A428 Black Cat to Caxton Gibbet improvements

TR010044

Volume 6

6.3 Environmental Statement

Appendix 8.7: Riparian Mammals

Planning Act 2008

Regulation 5(2)(a)

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

26 February 2021

Infrastructure Planning

Planning Act 2008

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

A428 Black Cat to Caxton Gibbet improvements

Development Consent Order 202[ ]

Appendix 8.7: Riparian Mammals

Regulation Reference:	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference	TR010044
Application Document Reference	TR010044/APP/6.3
Author	A428 Black Cat to Caxton Gibbet improvements Project Team, Highways England

Version	Date	Status of Version
Rev 1	26 February 2020	DCO Application

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1. Introduction

1.1 Background and scope of works

1.1.1 As part of the A428 Black Cat to Caxton Gibbet improvements scheme (the Scheme), surveys were undertaken of the riparian mammal species, Water Vole (*Arvicola amphibius*), European Otter (*Lutra lutra*) and American Mink (*Neovison americanus*) to inform the biodiversity assessment reported in **Chapter 8, Biodiversity** of the Environmental Statement **[TR010044/APP/6.1]**, (these species are subsequently referred to as Water Vole, Otter and Mink).

1.1.2 This appendix reports on the surveys of riparian mammals as recommended in the agreed scope for Stage 3 (Ref 1-1) and informed by a review of background information (Appendix 8.1 of the Environmental Statement **[TR010044/APP/6.3]**).

1.1.3 This identified riparian species including Water Vole and Otter as a potential constraint based on a desk study and an assessment in the field of the habitats present. The surveys were undertaken to identify whether Otter, Water Vole and Mink are present within the Survey Area (defined in Section 3.1) of the Scheme, in which case this may constrain the works or influence the design and implementation of the Scheme.

1.1.4 **Chapter 2, The Scheme** of the Environmental Statement **[TR010044/APP/6.1]** provides the background and a description of the Scheme.

1.1.5 The information described in this appendix provides a baseline of riparian mammals' activity recorded within the surveyed areas, which has been used to inform the Environmental Impact Assessment (EIA) for the Scheme.

1.1.6 This report includes:

a. Relevant legislation.

b. Methods for desk and field-based assessments undertaken between 2018 and 2019 to determine presence or absence of riparian mammals across the Survey Area (defined in 3.1) based on desk study and field survey visits.

c. Competencies of the ecologists involved in undertaking the above surveys.

d. Limitations to the surveys undertaken and any assumptions made as a result of incomplete data.

e. Survey results.

f. The approach for determining the nature conservation importance of riparian mammals recorded during the assessment.

1.2 Riparian mammal ecology

1.2.1 Water Vole has chestnut-brown fur, a blunt, rounded nose, small ears, and a furry tail. It is much bigger than other vole species. They live along rivers, streams and ditches, around ponds and lakes, and in marshes, reedbeds and areas of wet moorland.

1.2.2 Otter has brown fur that appears darker when wet with a slightly pale underside, a long slender body (adults being often over a metre in length) and long thick tapering tail. Otters can travel over large areas. They are known to use 20 kilometres (12.4 miles) or more of river habitat. Otters deposit faeces (known as spraints, with a characteristic sweet musky odour) in prominent places around their ranges. These serve to mark an Otter's range, defending its territory but also helping neighbours keep in social contact with one another.

1.2.3 Mink has glossy brownish-black fur with white on chin, throat and underside; elongated body (30-40 cm long) with short legs. A species of aquatic habitats ranging from sluggish rivers to ponds, marshes to lakes with a home range of 1-6 kilometres (0.6-3.7 miles) in length up and down a river or around a lake.

2. Legislation and policy

2.1 Legislative framework

2.1.1 Otter is classified under the *Habitats Directive (92/43/EEC)* (Ref 1-3) as a species requiring strict protection in Europe. In the UK, this is enacted by the *Conservation of Habitats and Species Regulations 2017* (Ref 1-4).

2.1.2 Otter and Water Vole are both fully protected under Schedule 5 of the Wildlife & Countryside Act 1981 (as amended) (Ref 1-2). They are afforded protection under Section 9 parts 9(1) (2) (4) and (5) of the Act, which make it an offence to:

a. Intentionally kill, injure or take these species

b. Possess or control live or dead individuals of these species or their derivatives

c. Intentionally or recklessly damage, destroy or obstruct access to any structure or place used for their shelter or protection

d. Intentionally or recklessly disturb these species whilst occupying a structure or place of shelter used for that purpose

e. Sell these species or offer or expose for sale or transport for sale

f. Publish or cause to be published any advertisement which conveys the buying or selling of these species.

2.1.3 Any operations that may impact upon Otters or their places of rest or shelter may require a European Protected Species (EPS) license obtained from Natural England.

2.1.4 Otter and Water Vole are identified as Priority Species under Section 41 of the *Natural Environment and Rural Communities (NERC) Act 2006* (Ref 1-5). However, a licence is not required to conduct an Otter survey, assuming that care is taken to avoid disturbance of potential couches (i.e. above-ground resting sites) and holt locations (i.e. underground resting sites). Where monitoring or confirmation of holts is required, non-invasive techniques will be utilised, such as the use of appropriately placed infra-red cameras and or camera traps.

2.1.5 Mink is listed under Schedule 9 to the *Wildlife and Countryside Act 1981* (as amended) (Ref 1-2) with respect to England, Wales and Scotland. As such it is an offence to release or allow the escape of this species into the wild.

2.2 Policy

2.2.1 National and local planning policies relevant to biodiversity are not provided here, these are evaluated in the Environmental Statement, Volume 1 **[TR010044/APP/6.1]**. In addition to these policies, the Biodiversity Action Plans (BAPs) produced for Bedfordshire, Cambridgeshire and specifically for South Cambridgeshire are of direct relevance to riparian mammals. These are summarised in **Table 2.1.**

Table 2.1: Species Action Plan information in the biodiversity action plans (BAPs for Bedfordshire, Cambridgeshire and South Cambridgeshire relevant to the Scheme.

Species	Cambridgeshire and Peterborough BAP Priority Species – Status and actions relevant to the Scheme	South Cambridgeshire District Council BAP Priority Species – Actions relevant to the Scheme	Bedfordshire and Luton BAP – Priority Species Actions relevant to the Scheme
Otter	Otter is identified as a priority species in Cambridgeshire and Peterborough.	Otter is widespread along the Upper Cam and its tributaries. Work must be undertaken to ensure that the local environment continues to have the capacity to support Otter.	Identify five areas of riparian habitat in need of habitat enhancement for Otter or a management regime to benefit Otters per year. Secure appropriate habitat management and/or enhancement of five areas of riverine habitat per year. When development is being considered, ensure appropriate mitigation measures are incorporated into transport and other development schemes affecting watercourses known to have Otters present. Ensure, on an ongoing basis, that all flood defence and routine river management is compatible with Otter habitat requirements.

Species	Cambridgeshire and Peterborough BAP Priority Species – Status and actions relevant to the Scheme	South Cambridgeshire District Council BAP Priority Species – Actions relevant to the Scheme	Bedfordshire and Luton BAP – Priority Species Actions relevant to the Scheme
Water Vole	Water Vole is identified as a priority species in Cambridgeshire and Peterborough.	Water Vole is widespread in some parishes. The species has the ability to live in close proximity to people if suitable habitat is maintained.	Identify three areas per year of riparian habitat in need of habitat enhancement or management regime to benefit Water Vole. Secure appropriate management and/or habitat enhancement of two areas of riverine habitat per year that will benefit known Water Vole populations and aid their expansion into and/or reduce fragmentation of suitable habitat. Ensure that development schemes do not affect the integrity of Water Vole populations by using appropriate scheme design and enforcement through planning conditions. Ensure all flood defence work and routine river management are compatible with Water Vole habitat requirements.

3. Methods

3.1 Survey Area

3.1.1 The Survey Area for the assessment of the presence, or likely absence of riparian mammals is shown in **Figure 1** and **Figure 2**. This was informed by published guidance (Ref 1-6 and Ref 1-13) and the professional judgement of suitably qualified and experienced ecologists.

3.1.2 Scoping was undertaken of all the watercourses and waterbodies within the Survey Area, the former comprising those sections within, and 500 metres upstream and 500 metres downstream of the Order limits. Those watercourses or waterbodies which required specific assessment were surveyed in 2018, 2019 and 2020 as described below. The scoping included use of walkover surveys, consulting the Phase 1 Habitat Survey map (Appendix 8.2: Sites Designated for their Biodiversity Value of the Environmental Statement **[TR010044/APP/6.3]**) and analysis of aerial photography. The watercourses and waterbodies which were surveyed are shown in **Figure 1** and **Figure 2**.

3.1.3 Watercourses and water bodies within the Survey Area that would have no potential to be impacted, directly or indirectly, by the Scheme, e.g. those in the vicinity of the de-trunked section of the existing A428 for which there will be no associated works, were not surveyed. Within the Survey Area there were also several watercourses and waterbodies that could not be surveyed as they had dried out. This approach ensured that all suitable habitat within the Survey Area was assessed prior to and following adoption of LA 108 (Ref 1-11).

3.1.4 Any limitations to these surveys are acknowledged and explained in the Limitations section of this appendix with consideration given to any implications to the findings.

3.2 Desk study

3.2.1 The aim of the desk study was to help inform the existing baseline and to identify the need for further surveys. The desk study covered a zone of 2 kilometres around the Order limits (the Study Area)and was undertaken to identify records and other relevant information relevant to Otter, Water Vole and Mink. A thorough review of published information about habitats and species in the Study Area and the surrounding landscape was undertaken (Appendix 8.1: Background Information of the Environmental Statement **[TR010044/APP/6.3]**).

3.2.2 Both the Cambridgeshire and Peterborough Environmental Records Centre and the Bedfordshire and Luton Biodiversity Recording and Monitoring Centre were contacted in 2018 to obtain relevant records from within 2 kilometres radius of the Scheme. Data were requested for the last ten years (2008-2018).

3.2.3 Additionally, a review was undertaken of the published information about the natural history of the wider area. The aims were to identify records of Otter, Water Vole and Mink and to put these species into perspective, e.g. were they increasing or decreasing in extent.

3.3 Surveyor competency

3.3.1 All field surveys were led by competent ecologists, familiar with riparian mammal ecology and surveying for Water Vole, Otter and Mink. All lead surveyors were members of the Chartered Institute of Ecology and Environmental Management (CIEEM).

3.4 Habitat assessment

3.4.1 A habitat assessment was undertaken in September 2017 of the Survey Area (see Section 3.1). Watercourses were only scoped out where there were significant barriers to movement, such as busy roads or concrete embankments, between the watercourse and the Scheme.

3.4.2 A walkover of each site selected for survey was conducted by an experienced surveyor, and a decision taken as to the need for subsequent detailed survey. This assessment included consideration of each site against the following criteria:

a. Proximity to the Scheme.

b. Presence of significant barriers to dispersal and movement through the territory.

c. Habitats present and suitability for use by Otter or Water Vole (including terrestrial habitats).

d. Adjoining land use.

e. Existing level of disturbance.

f. The nature of the watercourse or waterbody, including estimated depth, level of flow and width of channel.

g. Connectivity with other areas of suitable or sub-optimal habitat.

h. Evidence of pollution.

3.4.3 Nine watercourses were identified using the criteria above, with three of these subsequently excluded from further surveys as they were unsuitable to support Otter or Water Voles due to factors such as poor habitat quality and lack of foraging opportunities.

3.4.4 As part of the surveys, evidence of the presence of Mink was also recorded.

3.4.5 The watercourses requiring further assessment were the following:

a. River Great Ouse (Photo 1 in **Table A2**, Annex A):

b. Begwary Brook (a County Wildlife Site (CWS)) (Photo 2 in **Table A2**, Annex A).

c. Hen Brook (Photo 3 in **Table A2**, Annex A).

d. Stone Brook (Photo 4 in **Table A2**, Annex A).

e. South Brook (west and east of the A1) (Photos 5 and 6 respectively in Table A2, Annex A).

f. Caxton Gibbet attenuation pond (Photo 7 in **Table A2**, Annex A).

3.5 Field survey

Water Vole survey method

3.5.1 The Water Vole survey method drew largely upon the guidance provided in Ref 1-13), the *Water Vole Conservation Handbook* (Ref 1-7), and *Water Vole Mitigation Handbook* (Ref 1-8).

3.5.2 All suitable watercourses were surveyed by experienced ecologists, where the lead surveyor had greater than 10 years' riparian species survey experience. Where access was possible, evidence of Water Vole was recorded within the Survey Area (Section 3.1). For each watercourse a standard survey form was completed. The Survey Area is shown on **Figure 1** and **Figure 2** of this appendix.

3.5.3 Field signs recorded during the Water Vole surveys included:

a. Latrine sites – distinct piles of Water Vole droppings found near nest sites or burrows, at the ranges of territorial boundaries and where the animals enter and leave the water.

b. Feeding stations – areas with distinct neat piles of chewed lengths of vegetation along pathways or haul out platforms along the water's edge.

c. Burrows – above and below water with a cropped "garden" or "lawn" around the burrow entrance.

d. Paths and runs – along the water's edge, runs in the vegetation and footprints in soft mud.

e. Sightings, sounds entering the water.

3.5.4 In accordance with standard guidance, surveys were conducted in:

a. July/August (summer) (2018).

b. October/November (autumn) (2018).

c. April/May (spring) (2019), where access was permitted.

3.5.5 The 2019 survey was undertaken in part because the first 2018 survey had been undertaken at the end of the optimal survey season for Water Vole, i.e. April to September. All surveys were conducted during suitable weather conditions in accordance with the guidance set out in the Water Vole Mitigation Handbook 2016 (Ref 1-8).

Otter survey method

3.5.6 The Otter survey method drew largely upon the guidance provided in (Ref 1-6) the *New Rivers and Wildlife Handbook* (1994) (Ref 1-9), the Environment Agency's *Fifth Otter Survey of England 2009-2010* (Ref 1-10), and *Ecology of European Otter* (Ref 1-11).

3.5.7 The survey method concentrated on locating field signs indicating Otter presence as Otters were unlikely to be seen. Such signs include:

a. Spraints – characteristic sweet-smelling, black tar-like (where fresh/relatively recent i.e. within a few weeks) or grey crumbly (when old) faecal deposits usually containing fish scales, bones and occasionally invertebrate exoskeletons and bird feathers.

b. Footprints – in soft substrate, typically asymmetrical and showing five toes arched around a large pad and, depending on substrate, webbing and claw marks (coarser substrates do not often enable the identification of Otter footprints)

c. Feeding remains – which may include partially eaten fish, frogs, piles of mussel shells or crayfish remains.

d. Slides and haul-outs – routes into and out of the water, which are usually associated with terrestrial routes such as short cuts around meanders or along traditionally used Otter paths/routes.

e. Couches and hovers – above ground resting place which are usually associated with cover such as dense scrub, rushes or reed, flood debris or fallen trees.

f. Holts – below ground resting site, usually associated with spraints which can be important for breeding (natal holts) where other signs are usually absent.

3.5.8 The following criteria, devised by Chanin (2013) (Ref 1-12), were used to identify potential Otter breeding sites:

a. Any single area of extensive concealing habitat (woodland, scrub, reed bed) which was greater than 1ha in area and within 100 metres of a watercourse.

b. any combination of extensive concealing habitats which were within 100 metres of one another, totalling at least 1ha and were within 100 metres of a watercourse.

3.5.9 For all potential breeding sites identified using these criteria, a site visit was conducted by an experienced Otter surveyor to check for signs of breeding activity (e.g. well used paths, play areas, or large accumulations of spraints).

3.5.10 The location of any such feature identified was recorded, along with details of the feature and associated habitat (e.g. a large wood pile within an area of semi-natural woodland).

3.5.11 All watercourses present and suitable for Otter following the 2017 habitat assessment within the Survey Area were surveyed by experienced AECOM ecologists where the lead surveyor had greater than 10 years riparian species survey experience.

3.5.12 Both banks of the watercourses within the Survey Area (Section 3.1) were surveyed.

3.5.13 The survey was conducted at three month intervals over a period of one year to account for seasonal variations in Otter activity. These were during the following periods:

a. July and August (summer) 2018.

b. October (autumn) 2018.

c. January (winter) 2019.

d. May (spring) 2019.

3.5.14 Photographs were taken to compliment the field survey data (**Table A2**).

3.5.15 Otters may use different areas at different times of the year, and this was taken into account. The survey methodology aimed to determine the presence or likely absence of Otter on those watercourses and waterbodies surveyed.

3.5.16 The majority of the surveys were conducted during or following periods of dry weather. During or following periods of heavy rainfall surveys were avoided, as there is a risk that field signs would have been washed away. One survey was undertaken during a period of heavy rain, and the implications for the assessment are discussed in the Limitations (Section 1.10). In general, and where possible, survey visits were also timed to avoid periods when water levels were high.

Mink survey method

3.5.17 There is no standardised Mink survey method in the DMRB. Therefore, any Mink signs and animals recorded were incidental sightings during the Otter surveys and during camera trap monitoring undertaken for the Scheme.

Camera traps

3.5.18 Spypoint HD7 camera traps were used to extend the field survey data both by covering nocturnal activity and the duration of observation. Camera traps were installed over a four week period in October-November 2018 and for four weeks in January-February 2019 in locations where potential holt sites had been identified during previous surveys. These camera traps were subsequently checked for any pictures which may have recorded any evidence of Otter or Mink in the vicinity of the potential holt sites or Otter using it. To limit disturbance, once evidence of Otter using a holt had been confirmed, the cameras were removed.

3.6 Biodiversity evaluation

3.6.1 The baseline surveys and desk study identified a number of riparian mammal receptors (i.e. important ecological features) that could potentially be impacted by the Scheme.

3.6.2 A hierarchical geographical approach was used to assign value (i.e. ecological importance) as based upon *LA 108 Biodiversity* (Ref 1-13), *Guidelines of Ecological Impact Assessment in the UK and Ireland* (Ref 1-14), hereafter referred to as the CIEEM guidelines), and professional judgement.

3.6.3 The method used to determine ecological importance is summarised in **Table 3.1**.

Table 3.1: Importance of ecological features

Importance of ecological features	Typical Descriptors / Examples of criteria
International or European	An internationally designated site or candidate site including; Special Protection Areas (SPA); potential SPAs (pSPAs); Special Areas of Conservation (SAC); candidate or possible SACs (cSACs or pSACs[1]); and/ or Wetlands of International Importance (Ramsar sites). Biogenetic Reserves, World Heritage Sites and Biosphere Reserves. Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such. Resident or regularly occurring populations of species which may be considered at an international or European level[2] where: The loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale; The population forms a critical part[3] of a wider population at this scale; or, The species is at a critical phase[4] of its life cycle at this scale.
UK or National	Sites designated at national UK level e.g. Sites of Special Scientific Interest (SSSI); Marine Protection Areas (MPAs) including Marine Conservation Zones (MCZs); and National Nature Reserves (NNR). Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such. Areas of key/ priority habitats identified in the UK Post-2010 Biodiversity Framework i.e. UK Biodiversity Action Plan (BAP), including those published in accordance with Section 41 of the Natural Environment and Rural Communities Act (2006) and those considered to be of principal importance for the conservation of biodiversity. Areas of ancient woodland e.g. woodland listed within the Ancient Woodland Inventory. Resident or regularly occurring populations of species which may be considered at a national or UK level[5] where: The loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale; The population forms a critical part of a wider population at this scale; or, The species is at a critical phase of its life cycle at this scale.

Importance of ecological features	Typical Descriptors / Examples of criteria
Regional	Habitats or populations of species of value at a regional level (i.e. East Anglia). Areas of key/ priority habitat identified as being of Regional value in the appropriate Natural Area profile (or equivalent) now referred to as the National Character Area (NCA). Key/ priority habitat or species listed within the Highways England (HE) / Highways Agency (HA) BAP. Resident or regularly occurring populations of species which may be considered at a regional level[6] where: The loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale; The population forms a critical part of a wider population at this scale; or, The species is at a critical phase of its life cycle at this scale.
County or Unitary Authority or District	Habitats or populations of species of value at a County (i.e. Cambridgeshire) level or District (i.e. South Cambridgeshire). Designated sites, such as County Wildlife Sites (CWS), Local Wildlife Sites (LWS) or Sites of Importance for Nature Conservation (SINCs), and Local Nature Reserves (LNRs) designated in the county or unitary authority area i.e. District context. Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such. Areas of key/ priority habitats identified in the Local Biodiversity Action Plan (LBAP). Resident or regularly occurring populations of species which may be considered at a County (or District) level[7] where: The loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale; The population forms a critical part of a wider population at this scale; or, The species is at a critical phase of its life cycle at this scale.
Local	Habitats or species populations of value in a local (i.e. within ~ 3 miles (5km) of the site) context. Designated sites include LNRs designated in the local context. Trees that are protected by Tree Preservation Orders (TPOs). Areas of habitat, or populations/ communities of species considered to appreciably enrich the habitat resource within the local context (such as veteran trees), including features of value for migration, dispersal or genetic exchange.

Importance of ecological features	Typical Descriptors / Examples of criteria
Site	Habitat that is of value in the context of the site only. Populations of common and widespread species. A degraded/ impoverished example of a common or widespread habitat in the local area.

*As well as assigning importance there is also a need to identify all legally protected species that could be affected by the Scheme in order that measures can be taken to ensure that adherence to the relevant legislation is observed. This may include the adoption of mitigation and appropriate licensing which is acceptable to Natural England.

1 pSACs are sites which have been formally advised by to UK Government but have not yet been submitted to the European Commission. These sites should be valued at an international (European) level on the basis that they meet the relevant selection criteria for a SAC but are not yet designated as such.

2 Such species include those listed within the Directive 2009/147/EC on the Conservation of wild birds (i.e. EC Birds Directive) (codified version of Council Directive 79/409/EEC as amended) or animal/ plant species listed within Council Directive 92/43/EEC on the Conservation of natural habitats and of wild flora and fauna (i.e. Habitats Directive).

3 Such populations include sub-populations that are essential to maintenance of metapopulation dynamics e.g. critical emigration/ immigration links between otherwise discrete populations.

4 Seasonal activity or behaviour upon which survival or reproduction depends.

5 Species which may be considered at the UK or national level means; birds, other animals and plants which receive legal protection in the basis of their conservation interest (those listed within the Wildlife and Countryside Act 1981 (as amended) Schedule 1, 5 and 8); species listed for their principal importance for biodiversity (in accordance with the Natural Environment and Communities Act 2006 Section 41 England); priority species listed within the UK Post 2010 Biodiversity Framework (i.e. UKBAP); or species listed within the Red Data Book.

6 Such species include those listed in the appropriate National Character Area and key/ priority species listed on the 2002 HABAP

7 Such species include those at county level (i.e. Bedford or Cambridge) including unitary authority area i.e. District level (i.e. Bedford Borough Council); as listed on the LBAPs; and listed as a county designated site.

3.6.4 The geographical frames of reference used and assigned to important ecological features are:

a. International or European
b. UK or National
c. Regional
d. County or Unitary Authority
e. District
f. Local
g. Site level

3.6.5 The importance assigned to ecological features in this report reflects the currently known distribution within the Survey Area.

3.7 Limitations

Desk study

3.7.1 The information collected from the desk study background record search represents only those records submitted to records centres and is therefore not considered to be a definitive list of occurrences of Otter, Water Vole and Mink within the Study Area. If records have not been provided, this does not confirm absence of these species from within the Study Area.

3.7.2 Information obtained during the course of the desk study was dependent upon people and organisations having made and submitted records for the area of interest. As such, a lack of records does not necessarily mean that riparian species do not occur in the Survey Area. Similarly, the presence of records for any given species does not necessarily mean that it still occurs at a particular location or within the area.

Field survey

3.7.3 Sections of the River Great Ouse were heavily vegetated on both banks with dense scrub on some sections within the Survey Area. This prevented surveyors accessing all sections of the riverbank within the Survey Area on foot. However, this is not considered to have affected the overall conclusions as the majority of the banks were accessible, and those that were not accessible by foot were surveyed using a boat. Similarly, access was restricted to sections of Hen Brook due to dense vegetation in sections but overall, the watercourse was largely accessible, and the conclusions of the survey are considered to be robust.

3.7.4 Heavy rainfall occurred during one of the surveys in August, however this was not a constraint to the survey as Otter evidence was still identified and recorded on that day.

3.7.5 Due to the depth of the watercourses in places and the presence of dense vegetation in some locations, the field survey was not conducted from within the watercourses. Instead, the survey was carried out by walking along one bank of each watercourse.

3.7.6 In one section of Hen Brook, the bank of the watercourse was too steep to gain access to the water's edge. This location was excluded from the survey, however this did not affect the overall conclusion of the survey, as the majority of the watercourse was accessible.

3.7.7 The limitations above did not prevent a comprehensive baseline being undertaken over the survey period. There were no other significant constraints to the field surveys.

4. Results

4.1 Desk study results

Water Vole

4.1.1 The only Water Vole records returned were from 2009 and 2010. These were for unidentified waterbodies between 500-900 metres from the Order limits at the Caxton Gibbet end of the Scheme. The evidence recorded included burrows, feeding remains and live sightings.

4.1.2 The data search report summarises information published by Jefferies *et al*. (2004) (Ref 1-15) who used data for sites from national Water Vole surveys (May 1989 and April 1997) that were in “old” Cambridgeshire (see Appendix 8.1) to describe changes in distribution of Water Vole in the county. Although the surveys do not provide any data for the Study Area, they do describe a catastrophic and rapid crash in Cambridgeshire Water Voles preceded by a slow long-term decline. There was one record along the River Great Ouse, but it was unidentified location downstream of the Survey Area. However, another study conducted by Green and Baker (2004) (Ref 1-16). considered that the national surveys significantly under-represented the state of the Water Vole population in the smaller drainage ditches of the fens.

4.1.3 A detailed survey of the River Ivel catchment was undertaken in 2002 and 2003 by volunteers as part of the Ivel Otters and Rivers Project which found Water Vole at 33 sample sites (Ref 1-21). Further survey work in 2005, 2006 and 2007 by the Bedfordshire Otters and Rivers Project has confirmed an extensive metapopulation of Water Vole in the River Ivel catchment north of Biggleswade along with small populations of along the Potton Brook, Renhold Brook and River Lea and isolated populations in the Flit Valley and at Yeldon in the north of the county (Ref 1-21).

4.1.4 The mammal atlas for Cambridgeshire (Ref 1-17) shows that Water Vole is widespread in the county, but the populations are isolated.

Otter

4.1.5 A desk study was conducted in 2018 and records of Otter presence were returned from within the last 10 years on the River Great Ouse (2014, 2016), Begwary Brook CWS (2009 and 2014), Tempsford Bridge (2016 and 2017) and at Roxton (2014). An Otter road fatality was recorded at St Neots near the gravel pit lakes close to the River Great Ouse (2011) and another on the road close to ponds and lakes on Croxton Park Estate (2011). These records were between 1.3-1.5 kilometres (0.8 – 0.93 miles) from the Scheme.

4.1.6 The Environment Agency received a record of a dead Otter on Hen Brook at St Neots in 2007.

4.1.7 Otter was recorded in surveys for Bedfordshire (1996 to 1997, 2003 to 2004, 2008 to 2009 and 2014 to 2015) on the River Great Ouse, South Brook and Begwary Brook in Roxton and Wyboston.

4.1.8 The survey of Otter signs across the county from 2013 to 2014, found 77 sites of which 24 were on the River Great Ouse and its tributaries (Proud and Lawrence, 2015 (Ref 1-18).

Mink

4.1.9 A record was received of a Mink within 1 kilometre (0.6 miles) of the Scheme. There was one record of a Mink road casualty on the A1 400 metres north of the Scheme in 2012.

4.1.10 Mink was also recorded in surveys for Bedfordshire (1996 to 1997, 2003 to 2004, 2008 to 2009 and 2014 to 2015) on the River Great Ouse, South Brook and Begwary Brook in Roxton and Wyboston (Appendix 8.1).

4.2 Survey area - habitat assessment results

Habitat Description of the watercourses

4.2.1 The description of the watercourses is based on the habitat assessment carried out in September 2017, and also on information collated from Appendix 8.4, Aquatic Habitats (Ref 1-20) and Appendix 8.15, Fish of the Environmental Statement **[TR010044/APP/6.3]** (Ref 1-19).Ref 1-20.

River Great Ouse

4.2.2 Within the Survey Area the River Great Ouse is a large river approximately 20-30m wide. It is subject to boat traffic and angling but the area is otherwise relatively undisturbed as adjacent land consists largely of arable land with scrub and hedgerows interspersed along field boundaries as well as woodland habitat.

4.2.3 The river supports a number of fish species which provide a suitable foraging resource for Otter. Woodland to the east and west along the banks of the River Great Ouse provides suitable cover, breeding and resting habitat for Otter. Within the Survey Area the habitat was largely unsuitable for Water Vole due to woodland and scrub being dominant. Other habitat within the Survey Area included pasture and arable land, some of which was cattle poached or otherwise disturbed which had reduced the habitat quality for Water Voles. There was limited Water Vole foraging habitat present. Mink live along watercourses and feed on fish and small mammals which are abundant along the River Great Ouse, where Mink have been recorded.

Begwary Brook County Wildlife Site (CWS) and Nature Reserve

4.2.4 Begwary Brook is situated within the Begwary Brook CWS and Nature Reserve which consists of a number of small lakes and watercourses within a woodland setting. The brook flows into the River Great Ouse and the site is situated north of where the Scheme would cross the river. The watercourse was approximately 2-4 metres wide and was fairly silted up. Bankside habitat consisted of herbs and tall grasses but the vegetation was relatively sparse as there was woodland present that shaded the bank, thus limiting the potential to support Water Vole. However, the habitat was suitable for resting and breeding Otter. Habitat was suitable for Mink.

Hen Brook

4.2.5 Hen Brook flows from east to west, discharging into the River Great Ouse. It would be crossed by the Scheme to the east of the existing A428. Hen Brook runs through arable land with hedges and scrub lining the field boundaries. The banks were densely vegetated with scrub and trees and were heavily shaded. The channel of the stream contained gravel and silt and was 2-4 metres wide. Hen Brook supports fish populations, mainly Roach (*Rutilus rutilus*) and some Chub (*Leuciscus cephalus*) (Appendix 8.15 of the Environmental Statement **[TR010044/APP/6.3]**).

4.2.6 As large sections of the brook are shaded by trees and scrub, there is a lack of habitat suitable for foraging Water Vole.

4.2.7 Due to periods of low flow along the Hen Brook, it is unlikely to provide optimal foraging habitat for Otter within the Survey Area, although the woodland to the west of the Scheme provides some cover for Otter.

Stone Brook

4.2.8 Stone Brook is a tributary of the River Great Ouse. Scrub is dominant on the western bank, and cattle grazed pasture is present on the eastern bank, which has led to poaching; both of these factors mean there is limited potential for Water Vole. The channel is 3-4 metres wide and silty; at the time of the survey it had been recently dredged. The ditch provides suitable foraging habitat for Otter as fish are likely to be present due to the ditch being a tributary of the River Great Ouse.

South Brook (west of the A1)

4.2.9 The habitat adjacent to the South Brook comprised brownfield land to the west of the brook and farmland to the east. Trees and scrub were present on top of both banks. South Brook flows under the A1 and then into the River Great Ouse. The channel was approximately 2-3 metres wide with silt and gravel lining the floor of the channel. A spur of the Scheme would cross South Brook west of the A1. At the time of the survey the water levels were quite low. Sections of the brook were relatively shaded with limited foraging habitat and were unsuitable for Water Vole.

4.2.10 This brook is connected to the River Great Ouse and Otter may use this watercourse as a commuting route. Adjacent habitats were very disturbed, with an industrial area adjacent to the River Great Ouse, and construction work taking place in an area north of the A1 and west of South Brook.

South Brook (east of the A1)

4.2.11 This section of the brook was largely unshaded but adjacent land uses consist of a quarry and arable fields with scrub and trees along field boundaries. This watercourse was exposed to high levels of disturbance due to the quarry activities. The channel was approximately 2-3 metres wide and consisted of steep banks with some scrub vegetation on top. There was very limited vegetation within the channel itself, and limited foraging habitat for Water Voles on the banks. The watercourse is connected to the River Great Ouse to the east and it is possible that Otter may have been using this occasionally as a commuting corridor.

Caxton Gibbet attenuation Pond

4.2.12 This attenuation pond is adjacent to the existing Caxton Gibbet roundabout and supported an extensive stand of common reed (*Phragmites australis*) with some reedmace (*Typha latifolia*). There was limited bankside vegetation with some grass cover and pioneer species. The existing Caxton Gibbet roundabout was 160 metres to the west of the attenuation pond, which was parallel to and immediately south of the existing A428. A small unclassified road with minimal traffic and open fields and scrub were located to the south of the pond. The pond was nearly dry at the time of the survey and it is unlikely that it supported Otter as it did not connect into other watercourses where Otter may have been present. It was included in the field surveys as it had some potential to support Water Vole.

4.3 Survey area - field survey results

Water Vole

4.3.1 No evidence of Water Vole was found throughout all surveys conducted during 2018 and 2019, supporting the outcome of the desk study that the species is absent from Survey Area. Water Vole is known from the River Ivel (Ref 1-21) not far from its confluence with the River Great Ouse, i.e. upstream of the Scheme.

Otter and Mink

4.3.2 The results of the Otter and Mink surveys are provided in **Figure 1** and **Figure 2;** and in **Table 4.1** which cover the key survey periods as provided within the method (summer 2018 and autumn 2018, winter 2019 and spring 2019).

Table 4.1: Otter and Mink field signs recorded in summer 2018

Watercourse	Survey date	Results	Photo number (see Annex A)
River Great Ouse	24 July 2018 and 9 August 2018	No Mink evidence found. Otter surveys determined that Otter was present and used the entire stretch surveyed along the River Great Ouse. A significant number of old, recent and fresh spraints were recorded, suggesting that the river is frequently used by Otters. Other evidence recorded were footprints and potential couches and resting sites. The river also supports a number of fish species (refer to Appendix 8.15. Fish) and provides good foraging habitat. The habitat on the eastern side of the proposed bridge that will span the River Great Ouse comprises woodland and arable land. On the western side is an operating quarry with some gravel lakes and arable land interspersed with scrub and hedges. Further to the north of the Scheme, the riverbanks become more wooded and provide suitable cover for Otter. Further south of the proposed bridge, the woodland recedes, with more arable land and amenity grassland; coupled with the presence of a Kelpie Marina, the habitat suitability for Otters reduces substantially. However, further south the banks become more wooded again, providing more suitable habitat for Otter. The woodland on the eastern bank, close to the Scheme, provides suitable breeding and resting habitat. One location 140m south of the Scheme has been identified as a potential resting site (**Figure 1**- potential resting site O4), with a number of spraints of various ages located on a tree that has a large cavity and which protrudes into the River Great Ouse. As this could be a potential holt site, and as it is located close to the Scheme, it was proposed to monitor this location with camera traps. The bankside habitat along the watercourse in this location generally consists of scrub and wooded areas which provide some cover for Otter.	1
Begwary Brook CWS	9 August 2018	No Otter or Mink were recorded within this watercourse.	2
Hen Brook	9 August 2018	No Mink signs were recorded during the survey. No Otter spraints were recorded within the Survey Area. A cavity at the base of a poplar tree was identified as a potential resting site (**Figure 1**- potential resting site O25). There were no spraints or other evidence to confirm this. The tree is located to	3

Watercourse	Survey date	Results	Photo number (see Annex A)
		the east of the existing A428 and west of the Scheme within the Order Limits.	
Stone Brook	9 August 2018	No evidence of Mink was recorded along this watercourse. Otter spraints were recorded along Stone Brook which is a tributary of the River Great Ouse (**Figure 1**). This watercourse was bounded by scrub on one bank and cattle-grazed pasture on the other.	4
South Brook (West of the A1)	8 August 2018	Otter evidence was recorded in the form of an old and recent spraint. The ditch was inaccessible where dense scrub was present but joins the River Great Ouse east of the Great North Road near Roxton which Otter can access from the main river. No Mink evidence was recorded.	5
South Brook (East of the A1)	8 August 2018	No signs of Mink or Otter were recorded within this section of the watercourse.	6
Caxton Gibbet attenuation pond	15 August 2018	The attenuation pond is located adjacent to the existing A428. No signs of Mink or Otter were recorded within the pond. The pond was very overgrown with reeds and was dry at the time of the survey.	7

Table 4.2: Summary of Otter and Mink field signs recorded in autumn 2018

Watercourse	Survey date	Results	Photo number (see AnnexA)
River Great Ouse	25 October 2018 and 31 October 2018	No Mink evidence was recorded apart from camera traps, the results of which are presented in **Table 4.5**. The Otter survey confirmed that Otter use the river frequently for foraging and shelter. A significant number of old, recent and fresh spraints were recorded within the Survey Area and within the wider catchment. Local people have observed Otter moving through the River Great Ouse and reported the presence of Otter pups. The woodland on the eastern bank close to the Scheme provides suitable breeding and resting habitat. One location 140m south of the Scheme has been identified as a potential resting site (**Figure 1**- potential resting site O4), with a number of spraints of various ages located on a tree trunk with a large cavity which protrudes into the River Great Ouse. A camera trap was set up in October 2018 to monitor activity at this potential holt.	1
Begwary Brook CWS	29 October 2018 and 5 November 2018	Recent and old Otter spraints were recorded on a fallen tree with a long hollow cavity (**Figure 1**- potential resting site O49). This could potentially be a holt. No evidence of Mink was recorded.	2
Hen Brook	30 October 2018	No Otter spraints were recorded within the Survey Area. A cavity at the base of a poplar tree located along this watercourse was identified as a potential resting site (**Figure 1**- potential resting site O25); however, there were no spraints or other evidence to confirm this. This tree is located 240m northwest of the Scheme. No evidence of Mink was recorded.	3
Stone Brook	30 October 2018	No Otter evidence or evidence of Mink was recorded during the autumn survey.	4
South Brook (West of the A1)	N/A	South Brook was not surveyed as construction works had commenced adjacent to the brook to the west of the A1 and the stretch of South Brook could no longer be accessed.	5

Watercourse	Survey date	Results	Photo number (see AnnexA)
South Brook (East of the A1)	29 October 2018	No signs of Mink or Otter were recorded within this watercourse.	6

Table 4.3: Summary of Otter and Mink field signs recorded in winter 2019

Watercourse	Survey date	Results	Photo number (see Annex A)
River Great Ouse	15,16 January 2019	The Otter survey determined that Otter use the river frequently for foraging and shelter. A significant number of old, recent and fresh spraints were recorded again along the Survey Area and within the wider catchment. A Mink was also noted running along the bank of the River Great Ouse. The woodland on the eastern bank close to the Scheme provides suitable breeding and resting habitat. One location 140m south of the Scheme has been identified as a potential resting site (**Figure 2**- potential resting site O68) with a number of spraints of various ages located on a tree trunk with a large cavity which protrudes into the River Great Ouse. During this survey season, spraints on the tree trunk were still recorded but not at such high densities. Footprints were recorded under a small wooden bridge. Another potential holt (**Figure 2**- potential resting site O80) site was identified to the south of Kelpie Marina in a wooded area of an island located within an inlet to the River Great Ouse which is inaccessible to the general public. A number of spraints were recorded on the base of a tree with a large cavity into the trunk. Since this area is remote and largely undisturbed and not subject to flooding, this is likely to be used as a more permanent resting site.	1
Begwary Brook CWS	17 January 2019	No evidence of Mink was recorded. A number of recent Otter spraints were recorded under a wooden footbridge, as well as a fresh spraint on a tree stump rising from the water's edge (**Figure 2**). A number of recent spraints were also recorded on a fallen tree with a long hollow cavity, which suggests that this is being used frequently by Otter and is likely to be used as a holt (**Figure 2**- potential resting site O76).	2

Watercourse	Survey date	Results	Photo number (see Annex A)
Hen Brook	18 January 2019	An Otter spraint was recorded under a bridge within the survey area. No other evidence of Otter was recorded.	3
Stone Brook	15-16 January 2019	No Otter evidence was found. At the time of the survey the ditch had been heavily dredged, and vegetation removed on one bank, which reduced the likelihood of Otter using the ditch due to the exposed nature of the bankside habitat. It is still possible Otter may have been commuting along the ditch to access the River Great Ouse, but there was no evidence to support this. No evidence of Mink was recorded.	4
South Brook (West of the A1)	N/A	South Brook was not surveyed as construction works were continuing adjacent to the brook, west of the A1, and access remained impossible.	5
South Brook (East of the A1)	15 and 16 January 2019	No evidence of Otter or Mink were identified within this watercourse.	6

Table 4.4: Summary of Otter and Mink field signs recorded in spring 2019

Watercourse	Survey date	Results	Photo number (see Annex A)
River Great Ouse	7 and 10 May 2019	No Mink evidence was recorded. The Otter survey determined that Otters use the river frequently for foraging and shelter. A significant number of old, recent and fresh spraints were recorded again within the Survey Area and within the wider catchment that was surveyed. The recurring evidence of old, recent and fresh spraint in April and May 2019 and those recorded in other seasons indicates that Otter activity is relatively constant along the River Great Ouse throughout the year, confirming the importance of this river for Otter as foraging and commuting habitat. A number of potential resting sites have been identified. Foraging signs have been noted up and downstream on vegetation.	1
Begwary Brook CWS	9 April 2019	No evidence of Mink was recorded during this survey. Recent Otter spraints were found on a fallen tree near a wooden footbridge as well as on a tree stump at the confluence with the River Great Ouse. A number of older Otter spraints were found on a fallen tree with a long hollow cavity (**Figure 2**- potential resting site O76), which suggests that it is used by Otter but perhaps not continuously throughout the year,	2
Hen Brook	7 May 2019	No Mink evidence was recorded. Otter spraints were recorded in a number of locations within the Survey Area and also including where the Scheme crosses this watercourse. A potential resting site (**Figure 2**- potential resting site O99) was identified 250m east of where the Scheme will cross this watercourse; this was located under a tree with a cavity on the bank of the brook. Otter activity had increased on this watercourse in spring compared to the winter months, which suggests Hen Brook is more important for Otters in certain seasons. This could be due to fish migration and better foraging opportunities or expanding territorial ranges.	3

Watercourse	Survey date	Results	Photo number (see Annex A)
Stone Brook	7 and 10 May 2019	No Mink evidence was recorded. No Otter evidence was found. At the time of the survey, the ditch had been heavily dredged and vegetation had barely re-established on one of the banks where vegetation had been removed in the winter. This reduced the likelihood of Otter using this ditch due to the exposed nature of the bankside habitat, although they may use it for foraging and commuting due to its proximity to the River Great Ouse.	4
South Brook (West of the A1)	N/A	South Brook was not surveyed as adjacent construction works had continued and the stretch of South Brook could no longer be accessed.	5
South Brook (East of the A1)	9 April2019	No evidence of Mink was recorded. No evidence of Otter was found within this watercourse.	6
Caxton Gibbet attenuation pond	10 May 2019	No signs of Mink or Otter were recorded within the pond. Dense reeds, dry in places.	7

Camera trap survey results

4.3.3 The camera trap monitoring of the River Great Ouse in October and November 2018 confirmed the presence of Otter on the fallen tree protruding into the river 140m south of the Scheme which had a long, split cavity. Otter was not seen entering the cavity and it could not be confirmed that this location was being used as a resting site.

4.3.4 Mink was also recorded using the tree.

4.3.5 Camera trap monitoring was undertaken again in January and February 2019 at the location previously monitored on the River Great Ouse as well as on Hen Brook where a potential resting site had been identified. However, no Otters were recorded using these potential resting sites during this survey, there was no other riparian mammals recorded.

4.3.6 **Table 4.5** presents the results of the camera trap survey.

Table 4.5: Riparian mammal camera trapping results, 2018 and 2019

Species	Date of record	Location	Description	Photo number (see Annex A)
Otter	26 October 2018	River Great Ouse on Camera 1	Single adult Otter seen on potential resting site	8
Mink	29 October 2018	River Great Ouse on Camera 1	Single Mink seen on potential resting site	9
Mink	14 November 2018	River Great Ouse on Camera 2	Single Mink seen on potential resting site	10
Mink	3 February 2019	River Great Ouse on Camera 1	Single Mink seen on potential resting site	11

Survey weather records

4.3.7 The weather conditions recorded during the Otter and Water Vole surveys conducted are given in **Table 4.6.**

Table 4.6: Survey weather conditions for Otter and Water Vole surveys conducted in March, July-August and October-November 2018, and January and April 2019

Survey date	Weather Information (maximum day temperature)	
	Day before survey	Day of survey
21 March 2018	10°C, dry, cloudy	11°C, dry, cloudy
Weather conditions during summer surveys 2018		
24 July 2018	30°C, dry, mostly sunny	29°C, dry, mostly sunny
8 August2018	29°C, dry, mostly sunny	23°C, dry, mostly sunny
9 August 2018	23°C, dry, mostly sunny	17°C, light - heavy rain, overcast
15 August 2018	24°C, dry, mostly cloudy	24°C, dry, mostly cloudy
Weather conditions during autumn surveys 2018		
25 October 2018	14°C, dry, mostly cloudy	14°C, dry, mostly cloudy
29 October 2018	9°C, light rain, overcast	8°C, dry, mostly cloudy
30 October 2018	8°C, dry, mostly cloudy	8°C, dry, mostly cloudy

Survey date	Weather Information (maximum day temperature)	
	Day before survey	Day of survey
31 October 2018	8°C, dry, mostly cloudy	12°C, dry, mostly cloudy
5 November 2018	12°C, dry, overcast	14°C, dry, mostly cloudy
6 November 2018	14°C, dry, mostly cloudy	14°C, dry, mostly cloudy
Weather conditions during winter surveys 2019		
15 January. 2019	9°C, dry, cloudy	9°C, dry, mostly cloudy
16 January 2019	9°C, dry, mostly cloudy	10°C, light drizzle, mostly cloudy
17 January 2019	10°C, light drizzle, mostly cloudy	5°C, dry, partly cloudy
18 January 2019	5°C, dry, partly cloudy	5°C, dry, fair
Weather conditions during spring surveys 2019		
9 April 2019	16°C, dry, misty	12°C, dry, fair
10 April 2019	12°C, dry, fair	11°C, dry, partly cloudy
7 May 2019	11°C, dry, partly cloudy	14°C, dry, partly cloudy
10 May 2019	12°C, dry, mostly cloudy	14°C, dry, partly cloudy

4.4 Evaluation of nature conservation value

4.4.1 A hierarchical geographical approach was used to assign the nature conservation value of any Otter, Water Vole and Mink foraging in and commuting along habitat associated with the Scheme (see Section 3.6). Ref 1-13Ref 1-14

4.4.2 The importance presented reflects the currently known distribution of Water Vole, Otter and Mink within the Survey Area.

Water Vole

4.4.3 Water Vole was recorded in 2009 and 2010 within 500-900 metres south-east of the existing Caxton Gibbet roundabout.

4.4.4 No evidence of Water Vole was recorded during the surveys in 2018 or 2019.

4.4.5 Water Vole used to be widespread in Cambridgeshire and Bedfordshire but has declined dramatically in recent decades. The decline is largely attributed to the changes in habitat quality and the presence of Mink. Water Vole is vulnerable to predation by Mink, which has been identified within the Survey Area. Water Vole has not been recorded within the Survey Area as a result of either the surveys reported here or through the search for past records.(Ref 1-16). The nearest populations are in the Bourn catchment to the east of the Scheme, part of the River Cam catchment (Green and Baker, 2004) (Ref 1-16) and in the River Ivel upstream of its confluence with the River Great Ouse (Ref 1-21). Given the decline of Water Vole in this area, the unobtrusive nature of this species and the potential impact of the Scheme, a precautionary nature conservation valuation has been applied which considers Water Voles to be of Local importance.

Otter

4.4.6 Otter was present on five watercourses surveyed within 500 metres of the Order Limit(the River Great Ouse, Hen Brook, Stone Brook, South Brook and Begwary Brook) following the surveys undertaken in 2018 and 2019 in the Survey Area. Anecdotal evidence suggests that a family of Otters has been seen using the stretch of the River Great Ouse within the Survey Area (personal communication with a local resident).

4.4.7 In total 12 potential resting sites (above ground and underground resting sites, i.e. couch and holts) where found during the field surveys. Of the 12 potential resting sites, 10 were located within 500 meters of the Order Limits. In addition to this, two more potential resting sites where identified during the field surveys along River Great Ouse but located outside of the 500 meter zone of the Order Limits (Refer to **Figure 1**- O9 and O10). No confirmed otter holts where found during the survey.

4.4.8 Nine of these twelve potential resting sites were identified along the River Great Ouse.

4.4.9 Of the remaining three resting sites, one was recorded in Begwary Brook CWS and Nature Reserve during the surveys in 2018 and 2019 (Refer to **Figure 1**- O49 and **Figure 2**- O76). This was in a long cavity within a fallen tree in woodland, where number of old and recent spraints were recorded during survey in 2018 at the cavity opening suggesting it was being used by Otter.

4.4.10 Two were located on Hen Brook, the first was found during the surveys in 2018 in a cavity of a poplar tree within the Order Limits where the Scheme crosses Hen Brook (**Figure 1**- O25) during the surveys in 2018. This was subsequently monitored with camera traps in January 2019. No evidence of Otters was recorded by the camera trap. The second was found during the surveys in 2019, (**Figure 2** –O99) with recent spraints around was found along the northern riverbank of Hen Brook, located to the east of the Scheme.

4.4.11 The River Great Ouse is likely to support a good population of Otter based on the evidence recorded, (a large number of spraints of varying ages and footprints recorded throughout the Survey Area). Hen Brook, Stone Brook and South Brook are associated with the River Great Ouse and Otter evidence in the form of spraints was recorded on these watercourses, although not in such significant numbers. This indicates that the River Great Ouse is the most important watercourse for Otter in the area due to its variety of suitable habitat, which provides cover, resting sites and breeding habitat for Otters along its banks. The River Great Ouse would also be the main foraging habitat as it supports a number of prey species. Recent desk study records for Otter were provided for the River Great Ouse and Begwary Brook CWS. Apart from one record of Otter in Hen Brook near St Neots, no evidence of Otter was found in the review of existing information along the other brooks and ditches within the desk study.

4.4.12 It is concluded that the nature conservation value for Otter and its foraging and commuting habitat, in the areas associated with the Scheme is of Regional importance.

Mink

4.4.13 Mink is a non-native invasive species and has been confirmed as present along the River Great Ouse. Mink prey on ground nesting birds and rodents such as Water Vole; as such its presence could explain the absence of Water Vole within the Survey Area. Mink is widespread in Cambridgeshire (Ref 1-12). Due to its widespread presence in the geographical area and the adverse impacts it can have on native species it is considered to be of County importance.

5. Summary & conclusion

5.1.1 Watercourses and waterbodies within the Survey Area for the Scheme were surveyed for Water Vole, Otter and Mink to inform the biodiversity assessment reported in **Chapter 8, Biodiversity** of the Environmental Statement [**TR010044/APP/6.1**). The River Great Ouse, Begwary Brook CWS, Hen Brook, Stone Brook, South Brook and the attenuation pond at the Caxton Gibbet roundabout were identified as providing potentially suitable habitat for all three species and were surveyed.

5.1.2 There were no past records of Water Vole for any of the watercourses or waterbodies within the Study Area, i.e. a 2 kilometre (0.6 mile) radius of the of the Order Limits for the past 10 years, apart from the River Ivel immediately upstream of the Survey Area and watercourses 500-900 metres south-east of the existing Caxton Gibbet roundabout in 2009 and 2010 and surveys of Bourn Airfield in 2017-18, both of which are in a different catchment from the majority of the Survey Area. Surveys between July 2018 and May 2019 confirmed the likely absence of Water Voles within the Survey Area. Water Vole has been given a precautionary nature conservation value of Local importance.

5.1.3 Evidence of Otter was found along the River Great Ouse, Begwary Brook CWS, Hen Brook, Stone Brook and South Brook (Refer to Annex A: **Table A1**) this included spraints, footprints, slides and resting sites. A total of twelve resting sites were found, no confirmed holts were identified during the survey. Two of these resting sites are found within the Order Limit, the first was located on the River Great Ouse (**Figure 1**- O17), which suggests at least temporary use by Otters, and the second was identified on Hen Brook (**Figure 1**- O25) although no evidence of use could be confirmed. Camera trap monitoring was undertaken in one location on the River Great Ouse as a potential resting site was located 140 metres south of the proposed river crossing and at the location on Hen Brook which will also be crossed by the Scheme. Camera trap monitoring did not confirm that Otters use these potential holts. The nature conservation value for Otter is of Regional importance.

5.1.4 Mink is considered to be of County importance.

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Annex A: Full survey results

Table A1: Otter survey results

Feature ID	Survey date	Field sign	Description	Grid reference
O1	21.03.18	Old spraint	Approximately 3 months old, passing through	TL1700155899
O2	21.03.18	Old spraint	3 otter spraints. Not used for some time.	TL1697755841
O3	21.03.18	Old spraint	Old otter spraint and good resting habitat in woodland	TL1676955268
O4	21.03.18	Potential resting site	Very fresh spraint. Anal jelly and older spraint present. Good potential resting site. Worth camera trapping	TL1675155208
O5	21.03.18	Old spraint	2 older otter spraints	TL1669855095
O6	21.03.18	Recent spraint	Recent Otter spraint	TL1674255161
O7	24.07.18	Recent spraint	3 recent otter spraint	TL1699756389
O8	24.07.18	Old spraint	Old spraint around base of willow	TL1692456833
O9	24.07.18	Potential resting site	Potential resting site base of willow reaching across river, hollow, no spraints present	TL1785957211
O10	24.07.18	Potential resting site	Potential resting site with single spraint under willow	TL1715857043
O11	24.07.18	Slide	Slide on bank	TL1693456482
O12	24.07.18	Slide	Slide on bank	TL1700756250
O13	24.07.18	Old spraint	2 old spraints	TL1703056164
O14	24.07.18	Old spraint	Several month old spraints	TL1677055279
O15	24.07.18	Potential resting site	Potential resting site, locals suggest family of otter heard and seen within 5 weeks	TL1612453974
O16	24.07.18	Fresh spraint	Several fresh spraints present around island near lock	TL1607853493

Feature ID	Survey date	Field sign	Description	Grid reference
O17	24.07.18	Potential rest site	Potential resting site at base of willow (no spraints)	TL1673655269
O18	08.08.18	Old spraint	Old single spraint	TL1595555897
O19	08.08.18	Recent spraint	Recent and old spraint (few weeks old)	TL1594055901
O21	09.08.18	Footprint	Imprint in mud, likely otter	TL1614854370
O22	09.08.18	Fresh spraint	Fresh spraint	TL1669355095
O23	09.08.18	Old spraint	Older spraint on iron work of bridge <6 months old	TL1673255180
O24	09.08.18	Fresh spraint	Fresh spraint on log over brook	TL1721354900
O25	09.08.18	Potential resting site	In base of poplar tree on brook, no spraints	TL1997458647
O26	25.10.18	Old spraint	Older spraint on tree at least several months (spraint dray and crumbly)	TL1689455579
O27	25.10.18	Fresh spraint	Fresh spraint ,very recent	TL1692155675
O28	25.10.18	Old spraint	Older spraint	TL1694655728
O29	25.10.18	Old spraint	Older spraint	TL1697755810
O30	30.10.18	Fresh spraint	Mixture of very fresh and some older spraint, under bridge	TL2006458552
O31	30.10.18	Recent spraint	Recent spraint on bank near culvert	TL1985858794
O32	30.10.18	Fresh spraint	Fresh spraint on rock in brook	TL2018958460
O33	30.10.18	Old spraint	Older spraint at base of tree	TL2030558358
O34	31.10.18	Recent spraint	4 old spraints, one recent	TL1696355900
O35	31.10.18	Old spraint	Single old spraint	TL1693555791
O36	31.10.18	Old spraint	Single old spraint	TL1612253978

Feature ID	Survey date	Field sign	Description	Grid reference
O37	31.10.18	Recent spraint	Recent, fresh single spraint	TL1612353764
O38	31.10.18	Fresh spraint	Multiple fresh spraints, hole in bank present	TL1607453765
O39	31.10.18	Recent spraint	Recent spraint	TL1601553481
O40	31.10.18	Recent spraint	Recent spraint	TL1611453931
O41	31.10.18	Old spraint	Single old spraint	TL1613854103
O42	31.10.18	Recent spraint	Single recent spraint few weeks old	TL1673955269
O43	31.10.18	Recent spraint	Single recent spraint few weeks old	TL1698755966
O44	31.10.18	Recent Spraint	Single spraint recent	TL1700056362
O45	31.10.18	Fresh spraint	Fresh single spraint	TL1699756396
O46	05.11.18	Fresh spraint	Fresh and old spraints	TL1680256488
O47	05.11.18	Fresh spraint	Fresh spraint present	TL1677456511
O48	05.11.18	Potential resting site	Possible otter couch	TL1673356574
O49	05.11.18	Potential resting site	Potential resting site good fallen tree with long hollow cavity, fresh and old spraints	TL1680256487
O50	06.11.18	Fresh spraint	Multiple fresh and old spraints	TL1675155208
O51	24.07.18	Fresh spraint	Fresh and old spraint under bridge	TL1803758117
O52	24.07.18	Fresh spraint	Fresh and old spraint under bridge	TL1801458113
O53	15.1.19	Old spraint	Old spraint	TL1618554245
O54	15.1.19	Old spraint	Old spraint	TL1610353748
O55	15.1.19	Fresh spraint	Multiple fresh spraint under plank bridge	TL1610053751

Feature ID	Survey date	Field sign	Description	Grid reference
O56	15.1.19	Footprints	Multiple footprints under plank bridge	TL1609853748
O57	15.1.19	Potential resting site	Temporary resting site. 7 fresh/recent spraint	TL1615154112
O58	15.1.19	Recent spraint	Recent spraint on platform where river branches	TL1615954378
O59	15.1.19	Live Mink	Live mink seen on bank and into den. Scat seen	TL1670955215
O60	16.1.19	Fresh spraint	Fresh spraints and older spraints present	TL1698755968
O61	16.1.19	Recent spraint	Recent. spraint on top of old	TL1703456160
O62	16.1.19	Old spraint	Old spraint under bridge	TL1682856489
O63	16.1.19	Fresh spraint	Otter spraint tar fresh	TL1696856493
O64	17.1.19	Fresh spraint	Fresh otter spraint	TL1698556438
O65	17.1.19	Fresh spraint	Two fresh otter spraints	TL1699856395
O66	17.1.19	Recent spraint	Recent otter spraint tar, older spraint	TL1679155344
O67	17.1.19	Fresh spraint	Fresh spraint on tree log potential resting site	TL1674355217
O68	17.1.19	Potential resting site	Recent spraint on tree log potential resting site	TL1675855242
O69	17.1.19	Old spraint	Old spraint on tree log potential resting site	TL1676355234
O71	17.1.19	Fresh spraint	three fresh spraints on footbridge	TL1678056460
O72	17.1.19	Fresh spraint	Multiple fresh spraints at entrance to tree cavity	TL1680156490
O73	17.1.19	Recent spraint	Spraints on log rising from water edge	TL1680756496
O74	17.1.19	Potential resting site	Potential resting site. lots of debris so not likely being used	TL1700856247

Feature ID	Survey date	Field sign	Description	Grid reference
O75	18.1.19	Fresh spraint	Fresh spraint under bridge	TL2006658561
O76	9.4.19	Potential resting site	Old spraints on fallen tree with resting potential	TL1679956491
O77	9.4.19	Recent spraint	Recent spraint on platform at river confluence	TL1679456491
O78	9.4.19	Recent spraint	Recent spraint on fallen tree near bridge	TL1678956420
O79	10.4.19	Footprints	Recent footprints on island	TL1615754379
O80	7.5.19	Potential resting site	Potential resting site under willow tree	TL1615254381
O81	7.5.19	Fresh spraint	Fresh spraint	TL1615254382
O82	7.5.19	Old spraint	Old spraint	TL1615354381
O83	7.5.19	Old spraint	Many old spraints on study tree	TL1674455232
O84	7.5.19	Recent spraint	Recent spraints on study tree	TL1674455216
O85	7.5.19	Footprints	Series of footprints on mud next to river	TL1671355176
O86	7.5.19	Fresh spraint	Fresh spraint	TL1654155050
O87	7.5.19	Old spraint	Several old spraints	TL1654055051
O88	7.5.19	Footprints	Footprints	TL1647354987
O89	7.5.19	Fresh spraint	Fresh spraint	TL1663054592
O90	7.5.19	Old spraint	Old spraint	TL1669655096
O91	7.5.19	Old spraint	Old spraint	TL1677055281
O92	7.5.19	Recent spraint	Recent spraint	TL1677055282
O93	7.5.19	Recent spraint	Recent spraint under bridge	TL2006458558

Feature ID	Survey date	Field sign	Description	Grid reference
O94	7.5.19	Recent spraint	Recent spraint	TL2018858454
O95	7.5.19	Footprints	Otter footprints	TL2021158437
O96	7.5.19	Old spraint	Two old spraints	TL2030158353
O97	7.5.19	Footprints	Otter footprints	TL2030358356
O98	7.5.19	Fresh tar	Fresh tar	TL2030058354
O99	7.5.19	Potential resting site	Three recent spraints in tree, potential resting site	TL2042058303
O100	10.5.19	Feeding remains	Feeding remains on branch overhanging river. fish scales/fin	TL1617054316
O101	10.5.19	Recent spraint	Recent spraint	TL1613854119
O102	10.5.19	Old spraint	Old spraint	TL1613754118
O103	10.5.19	Feeding remains	Old feeding remains on tree overhanging river	TL1608353506
O104	10.5.19	Recent spraint	Two recent spraints on tree under bridge	TL1622954654
O105	10.5.19	Recent spraint	Two recent spraints on tree	TL1676855276
O106	10.5.19	Recent spraint	Two recent spraints under bridge	TL1802858146
O107	10.5.19	Fresh spraint	Fresh spraint	TL1703156160
O108	10.5.19	Recent spraint	Recent spraint	TL1698455965
O109	10.5.19	Old spraint	Old spraint	TL1696555895
O110	10.5.19	Feeding remains	Recent spraint with feeding remains	TL1696655894
O111	10.5.19	Fresh spraint	Fresh spraint	TL1673855265

Table A2: Photos of watercourses

Watercourses	Photo
River Great Ouse	Photo 1
Begwary Brook	Photo 2
Hen Brook	Photo 3

Watercourses	Photo
Stone Brook	Photo 4
South Brook (West of A1)	Photo 5
South Brook (East of A1)	Photo 6

Watercourses	Photo
Caxton Gibbet attenuation pond	Photo 7

Table A3: Camera trap results (NB dates not set to actual date)

Species	Photo
Otter	Photo 8
Mink	Photo 9

Species	Photo
Mink	Photo 10
Mink	Photo 11

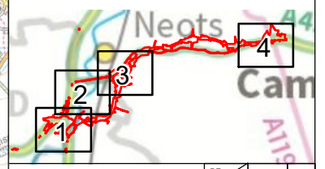
Annex B: Figures

N

NOTES

LEGEND

- Order Limits
- The Scheme
- Survey Area (500m)



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Project Title

A428 BLACK CAT
TO CAXTON GIBBET
IMPROVEMENTS

Drawing Title

FIGURE 1 STUDY AREA:
SUMMER AND AUTUMN 2018
OTTER AND WATER VOLE RESULTS
PAGE 1 OF 5

Designed	Drawn	Checked	Approved	Date
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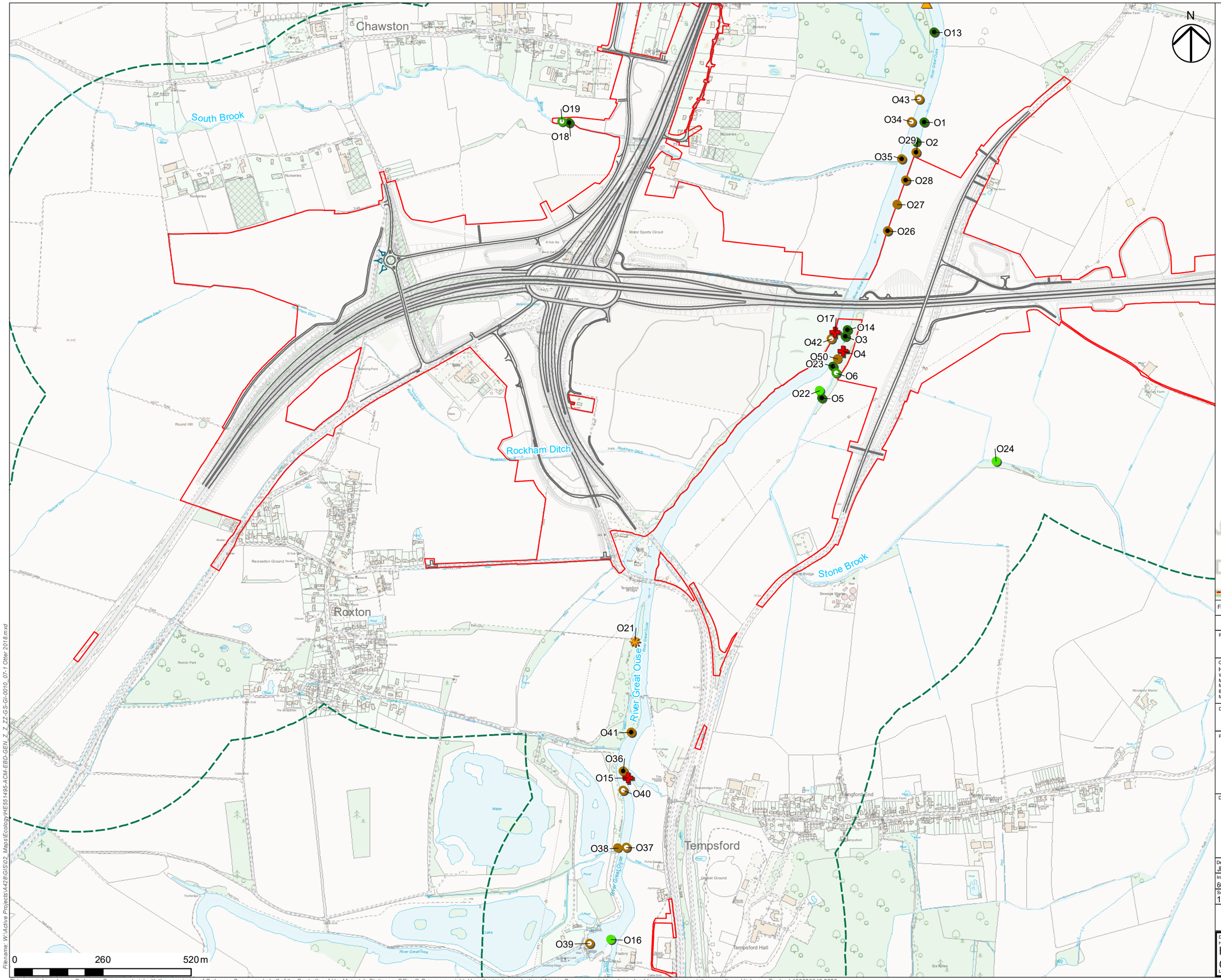

NOTES

LEGEND

- Order Limits
- The Scheme
- Survey Area (500m)

Otter signs

- Potential resting site
- Slide
- Footprint

Spraint signs

Summer 2018 survey

- Fresh spraint, less than one week old
- Recent spraint, less than one month old
- Old spraint, one month or older

Autumn 2018 survey

- Fresh spraint, less than one week old
- Recent spraint, less than one month old
- Old spraint, one month or older

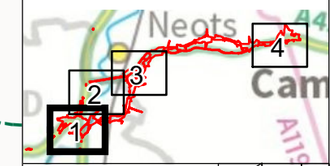

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FIGURE 1 STUDY AREA: SUMMER AND AUTUMN 2018 OTTER AND WATER VOLE RESULTS PAGE 2 OF 5

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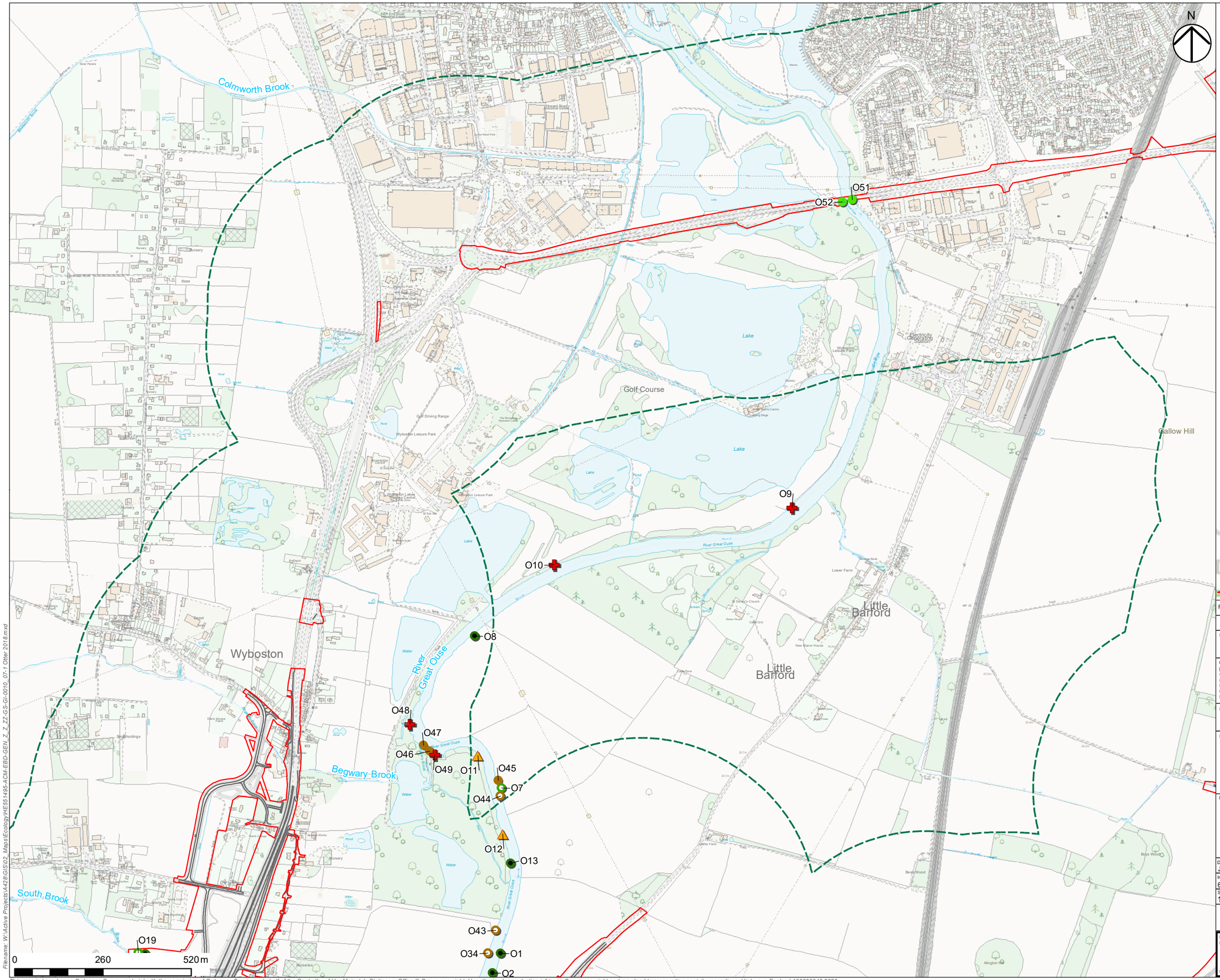

NOTES

LEGEND

- Order Limits
- The Scheme
- Survey Area (500m)

Otter signs

- Potential resting site
- Slide

Spraint signs

Summer 2018 survey

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- Old spraint, one month or older

Autumn 2018 survey

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- Recent spraint, less than one month old

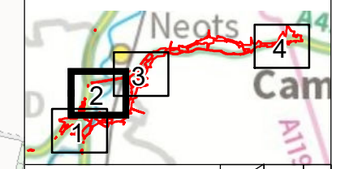

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FIGURE 1 STUDY AREA: SUMMER AND AUTUMN 2018 OTTER AND WATER VOLE RESULTS PAGE 3 OF 5

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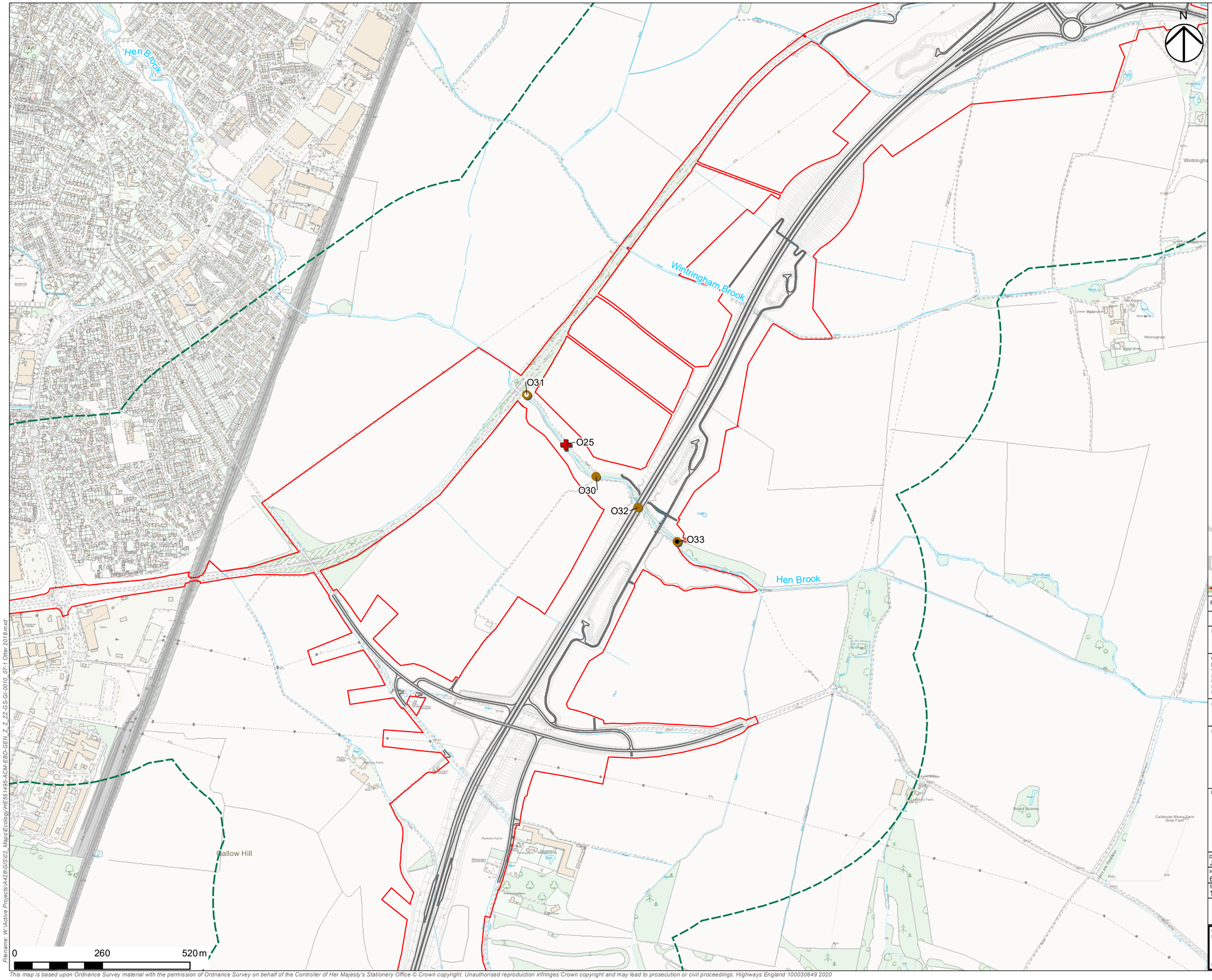

NOTES

LEGEND

- Order Limits
- The Scheme
- Survey Area (500m)

Otter signs

- Potential resting site

Spraint signs

Autumn 2018 survey

- Fresh spraint, less than one week old
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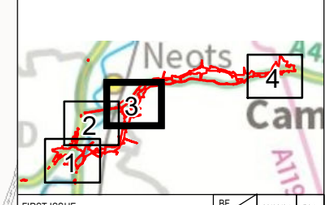

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FIGURE 1 STUDY AREA:
SUMMER AND AUTUMN 2018
OTTER AND WATER VOLE RESULTS
PAGE 4 OF 5

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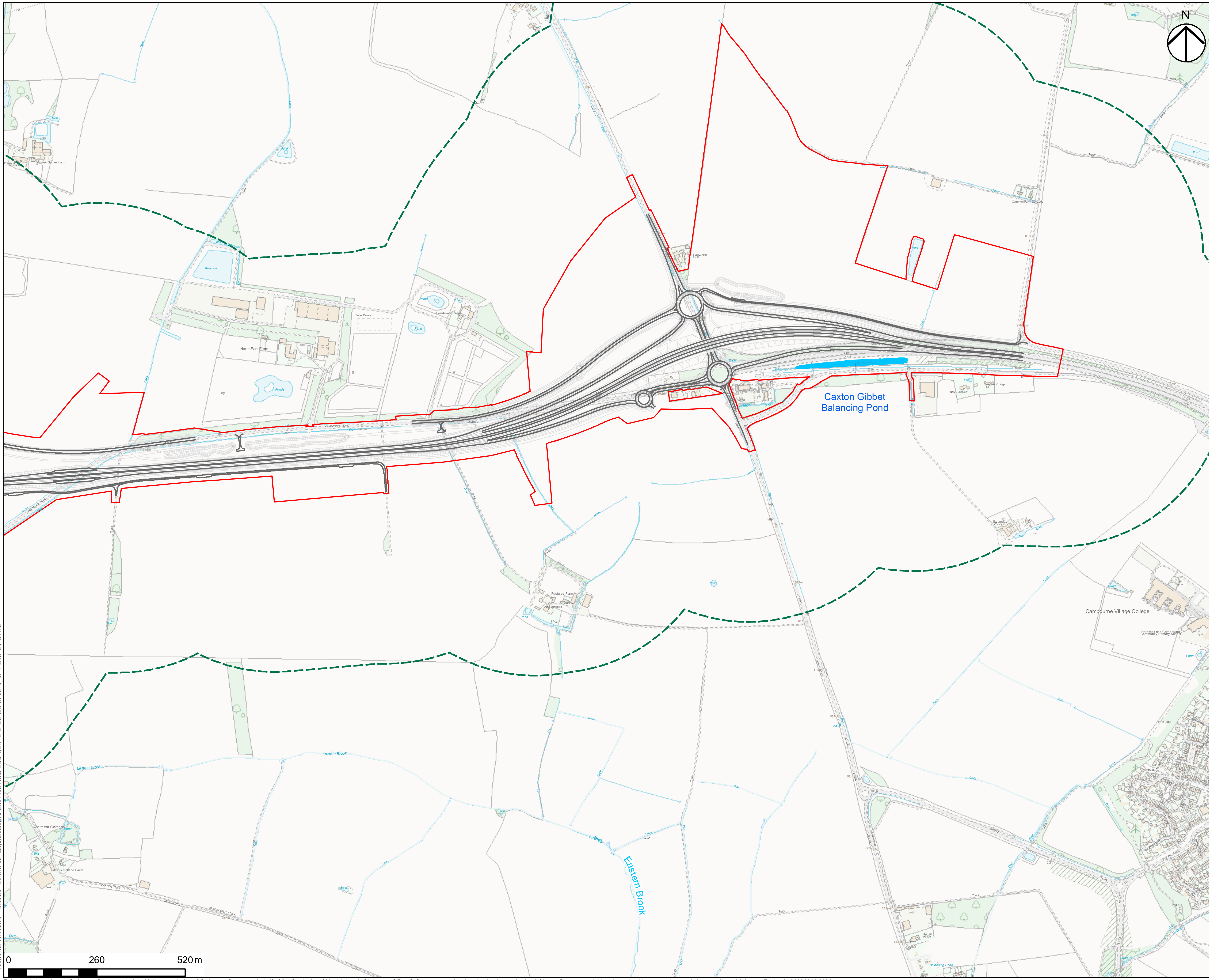

NOTES

LEGEND

- Order Limits
- The Scheme
- Survey Area (500m)

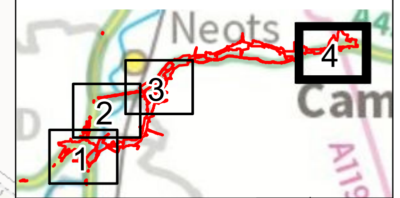

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FIGURE 1 STUDY AREA:
SUMMER AND AUTUMN 2018
OTTER AND WATER VOLE RESULTS
PAGE 5 OF 5

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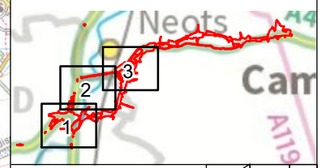
NOTES

LEGEND

- Order Limits
- The Scheme
- Survey Area (500m)



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TO CAXTON GIBBET
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FIGURE 2 STUDY AREA:
WINTER AND SPRING 2019
OTTER AND WATER VOLE RESULTS
PAGE 1 OF 4

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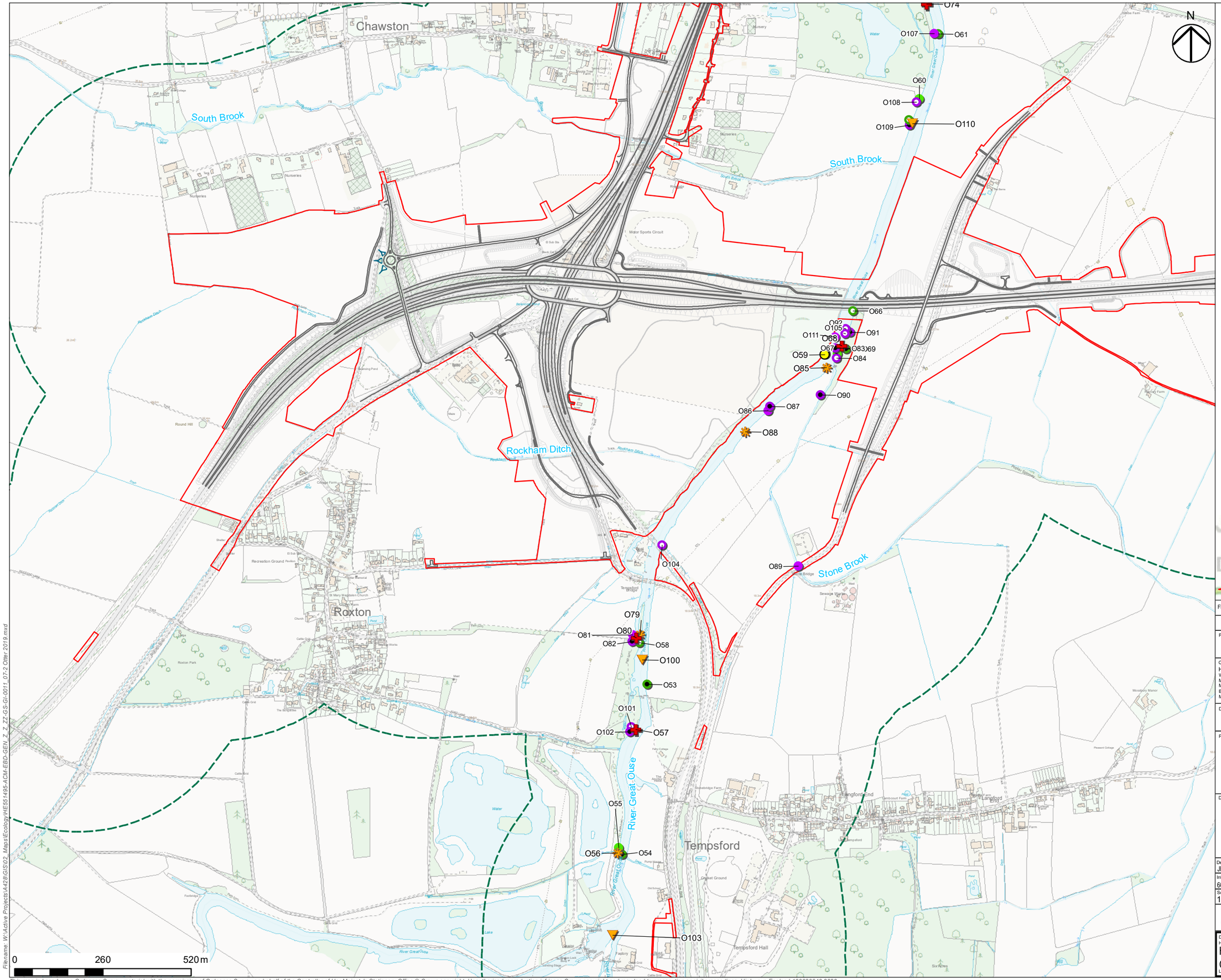


NOTES

LEGEND

- Order Limits
- The Scheme
- Survey Area (500m)

Otter signs

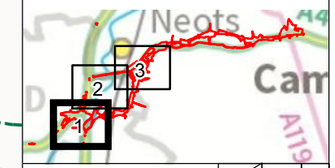
- Potential resting site
- Footprints
- Feeding remains
- Live Mink

Spring 2019 survey

- Fresh spraint, less than one week old
- Recent spraint, less than one month old
- Old spraint, one month or older

Winter 2019 survey

- Fresh spraint, less than one week old
- Recent spraint, less than one month old
- Old spraint, one month or older



Revision Details	By	Check	Date	Suffix
FIRST ISSUE	BF	JG	26/02/21	P01

Purpose of Issue: DCO APPLICATION

Client: Highways England, Woodlands, Manton Lane, Manton Industrial Estate, Bedford, MK41 7LW

Development Consent Order Number: TR010044

Project Title: A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title: FIGURE 2 STUDY AREA: WINTER AND SPRING 2019 OTTER AND WATER VOLE RESULTS PAGE 2 OF 4

Designed	Drawn	Checked	Approved	Date
JB	BF	LH	JG	26/02/21

Internal Project No	Suitability
60541541	D7
Scale @ A3: 1:10,000	Zone

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Drawing Number: Highways England Pin HE551495 | Originator -ACM | Volume -EBD- | Location GEN_Z_Z_ZZ | Type | Role | Number -GS-GI-0011 | Rev P01

Filename: W:\Active Projects\A428\GIS\02_Maps\Ecology\HE551495-ACM-EBD-GEN_Z_Z_ZZ-GS-GI-0011_01-2 Otter 2019.mxd

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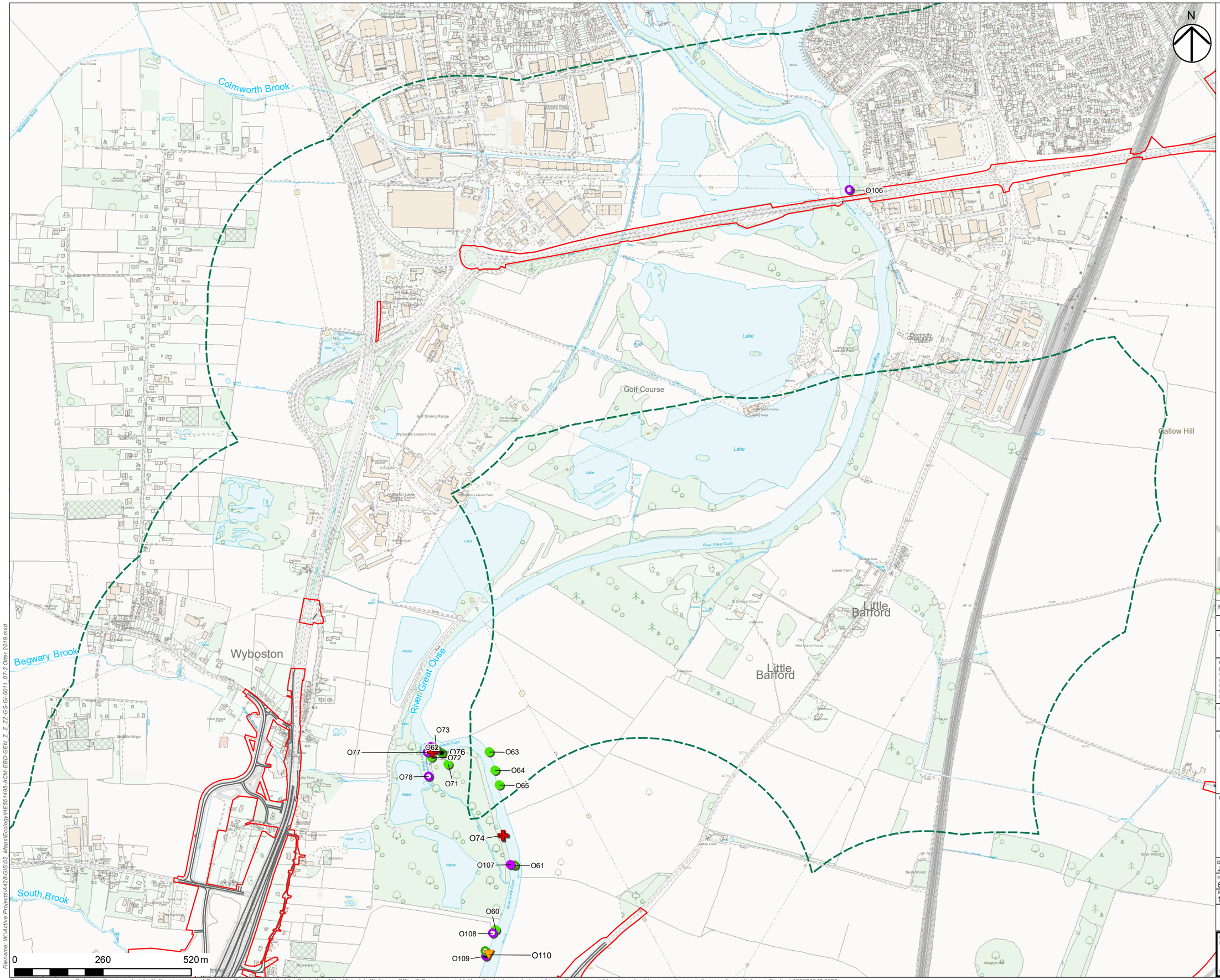


NOTES

LEGEND

- Order Limits
- The Scheme
- Survey Area (500m)

Otter signs

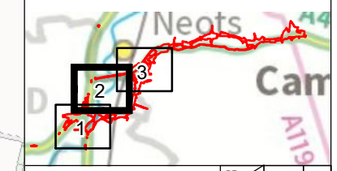
- Potential resting site
- Feeding remains

Spring 2019 survey

- Fresh spraint, less than one week old
- Recent spraint, less than one month old
- Old spraint, one month or older

Winter 2019 survey

- Fresh spraint, less than one week old
- Recent spraint, less than one month old
- Old spraint, one month or older



FIRST ISSUE	BF / JG	26/02/21	P01
Revision Details	By / Check	Date	Suffix

Purpose of Issue

DCO APPLICATION

Client

Highways England
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

FIGURE 2 STUDY AREA: WINTER AND SPRING 2019 OTTER AND WATER VOLE RESULTS PAGE 3 OF 4

Designed	Drawn	Checked	Approved	Date
JB	BF	LH	JG	26/02/21

Internal Project No: 60541541	Suitability: D7
Scale @ A3: 1:10,000	Zone:

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Drawing Number				Rev
Highways England Pin	| Originator	| Volume		
HE551495	-ACM	-EBD-	-GS-GI-0011	P01
GEN_Z_Z_ZZ				
Location		| Type | Role | Number		

Filename: W:\Active Projects\A428\GIS\02_Maps\Ecology\HE551495-ACM-EBD-GEN_Z_Z_ZZ-GS-GI-0011_07-2 Otter 2019.mxd

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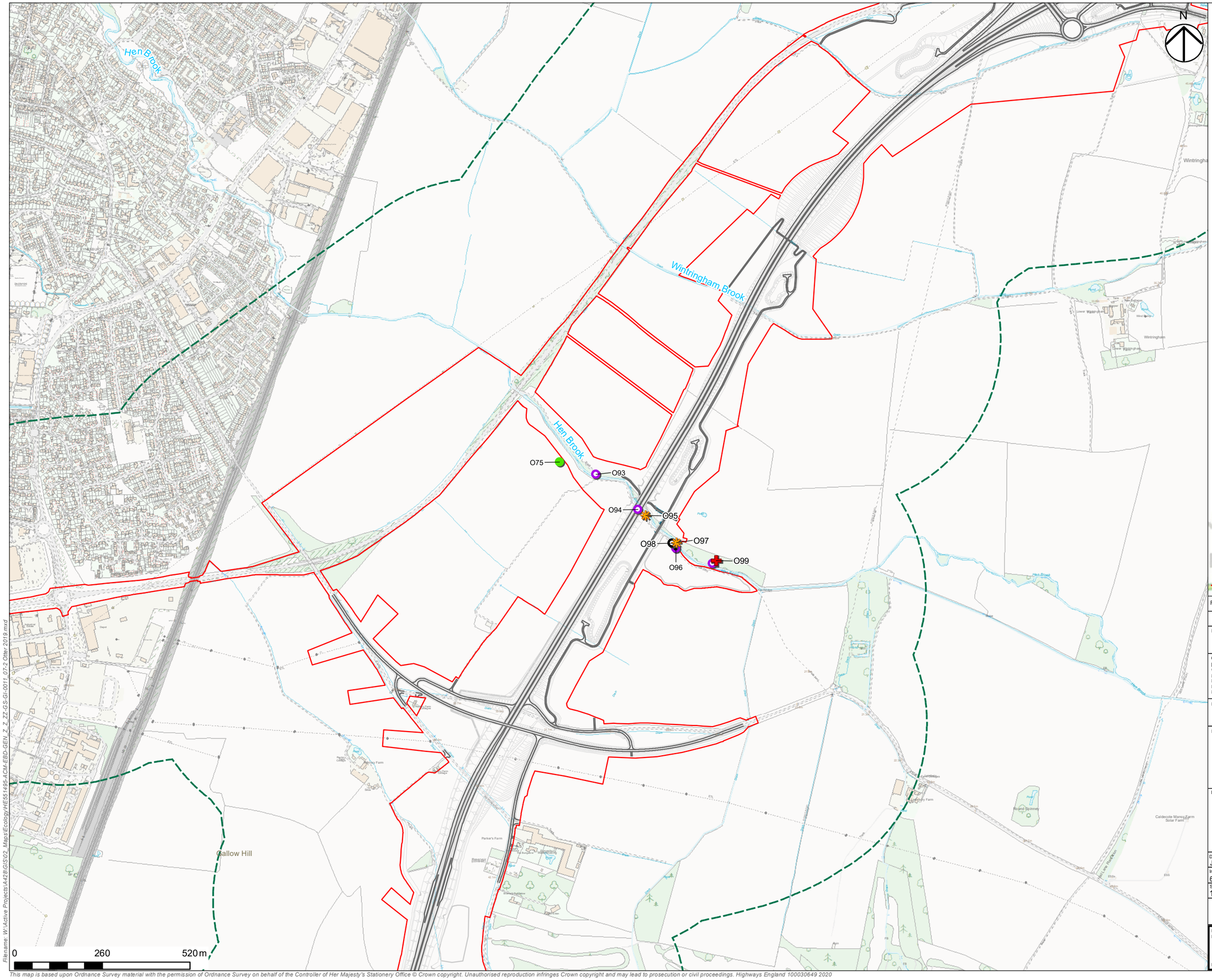

NOTES

LEGEND

- Order Limits
- The Scheme
- Survey Area (500m)

Otter signs

- Potential resting site
- Footprints
- Fresh tar

Spring 2019 survey

- Recent spraint, less than one month old
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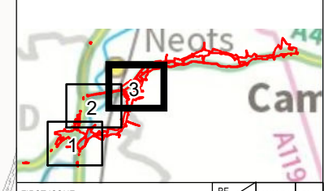
Winter 2019 survey

- Fresh spraint, less than one week old



FIRST ISSUE	BF / JG	26/02/21	P01	
Revision Details	By / Check	Date	Suffix	

Purpose of Issue

DCO APPLICATION

Client

Highways England
Woodlands
Manton Lane
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MK41 7LW

Development Consent Order Number

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Project Title

A428 BLACK CAT
TO CAXTON GIBBET
IMPROVEMENTS

Drawing Title

FIGURE 2 STUDY AREA:
WINTER AND SPRING 2019
OTTER AND WATER VOLE RESULTS
PAGE 4 OF 4

Designed	Drawn	Checked	Approved	Date
JB	BF	LH	JG	26/02/21

Internal Project No: 60541541	Suitability: D7
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Drawing Number

Highways England Pin	Originator	Volume	Rev
HE551495	-ACM	-EBD-	P01

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