the channel, width between banks and dense impassable scrub along the east bank (ruling out refuge searches)

3.7.4 Furthermore, there was a safety risk to surveyors navigating to the pond at night along the top of the west bank, due to a thick build-up of spoil deposited from the channel resulting in uneven depths.

3.7.5 In addition to the above, the spring and summer periods of 2022 in the UK were subject to unseasonably hot and dry conditions. As such, the occurrence of GCN and the wetland habitats that support their breeding may have been impacted due to a significant reduction or drying up of waterbodies. This is not considered to be a significant limitation as it is likely that GCN would find and use other waterbodies within the vicinity in such scenarios and surveyors would have recorded presence of GCN during the survey effort.

3.7.6 The above factors are not thought to be major limitations as it is considered that the waterbodies that were sampled in 2022 span across a good representation of habitats throughout the Order Limits and survey area and are of similar habitats to those which were not accessible. Therefore, for those areas that were subject to surveys, the survey outputs, coupled with the desk studies, are likely to capture a robust assessment on the presence of GCN within the total area.

# 4 Results

## 4.1 Desk study

4.1.1 No statutory or non-statutory sites designated for Great Crested Newt (GCN) were recorded within 2 kilometres of the Order Limits. A total of three GCN records, 19 records of smooth newt *Lissotriton vulgaris* and 35 unidentified newt records were returned by Nottinghamshire Biological and Geological Record Centre (NBGRC). All three GCN records returned were located near to the Kelham and Averham Floodplain Compensation Area (FCA) (which is separated from the main alignment by the River Trent) and were dated from 2020. The 19 records of smooth newt were identified in six different locations, three of which were near the Kelham and Averham FCA, one south of the Order Limits in Farndon, another east of the Order Limits within Newark-on-Trent and the final one far-south of the Order Limits near Hawton. The closest of these records was located 439 metres south-west of the Order Limits in Farndon. These records were dated from 2015 to 2020. The 35 unidentified newt records were located within Newark-on-Trent 1.6 kilometres east of the Order Limits, all 35 records dated from 2013. Full locations of these desk records can be seen in Appendix C (GCN desk study records) of this report.

4.1.2 An absence of data records should not be taken as confirmation that a species is absent from the search area.

## 4.2 GCN Habitat Suitability Index

4.2.1 A total of 27 waterbodies were identified within the survey area, 22 of which were subject to Habitat Suitability Index (HSI) surveys. The remaining five waterbodies were not surveyed due to being dry at the time of survey or being considered unsuitable. Of the 27 waterbodies subject to HSI surveys, 16 waterbodies had a HSI score of ‘Average’ or above. The initial HSI score for F022 was recorded as ‘Average’ in 2022 and when revisited in 2023 to undertake an eDNA survey, the HSI score was recalculated due to a change in habitat condition, which resulted in a score of ‘Below Average’. Using professional judgement, the suitability of the aquatic and terrestrial habitat in the immediate vicinity of F022 was considered to be poor at the time of survey. As vegetation regenerates, there is potential for habitat suitable for newts to re-establish providing shelter and, potentially, egg-laying substrate over the medium-term. Long-term, if left unmanaged could result in deterioration of habitat suitability for newts, further rendering F022 in poor condition. A full summary of these 27 waterbodies and their HSI results can be seen in Table 4-1 below. The full locations of these waterbodies can be seen in

Appendix D (GCN Waterbody Habitat Suitability Index) and the full results in Appendix E (Habitat Suitability Index results) of this report.

**Table 4-1: Summary of HSI results**

| Waterbody numbers | Number of waterbodies | Suitability for GCN |
|---|---|---|
| F012, F021, F029 | 3 | Unsuitable – Dry |
| F006, F011 | 2 | Unsuitable |
| F004 | 1 | Poor |
| F007, F013, F022, F023, F024 | 5 | Below average |
| F002, F010, F014, F016, F020 | 5 | Average |
| F005, F008, F009, F015, F017, F018, F025, F026, F027, F028 | 10 | Good |
| F003 | 1 | Excellent |

Source: Mott MacDonald 2023

## 4.3 GCN environmental DNA surveys

4.3.1 In 2022 and 2023, eDNA surveys were undertaken on 20 of the 21 waterbodies with an HSI score of 'Below Average' or above. F018 was not re-visited for the remainder of the survey period due to safety issues that could not be resolved. Of these 20 waterbodies surveyed for eDNA, 16 were located along the 'main alignment' of the Scheme and four were located within the Kelham and Averham FCA survey area. Surveys were undertaken between 19 and 21 of April 2022, on 14 and 23 June 2022 and on 17 and 18 April 2023. All these dates are within the eDNA survey window (which occurs from mid-April to the end of June).

4.3.2 Nineteen of the tested waterbodies returned 'Negative' results for GCN presence. Only one of the waterbodies (waterbody F022) returned an 'Inconclusive' result. Appendix F (eDNA survey results) of this report outlines the details of the waterbodies surveyed and the eDNA results.

4.3.3 Due to the discovery of waterbody F022 at the end of the GCN breeding season (which occurs between mid-March and mid-June) and the fact that eDNA results were returned after the GCN breeding season had commenced, traditional presence/likely absence surveys of waterbody F022 could not be undertaken in 2022. On return to F022 in April 2023 to undertake a supplementary eDNA survey, it was noted that the condition of habitat had deteriorated as a direct result of heavy management of the pond and adjoining ditch and so the HSI result from 2022 was re-assessed, resulting in a 'Below Average' score in 2023. A truer reflection of the suitability of this waterbody to support GCN was considered to be 'Poor' in the short-term. Furthermore, no standard and alternative survey methodology

could be implemented to obtain robust data for the presence or likely absence of GCN and so using professional judgement, F022 was scoped out of further surveys (see justification in Section 3.7 of this report).

## 4.4 GCN traditional presence/likely absence surveys

4.4.1 Waterbodies that returned an HSI score of 'Average' or higher were subject to traditional presence/likely absence surveys in 2022 or 2023, except for waterbodies F014, F015 and F018 which were deemed unsafe to access at night. Whilst waiting on eDNA results, one tranche of GCN traditional presence/likely absence surveys was undertaken on seven waterbodies in 2022 and six waterbodies in 2023. Before the second tranche of surveys were undertaken, a 'Negative' result was returned for these waterbodies with HSI scores of 'Average' or higher, and therefore no further traditional presence/likely absence surveys were undertaken. The results of these presence/likely absence surveys can be seen in Appendix G (Presence/likely absence survey summary results – peak counts) of this report.

# 5 Summary

5.1.1 A desk study, Habitat Suitability Index (HSI) and eDNA surveys of waterbodies within the survey area were undertaken. Three records of Great Crested Newt (GCN),19 records of smooth newt and 35 records of unidentified newt species were identified within 2 kilometres of the Order Limits.

5.1.2 Twenty-seven waterbodies were identified within the survey area, 22 of which were subject to HSI surveys. The remaining five of these waterbodies were not surveyed due to being dry at the time of survey or being unsuitable for GCN. Of the waterbodies surveyed, 21 returned a HSI result of 'Below Average' or higher, 20 of which were subject to eDNA surveys after agreeing access, except for waterbody F018 which was deemed unsafe to access following completion of HSI surveys).

5.1.3 Of the 20 waterbodies that were subject to eDNA surveys in 2022 and 2023, 19 returned a 'Negative' result and one (waterbody F022) returned an 'Inconclusive' result. Waterbody F022 was scoped out of further surveys in April 2023, following heavy management of the waterbody and adjoining ditch by a third party causing deterioration of habitat suitability for GCN. Further details can be found in Section 3.7 of this report.

5.1.4 From a total of 16 waterbodies that returned a HSI score of 'Average' or higher, only 13 were subject to traditional presence/likely absence surveys in 2022 or 2023. Waterbodies F014, F015 and F018 were deemed unsafe to access, following completion of HSI surveys. Fifteen of the 16 waterbodies (excluding F018, which wasn't subject to eDNA surveys due to safety issues) returned a 'Negative' eDNA result after the first tranche of traditional presence/likely absence were completed. Therefore, no further surveys for GCN were required.

# 6 References

[1] HMSO, The Wildlife & Countryside Act, 1981. Wildlife and Countryside (Service of Notices) Act 1985 (legislation.gov.uk) (Last accessed December 2023).

[2] HMSO, The Conservation of Habitats and Species Regulations, 2017. The Conservation of Habitats and Species Regulations 2017 (legislation.gov.uk) (Last accessed December 2023).

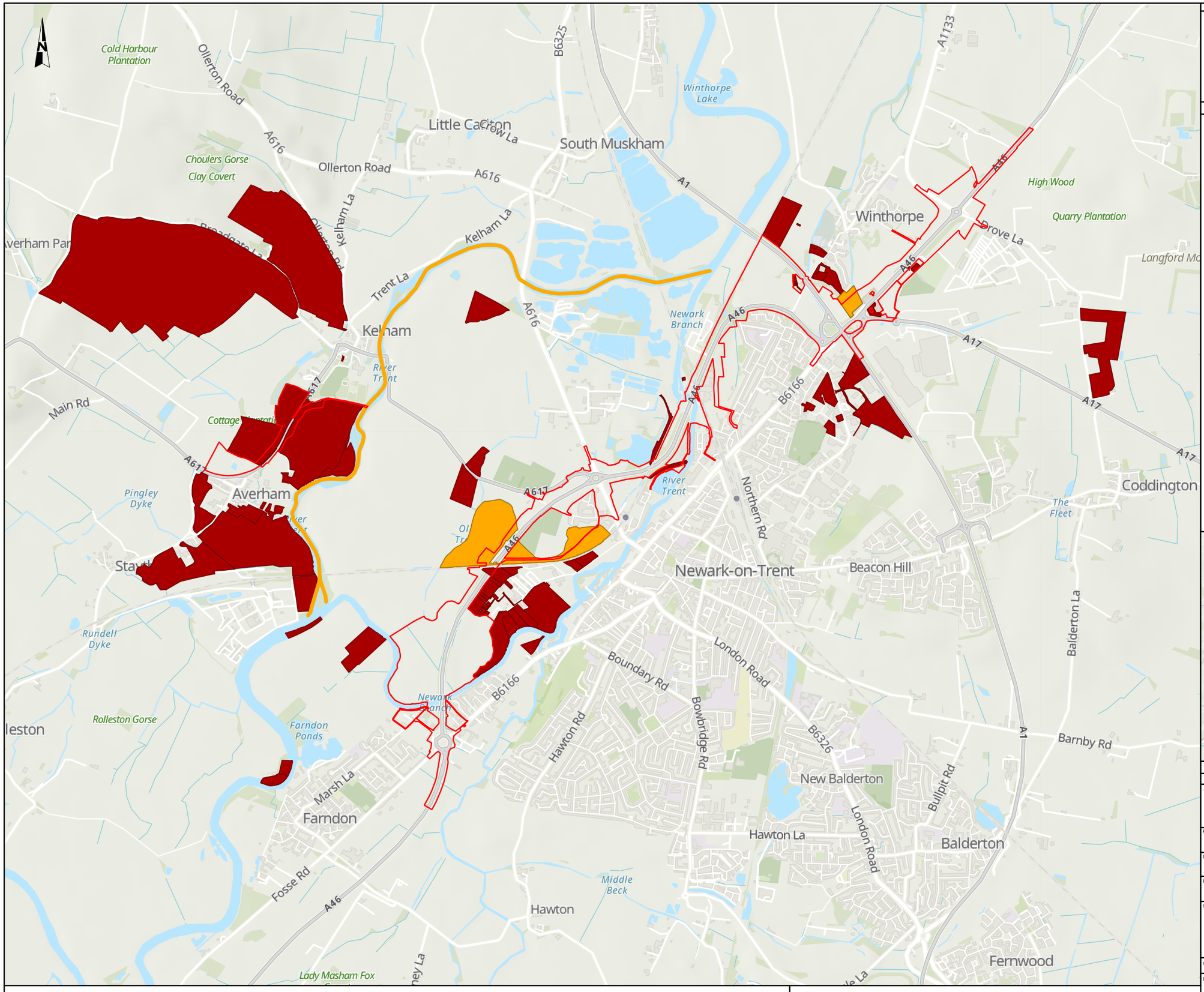
[3] HMSO, Natural Environment and Rural Communities (NERC) Act, 2006 Natural Environment and Rural Communities Act 2006 (legislation.gov.uk) (Last accessed December 2023).

[4] Local Biodiversity Action Plan – Nottinghamshire Biodiversity Action Group (nottsbag.org.uk) (Last accessed December 2023).

[5] Amphibian and Reptile Groups of the United Kingdom (ARG) (2010) 'ARG UK Advice Note 5: Great Crested Newt Habitat Suitability Index', ARG UK. Available at: [redacted] (Last accessed December 2023).

[6] Biggs J., Ewald N., Valentini A., Gaboriaud C., Griffiths R.A., 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.

# A. Appendix: Land Access Constraints

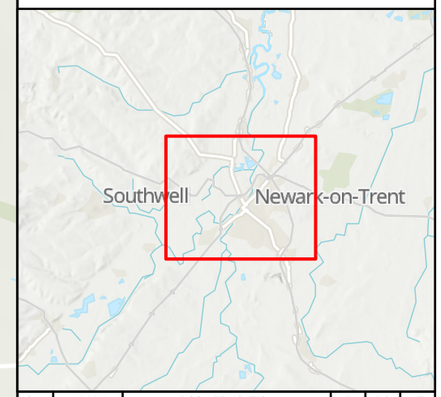



NOTES

**Source**
Land access data collected by Mott MacDonald, 2022.
**Service Layer Credits**
Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack

KEY TO SYMBOLS

- Order Limits
- Intermittent access - partial completion of ecological survey
- No access - no ecological survey completed




| REV. | DATE | AMENDMENT DETAILS | ORIG | CHK'D | APP'D |
|---|---|---|---|---|---|
| C01 | 08/12/23 | DCO APPLICATION | JB | BC | HF |

CLIENT
national highways

PURPOSE OF ISSUE
DCO APPLICATION

DEVELOPMENT CONSENT ORDER NUMBER
TR010065

PROJECT TITLE
A46 NEWARK BYPASS

DRAWING TITLE
Appendix A
Land Access Constraints

ORIGINAL SIZE A3
SCALE 1:30,000

DRAWING NUMBER
HE PIN | ORIGINATOR | VOLUME | LOCATION | TYPE | ROLE | NUMBER
HE551478 SKAG EBD CONWI_CONW DR LE 00033

PROJECT REF NO.
HE551478

REVISION
C01

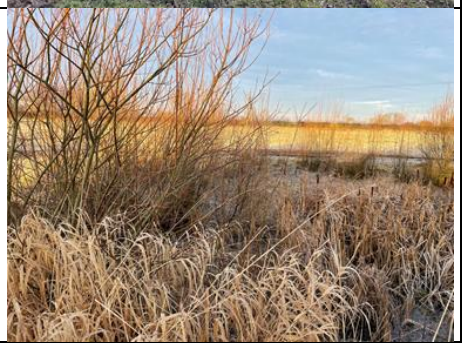


0 1,000 2,000 Metres

# B. Appendix: Summary of identified waterbodies with potential breeding suitability for GCN

### Appendix Table A-1: Summary of identified waterbodies with potential breeding suitability for GCN

| Feature Number | Waterbody Description | HSI Score and Waterbody Suitability | Photographs |
|---|---|---|---|
| F002 | Waterbody within highways soft-estate, adjacent to a mosaic of scrub and tall ruderal. | 0.69 - Average |  |
| F003 | Waterbody with open water and bull rush that shades the waterbody. Clear water with wetland vegetation. Waterbody within fairly undisturbed habitat. | 0.85 - Excellent |  |
| F004 | Large waterbody surrounded by scrub, bare ground and scattered trees. Evidence of waterfowl with tufted ducks and other birds present. | 0.42 - Poor |  |

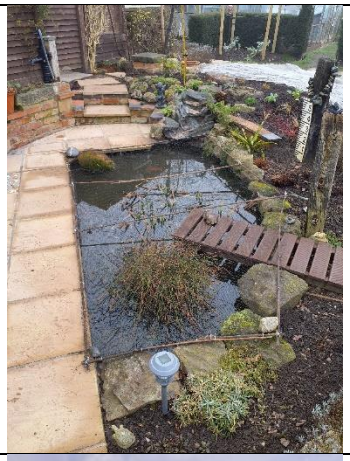
| Feature Number | Waterbody Description | HSI Score and Waterbody Suitability | Photographs |
|---|---|---|---|
| F005 | Heavily shaded waterbody in undisturbed habitat in the grounds of Newark Sugar Factory. | 0.71 - Good |  |
| F006 | Waterlogged muddy field with temporary puddles present. | Unsuitable |  |
| F007 | Unshaded waterbody with poor water quality within the River Trent floodplain. Waterbody connected to the adjacent field via a drain. | 0.54 – Below Average |  |
| F008 | Waterbody within semi-improved grassland. Moderate water quality with fish absent. | 0.78 – Good |  |

| Feature Number | Waterbody Description | HSI Score and Waterbody Suitability | Photographs |
|---|---|---|---|
| F009 | Waterbody with aquatic vegetation and swamp vegetation. Waterbody not accessed in 2022. | 0.78 - Good |  |
| F010 | Concrete-lined shallow drainage basin connecting to drains under A46. Surrounding dense bramble dominated scrub and then grassland provides good terrestrial habitat. | 0.67 - Average |  |
| F011 | Temporary waterbody due to recent period of heavy rain. | Unsuitable |  |
| F012 | Drainage ditch overgrown with bramble scrub, dry upon reinspection in 2022. | Unsuitable – Dry at time of HSI |  |

| Feature Number | Waterbody Description | HSI Score and Waterbody Suitability | Photographs |
|---|---|---|---|
| F013 | Waterbody with Typha species locally dominant and poor water quality. Waterbody likely to dry out annually. | 0.52 – Below Average |  |
| F014 | Waterbody with poor water quality and low levels of shade. Adjacent to intensive agricultural land. | 0.65 – Average |  |
| F015 | Waterbody adjacent to the River Trent. Unshaded and within species-poor semi-improved grassland. | Good – 0.71 |  |

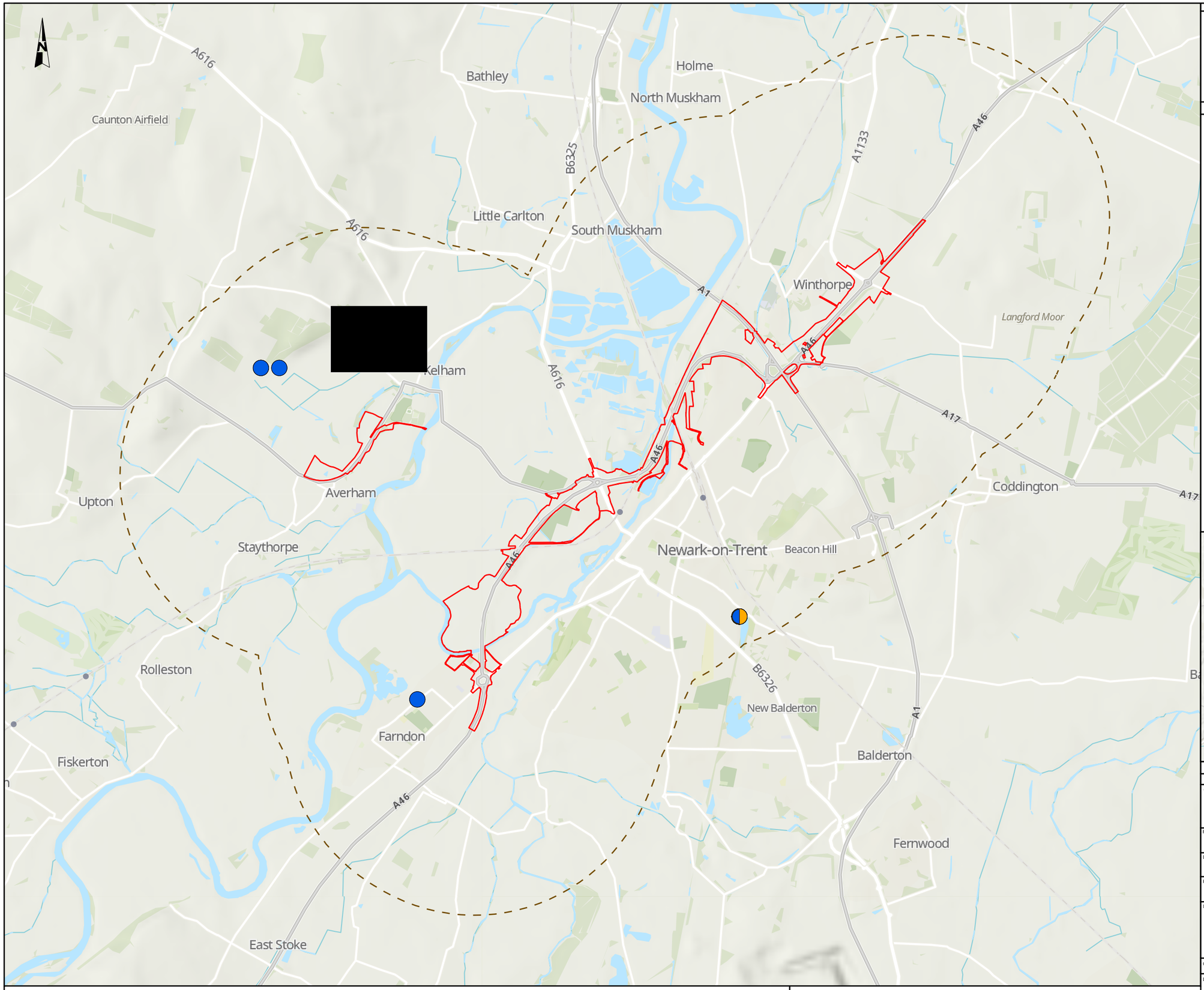
| Feature Number | Waterbody Description | HSI Score and Waterbody Suitability | Photographs |
|---|---|---|---|
| F016 | Waterbody adjacent and to the north of the A1. Privately owned. Recently lined and managed. | Average – 0.64 |  |
| F017 | Waterbody within broad-leaved young to semi-mature woodland. | Good – 0.78 | No photograph available |
| F018 | Ditch adjacent to arable and linear broad-leaved woodland. | Good – 0.70 |  |
| F020 | Waterbody within biodiversity woodland area of sewage works. Highly shaded with a complete cover of duckweed. Fed into with clean water from sewage works, water highly turbid. | Average – 0.64 |  |

| Feature Number | Waterbody Description | HSI Score and Waterbody Suitability | Photographs |
|---|---|---|---|
| F021 | Waterbody now dry as no longer maintained or topped up from the sewage works. Area completely overgrown with tall herb, mainly common nettle. | Unsuitable - Dry |  |
| F022 | Large waterbody underneath old concrete bridge structure, connected to an drainage ditch. Void of aquatic vegetation and bankside vegetation in 2023 following intensive management, other than some hawthorn scrub in the wider area. | 0.54 – Below Average recorded during re-assessment in 2023<br><br>(0.62 – Average recorded during 2022) |  |
| F023 | Steep banked small waterbody in depression. | 0.55 – Below Average |  |

| Feature Number | Waterbody Description | HSI Score and Waterbody Suitability | Photographs |
|---|---|---|---|
| F024 | Small ornamental, lined, garden pond in residential property, stocked with small numbers of fish. Anecdotes from the residents about newts being present within the waterbody. Tested negative for GCN eDNA during sampling. | 0.53 – Below Average |  |
| F025 | Waterbody fringed and shaded with semi-mature trees. Appears to be permanent. | 0.72 – Good |  |
| F026 | Large waterbody with little shade or macrophyte over. | 0.73 – Good |  |

| Feature Number | Waterbody Description | HSI Score and Waterbody Suitability | Photographs |
|---|---|---|---|
| F027 | Small waterbody heavily shaded within woodland plantation, connected to a wide ditch. Clear water, filled with leaf litter, lacks aquatic plants other than duck weed. | 0.72 - Good |  |
| F028 | Large, rectangular waterbody with little shade or macrophyte cover. | 0.71 – Good |  |
| F029 | Shallow impression filled with leaf litter and twigs, located under a willow (likely shaded when tree in leaf). | Unsuitable – Dry |  |

# C. Appendix: GCN desk study records

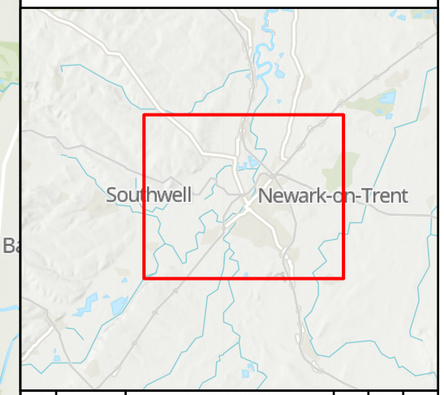



NOTES

**Source**
Records: Biological Records Centre, 2023.
**Service Layer Credits**
Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack

KEY TO SYMBOLS

- Order Limits
- Order Limits 2km buffer
- Great Crested Newt
- Smooth Newt
- Unknown Newt species




| REV. | DATE | AMENDMENT DETAILS | ORIG | CHK'D | APP'D |
|---|---|---|---|---|---|
| C01 | 08/12/23 | DCO APPLICATION | JB | BC | HF |

CLIENT: national highways

PURPOSE OF ISSUE: DCO APPLICATION

DEVELOPMENT CONSENT ORDER NUMBER: TR010065

PROJECT TITLE: A46 NEWARK BYPASS

DRAWING TITLE: Appendix C
GCN Desk Study Records

ORIGINAL SIZE: A3 SCALE: 1:40,000

DRAWING NUMBER: HE PIN HE551478 | ORIGINATOR SKAG | VOLUME EBD | LOCATION CONWI_CONW | TYPE DR | ROLE LE | NUMBER 00031

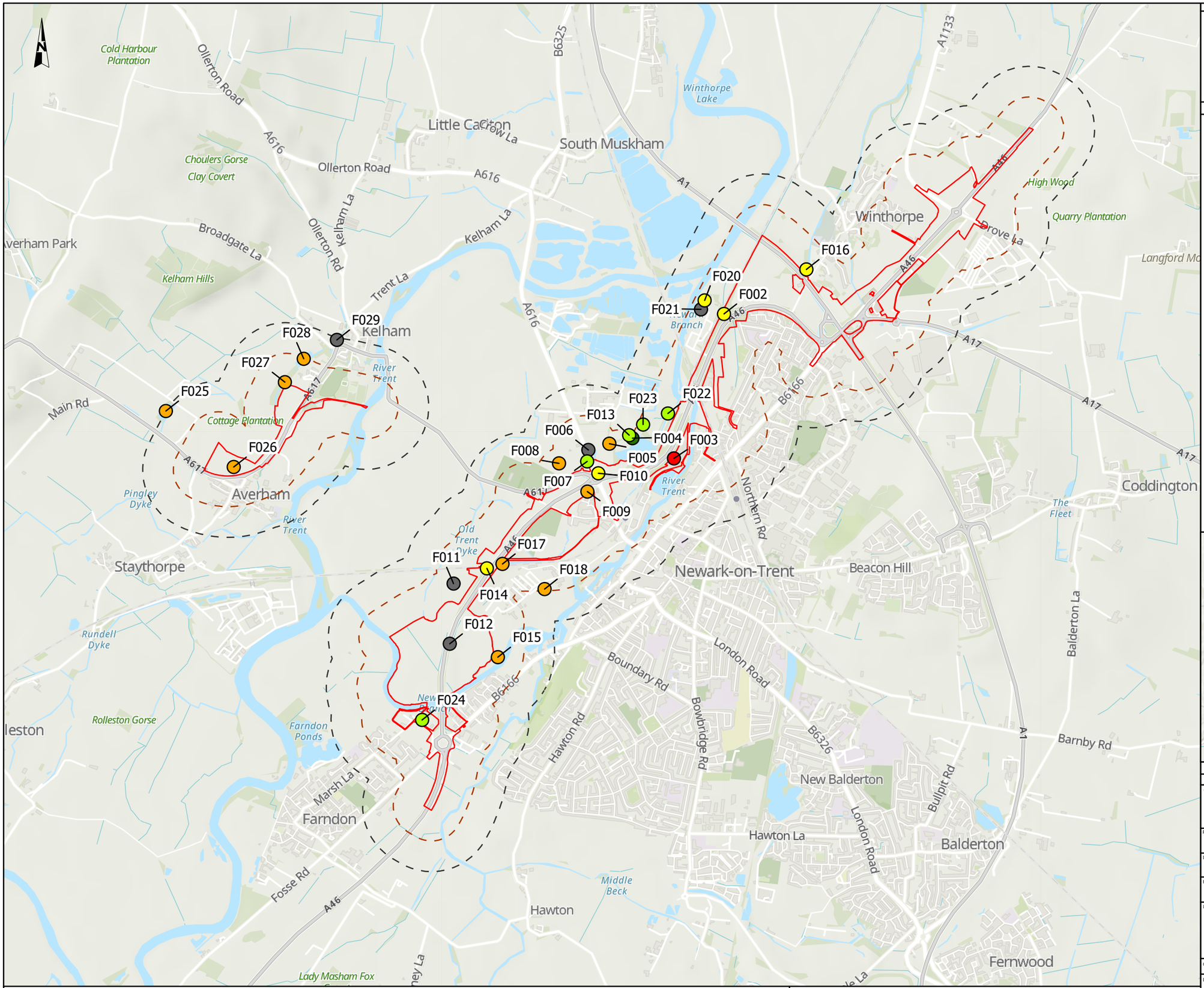
PROJECT REF NO.: HE551478

REVISION: C01



0 1,000 2,000 Metres

# D. Appendix: GCN Waterbody Habitat Suitability Index




NOTES

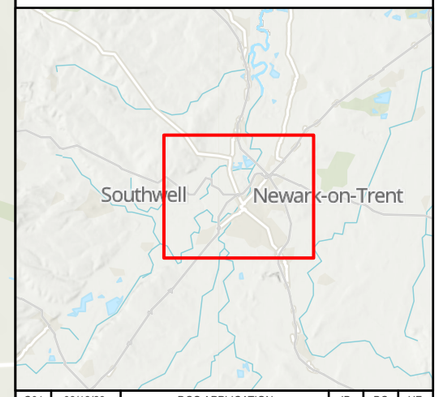
**Source**
Ecology data collected by Mott MacDonald, 2022 and 2023.
**Service Layer Credits**
Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack

KEY TO SYMBOLS

- Order Limits
- Order Limits 250m buffer
- Order Limits 500m buffer

**GCN waterbody habitat suitability index (HSI)**

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




| REV. | DATE | AMENDMENT DETAILS | ORIG | CHK'D | APP'D |
|---|---|---|---|---|---|
| C01 | 08/12/23 | DCO APPLICATION | JB | BC | HF |

CLIENT
national highways

PURPOSE OF ISSUE
DCO APPLICATION

DEVELOPMENT CONSENT ORDER NUMBER
TR010065

PROJECT TITLE
A46 NEWARK BYPASS

DRAWING TITLE
Appendix D
GCN Waterbody Habitat Suitability Index (HSI)

ORIGINAL SIZE A3 | SCALE 1:30,000

| DRAWING NUMBER HE PIN | ORIGINATOR | VOLUME | PROJECT REF NO. |
|---|---|---|---|
| HE551478 | SKAG | EBD | HE551478 |
| CONWI_CONW LOCATION | DR TYPE | LE ROLE | 00032 NUMBER |

REVISION C01



0 1,000 2,000 Metres

# E. Appendix: Habitat Suitability Index results

### Appendix Table E-1: HSI results

| | $SI_1$ | $SI_2$ | $SI_3$ | $SI_4$ | $SI_5$ | $SI_6$ | $SI_7$ | $SI_8$ | $SI_9$ | $SI_{10}$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Pond ID** | **Location** | **Pond Area** | **Permanence** | **Water Quality** | **Shade** | **Waterfowl** | **Fish** | **Pond Count** | **Terrestrial Habitat** | **Macrophytes** | **HSI Score** | **HSI Rating** |
| F002 | 1.00 | 0.40 | 0.90 | 0.67 | 1.00 | 0.67 | 0.67 | 0.80 | 1.00 | 0.30 | 0.69 | Average |
| F003 | 1.00 | 0.90 | 0.90 | 1.00 | 1.00 | 0.67 | 0.67 | 1.00 | 0.67 | 0.85 | 0.85 | Excellent |
| F004 | 1.00 | 0.00 | 0.90 | 0.67 | 1.00 | 0.01 | 0.67 | 1.00 | 0.33 | 0.30 | 0.42 | Poor |
| F005 | 1.00 | 0.00 | 1.00 | 0.67 | 0.80 | 0.67 | 0.67 | 1.00 | 0.67 | 0.30 | 0.71 | Good |
| F006 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | Unsuitable |
| F007 | 1.00 | 0.50 | 0.10 | 0.33 | 1.00 | 0.67 | 1.00 | 1.00 | 0.67 | 0.30 | 0.54 | Below Average |
| F008 | 1.00 | 0.40 | 0.50 | 0.67 | 1.00 | 0.67 | 1.00 | 1.00 | 1.00 | 0.90 | 0.78 | Good |
| F009 | 1.00 | 1.00 | 1.00 | 0.67 | 1.00 | 0.67 | 1.00 | 0.75 | 0.67 | 0.35 | 0.78 | Good |
| F010 | 1.00 | 0.80 | 0.50 | 0.33 | 1.00 | 0.67 | 0.67 | 1.00 | 1.00 | 0.30 | 0.67 | Average |
| F011 | 1.00 | 0.30 | 0.10 | 0.00 | 1.00 | 0.00 | 0.00 | 0.93 | 0.00 | 0.30 | 0.00 | Unsuitable |
| F012 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | Unsuitable - Dry |
| F013 | 1.00 | 0.20 | 0.10 | 0.33 | 1.00 | 0.67 | 1.00 | 1.00 | 0.33 | 1.00 | 0.52 | Below Average |
| F014 | 1.00 | 0.95 | 1.00 | 0.33 | 1.00 | 0.67 | 1.00 | 0.69 | 0.33 | 0.30 | 0.65 | Average |
| F015 | 1.00 | 0.80 | 1.00 | 0.67 | 1.00 | 0.67 | 1.00 | 0.43 | 0.67 | 0.30 | 0.71 | Good |
| F016 | 1.00 | 0.70 | 0.90 | 0.67 | 1.00 | 0.67 | 0.33 | 0.55 | 0.67 | 0.35 | 0.64 | Average |
| F017 | 1.00 | 1.00 | 0.90 | 0.67 | 0.70 | 0.67 | 1.00 | 1.00 | 0.67 | 0.46 | 0.78 | Good |
| F018 | 1.00 | 0.96 | 1.00 | 0.67 | 0.70 | 0.67 | 0.67 | 0.69 | 0.67 | 0.30 | 0.70 | Good |
| F020 | 1.00 | 0.50 | 0.90 | 0.33 | 0.60 | 0.67 | 1.00 | 0.69 | 0.67 | 0.40 | 0.64 | Average |
| F021 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.30 | 0.00 | Unsuitable - Dry |
| F022 | 1.00 | 0.40 | 0.90 | 0.33 | 0.40 | 1.00 | 0.33 | 0.69 | 0.67 | 0.30 | 0.54 | Below Average |

| | $SI_1$ | $SI_2$ | $SI_3$ | $SI_4$ | $SI_5$ | $SI_6$ | $SI_7$ | $SI_8$ | $SI_9$ | $SI_{10}$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Pond ID** | **Location** | **Pond Area** | **Permanence** | **Water Quality** | **Shade** | **Waterfowl** | **Fish** | **Pond Count** | **Terrestrial Habitat** | **Macrophytes** | **HSI Score** | **HSI Rating** |
| F023 | 1.00 | 0.20 | 0.50 | 0.33 | 0.40 | 1.00 | 1.00 | 0.69 | 1.00 | 0.30 | 0.55 | Below Average |
| F024 | 1.00 | 0.05 | 0.90 | 0.67 | 1.0 | 1.0 | 0.33 | 0.80 | 0.33 | 0.70 | 0.53 | Below Average |
| F025 | 1.00 | 0.00 | 0.90 | 0.67 | 1.00 | 0.67 | 0.67 | 0.85 | 0.67 | 0.35 | 0.72 | Good |
| F026 | 1.00 | 0.90 | 0.90 | 0.67 | 1.00 | 0.67 | 0.67 | 0.75 | 0.67 | 0.35 | 0.73 | Good |
| F027 | 1.00 | 0.40 | 0.90 | 1.0 | 0.6 | 1.0 | 1.0 | 0.85 | 0.67 | 0.30 | 0.72 | Good |
| F028 | 1.00 | 0.00 | 0.90 | 0.67 | 1.00 | 0.67 | 0.67 | 0.75 | 0.67 | 0.35 | 0.71 | Good |
| F029 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.30 | 0.00 | Unsuitable - Dry |

# F. Appendix: eDNA survey results

### Appendix Table F-1: Summary of eDNA results

| Waterbody Number | eDNA Survey Date | eDNA Result |
|---|---|---|
| F002 | 20/04/2022 | Negative |
| F003 | 21/04/2022 | Negative |
| F005 | 20/04/2022 | Negative |
| F007 | 20/04/2022 | Negative |
| F008 | 20/04/2022 | Negative |
| F009 | 20/04/2022 | Negative |
| F010 | 20/04/2022 | Negative |
| F013 | 20/04/2022 | Negative |
| F014 | 19/04/2022 | Negative |
| F015 | 19/04/2022 | Negative |
| F016 | 21/04/2022 | Negative |
| F017 | 17/04/2023 | Negative |
| F018 | N/A – No safe access | N/A |
| F020 | 23/06/2022 | Negative |
| F022 | 14/06/2022 | Inconclusive in 2022 –waterbody scope out of further surveys in April 2023 (see Section 3.7 in this report for further details). |
| F023 | 14/06/2022 | Negative |
| F024 | 17/04/2023 | Negative |
| F025 | 18/04/2023 | Negative |
| F026 | 18/04/2023 | Negative |
| F027 | 17/04/2023 | Negative |
| F028 | 18/04/2023 | Negative |

# G. Appendix: Presence/likely absence survey summary results – peak counts

### Appendix Table G-1: Presence/likely absence survey summary results – peak counts

| Waterbody Number | Survey Date | Visit Number | Weather Conditions | Survey Methods Used | Newt Species Recorded | | | | Other Amphibians Recorded | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Great crested newt | Smooth newt | Palmate newt | Unidentified newt species | Common frog | Common toad | Other amphibian |
| F002 | 20/04/2022 | 1 | 10°C, cloud cover - 1/8, rain - 0/5, wind - 3 (BF Scale) | Torching, Bottle-trapping, Egg search | N/A | 2 – adult females | NA | NA | 1 – adult | NA | NA |
| F003 | 21/04/2022 | 1 | 10°C, cloud cover – 0/8, rain – 0/5, wind – 1 (BF Scale) | Torching, Netting, Egg search | N/A | 1 – adult male | N/A | N/A | N/A | N/A | N/A |
| F005 | 20/04/2022 | 1 | 10°C, cloud cover – 1/8, rain – 0/5, wind – 1 (BF Scale) | Torching, Bottle-trapping, Egg search | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| F008 | 21/04/2022 | 1 | 12°C, cloud cover - 0/8, rain - 0/5, wind - 2 (BF Scale) | Torching, Bottle-trapping, Egg search | N/A | N/A | N/A | N/A | Tadpoles | N/A | N/A |
| F009 | 21/04/2022 | 1 | 10°C, cloud cover - 0/8, rain - 0/5, wind - 2 (BF Scale) | Torching, Bottle-trapping, Egg search | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

| Waterbody Number | Survey Date | Visit Number | Weather Conditions | Survey Methods Used | Newt Species Recorded | | | | Other Amphibians Recorded | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Great crested newt | Smooth newt | Palmate newt | Unidentified newt species | Common frog | Common toad | Other amphibian |
| F010 | 20/04/2022 | 1 | 10°C, cloud cover - 1/8, rain - 0/5, wind - 0 (BF Scale) | Torching, Netting, Egg search | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| F016 | 21/04/2022 | 1 | 10°C, cloud cover - 0/8, rain - 0/5, wind - 1 (BF Scale) | Torching, Egg search, Refuge search | N/A | N/A | N/A | N/A | Tadpoles | N/A | N/A |
| F017 | 18/04/2023 | 1 | 8°C, cloud cover – 2/8, rain - 0/5, wind - 1 (BF Scale) | Torching | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| F024 | 18/04/2023 | 1 | 8°C, cloud cover – 2/8, rain - 0/5, wind - 1 (BF Scale) | Torching | N/A | 2 adult males | N/A | N/A | N/A | N/A | N/A |
| F025 | 19/04/2023 | 1 | 7°C, cloud cover – 2/8, rain - 0/5, wind - 1 (BF Scale) | Torching, bottle-trapping, egg search | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| F026 | 19/04/2023 | 1 | 8°C, cloud cover – 0/8, rain - 0/5, wind - 4 (BF Scale) | Torching, bottle-trapping, egg search | N/A | 10 adults (5 male and 5 female) | N/A | N/A | N/A | N/A | N/A |

| Waterbody Number | Survey Date | Visit Number | Weather Conditions | Survey Methods Used | Newt Species Recorded | | | | Other Amphibians Recorded | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Great crested newt | Smooth newt | Palmate newt | Unidentified newt species | Common frog | Common toad | Other amphibian |
| F027 | 20/04/2023 | 1 | 8°C, cloud cover - 8/8, rain - 0/5, wind - 1 (BF Scale) | Torching, bottle trapping, netting | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| F028 | 20/04/2023 | 1 | 9°C, cloud cover - 8/8, rain - 0/5, wind - 3 (BF Scale) | Torching, bottle trapping, egg search | N/A | N/A | N/A | N/A | N/A | 1 dead adult floating | N/A |