

# **A1 in Northumberland: Morpeth to Ellingham**

**Scheme Number: TR010041**

## **6.7 Environmental Statement – Appendix 9.17 Water Vole and Otter Survey Report**

### **Part A**

APFP Regulation 5(2)(a)

Planning Act 2008

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Infrastructure Planning

Planning Act 2008

**The Infrastructure Planning  
(Applications: Prescribed Forms and  
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**Environmental Statement - Appendix**

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# A1 in Northumberland

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Water Vole and Otter Survey Report

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A1 in Northumberland  
Water Vole and Otter Report

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## EXECUTIVE SUMMARY

This technical report presents the findings of water vole and otter surveys undertaken by Jacobs UK Ltd. (Jacobs) on behalf of Highways England. The report provides a summary of ecological information obtained from a desk study as well as the results from a water vole and otter survey that was undertaken between the 5<sup>th</sup> and 9<sup>th</sup> September 2016 and the 17<sup>th</sup> and 19<sup>th</sup> October 2016. An additional water vole and otter survey was undertaken between the 30<sup>th</sup> May and 2<sup>nd</sup> June 2017. This report been updated to include results from survey undertaken in 2016 and 2017.

The aim of the survey was to determine the presence or likelihood of protected fauna which may pose constraints upon the proposed upgrade to dual carriageway of the A1 between Morpeth and Ellingham. The proposals comprised two discreet sections:

- Section A - Morpeth to Felton, and;
- Section B - Alnwick to Ellingham.

Thirty-eight desk study records for water vole and otter were received from the local records centre, the Environmental Records Information Centre North East (ERIC North East).

Records from the 2 km study area around Section A were widespread although a notable cluster of ten otter records was returned for the River Coquet and Felton Park area. The 2 km study area for Section B had much fewer otter records; 11 in all, clustered around the River Aln at Alnwick, Charlton Bog and Charlton Mires.

Water vole records were limited to a single count at Rock at the limit of the surveyed area in Section B.

Field surveys in the study area focused on suitable water vole and otter habitat that included several specific locations such as the River Coquet, River Lyne, Denwick Burn and associated tributaries and field drainage ditches.

Water vole field signs (e.g. latrines, prints) were found within four watercourses in Section A including the River Coquet and Fenrother Burn and five watercourses in Section B including Shipperton Burn and White House Burn. The other 35 surveyed watercourses provided no field signs. The comparatively low habitat suitability for water vole within these watercourses may be a factor in the lack of colonisation as is likely the case with American mink, field signs of which were noted in three watercourses containing water vole.

Otter field signs were noted on the River Coquet, within Longdike Burn at Bockenfield and within Earsdon Burn at Causey Park.

The results within this report reflect the site conditions up to 2<sup>nd</sup> June 2017. As the behaviour of wildlife is seasonable and highly unpredictable, it is therefore considered good practice that the surveys for water voles and otters should be repeated if the development is deferred for over 12 months from the date of the initial survey.

## 1 INTRODUCTION

### 1.1 Background

- 1.1.1 Following the outcomes of the 2014 A1 North of Newcastle Feasibility Study the Department of Transport confirmed, in its first Roads Investment Strategy, the intention to upgrade twenty-one kilometres of the existing A1 to a dual carriageway between Morpeth and Ellingham in Northumberland. This comprised two discreet sections:

- Section A - Morpeth to Felton, and;
- Section B - Alnwick to Ellingham.

- 1.1.2 At that stage of the project (PCF Stage 2) three options were under consideration for Section A and one option was under consideration for Section B, these are briefly described below:

#### Section A - Morpeth to Felton

- Online Option – this option follows the line of the existing A1.
- Hybrid Option - this option has a similar arrangement to the online option, however a short offline section would provide a smoother curve between Causey Park Bridge and Bockenfield Bridge. A short section of the existing A1 would be de-trunked (i.e. handed over for maintenance by Northumberland County Council rather than Highways England) and form part of a local road network.
- Offline Option – this option would be online at its northern and southern ends, but a large central section would form a new bypass to the west of the existing A1 between the Floodgate Burn crossing and Bockenfield Bridge. The existing A1 would be de-trunked and form part of a local road network, which would separate local and strategic traffic.

#### Section B – Alnwick to Ellingham

- Online Option – this option follows the route of the existing A1. This option includes the construction of a single compact grade separated junction accommodating all movements, with an overbridge, at Charlton Mires, linking the A1 with the B6347; all other junctions would be closed off, and the provision of a number of accommodation bridges to improve connectivity and allow access to farm units.
- 1.1.3 At the time of the water vole and otter survey undertaken in 2017, only a single option was under consideration for Section A; namely the Offline Option. Section B option(s) were no longer being progressed at this time therefore survey data presented in this report for May/June 2017 focuses on Section A options only.

### 1.2 Report Rationale

- 1.2.1 The aim of this report is to present water vole (*Arvicola amphibius*) and otter (*Lutra lutra*) desk study information and data from field surveys undertaken in September and October 2016 and May and June 2017 by Jacobs on behalf of Highways England. The information presented will be used to inform the preferred option and identify the requirement for additional surveys to be completed at PCF Stage 3. The data will ultimately inform the Environmental Impact assessment (EIA) for the preferred options.

### 1.3 Definitions

- 1.3.1 The study area refers to a 2 km buffer around the proposed options for Section A and Section B in which desk study information has been collated via online and third party sources. The buffer is shown on Figures 2.1 – 2.19, Figures 3.1-3.13 and Figures 4.1 – 4.19 in Section 6 of this report.

- 1.3.2 The survey area refers to a 500 m buffer around the proposed options for Section A and Section B.

#### **1.4 Legislative and Regulatory Context**

- 1.4.1 A summary of the legislation and policy framework for water vole and otter is provided below:

- 1.4.2 An assessment of the legislative and regulatory framework covering amphibians in the UK has been undertaken. Due consideration has been given to the following statutory instruments and policy frameworks in the preparation of this report:

- Conservation of Habitats and Species Regulations 2017<sup>1</sup>;
- Wildlife and Countryside Act 1981 (as amended)<sup>2</sup> (WCA), and;
- Natural Environment and Rural Communities Act 2006<sup>3</sup> (NERC).

- 1.4.3 Water vole are fully protected under Section 9 of the Wildlife and Countryside Act 1981 (as amended) through its inclusion in Schedule 5. This legal protection makes it an offence to:

- intentionally kill, injure or capture or take a water vole;
- deliberately (intentionally) or recklessly damage, destroy or obstruct access to a breeding site or any structure or place used for shelter or protection by a water vole, and;
- deliberately (intentionally) or recklessly disturb a water vole whilst occupying such as structure or place.

- 1.4.4 Otter are afforded strict protection under the Conservation of Habitats and Species Regulations 2017 and the Wildlife and Countryside Act 1981 (as amended). In summary the relevant parts of this legislation make it illegal to:

- intentionally kill, injure or capture or take an otter;
- intentionally or recklessly disturb an otter whilst it is occupying a holt;
- deliberately disturb an otter in such a way as to be likely to significantly affect the local distribution or abundance of otters or the ability of any significant group of otters to survive, breed, rear or nurture their young;
- deliberately (intentionally) or recklessly damage, destroy or obstruct access to a holt; and,
- deliberately (intentionally) or recklessly disturb an otter whilst it is occupying such a structure or place.

#### ***Natural Environment and Rural Communities (NERC) Act, 2006***

- 1.4.5 In addition to species protected by law, Section 41 of the Natural Environment and Rural Communities (NERC) Act, 2006 requires the Secretary of State to publish a list of species which are of principal importance for the conservation of biodiversity in England. There are currently 943 species of principal importance listed. Both otter and water vole are listed as Species of Principal Importance (SoPIs).

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<sup>1</sup> <https://www.legislation.gov.uk/uksi/2017/1012/contents/made>

<sup>2</sup> <http://www.legislation.gov.uk/ukpga/1981/69>

<sup>3</sup> [http://www.legislation.gov.uk/ukpga/2006/16/pdfs/ukpga\\_20060016\\_en.pdf](http://www.legislation.gov.uk/ukpga/2006/16/pdfs/ukpga_20060016_en.pdf)

## Nature Conservation Status

- 1.4.6 The Local Biodiversity Action Plan (LBAP) for Northumberland contains 22 species action plans (Northumberland LBAP 2008, 2008a). Both otter and water vole have specific species action plans (SAPs). The summaries of these SAPs are outlined below.

### Otter

- 1.4.7 Currently otter have been recorded on every river catchment in Northumberland. In more recent years they have started to populate watercourses in urban centres such as Blyth, Morpeth and Newcastle upon Tyne. In many cases however, this expansion is into largely 'unsuitable' areas, which support impoverished prey resources and poor quality habitat. Improvements in water quality and habitat have been largely responsible for the return of the otter to Northumberland's rivers. This has led to its much increased distribution in the past five years. It has also led to the sharp increase in the number of fatalities on the region's roads as the population expands to seek new territory. It is understood that the majority of otter fatalities recorded are young, fit and healthy individuals. The SAP for otter lists a number of priority actions including:

- ensuring all operations affecting watercourses take account of otters, retaining features such as old trees, scrub and overhanging root systems;
- ensuring that designated otter sites are properly recognised within River Basin Management Plans as required by the Water Framework Directive;
- encouraging land owners and managers to carry out favourable management of the riparian zone to protect river margins and encourage the expansion of otter populations; and,
- identifying and prioritising sites where suitable enhancement, restoration and management works may be considered to benefit the otter<sup>4</sup>.

### Water Vole

- 1.4.8 Water vole populations have declined locally by over 95%, leaving very few sites left in Northumberland with water vole presence. As regional populations have contracted, colonies have become extremely fragmented and local surveys show that these isolated pockets survive at very low densities, making them extremely vulnerable and facing a real possibility of extinction from the county. Surviving colonies in Northumberland are mainly found in upland burns, coastal streams and drains and urban watercourses. The future of the water vole in Northumberland as anywhere in the country is dependent on the relative presence or absence of the mink. Evidence from Northumberland has shown that the increase in the region's otter population has succeeded in reducing the overall presence of mink in the county. However, there is limited scope of a total eradication of mink but some form of targeted control in key water vole areas would be beneficial<sup>5</sup>. The SAP for water vole lists a number of priority actions including:

- establishing an effective perimeter network of mink control around key water vole areas with appropriate parties;
- investigating the feasibility of reintroduction of the water vole to appropriate previously occupied sites;
- carrying out riparian habitat improvements for water vole, particularly up and down stream of known sites in order to prevent isolation; and,

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<sup>4</sup> <http://www.nwt.org.uk/sites/default/files/files/Otter.pdf>

- ensuring all land managers/owners of sites containing or adjacent to water vole populations are aware of their presence, encouraging sympathetic management and enhancement of habitat.

## 1.5 Nature Conservation Status

- 1.5.1 There has been a steady decline of the water vole population over the last century due to a combination of factors including agricultural intensification and habitat loss (Strachan et al 2011). This decline has accelerated over the last 30 years and the water vole populations have become increasingly isolated as a result.
- 1.5.2 The Vincent Wildlife Trust undertook a national survey in 1989-90 which showed an initial estimated population of 7.3 million water voles (Strachan and Jefferies 1993). A second national survey in 1996-1998 indicated an estimated loss of 88% of that population within 7 years. This decline has been attributed to the loss of habitat, changes in riparian management and the spread of American mink (*Neovison vison*) which is an effective predator of water vole (Jefferies 2003).
- 1.5.3 As regional populations have contracted, colonies have become extremely fragmented and local surveys show that these isolated pockets survive at very low densities, making them extremely vulnerable and facing a real possibility of extinction from the county. Surviving colonies in Northumberland are mainly found in upland burns, coastal streams and drains and urban watercourses (Northumberland LBAP 2008a). A water vole survey of the Borough of North Tyneside in 2002 (O'Hara, 2005) found that water voles were only present at 13 of the 53 sites surveyed (25%), and as a result of this a large amount of practical improvement work was carried out to safeguard the population's survival in the region. There are still unconfirmed reports of water vole presence further up on Wooler Common, and new populations were found at Berwick Moor, east of Chillingham, in 2009 which are still present, if elusive (Natural History Society of Northumbria 2016).

### Otter

- 1.5.4 The otter population of the UK underwent a dramatic decline from the mid-1950s until at least the mid-1970s. The factors contributing to this decline included:
- habitat loss due to drainage of wetlands and insensitive management of riparian habitats;
  - use of organochlorine pesticides leading to reduced ability to reproduce;
  - widespread pollution of watercourses resulting in reduced availability of prey species,
  - hunting; and,
  - road mortality.
- 1.5.5 The greatest declines were in England and Wales and although otters were generally widespread in Scotland in the 1970s, very low populations were recorded in lowland areas in south-central Scotland.
- 1.5.6 As a result of legal protection, improving water quality, strategic conservation efforts and sensitive river management the otter population has increased in most areas of the UK, but there have been some regional variations from this. The most recent national survey shows a continuation of the otter population recovery throughout England, although it appears to be slower than expected in some northern areas. Since 1996, otters have successfully colonised rivers such as the River Tyne (BBC 2009). At present, every river catchment in Northumberland boasts signs of otter. In more recent years they have even started to populate urban centres such as Blyth, Morpeth and Newcastle upon Tyne. In many cases however, this expansion is into largely 'unsuitable' areas, which support impoverished prey resources and poor habitat qualities (BAP 2008b)



## 2 METHODOLOGY

### 2.1 Objectives

- 2.1.1 The objectives of the water vole and otter surveys were to:
- identify water vole or otter presence within the study area;
  - establish a robust baseline to determine the importance of the study area for the local water vole and otter population;
  - inform the assessment of potential impacts on water voles and otters associated with the scheme;
- and,
- provide sufficient field data for the development of appropriate mitigation.

### 2.2 Desk Study

- 2.2.1 A search of online resources was undertaken between August and November 2016 to obtain ecological information about the study area and surrounding landscape. The study area for desktop searches was based on a combined 2 km buffer from Section A and Section B options.
- 2.2.2 The following websites were researched:
- National Biodiversity Network (NBN);
  - Multi-Agency Geographic Information for the Countryside (MAGIC); and,
  - Northumberland Biodiversity Action Plan.
- 2.2.3 In addition to online resources, consultation was undertaken in May 2016 with:
- Alnwick & District Natural History;
  - Alnwick Wildlife Group;
  - the Environmental Records Information Centre North East (ERIC North East); and,
  - the Natural History Society of Northumberland;
- 2.2.4 Ordnance survey maps and aerial photographs were also studied to identify habitats of possible conservation importance within the study area.
- 2.2.5 Species records were also obtained from the managing agent for the A1 between Morpeth and Ellingham A-one +.

### 2.3 Field Survey

- 2.3.1 The field surveys were undertaken between 5<sup>th</sup> and 9<sup>th</sup> September, between 17<sup>th</sup> and 19<sup>th</sup> October 2016 and between the 30<sup>th</sup> May and 2<sup>nd</sup> June 2017 by experienced Jacob's ecologists. Surveys followed standard methodologies for water vole (Strachan et al 2011; Dean et al 2016) and otter (National Rivers Authority, 1993, Highways Agency 2001). The surveys comprised a systematic inspection of the banks of all watercourses including rivers, burns and ditches crossed by the options under consideration. Watercourses were surveyed for a distance of 250 m either side of the scheme options and included surveys of watercourses running parallel to the scheme options within 250 m; an example being Denwick Burn which runs in parallel with and within 250 m of the A1, for nearly 2 km.

2.3.2 The following 31 watercourses were surveyed for otter and water vole in Section A of the A1 (watercourses numbers illustrated on Figures 2.1 to 2.19 and 4.1 to 4.19 are shown in parentheses):

- Back Burn (A1);
- Un-named ditch (A2);
- River Coquet (A3)
- Tributary of Thirston Burn (A4)
- Un-named ditch (A5);
- Un-named ditch (A6);
- Longdike Burn (A7);
- Un-named ditch (A8);
- Eshott Burn (A9);
- Tributary of Eshott Burn (A10);
- Earsdon Burn (A11);
- Un-named ditch (A12);
- Un-named ditch (A13);
- River Lyne (A14);
- Un-named ditch (A15);
- Tributary of Kater Dean (Morpeth Hospital (A16);
- Un-named ditch (A17);
- Un-named ditch (A18);
- Bywell Letch (A19);
- Tributary of Longdike Burn (A20);
- Drain feeding Earsdon Burn (A21);
- Tributary of Earsdon Burn (A22);
- Un-named ditch (A23);
- Fenrother Burn (A24);
- Canalised section of Fenrother burn (A25);
- Floodgate burn (A26);
- Un-named ditch (A27);
- Shieldhill Burn (A28);
- Un-named ditch around Morpeth Cemetery (A29);
- Un-named ditch feeding the River Lyne (A30); and,
- Un-named ditch (A31).

2.3.3 The following 13 watercourses were surveyed for otter and water vole in Section B of the A1 (watercourses numbers illustrated on Figures 3.1-3.13 are shown in parentheses):

- Shipperton Burn (B1);
- Un-named ditch at Charlton Mires (B2);
- Un-named ditch at Craggy Wood (B3);
- Un-named ditch within Kiln Plantation Farm (B4);
- Un-named ditch south west of Heckley House (B5);
- Un-named ditch at Heckley Fence Farm (B6);
- Un-named ditch west of Whinney Plantation (B7);
- Denwick Burn (B8);
- White House Burn at Heiferlaw Bridge (B9);
- Un-named ditch at Heiferlaw Bank (B10);
- Un-named ditch feeding into Denwick Burn (B11);
- Un-named ditch east of Heckley House (B12); and,
- Un-named ditch feeding White House Burn (B13).

## 2.4 Water Vole Field Survey

2.4.1 Water vole surveys were conducted using standard methodologies which involved surveying for indicative field signs of water vole, including:

- droppings and latrines;
- burrows;
- feeding stations;
- runs through vegetation;
- prints; and,
- sightings.

2.4.2 Definitive water vole field signs include droppings or latrines, water vole prints and sightings as they can only be attributed to water vole. Field signs such as burrows, runs through vegetation and feeding remains may be attributed to but not limited to brown rat (*Rattus norvegicus*), field vole (*Microtus agrestis*) and rabbit (*Oryctolagus cuniculus*).

2.4.3 Any signs of American mink (*Neovison vison*) were also sought as they are a major predator of water vole, so their presence within a section of river will greatly reduce its suitability for this species.

2.4.4 The surveys were conducted from within the channel wherever possible to maximise the chances of detecting evidence of water vole presence.

2.4.5 The optimum time for water vole surveys is during the breeding season when the species is most active; typically, between late March and October in the north of England. Therefore, the surveys reported herein were undertaken during the optimal survey period (September and October).

- 2.4.6 Where identified water vole population density was calculated based on guidance outlined in the Water Vole Mitigation Handbook (Dean et al., 2016). This suggests that relative population size can be assessed by counting the approximate number of latrines per 100 m of bankside habitat. The classification is shown in Table 1:

**Table 1: Population density guidance table (The Water Vole Mitigation Handbook; Dean et al. 2016).**

Relative population density	Approximate number of latrines per 100 m of bankside habitat	
	First half of survey season (mid-April to end of June)	Second half of survey season (July to September)
High	10 or more	20 or more
Medium	3-9	6-19
Low	≤ 2 (or none, but with other confirmatory field signs)	≤ 5 (or none, but with other confirmatory field signs)

## 2.5 Otter Field Survey

- 2.5.1 Otter surveys were conducted using methodologies adapted from Volume 10 of the Design Manual for Roads and Bridges (DMRB – Vol.10, Section 4, Part 4, HA88/91 - Nature Conservation Advice In Relation To Otters). This involved surveying for indicative signs of otters, including:
- spraint;
  - footprints;
  - feeding remains;
  - sightings; and,
  - confirmed or potential resting sites.

## 2.6 Limitations

- 2.6.1 The interiors of culverts where watercourses passed under the A1 were not surveyed due to the potential hazards presented by confined spaces although both entrances to the culvert were checked for field signs.
- 2.6.2 A number of the smaller streams and ditches were densely vegetated by species such as gorse (*Ulex europaeus*), great willowherb (*Epilobium hirsutum*), willow (*Salix sp.*), hawthorn (*Crataegus monogyna*), bramble (*Rubus fruticosus*) and common reed (*Phragmites australis*) preventing safe access to the entirety of the watercourses. However, all areas that afforded access were inspected for field signs. Within Section A, stretches of Shieldhill Burn (A28), Longdike Burn (A7) and an associated ditch (A30), Eshott Burn (A9), the River Lyne (A14) and sections of field drains (A17, A27) were also unable to be fully surveyed due to dense vegetation and, in the case of Longdike Burn some deep water to the west of the A1. Sections of Earsdon Burn (A11) and Fenrother Burn (A24) were densely vegetated preventing safe access. Waterbody A31, an un-named ditch, contained a large amount of effluent and was not surveyed from within the channel. Of these watercourses, Longdike Burn, Earsdon Burn and the River Lyne are likely to be directly impacted by the scheme crossing the A1 at Bockenfield (NZ178973), Causey Park (NZ189945) and Priest's Bridge (NZ185916) respectively.
- 2.6.3 During the 2017 survey access was not afforded to the following watercourses either due to cattle being present or absence of landowner permission; A2 (an unnamed ditch), Earsdon Burn (A11), the canalised section of Fenrother Burn (A25) and the section above (A24), and the River Lyne west of the A1 (A14). Of these five watercourses or sections

thereof that could not be surveyed Earsdon Burn and Fenrother Burn had previously identified positive field signs of water in 2016 surveys. The three remaining watercourses had no field signs attributable to water vole or otter during the previous surveys in 2016.

- 2.6.4 Within Section B, stretches of Shipperton Burn (B1), Un-named ditches at Charlton Mires and Craggy Wood (B2 & B3), Denwick Burn (B8) and associated ditch (B11), White House Burn (B9) and one of its tributaries (B13) and an un-named ditch at Heiferlaw Bank (B10) were too densely vegetated to access. These watercourses will be revisited during spring 2017 when vegetation is likely to be lower and re-assessed.
- 2.6.5 The surveys were undertaken at an appropriate time of year so the results are considered appropriately robust. However, it should be noted that site conditions can change over time with the inward and outward movement of species so an absence of a species record should not be taken as an indication of an absence of that species from the survey area. Therefore, this report reflects the site conditions up to the 2<sup>nd</sup> June 2017. The behaviour of wildlife is seasonable and highly unpredictable and as such, it is considered good practice for wildlife surveys to be repeated should development be deferred for over 12 months from the date of the most recent survey.
- 2.6.6 The findings of this report represent the professional opinion of qualified ecologists and do not constitute professional legal advice. The client may wish to seek professional legal interpretation of the relevant wildlife legislation cited in this document. Should there be a delay in the proposed construction programme, it is considered prudent that the survey findings be reviewed and updated as required for subsequent planning application(s) to ensure that the assessment of ecological impacts is undertaken against an accurate baseline.

### 3 BASELINE

#### 3.1 Desk Study Results

##### Water Vole

- 3.1.1 Data was provided by ERIC North East to supplement the 2016 survey undertaken by Jacobs. Records were dated from between 1999 to 2013 and are therefore considered contemporaneous.
- 3.1.2 There was only one record for water vole (*Arvicola amphibius*) found within 2 km of the proposals, based on ERIC North East records. This record dating from 2009 was located at Rock, approximately 2 km to the east of the scheme in Section B.

##### Otter

- 3.1.3 There were 50 records for otter (*Lutra lutra*) within 2 km of the proposals held by ERIC North East and Aone+ Records. Section B returned 15 records of which 10 were clustered on the River Aln in Alnwick and at Charlton Bog/Charlton Mires. The 35 records from within 2 km of Section A were more widely scattered with a notable concentration of 10 records within the River Coquet and Felton Park environs.
- 3.1.4 The water vole and otter records from ERIC North East are presented in Table 2 below.

**Table 2: Water Vole and Otter Records from ERIC North East and A-One+.**

Section A Otter Records				
Date	Location	Record Type	Grid Reference	Distance from Scheme (Approx.).
1999 - 2000	Lyne	--	NZ203924	1.5 km east
2001 - 2002	Thirston Burn	--	NZ194993	2 km east
2001 - 2002	Shothaugh	--	NZ165999	925 m west
2001 - 2002	Lyne	--	NZ203924	1.5 km east
2002 - 2003	Thirston Burn	--	NZ194993	2 km east
2002 - 2003	Paxtondean Burn	--	NZ170948	2 km west
2002 - 2003	Shothaugh	--	NZ165999	925 m west
2002 - 2003	Lyne	--	NZ203924	1.5 km east
2009	Felton, River Coquet	1 Count of Adult; 4 Count of cubs	NU1800	550 m east
17/05/2009	Elyhaugh, River Coquet	2 Count	NZ1599	1.5 km west
24/12/2012	Fairmoor, Morpeth	1 Count of deceased	NZ1888	190 m west
24/01/2012	River Wansbeck, Morpeth, close to Elliot footbridge	2 Count	NZ1986	1.75 km south east
14/01/2012	Morpeth	1 Count	NZ1986	1.75 km south east
23/04/2012	River Coquet	1 Count of Adult; 2 Count of Juvenile	NU1654900265	890 m west
06/01/2011	Longdyke Burn, Eshottheugh, NE65 9QH	--	NZ1997	1.45 km east
13/02/2013	Longhorsley slip road north of Morpeth	1 Count	NZ1818288411	115 m west
13/02/2013	Longhorsley slip road north of Morpeth	--	NZ1818288411	115 m west

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20/05/2012	River Coquet, Felton	1 Count	NZ1899	575 m east
28/05/2012	Mitford	--	NZ1786	630 m west
1999 - 2000	Shothaugh	--	NZ165999	925 m west
15/01/2000	A1, Felton Park	1 Count of Female	NU174004	50 m west
04/02/2001	A1, Felton Park	1 Count of Male	NU174004	50 m west
27/03/2001	A1(T), Tritlington	Adult Count of Male	NZ188933	90 m west
02/04/2001	A1(T), Felton Park	Adult Count of Male	NU175001	45 m east
08/11/2004	A1, Earsdon Farm	1 Count of Female	NZ189932	0 m
04/01/2006	A1, Felton	1 Count of Unknown	NU175017	0 m
01/05/2004	Felton, River Coquet	--	NU1800	550 m east
01/05/2004	Felton, Coquet	--	NU1800	550 m east
25/06/2009	A1 Lane Head Farm	I Count RTA		0 m
25/06/2009	A1 Duke's Bank Wood	I Count RTA		0 m
25/06/2009	A1 Duke's Bank Wood	I Count RTA		0 m
25/06/2009	A1 Earsdon Cottage	I Count RTA		0 m
25/06/2009	A1 Earsdon Moor Farm	I Count RTA		0 m
25/06/2009	A1 Earsdon Moor Farm	I Count RTA		0 m
25/06/2009	A1 The Old School	I Count RTA		0 m
<b>Section B Otter Records</b>				
16/09/2009	Alnwick (Drythrottle)	1 Count	NU182207	500 m east
1999 - 2000	Hulne Park Bridge, River Aln	--	NU181140	2 km south west
2001 - 2002	Hulne Park Bridge, River Aln	--	NU181140	2 km south west
2002 - 2003	Hulne Park Bridge, River Aln	--	NU181140	2 km south west
2009	nr Denwick Bridge, River Aln	--	NU205144	700 m south east
01/03/2001	A1, Charlton bog	1 Count of Male	NU183188	70 m west
01/08/2001	A1, Alnwick	--	NU205132	1.6 km south
01/07/2002	A1, Charlton Bog	1 Count of Male	NU183188	70 m west
01/10/2002	A1, Charlton Mires	Juvenile Count of Female	NU178203	0 m
01/08/2008	A1, Charlton Mires	--	NU178203	0 m
25/06/2009	A1 Brownieside	I Count RTA		0 m
25/06/2009	A1 South Charlton	I Count RTA		0 m
25/06/2009	A1 Heiferlaw Bridge	I Count RTA		0 m
25/06/2009	A1 Heiferlaw Bank	I Count RTA		0 m
25/06/2009	A1 Broxfield	I Count RTA		0 m
<b>Section B Water Vole Records</b>				
13/04/2009	Rock	1 Count	NU2006520204	2 km east

## 3.2 Field Survey Results

### Water Vole

- 3.2.1 A total of 44 watercourses within 500 m of Section A and Section B options were surveyed for water vole presence. Detailed results for water vole are presented in Appendix A for Section A and Section B. Water vole activity is mapped for Section A on Figures 2.1 to 2.19 and for Section B on Figures 3.1 to 3.13.

- 3.2.2 During the survey minor watercourses such as ditches were assessed as offering potential water vole habitat. Habitat in several of these ditches was considered sub-optimal because they contained few water vole habitat features and / or were choked with vegetation / scrub or because they were dry. A number of the sub-optimal ditches were only assessed as such because they were dry. These may become suitable if water levels increase sufficiently for water vole habitation. Those watercourses assessed as sub-optimal in Section A were: the un-named ditches A5, A18, A23, the un-named ditch around Morpeth Cemetery (A29), a tributary of Earsdon Burn (A22) and sections of Fenrother Burn (A24). In Section B, watercourses assessed as sub-optimal were the un-named ditches at Charlton Mires (B2), Craggy Wood (B3) and Heckley House (B12) with sections of the un-named ditches at Heckley Fence Farm (B6), Heiferlaw Bank (B10), White House Burn (B13), Denwick Burn (B8) and one of its tributaries (B11).
- 3.2.3 Photographs, where available, and locations of all the waterbodies surveyed are provided in Appendices B and C. Tables 3 and 4 below provide the details of water vole presence in Sections A and B survey areas from 2016. No definitive water vole presence within Section A was recorded in 2017. Potential water vole prints were identified on Longdike Burn in 2017 (see Figure 4.5) however given their size these are likely attributable to bank vole or similar species.
- 3.2.4 Details of each watercourse surveyed can be found in Appendix A.

**Table 3: Section A Water Vole Field Survey Results 2016.**

Water Body Ref.	Water Body Name	Grid Ref. at Start	Grid Reference at End	Field Signs Present (Location Count)				
				Latrines/droppings	Burrows	Prints	Feeding Remains	Runs/Paths
A3	River Coquet	NZ174997	NZ177998	2	0	0	1	0
A7	Longdike Burn	NZ179965	NZ181975	0	1	6	0	0
A11	Earsdon Burn	NZ183943	NZ193942	3	0	0	0	1
A24	Fenrother Burn	NZ182922	NZ182922	4	0	0	2	0

**Table 4: Section B Water Vole Field Survey Results 2016.**

Water Body Ref	Water Body Name	Grid Ref at Start	Grid Ref at End	Field Signs Present (Location Count)				
				Latrines/droppings	Burrows	Prints	Feeding Remains	Runs/Paths
B1	Shipperton Burn	NU167220	NU174220	0	2	3	0	0
B2	Field ditch	NU178212	NU175202	0	1	1	0	0
B4	Ditch in Kiln Plantation	NU188201	NU191201	0	3	1	0	0
B8	Denwick Burn	NU191167	NU198150	0	1	0	0	0



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Water Body Ref	Water Body Name	Grid Ref at Start	Grid Ref at End	Field Signs Present (Location Count)				
				Latrines/droppings	Burrows	Prints	Feeding Remains	Runs/Paths
B9	White House Burn	NU183187	NU186188	2	3	3	0	1

### Otter

- 3.2.5 Tables 5 and 6 below provide a summary of otter field signs within the survey area of Section A during the 2016 and 2017 surveys respectively. There were no otter field signs found within 250 m of Section B in 2016.

**Table 5: Section A: Otter Field Survey Results 2016.**

Water Body Ref	Water Body Name	Grid Ref at Start	Grid Ref at End	Field Signs Present (Location Count)				
				Sprints	Prints	Sightings	Hover/Holt	Runs/Slides
A3	River Coquet	NZ174997	NZ177998	4	0	0	1	1
A7	Longdike Burn	NZ179965	NZ181975	1	1	0	0	0
A11	Earsdon Burn	NZ183943	NZ193942	1	0	0	0	0

**Table 6: Section A: Otter Field Survey Results 2017.**

Water Body Ref	Water Body Name	Grid Ref at Start	Grid Ref at End	Field Signs Present (Location Count)				
				Sprints	Prints	Sightings	Hover/Holt	Runs/Slides
A3	River Coquet	NZ174997	NZ177998	4	1	0	1	1
A7	Longdike Burn	NZ179965	NZ181975	14	4	1	2	0

- 3.2.6 A suspected otter holt was reported during a separate survey of woodlands 80 m beyond the survey area on the un-named watercourse within Craggy Wood (Watercourse B3) during 2016. Non-target Species
- 3.2.7 Table 6 below provides location details of the potential otter holts/hover identified on the River Coquet and Longdike Burn during surveys in 2016 and 2017.

**Table 7: Section A: Otter Field Survey Results 2017.**

Waterbody Ref	Water Body Name	Grid Ref	Feature
A3	River Coquet	NZ 17459978	Potential holt recorded during 2016 survey - void under bankside tree on south bank of River Coquet intertwined with large cobbles. Feature monitored for approximately 10 days during via a

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Waterbody Ref	Water Body Name	Grid Ref	Feature
			trailcam in September 2016 but no positive otter evidence was recorded.  No evidence of otter usage during 2017 repeat surveys.
A3	River Coquet	NZ 17619989	Potential holt recorded during 2017 survey - void under bankside tree on northern bank of River Coquet. Nearby run/slide was in evidence at time of survey.
A7	Longdike Burn	NZ 18009689	Potential hover recorded during the 2017 survey – Dry, shelf-like hollow within bankside amongst tree roots above mean water level at entrance to culvert.
A7	Longdike Burn	NZ 18119746	Potential holt recorded during 2017 survey - void under tree root on north bank adjacent to Bockenfield Caravan Park.

### Non-target Species

- 3.2.8 Table 6 below provides the evidence of American mink presence found during surveys of Section A and Section B of the project in 2016. Coincident with the otter survey results, there were no American mink signs found during the water vole and otter surveys of Section B. However, during a badger survey of the area in November 2016 a mink scat was noted adjacent to Shipperton Burn just outside the water vole survey area. No such field signs were recorded within Section A during the 2017 surveys.

**Table 8: American Mink Field Survey Results 2016.**

Water Body Ref	Water Body Name	Grid ref at Start	Grid Ref at End	Field Signs Present (Location Count)		
				Scat	Prints	Sightings
A7	Longdike Burn	NZ179965	NZ181975	>10	0	0
A11	Earsdon Burn	NZ183943	NZ193942	1	0	0
B1	Shipperton Burn	NU167220	NU174220	1	0	0

## 4 SUMMARY

### 4.1 Water Vole

- 4.1.1 Although the citation for the River Coquet and Coquet Valley Woodlands Site of Special Scientific Interest (SSSI) states that the river is frequented by water voles along much of its 57-mile length, the desktop study returned only one recent record of water vole within the 2 km study area, at Rock, located at the north-east of the scheme in Section B. This record was provided by ERIC North East.
- 4.1.2 The number of field signs for water vole recorded across Section A and Section B in 2016 were low and widespread throughout the survey areas. An assessment of relative population size within each of the watercourses where field signs were found was assessed as Low, based on current guidance from the mitigation handbook (Dean et al, 2016).
- 4.1.3 Water vole signs were also recorded on four watercourses in Section A with American mink also recorded at two of these watercourses, namely Longdike Burn (A7) and Earsdon Burn (A11), which could result in the future loss of water voles at these sites due to predation by mink.
- 4.1.4 Water vole field signs were recorded on five watercourses in Section B with American mink recorded at one of the watercourses, namely Shipperton Burn (B1).
- 4.1.5 During the 2017 survey however, no definitive water vole signs were recorded in any of the watercourses. No definitive water vole presence within Section A was recorded in 2017. Potential water vole prints were identified on Longdike Burn in 2017 (see Figure 4.5) however given their size these are likely attributable to bank vole or similar species.
- 4.1.6 . Therefore, an assessment or relative population size (Dean et al, 2016) could not be determined.
- 4.1.7 Access to, part or all, of ten watercourses in Section A during 2016 was limited due either to access restrictions or impenetrable vegetation. Similar restrictions were encountered during the 2017 surveys within Section A and eight of the watercourses in Section B had partial access due to impenetrable vegetation. However, given the complete absence of signs in those watercourses or sections of watercourse that could be surveyed, this is not seen as a limitation on the findings. Impact assessment and any mitigation measures required in relation to adverse effects upon these sites and habitats will be presented within environmental reporting at a later stage of the project (i.e. PCF Stage 2 Environmental Assessment Report and subsequent reporting at PCF Stage 3).

### 4.2 Otter

- 4.2.1 The desk study found recent records of otter field signs within the 2 km study area for Section A and Section B. The records (50 no) were provided by ERIC North East and A-One+ records. These records were widespread throughout the survey area with local concentrations such as at the River Coquet. The most recent records dated from 2013. Section B returned ten records clustered on the River Aln in Alnwick and at Charlton Bog/Charlton Mires. The 28 records from within Section A were more widely scattered with a notable concentration of ten records within the River Coquet and Felton Park environs.
- 4.2.2 Otter field signs and potential holts/hovers were only noted within three watercourses in Section A, namely the River Coquet, Longdike Burn and Earsdon Burn in 2016 and 2017. However, these had increased in number, most notably within Longdike Burn which previously recorded an abundance of mink field signs; now no longer in evidence.
- 4.2.3 No otter field signs were recorded within Section B during the field surveys. However, as demonstrated by the desktop records (River Aln at Alnwick and Charlton Bog adjacent to

and within the scheme at Section B) and the suitable habitat within the survey area, it is considered likely that otter are present.

- 4.2.4 A suspected otter holt was reported during a separate survey of woodlands 80 m beyond the 500 m survey area on the un-named watercourse within Craggy Wood (Watercourse B3). Two potential holts were also noted within Longdyke Burn in 2017 (Figure 4.6) where previously none had been detected.
- 4.2.5 Impact assessment and any mitigation measures required in relation to adverse effects upon these sites and habitats will be presented within environmental reporting at a later stage of the project (i.e. PCF Stage 2 Environmental Assessment Report and subsequent reporting at PCF Stage 3).

### 4.3 Mink

- 4.3.1 The desk study returned six records of mink field signs within the study area. The records were provided by ERIC North East. These records were concentrated on Hulne Park Bridge in Alnwick 1.9 km south west of Section B of the scheme. The most recent record dated from 1997.
- 4.3.2 During the 2016 surveys, mink field signs (scat) were noted within three of the watercourses surveyed, namely Longdike Burn and Earsdon Burn in Section A and Shipperton Burn within Section B. Perhaps unsurprisingly, these watercourses also provided evidence of water vole. However, predation by mink was likely responsible for the limited water vole field signs (at least in these watercourses) and was felt likely to herald an absence of water vole in the near future at these locations.
- 4.3.3 No evidence of mink field signs including scat were noted during the field surveys within Section A during 2017. Anecdotal evidence from local landowners was that mink trapping had been carried out due to the predation upon game birds and their eggs by the species. During the 2016 surveys, two of the watercourses surveyed, namely Longdike Burn and Earsdon Burn in Section provided evidence of mink. At the time, these watercourses also provided evidence of water vole. However, predation by mink is likely responsible for the current absence of water vole field signs in these watercourses. The commensurate increase in otter field signs may, in conjunction with trapping, go some way in explaining the subsequent absence of mink in the same locations.

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## FIGURES

Figure 1.1:	Section A - Desk Study Data (2016)
Figure 1.2:	Section B - Desk Study Data (2016)
Figures 2.1-2.19:	Section A – Water Vole and Otter Survey Maps (2016)
Figures 3.1-3.13:	Section B – Water Vole and Otter Survey Maps (2016)
Figures 4.1 – 4.19:	Section B - Water Vole and Otter Survey Maps (2017)



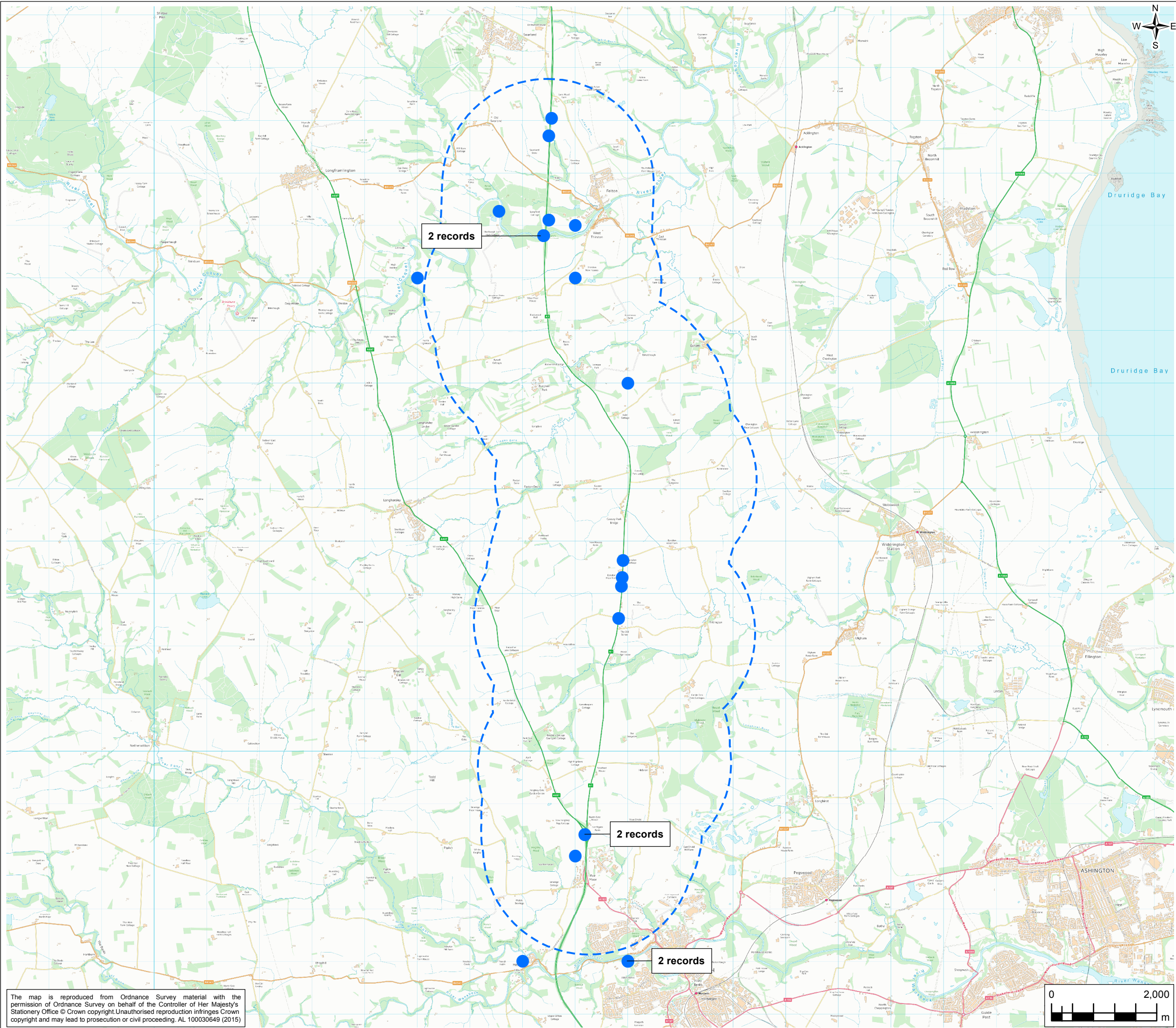


FIGURE 1.1

**Legend**

2km Buffer (all options combined)

**Species Records**

Otter

Water Vole

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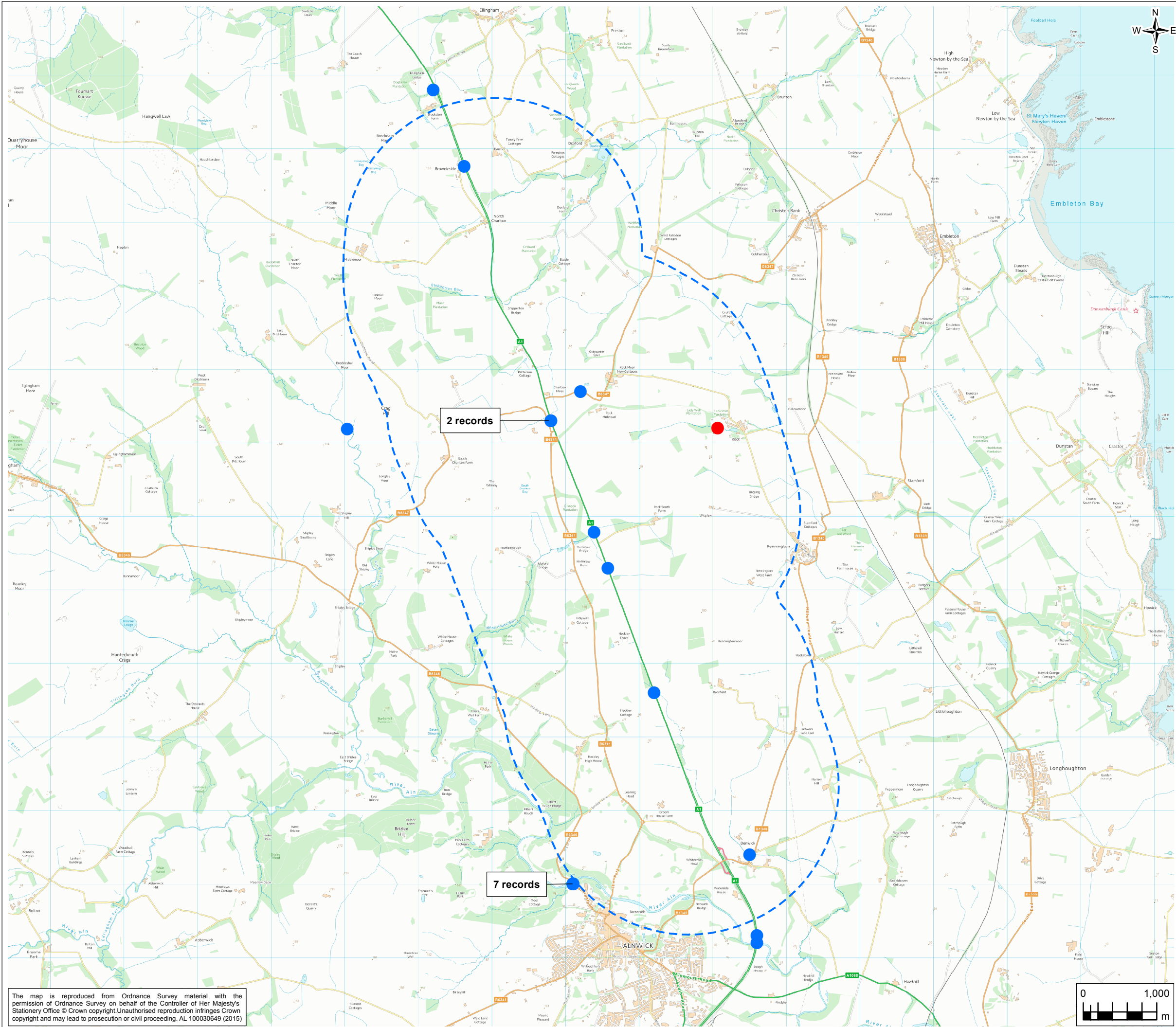


FIGURE 1.2

Legend

2km Buffer

Species Records

● Otter

● Water Vole

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SECTION B  
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WATER VOLES AND OTTERS

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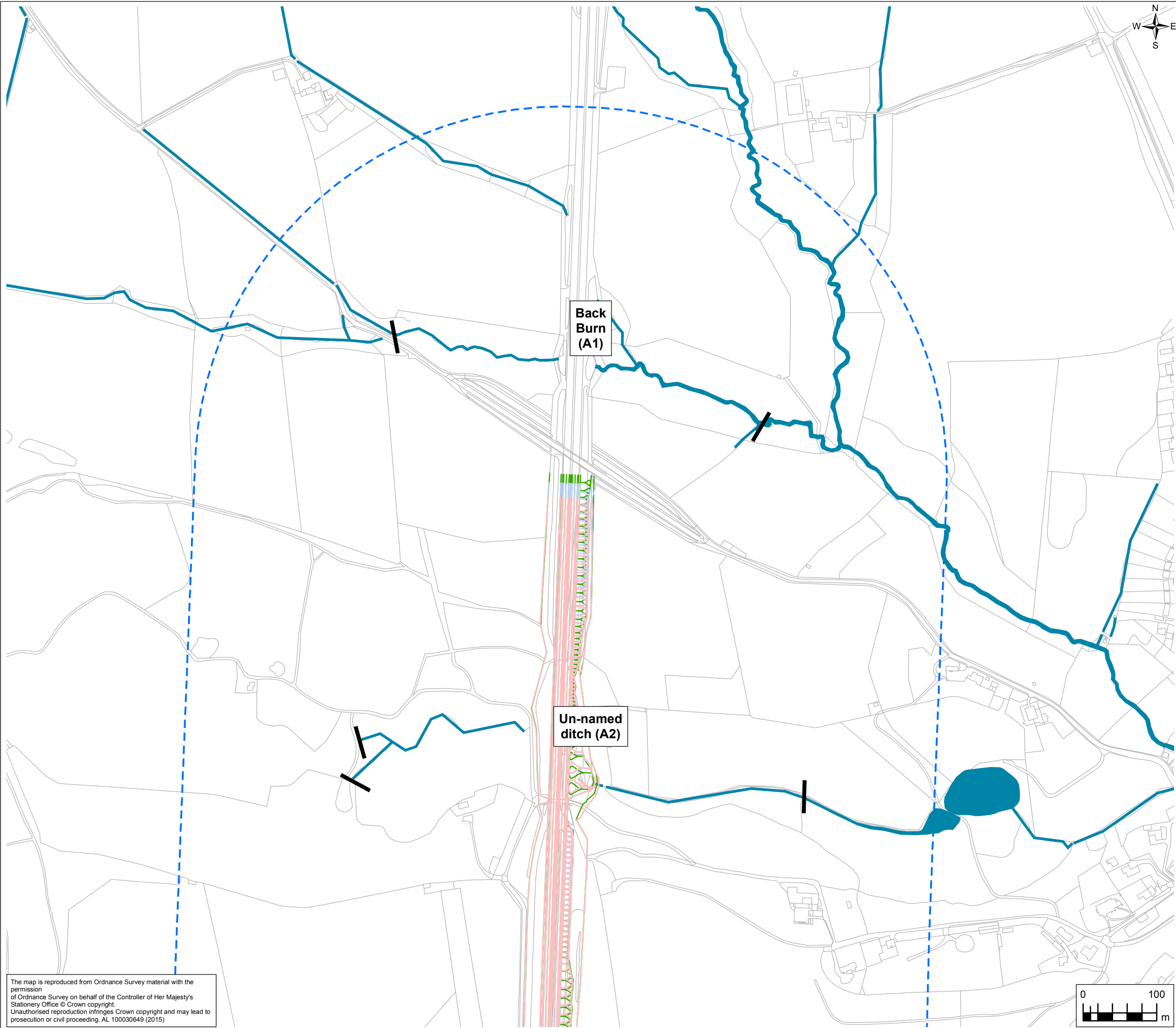
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FIGURE 2.2

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Hybrid Option
  - Offline Option
  - 500m Buffer (all options combined)
  - Watercourse
  - Waterbody

Water Vole Results

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

Otter Results

- S Spraint
- H Hover/Holt
- R Run/Slide

Mink

- Spraint
- A1 Watercourse number

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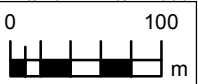
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Drawing Title  
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WATER VOLE AND OTTER SURVEY MAP  
Sheet 1

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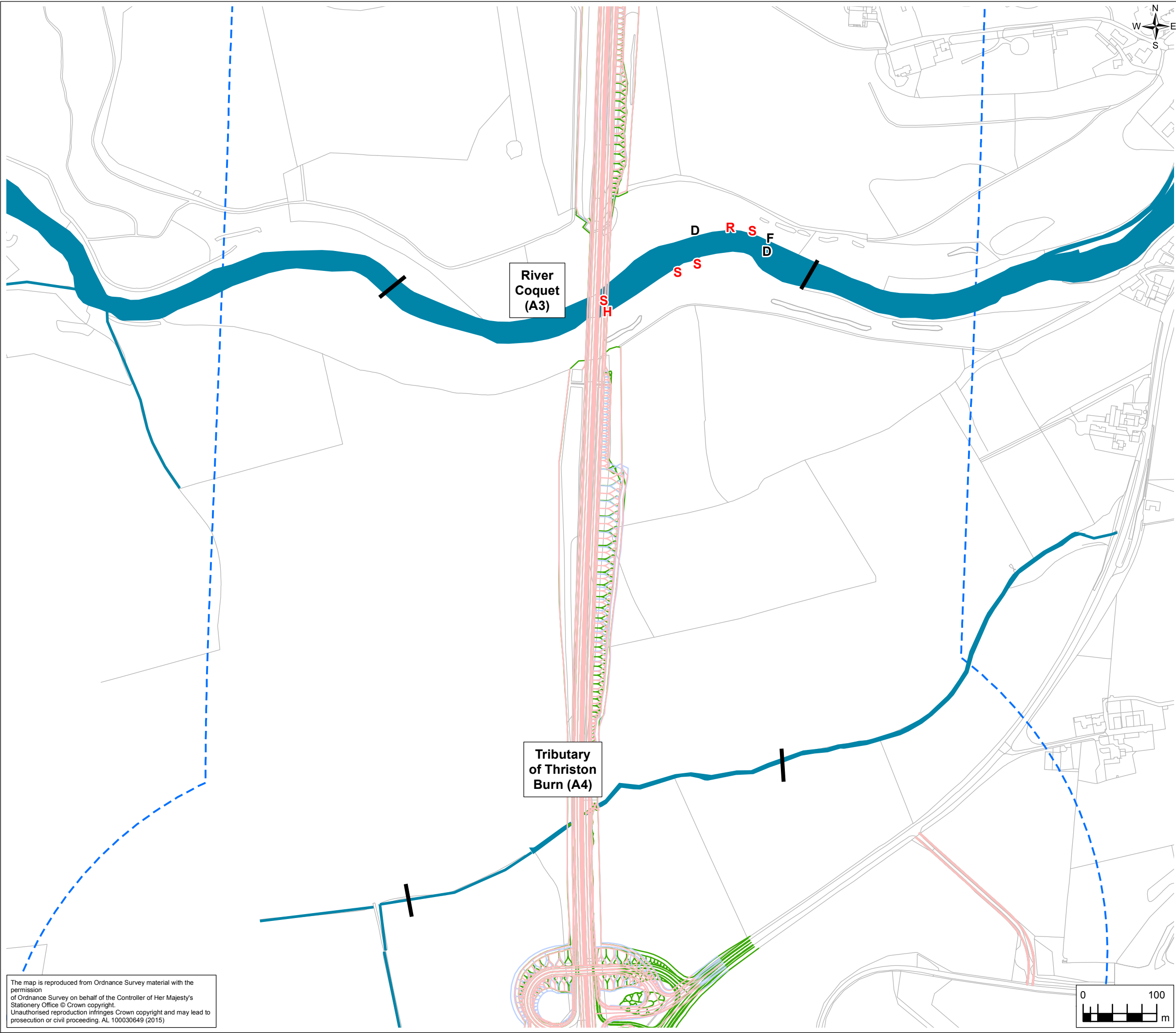


FIGURE 2.3

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Hybrid Option
  - Offline Option
  - 500m Buffer (all options combined)
  - Watercourse
  - Waterbody

Water Vole Results

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

Otter Results

- S Spraint
- H Hover/Holt
- R Run/Slide

Mink

- Spraint
- A1 Watercourse number

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Sheet 2

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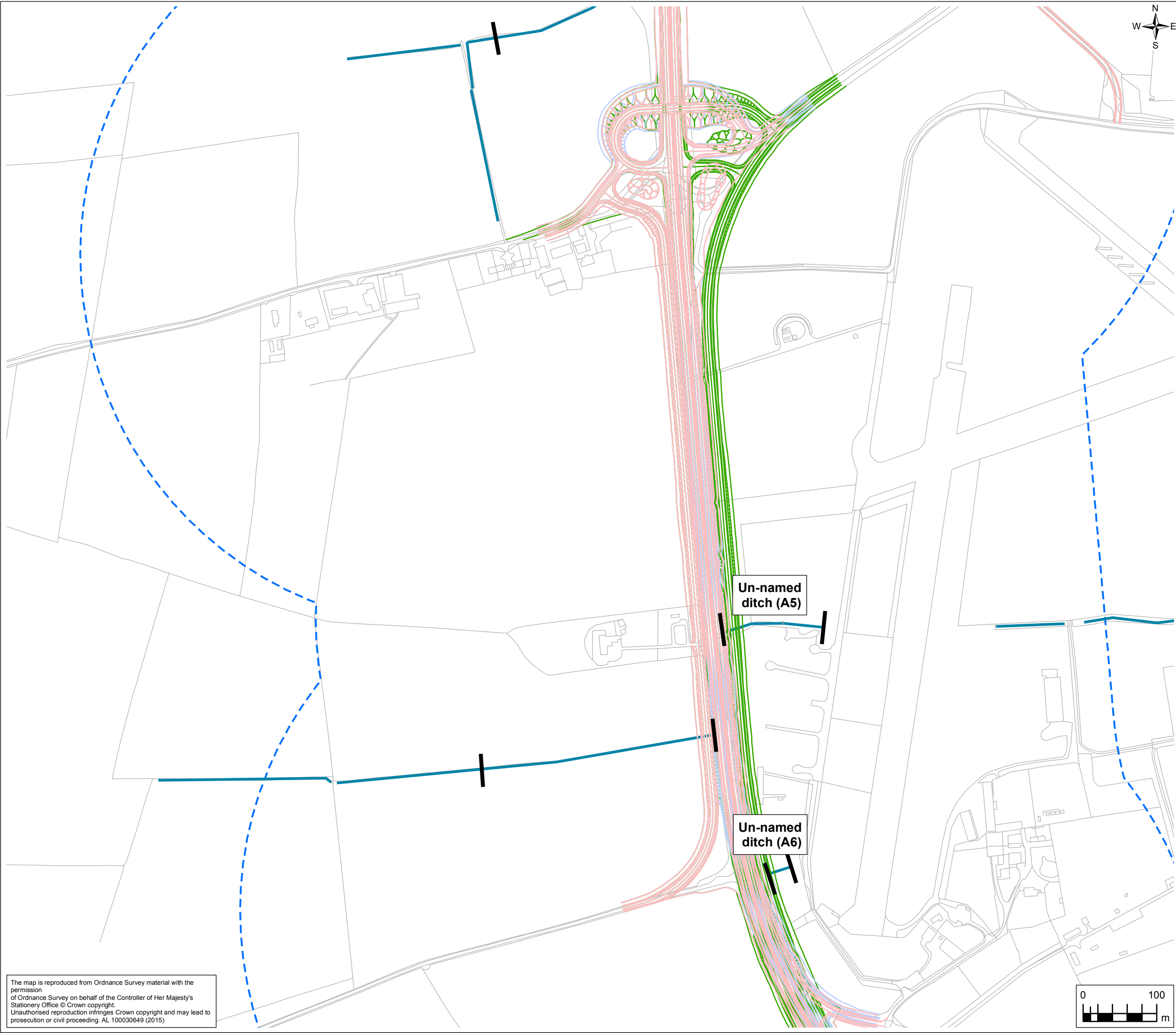


FIGURE 2.4

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Hybrid Option
  - Offline Option
  - 500m Buffer (all options combined)
  - Watercourse
  - Waterbody

Water Vole Results

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

Otter Results

- S Spraint
- H Hover/Holt
- R Run/Slide

Mink

- Spraint
- A1 Watercourse number

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WATER VOLE AND OTTER SURVEY MAP  
Sheet 3

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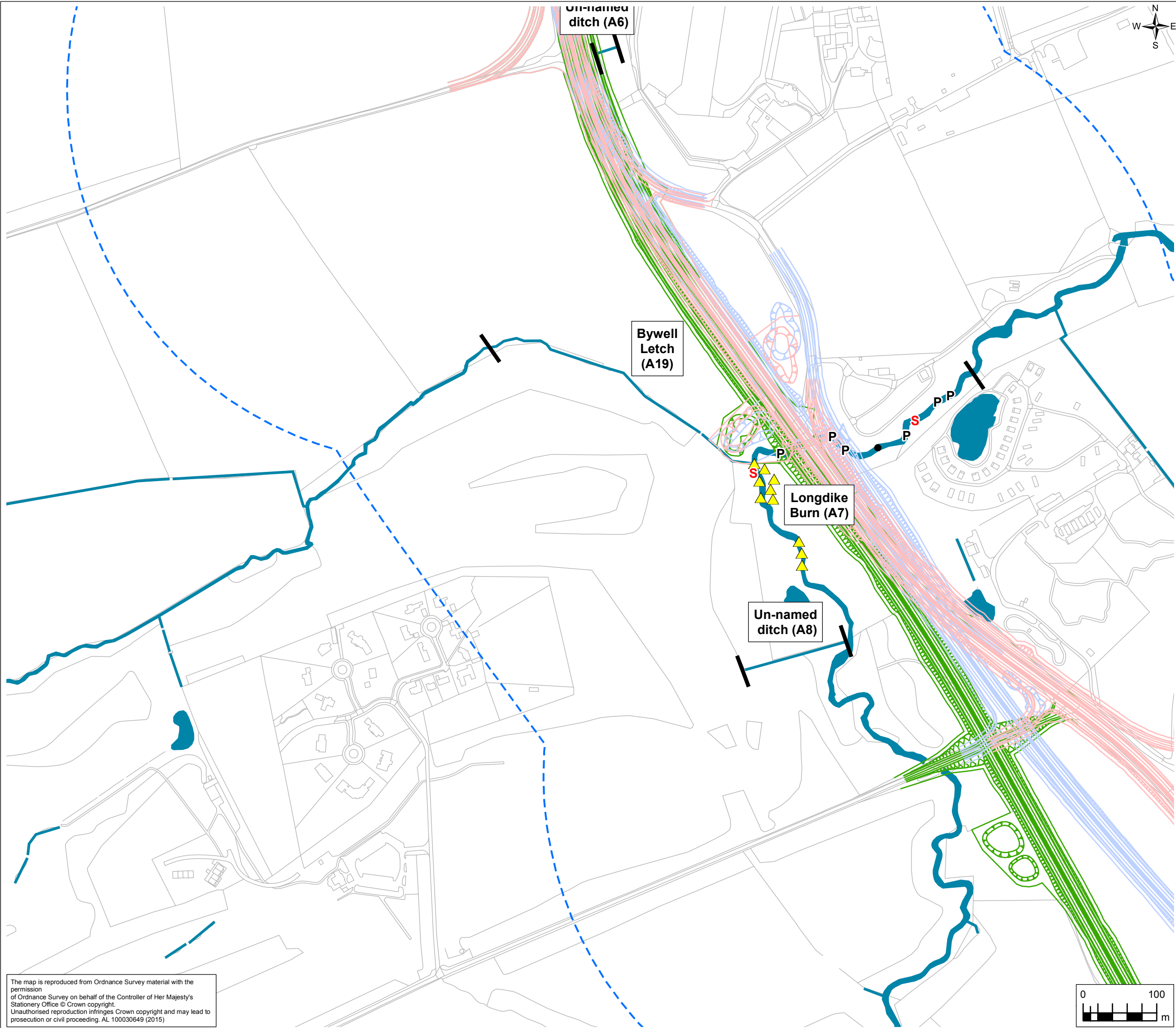


FIGURE 2.5

Legend

Extent of Surveyed Waterbody

Online Option

Hybrid Option

Offline Option

500m Buffer (all options combined)

Watercourse

Waterbody

Water Vole Results

Burrow

P Print

R Run/Pathway

F Feeding Remains

D Dropping

L Latrine

Otter Results

S Spraint


H Hover/Holt

R Run/Slide

Mink

Spraint

A1 Watercourse number

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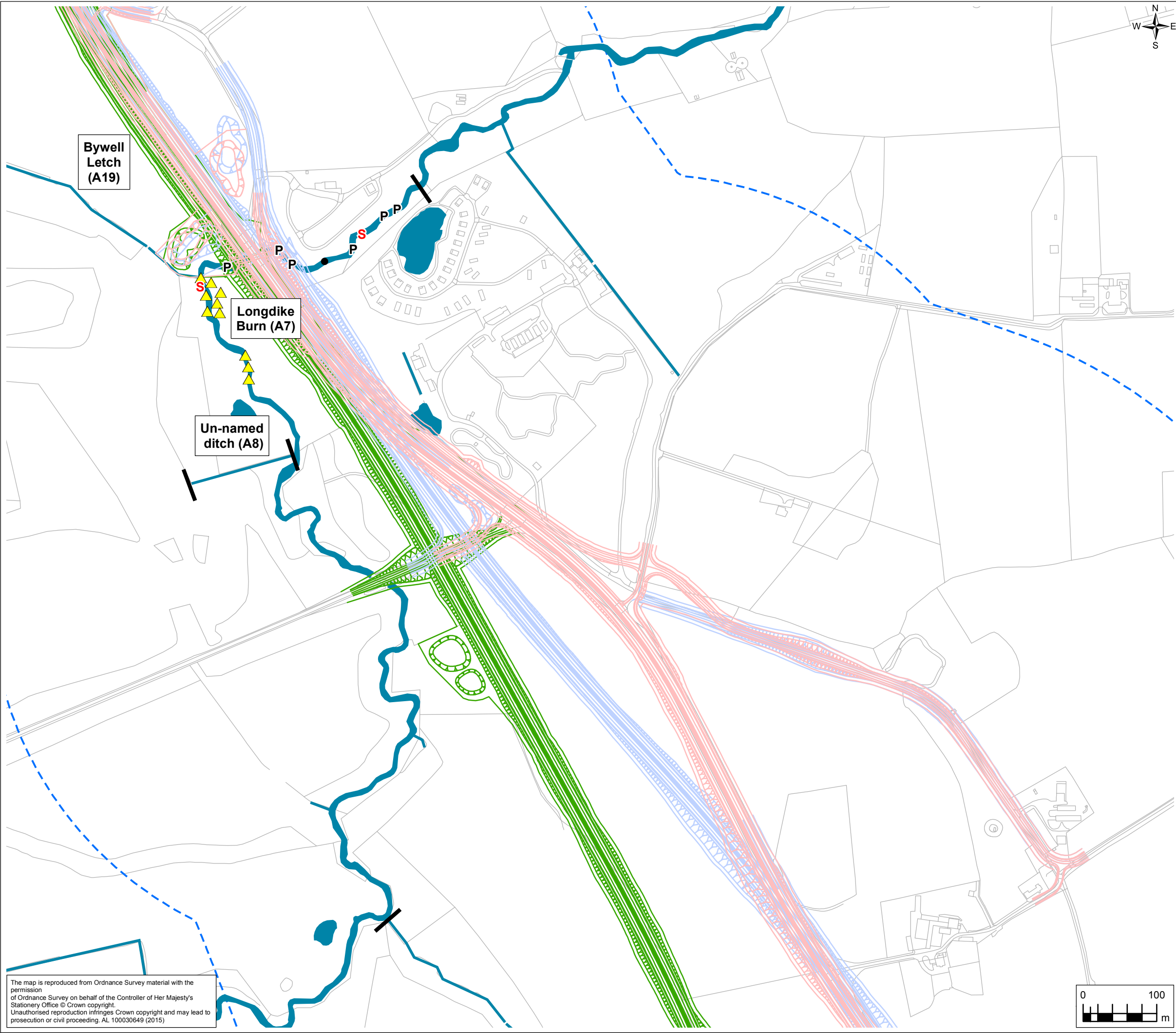


FIGURE 2.6

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Hybrid Option
  - Offline Option
  - 500m Buffer (all options combined)
  - Watercourse
  - Waterbody

Water Vole Results

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

Otter Results

- S Spraint
- H Hover/Holt
- R Run/Slide

Mink

- Spraint
- A1 Watercourse number

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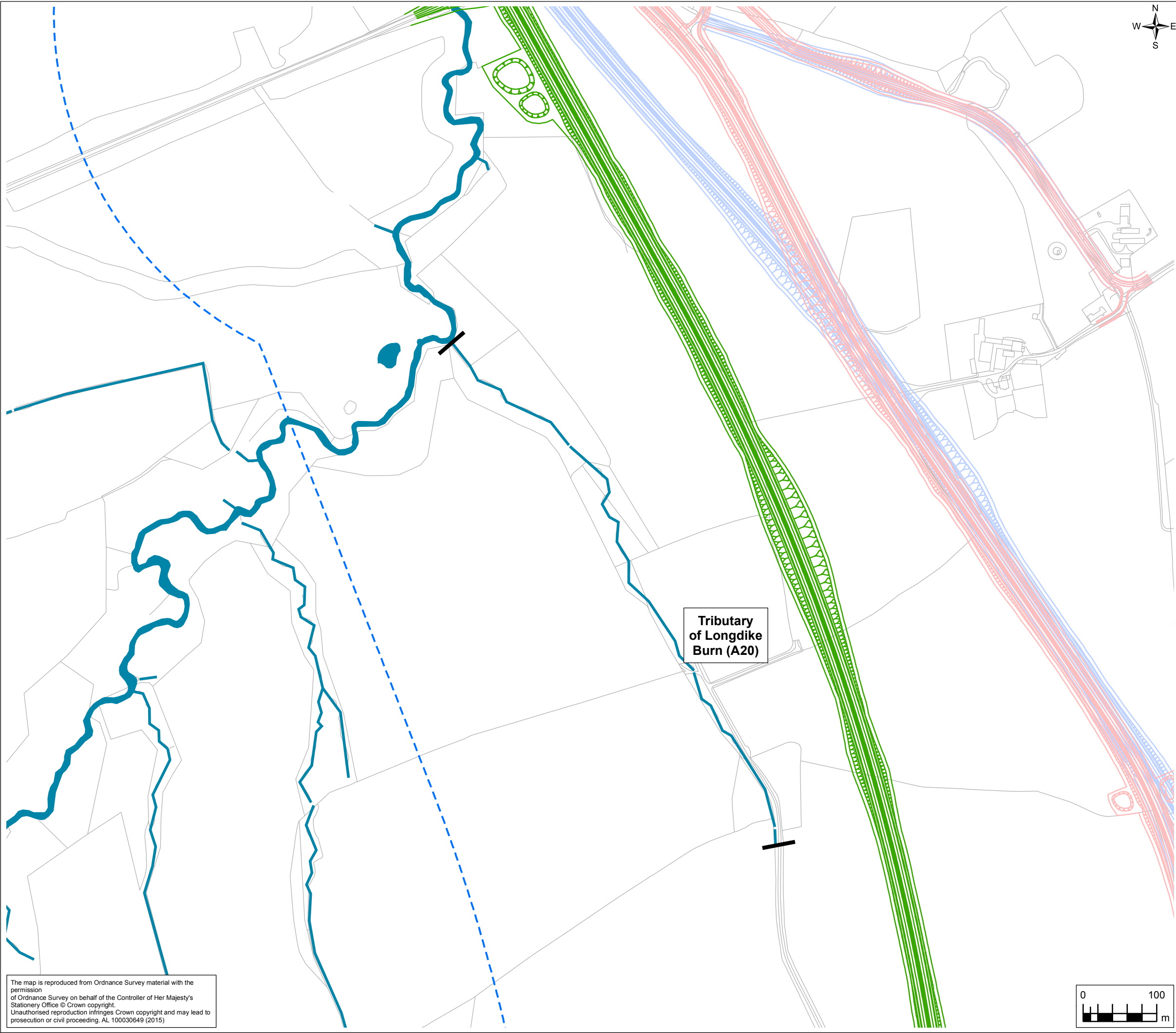


FIGURE 2.7

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Hybrid Option
  - Offline Option
  - 500m Buffer (all options combined)
  - Watercourse
  - Waterbody

Water Vole Results

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

Otter Results

- S Spraint
- H Hover/Holt
- R Run/Slide

Mink

- Spraint
- A1 Watercourse number

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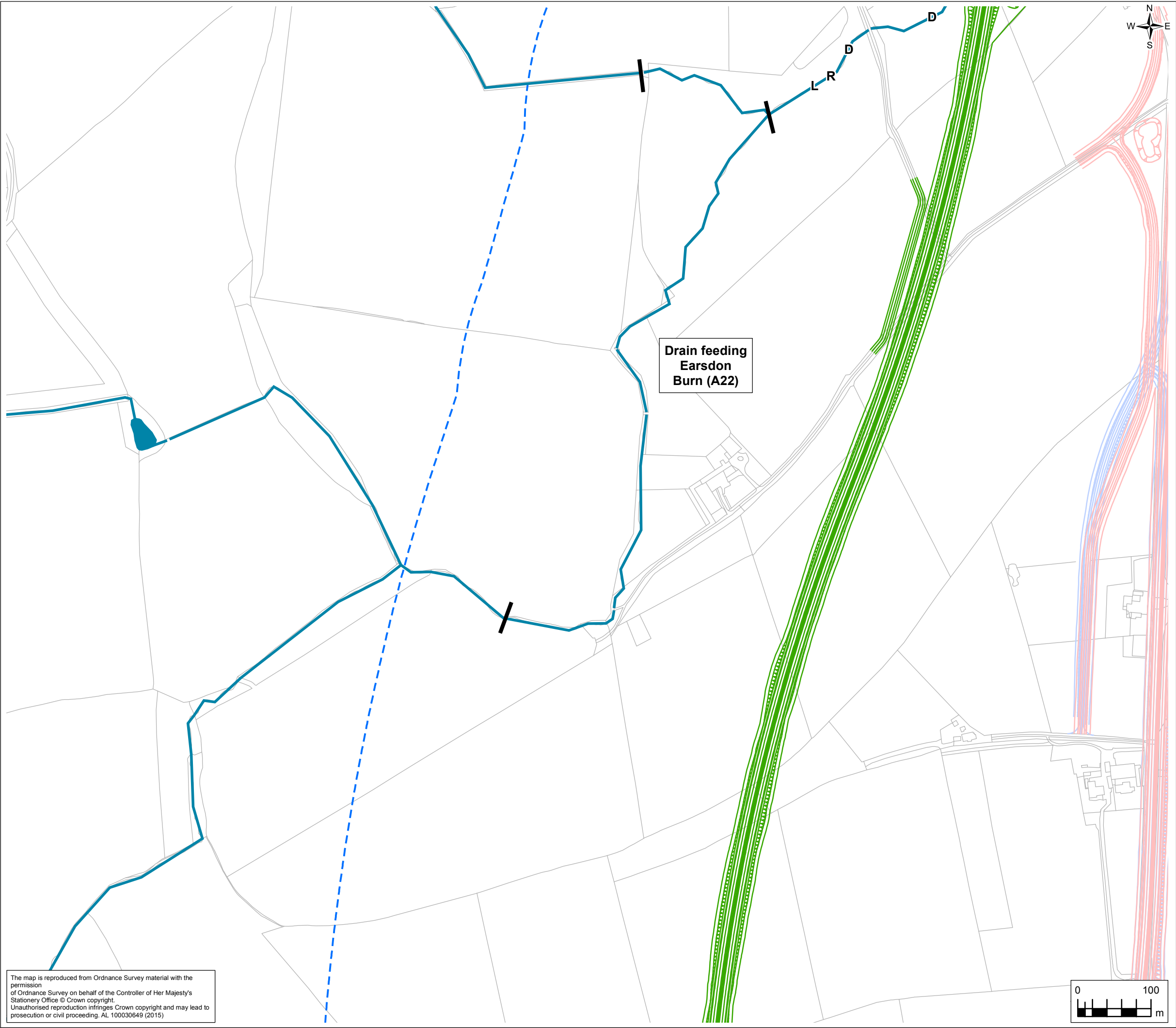


FIGURE 2.9

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Hybrid Option
  - Offline Option
  - 500m Buffer (all options combined)
  - Watercourse
  - Waterbody

Water Vole Results

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

Otter Results

- S Spraint
- H Hover/Holt
- R Run/Slide

Mink

- Spraint
- A1 Watercourse number

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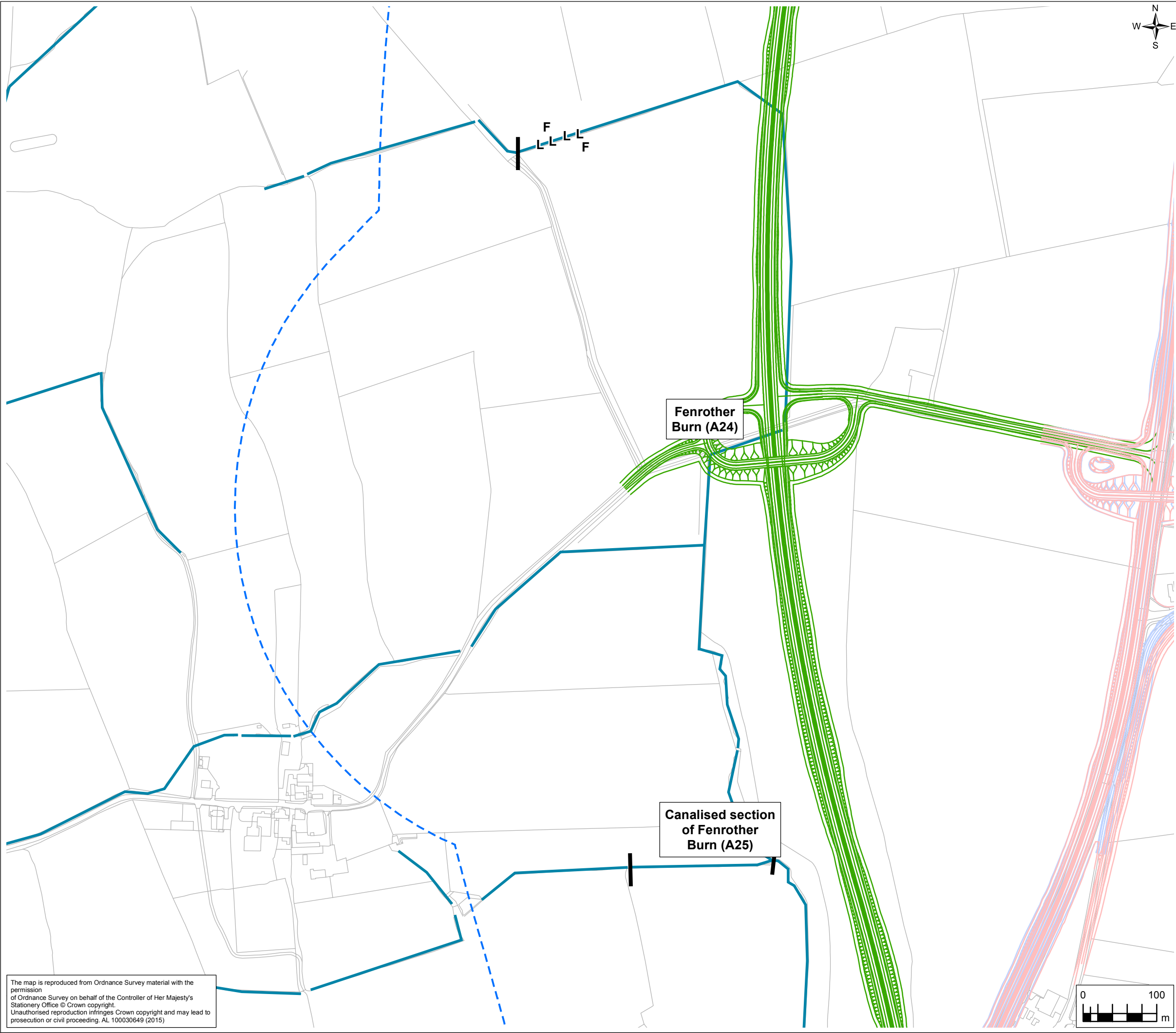


FIGURE 2.10

**Legend**

- Extent of Surveyed Waterbody
- Online Option
- Hybrid Option
- Offline Option
- 500m Buffer (all options combined)
- Watercourse
- Waterbody

**Water Vole Results**


- Burrow
- Print
- Run/Pathway
- Feeding Remains
- Dropping
- Latrine

**Otter Results**

- Spraint
- Hover/Holt
- Run/Slide

**Mink**

- Spraint
- Watercourse number

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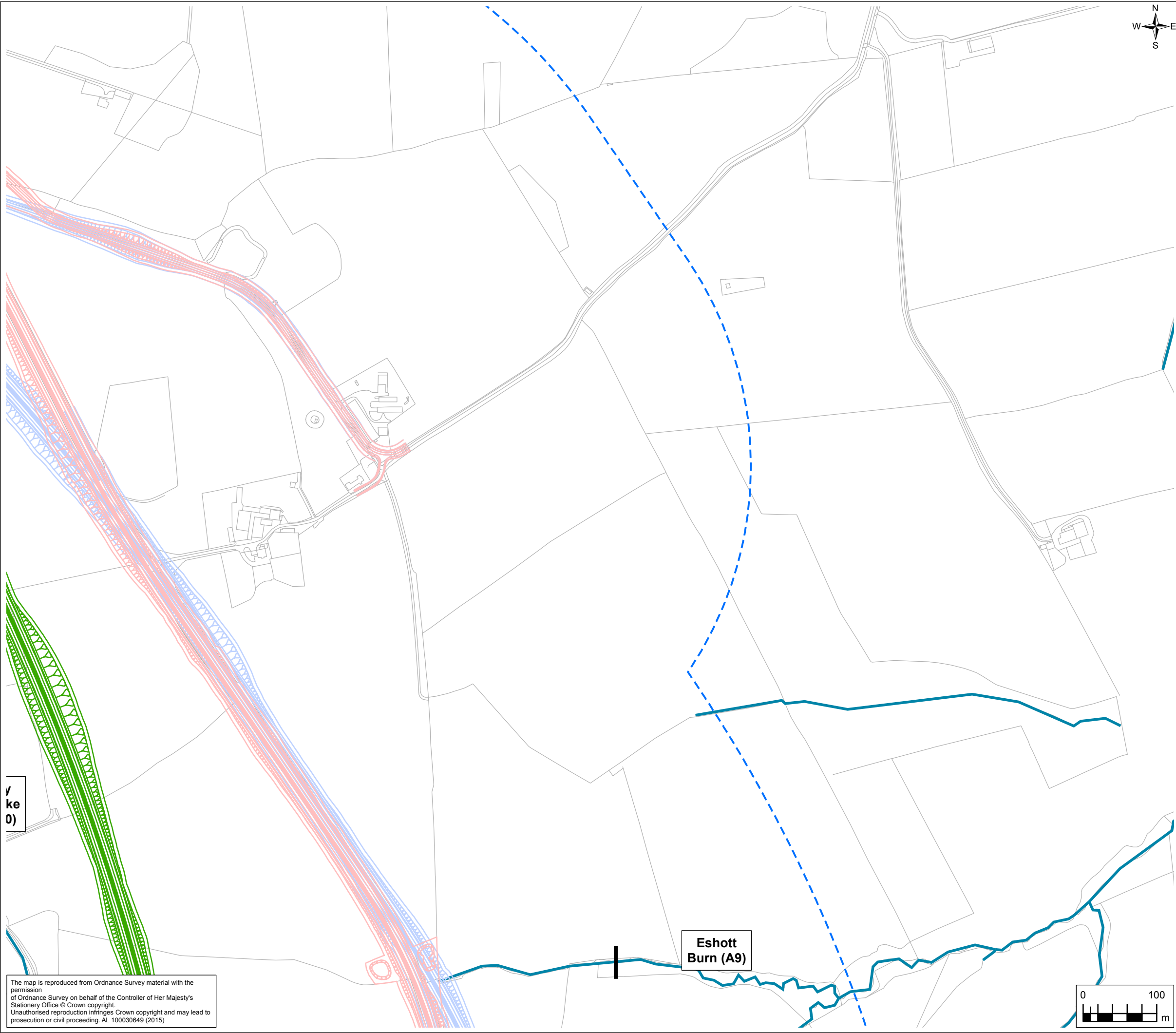


FIGURE 2.11

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Hybrid Option
  - Offline Option
  - 500m Buffer (all options combined)
  - Watercourse
  - Waterbody

Water Vole Results

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

Otter Results

- S Spraint
- H Hover/Holt
- R Run/Slide

Mink

- Spraint
- A1 Watercourse number

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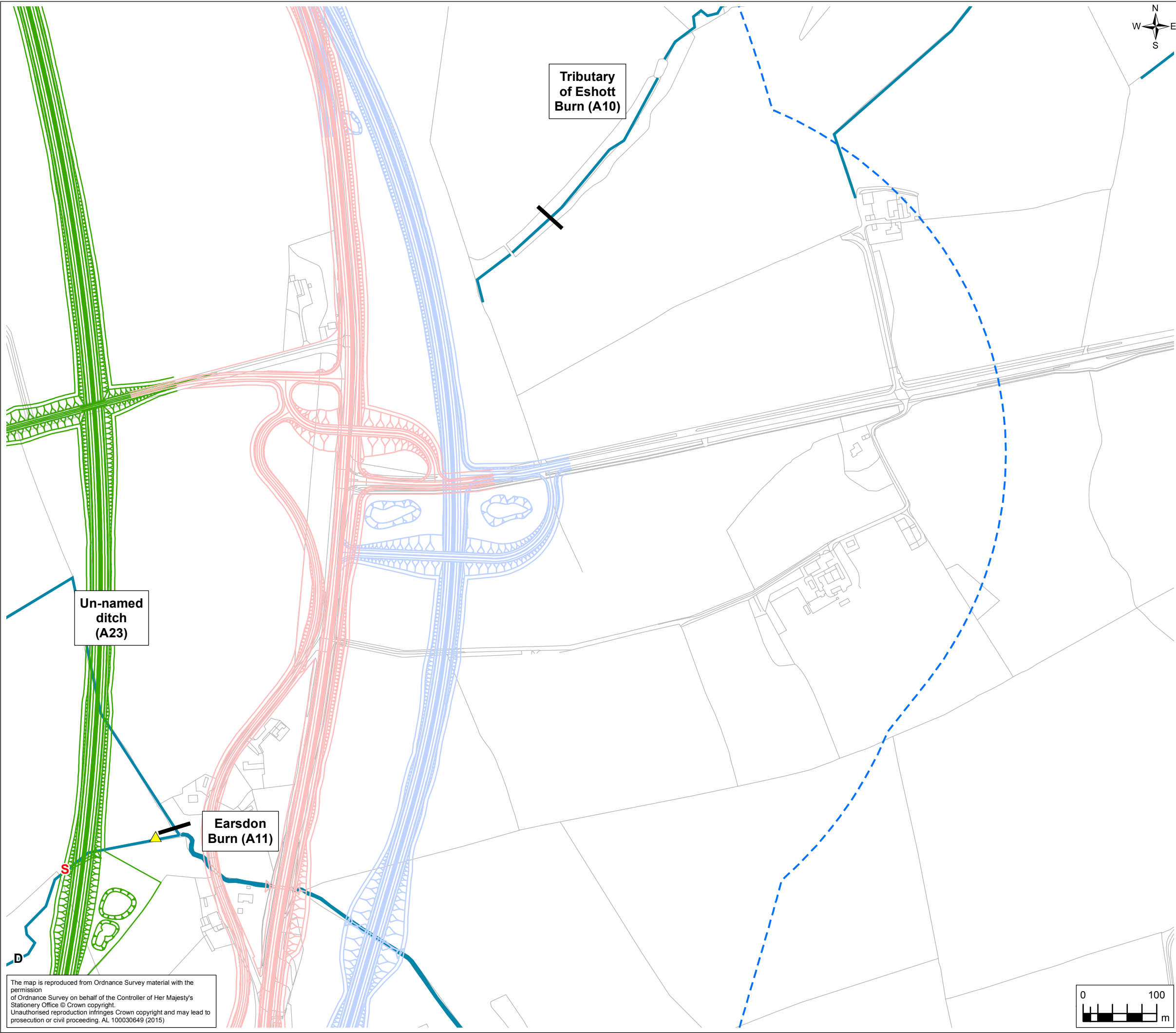


FIGURE 2.12

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Hybrid Option
  - Offline Option
  - 500m Buffer (all options combined)
  - Watercourse
  - Waterbody

Water Vole Results

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

Otter Results

- S Spraint
- H Hover/Holt
- R Run/Slide

Mink

- Spraint
- A1 Watercourse number

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WATER VOLE AND OTTER SURVEY MAP  
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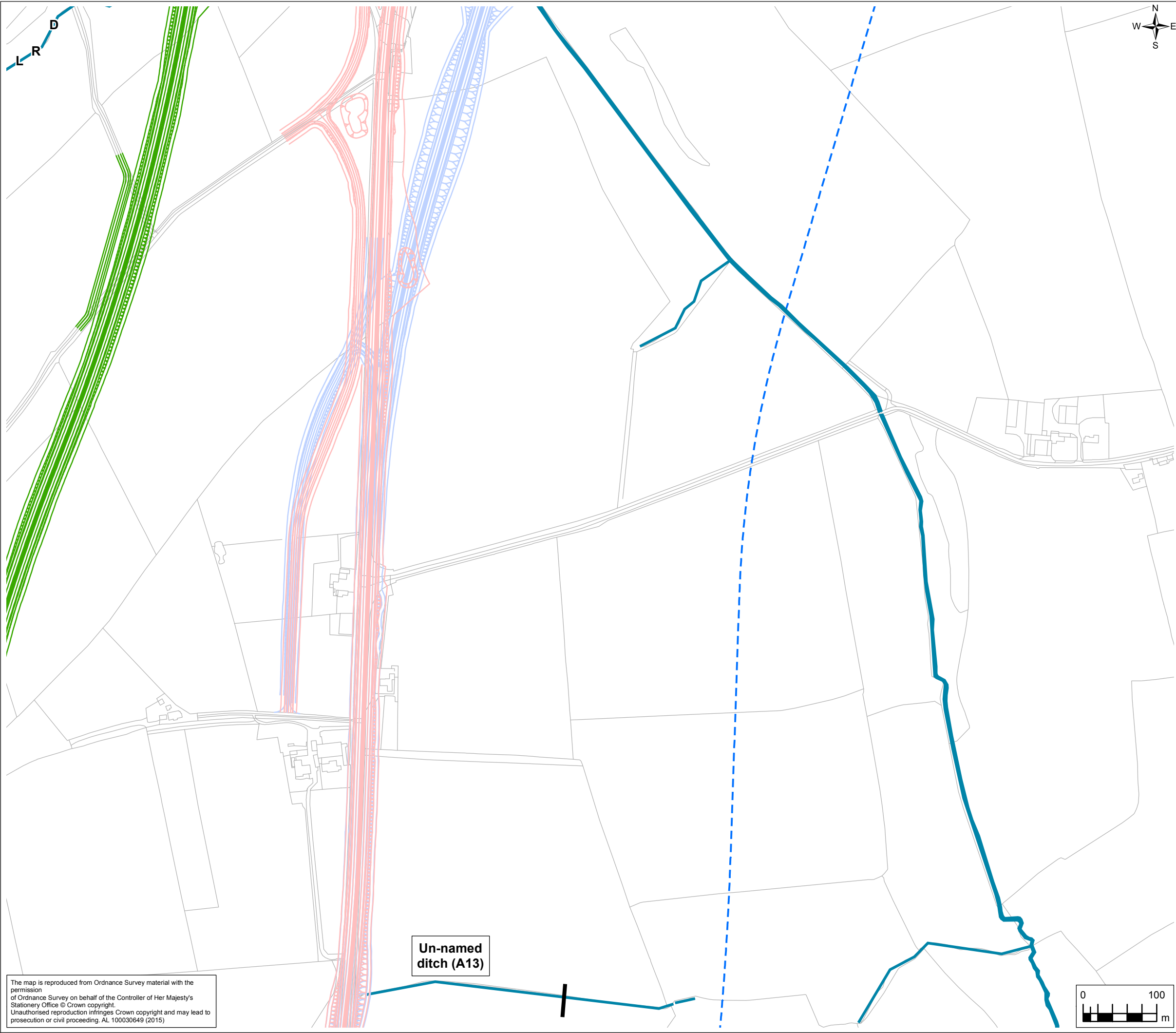


FIGURE 2.13

**Legend**

- Extent of Surveyed Waterbody
- Online Option
- Hybrid Option
- Offline Option
- 500m Buffer (all options combined)
- Watercourse
- Waterbody

**Water Vole Results**


- Burrow
- Print
- Run/Pathway
- Feeding Remains
- Dropping
- Latrine

**Otter Results**

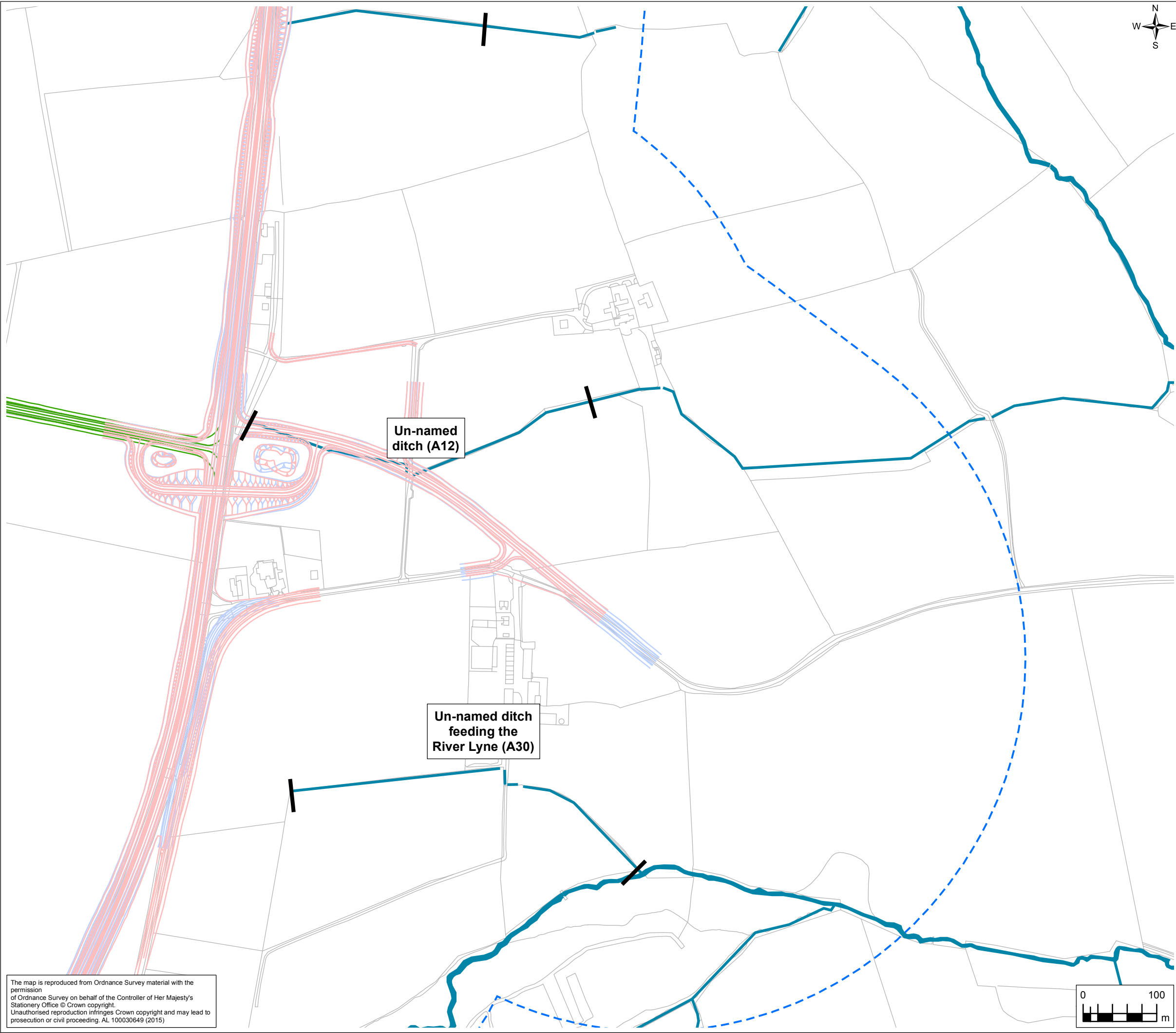
- Spraint
- Hover/Holt
- Run/Slide

**Mink**

- Spraint
- Watercourse number

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**FIGURE 2.14**

**Legend**

- Extent of Surveyed Waterbody
- Online Option
- Hybrid Option
- Offline Option
- 500m Buffer (all options combined)
- Watercourse
- Waterbody

**Water Vole Results**


- Burrow
- Print
- Run/Pathway
- Feeding Remains
- Dropping
- Latrine

**Otter Results**

- Spraint
- Hover/Holt
- Run/Slide

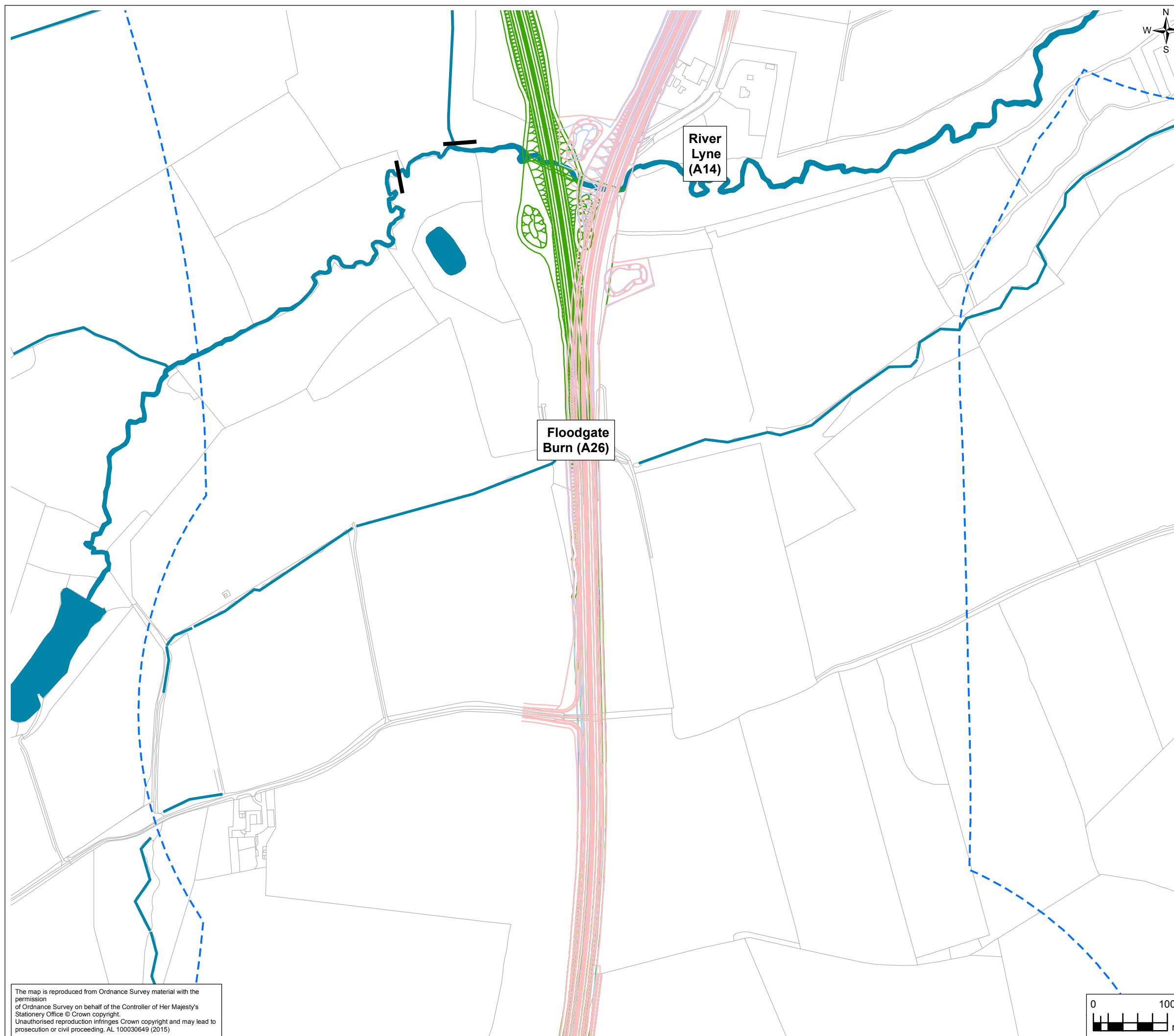
**Mink**

- Spraint
- Watercourse number

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**FIGURE 2.15**

### Legend

-  Extent of Surveyed Waterbody
-  Online Option
-  Hybrid Option
-  Offline Option
-  500m Buffer (all options combined)
-  Watercourse
-  Waterbody


### Water Vole Results

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

### Otter Results

- S** Spraint
- H** Hover/Holt
- R** Run/Slide

Mink

-  Spraint
- A1** Watercourse number

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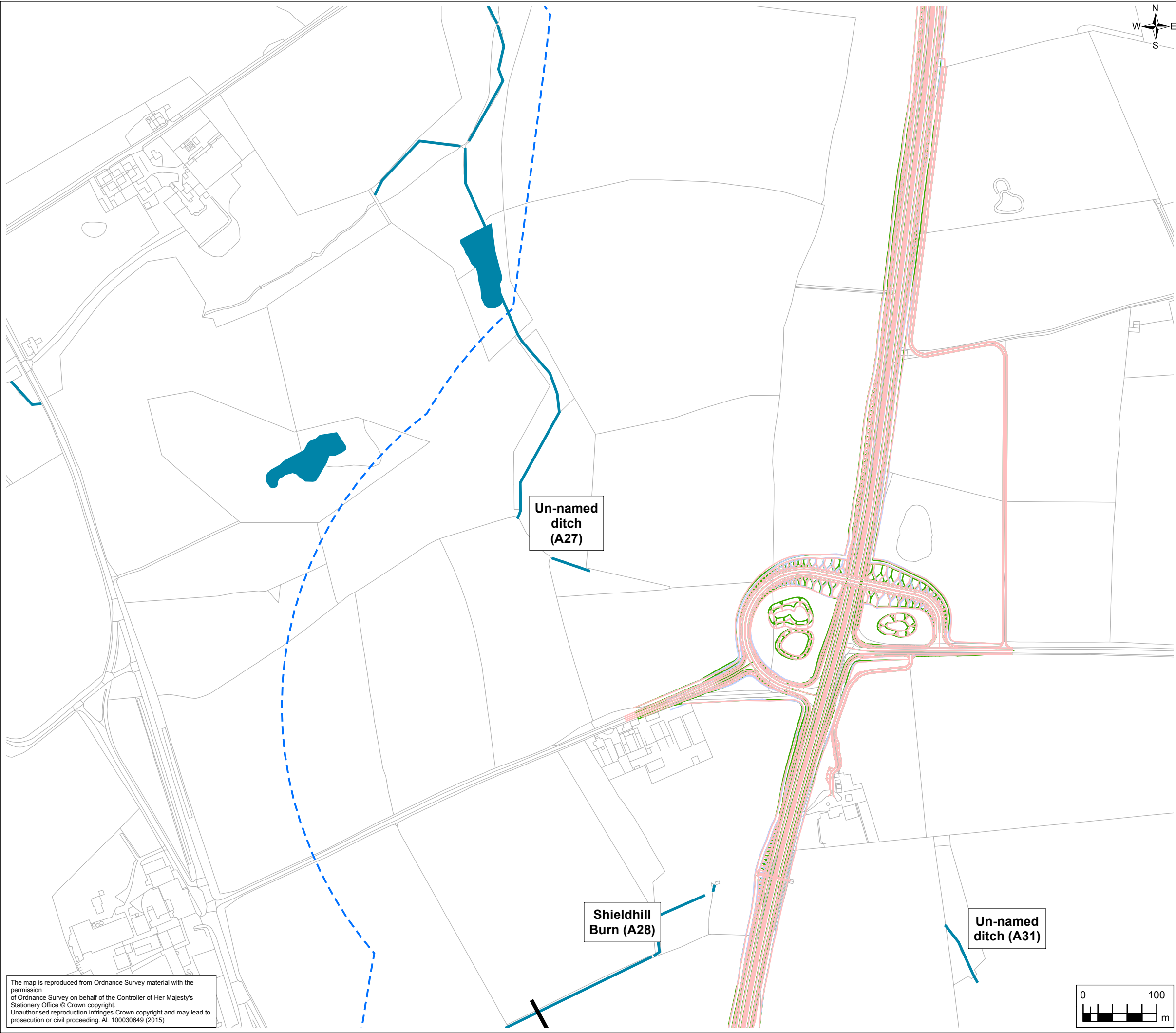
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FIGURE 2.16

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Hybrid Option
  - Offline Option
  - 500m Buffer (all options combined)
  - Watercourse
  - Waterbody

Water Vole Results

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

Otter Results

- S Spraint
- H Hover/Holt
- R Run/Slide

Mink

- Spraint
- A1 Watercourse number

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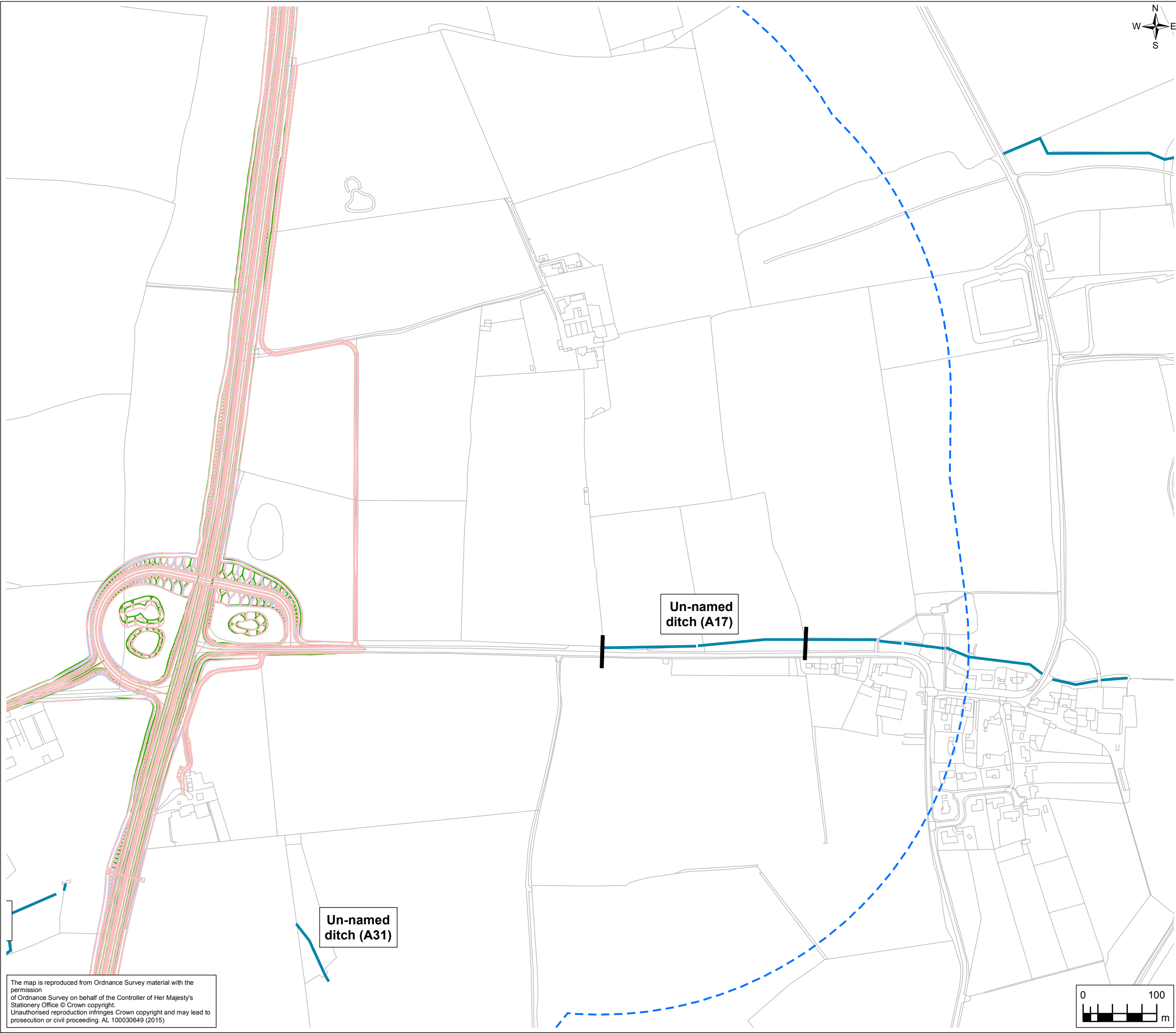


FIGURE 2.17

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Hybrid Option
  - Offline Option
  - 500m Buffer (all options combined)
  - Watercourse
  - Waterbody

Water Vole Results

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

Otter Results

- S Spraint
- H Hover/Holt
- R Run/Slide

Mink

- Spraint
- A1 Watercourse number

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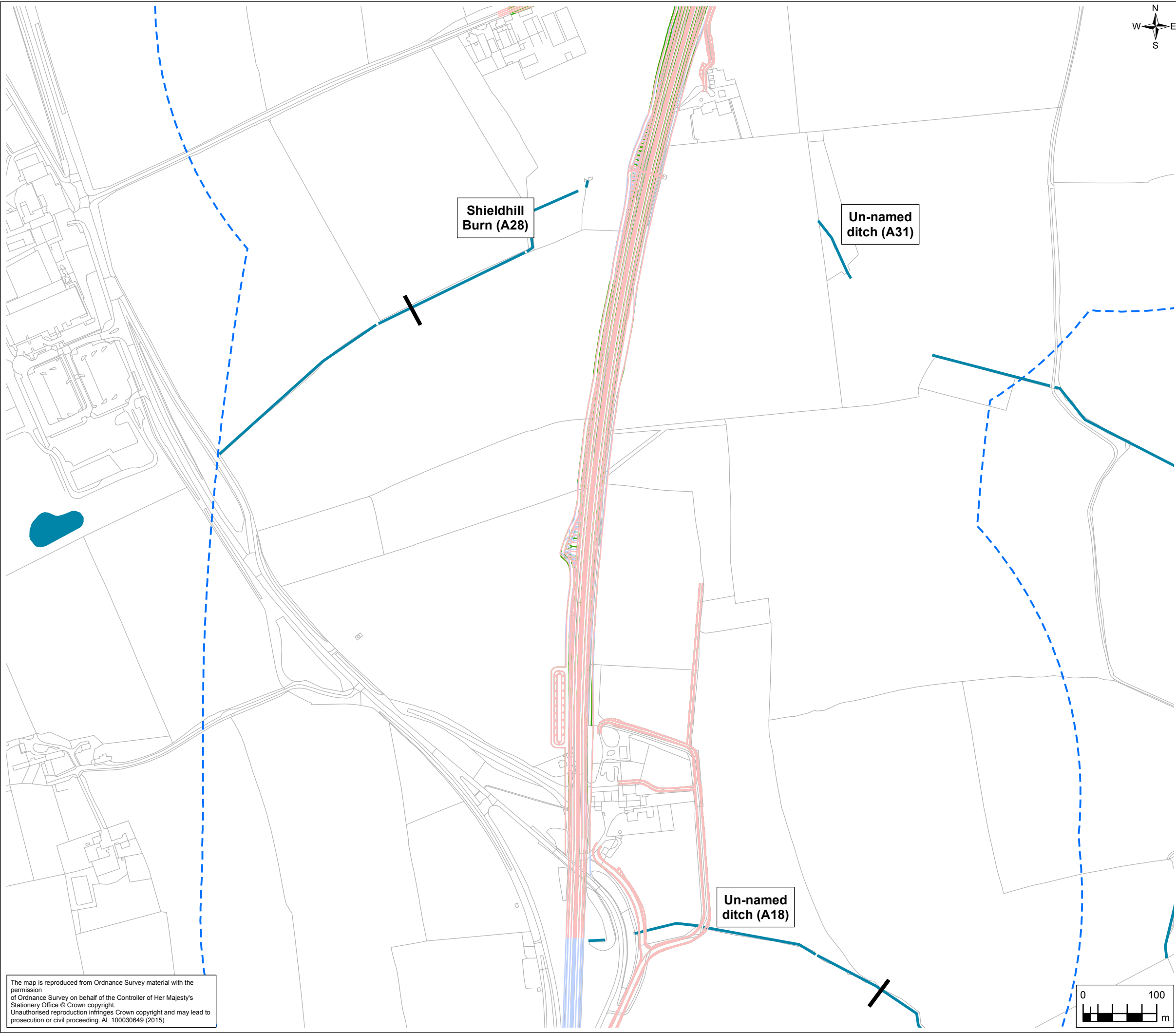


FIGURE 2.18

**Legend**

- Extent of Surveyed Waterbody
- Online Option
- Hybrid Option
- Offline Option
- 500m Buffer (all options combined)
- Watercourse
- Waterbody

**Water Vole Results**


- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

**Otter Results**

- S Spraint
- H Hover/Holt
- R Run/Slide

**Mink**

- Spraint
- A1 Watercourse number

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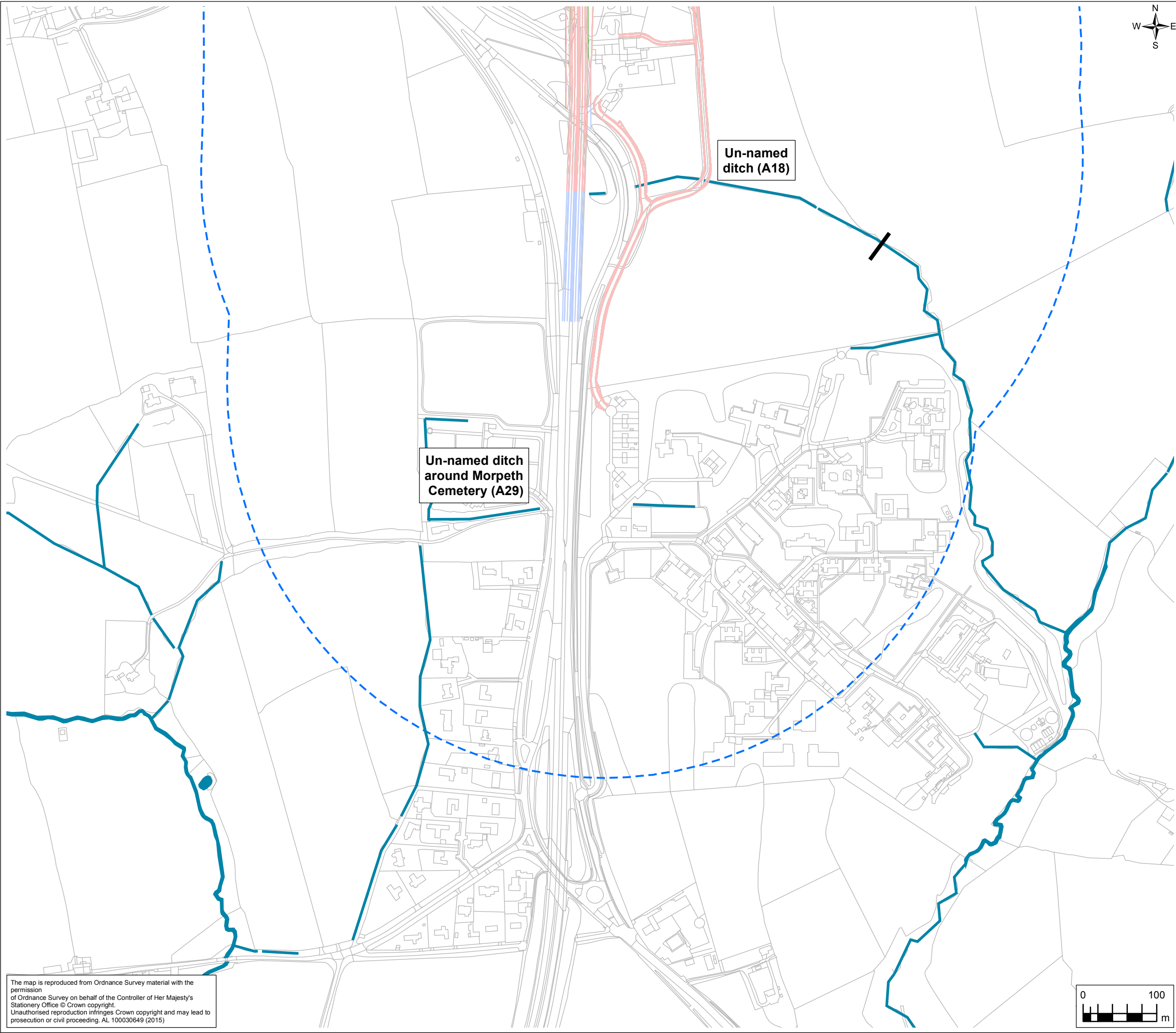


FIGURE 2.19

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Hybrid Option
  - Offline Option
  - 500m Buffer (all options combined)
  - Watercourse
  - Waterbody

Water Vole Results

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

Otter Results

- S Spraint
- H Hover/Holt
- R Run/Slide

Mink

- Spraint
- A1 Watercourse number

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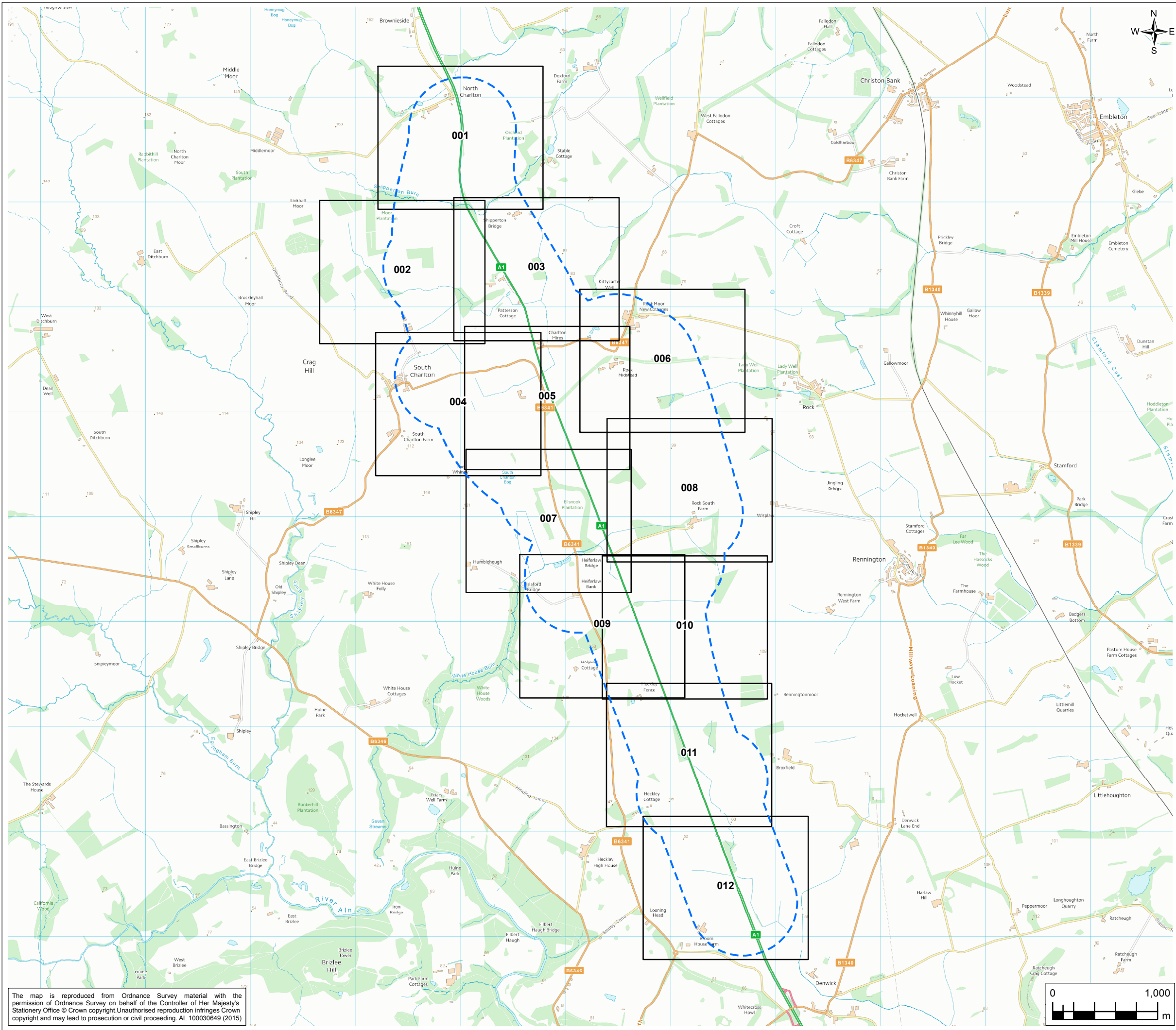
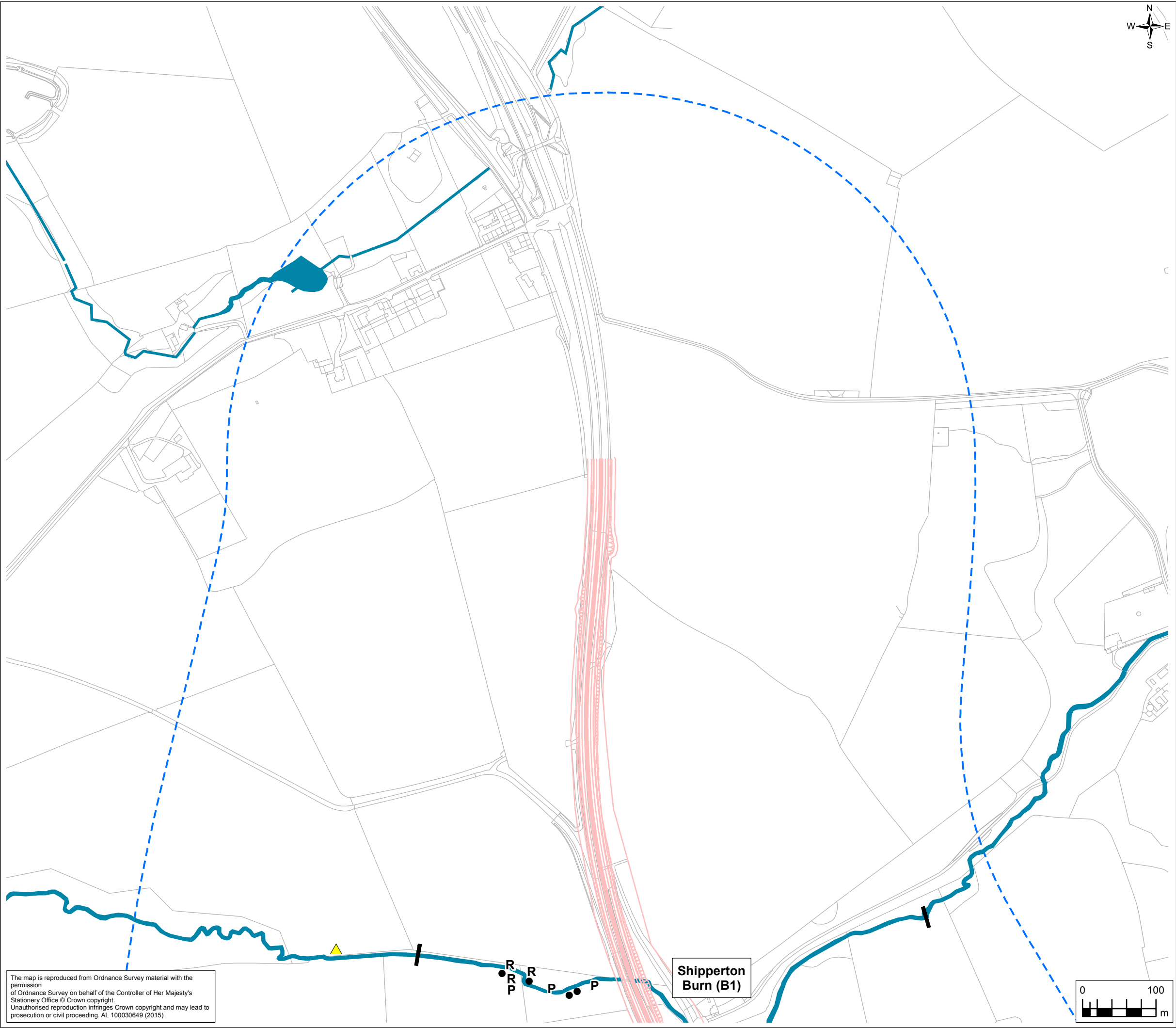


FIGURE 3.1

- Legend**
- Survey Area
  - Sheet Extents (sheet number)

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Legend

- Extent of Surveyed Waterbody
- Online Option
- Survey
- Watercourse
- Waterbody

Water Vole Results

- Burrow
- Print
- Run/Pathway
- Feeding Remains
- Dropping
- Latrine

Mink

- Spraint

- B1 Watercourse number

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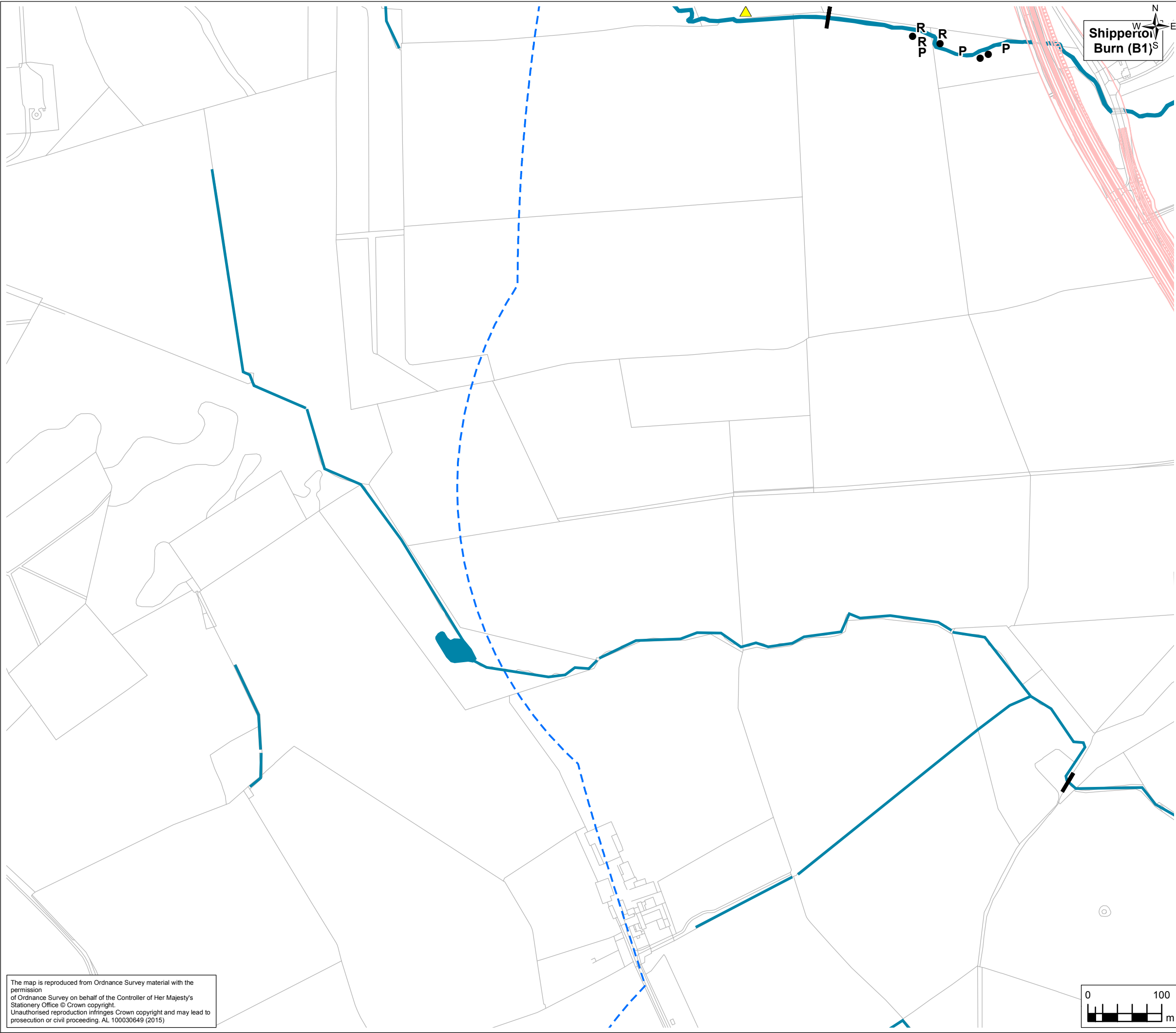


FIGURE 3.3

**Legend**

- Extent of Surveyed Waterbody
- Online Option
- Survey
- Watercourse
- Waterbody


**Water Vole Results**

- Burrow
- Print
- Run/Pathway
- Feeding Remains
- Dropping
- Latrine

**Mink**

- Spraint

**B1** Watercourse number

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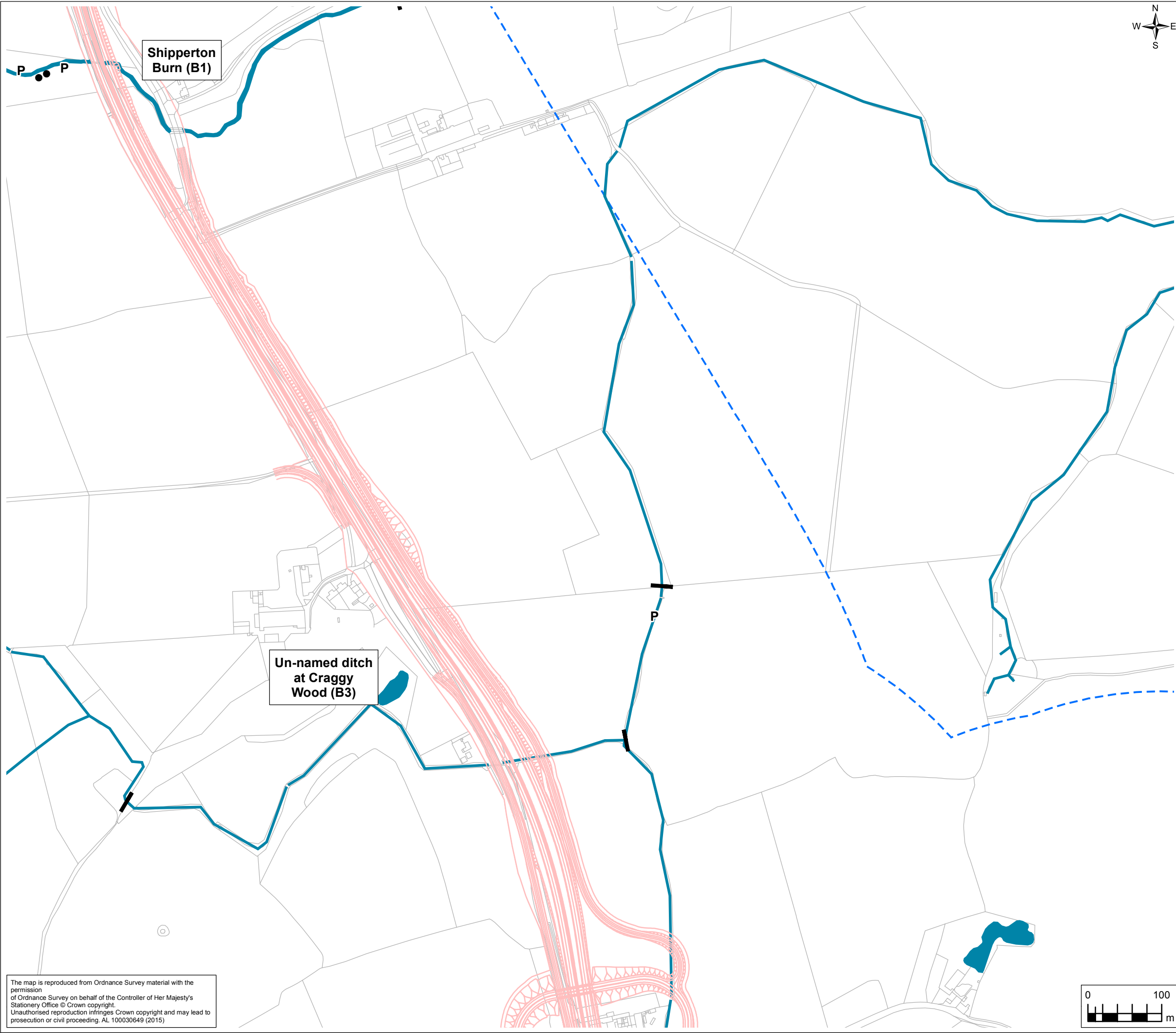


FIGURE 3.4

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Survey
  - Watercourse
  - Waterbody

Water Vole Results

- Burrow
- Print
- Run/Pathway
- Feeding Remains
- Dropping
- Latrine

Mink

- Spraint

B1 Watercourse number

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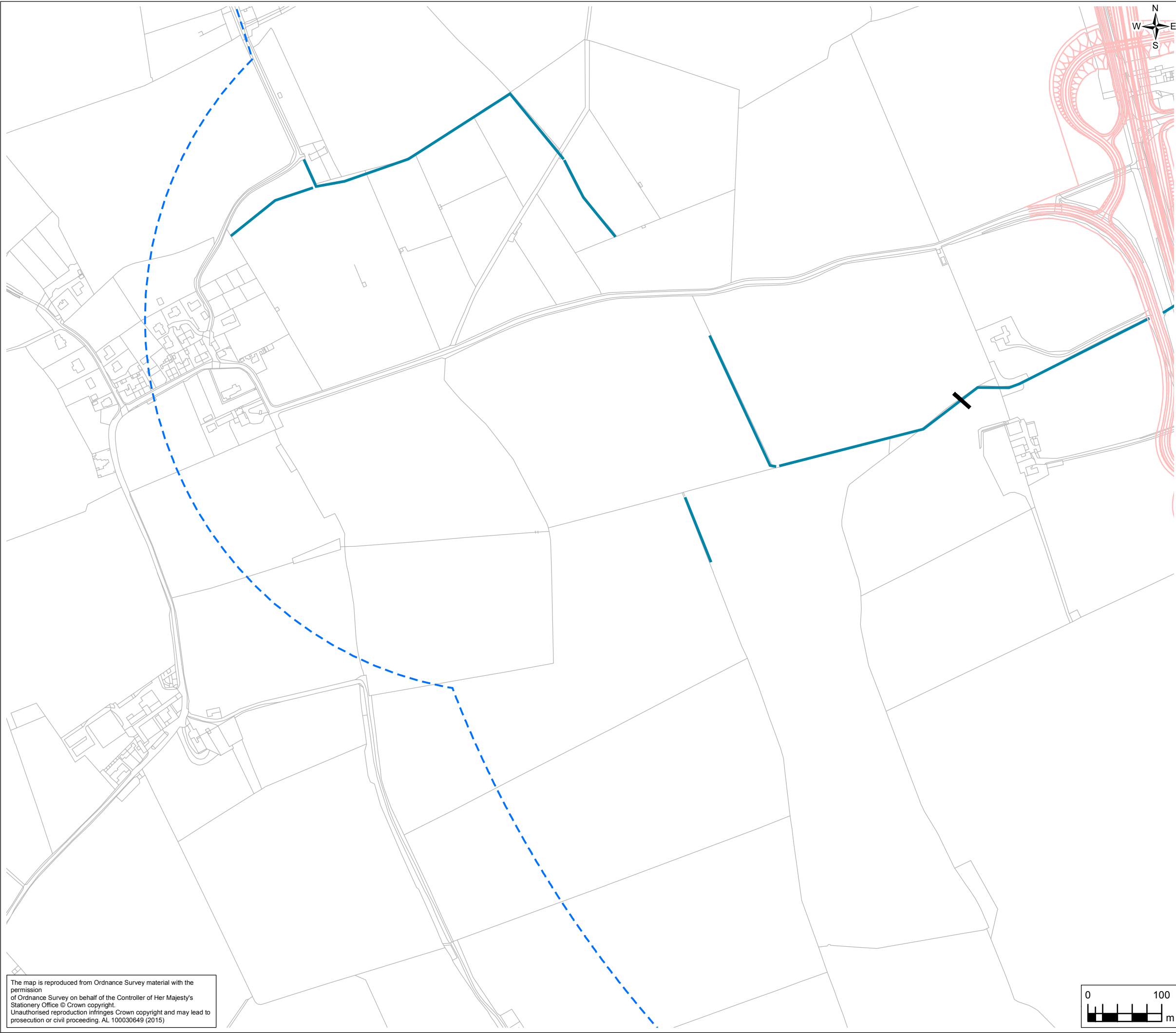
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FIGURE 3.5

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Survey
  - Watercourse
  - Waterbody

Water Vole Results

- Burrow
- Print
- Run/Pathway
- Feeding Remains
- Dropping
- Latrine

Mink

- Spraint

B1 Watercourse number

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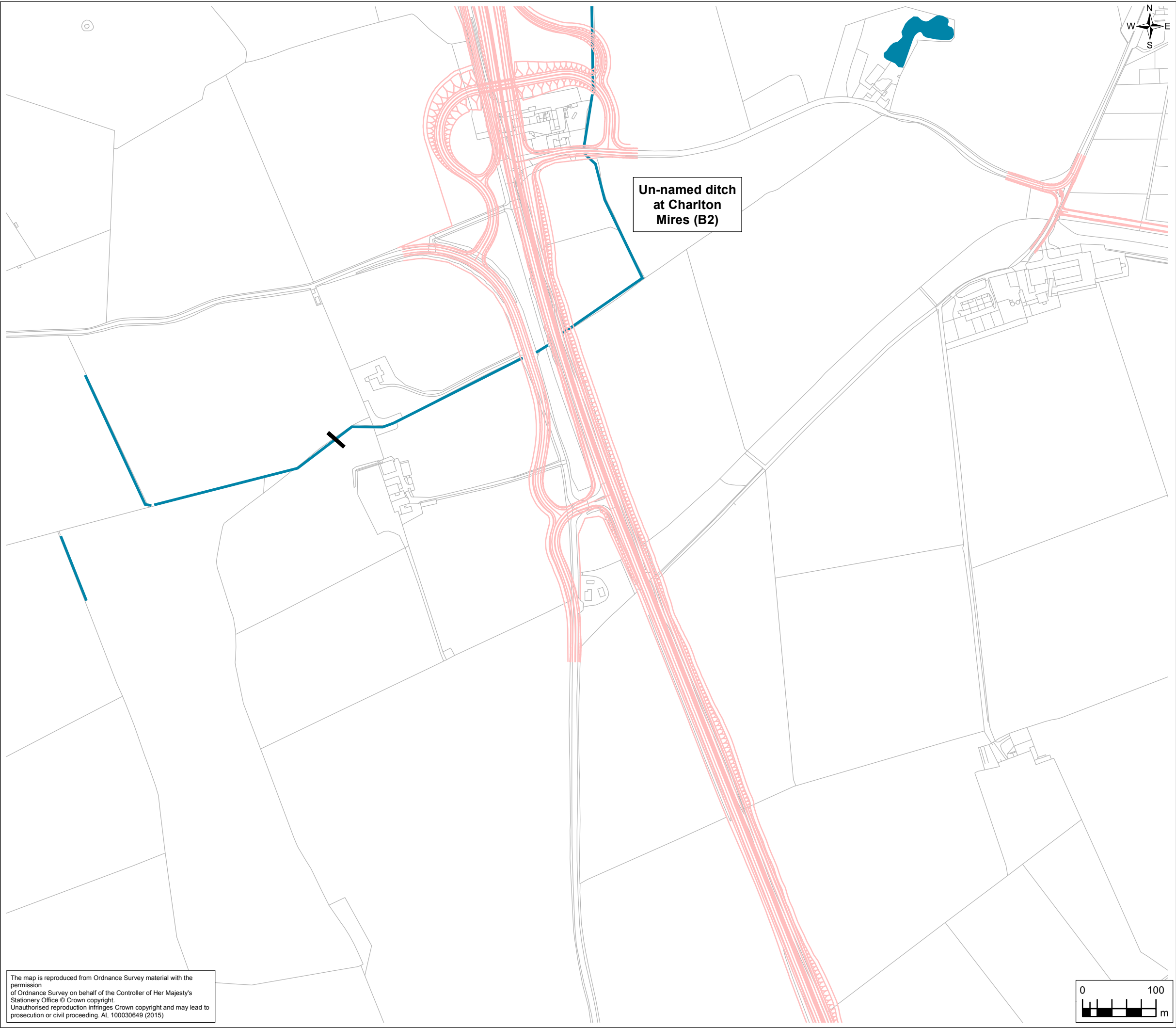
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FIGURE 3.6

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Survey
  - Watercourse
  - Waterbody

Water Vole Results

- Burrow
- Print
- Run/Pathway
- Feeding Remains
- Dropping
- Latrine

Mink

- Spraint

B1 Watercourse number

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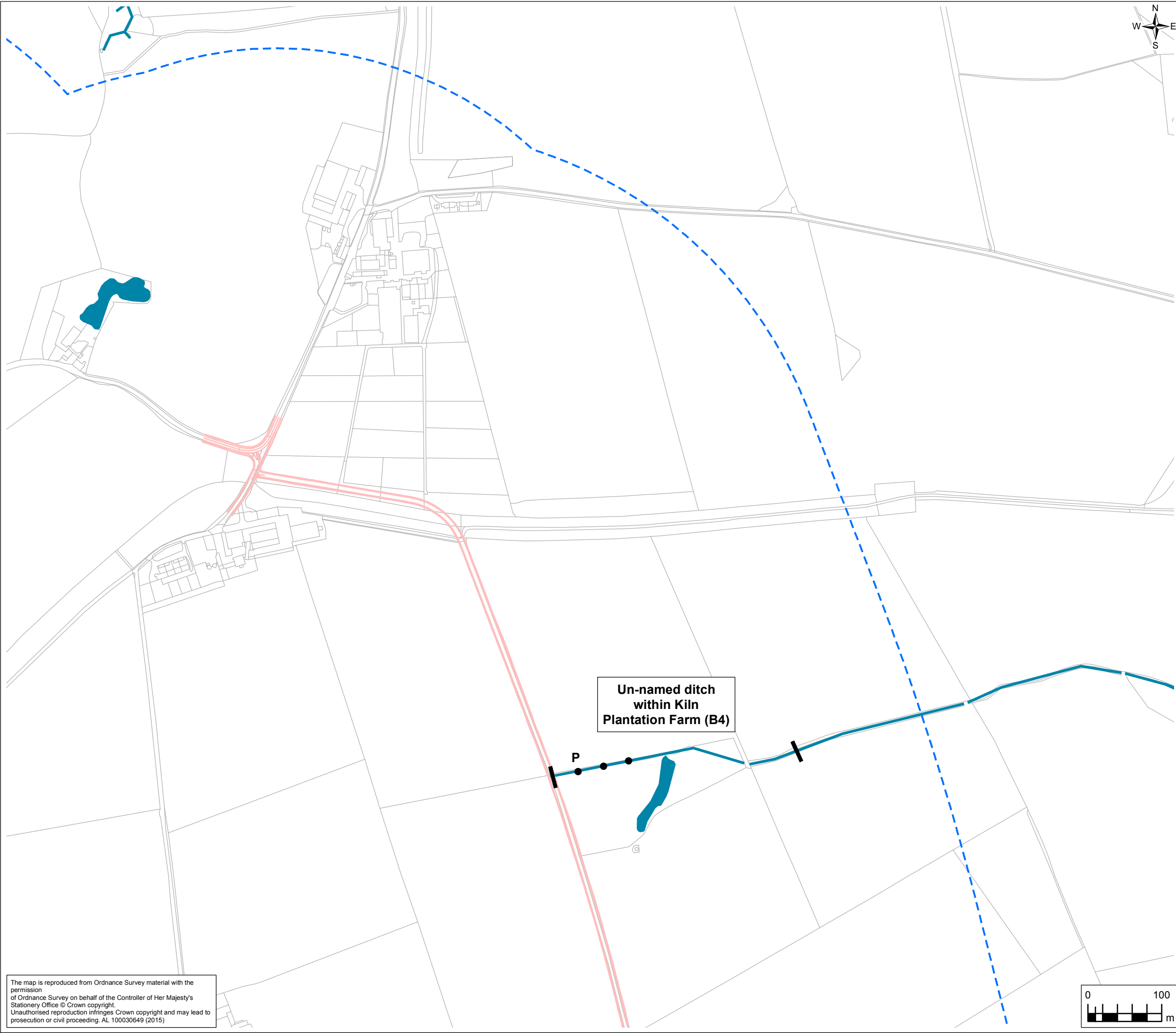


FIGURE 3.7

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Survey
  - Watercourse
  - Waterbody

Water Vole Results

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

Mink

- Spraint

- B1 Watercourse number

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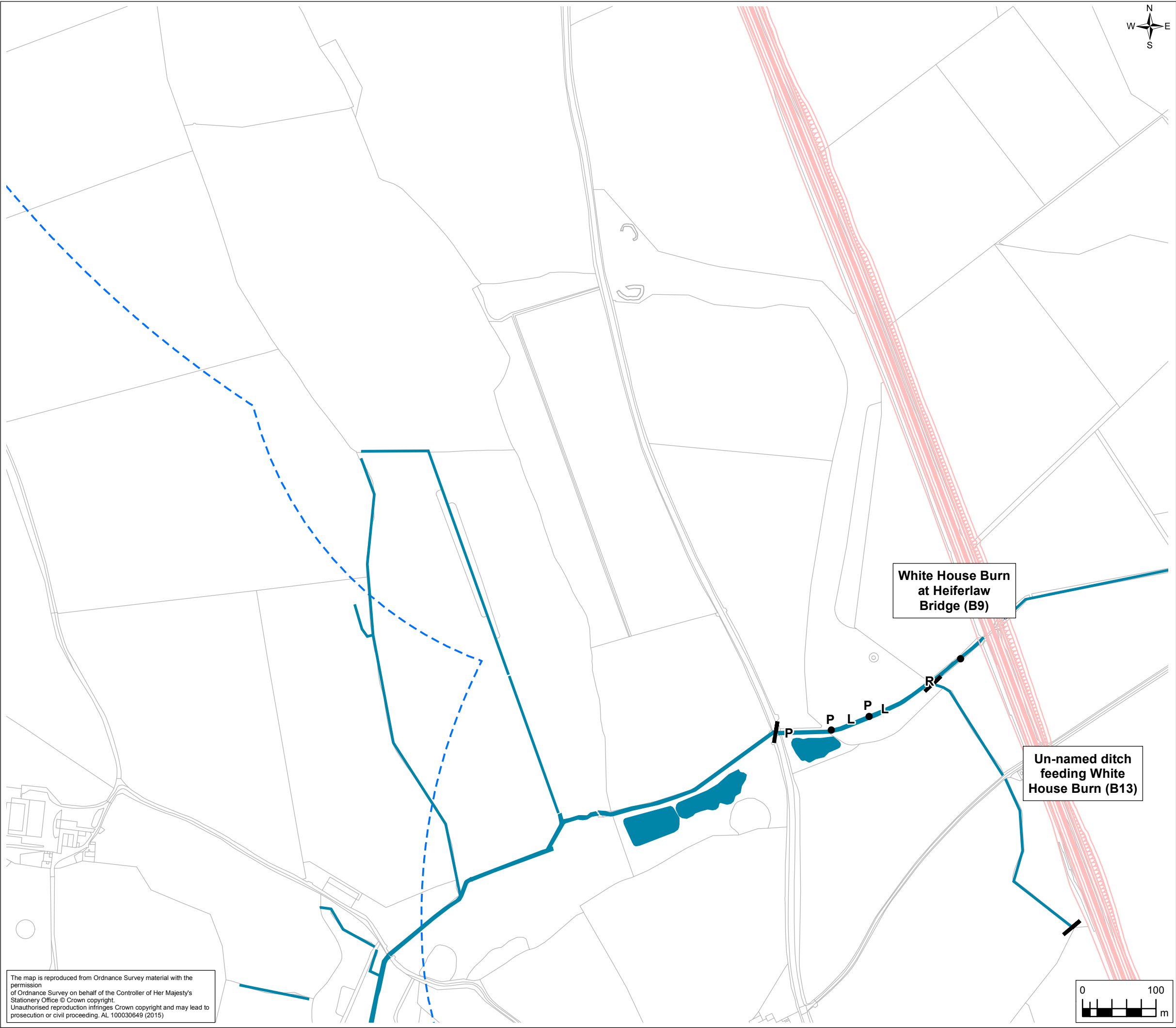


FIGURE 3.8

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Survey
  - Watercourse
  - Waterbody

Water Vole Results

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

Mink

- Spraint

- B1 Watercourse number

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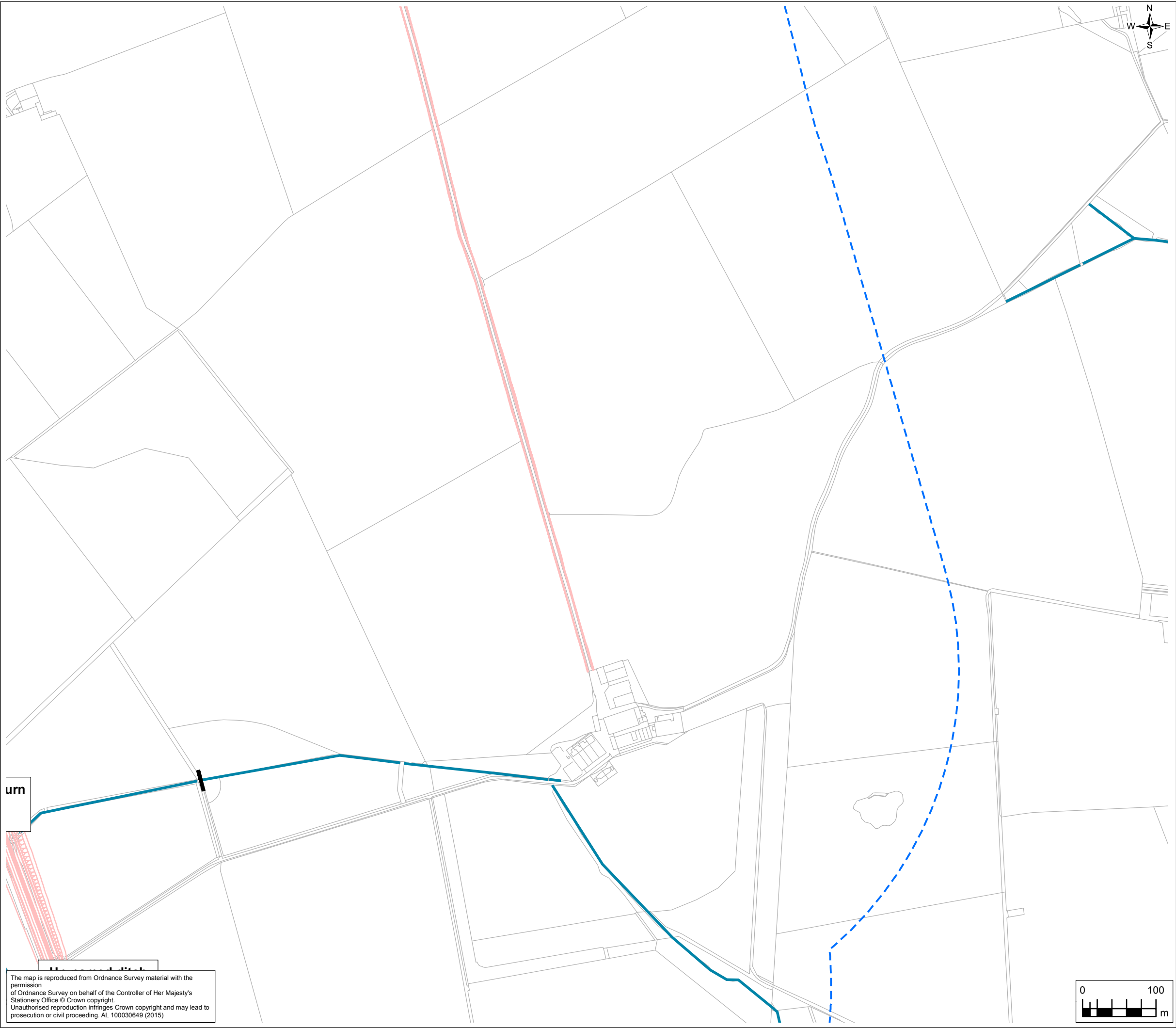


FIGURE 3.9

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Survey
  - Watercourse
  - Waterbody

Water Vole Results

- Burrow
- Print
- Run/Pathway
- Feeding Remains
- Dropping
- Latrine

Mink

- Spraint

B1 Watercourse number

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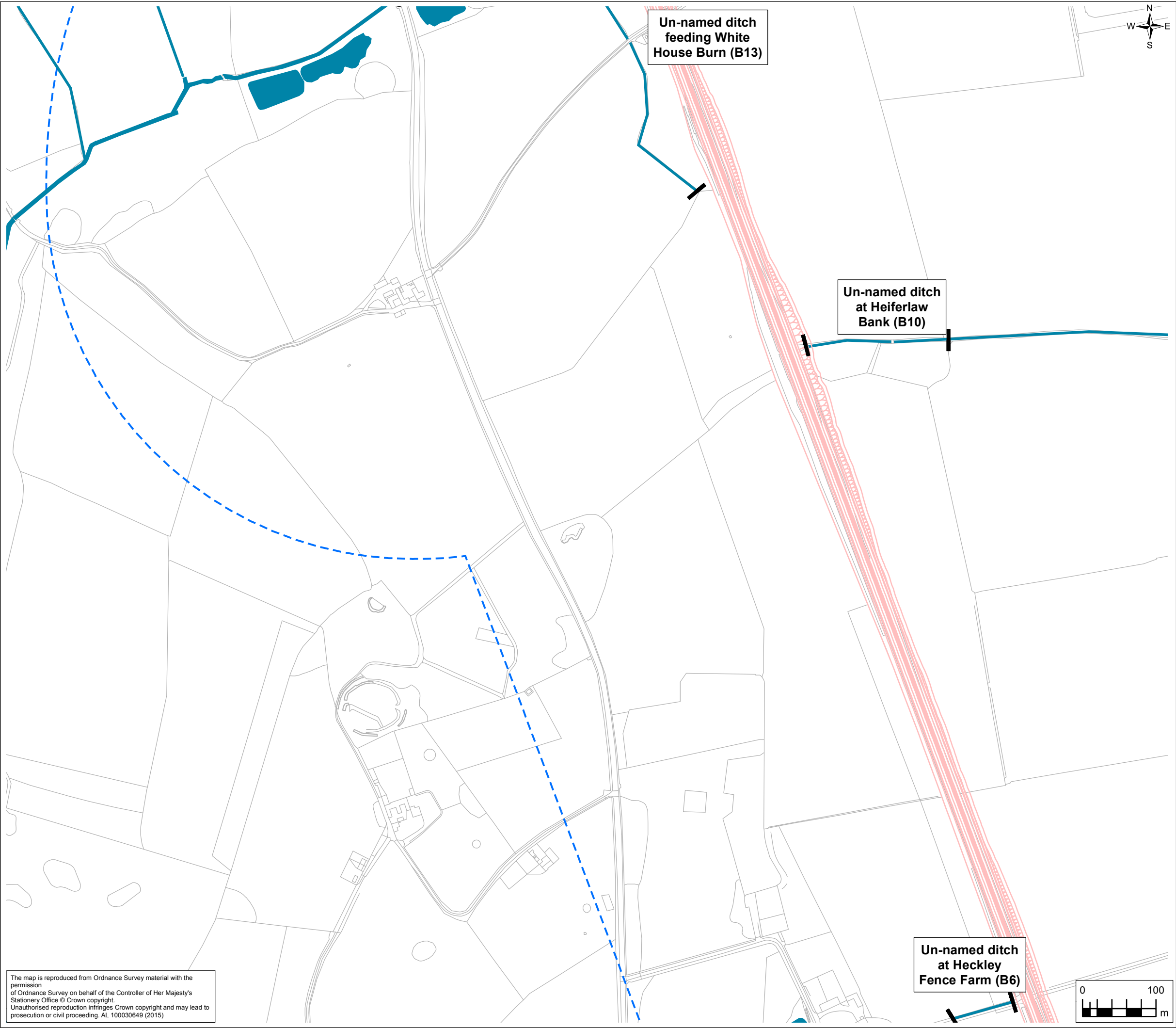
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FIGURE 3.10

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Survey
  - Watercourse
  - Waterbody

Water Vole Results

- Burrow
- Print
- Run/Pathway
- Feeding Remains
- Dropping
- Latrine

Mink

- Spraint

B1 Watercourse number

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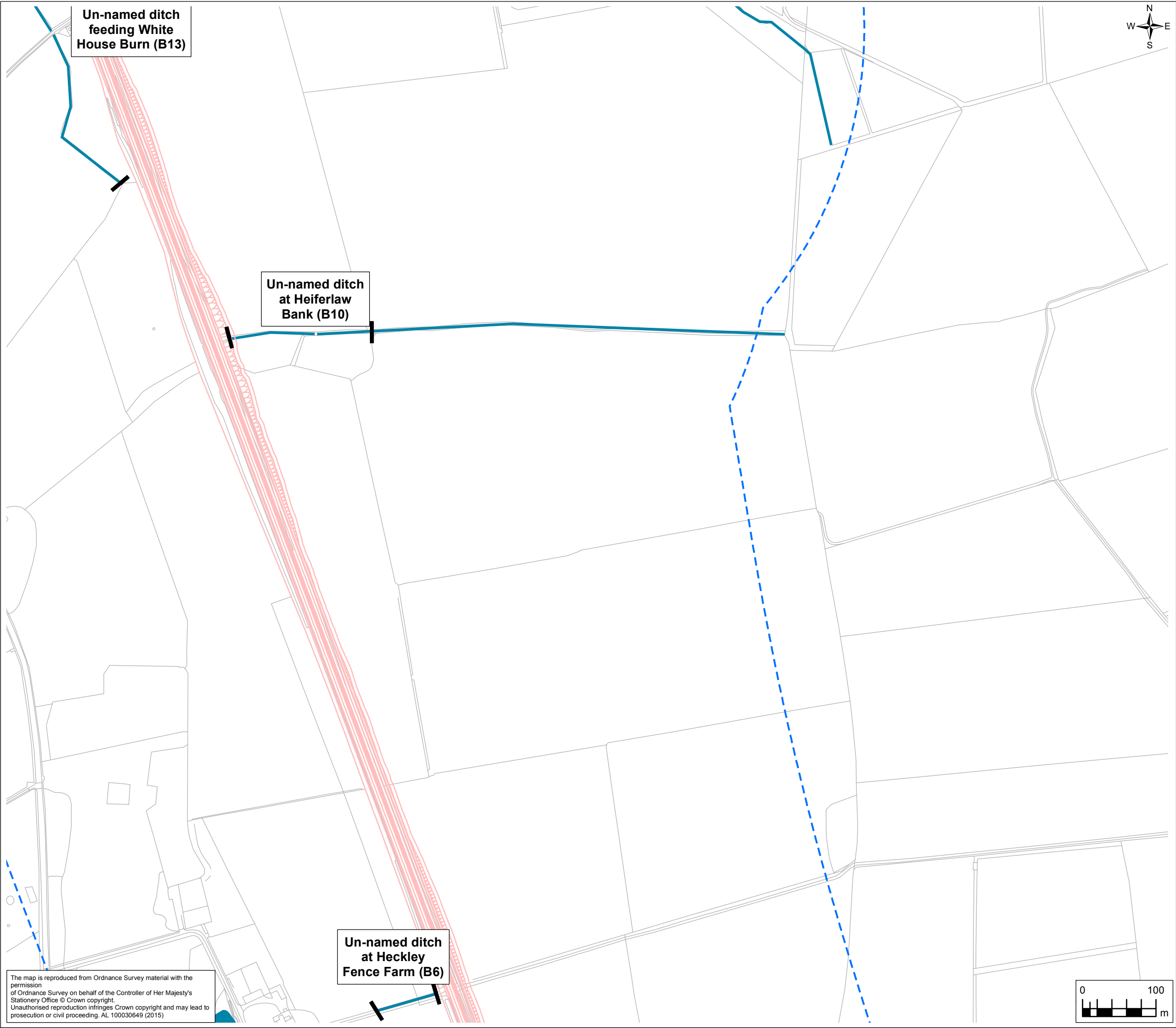
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Un-named ditch  
feeding White  
House Burn (B13)

Un-named ditch  
at Heiferlaw  
Bank (B10)

Un-named ditch  
at Heckley  
Fence Farm (B6)

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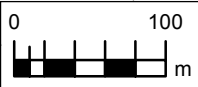


FIGURE 3.11

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Survey
  - Watercourse
  - Waterbody

Water Vole Results

- Burrow
- Print
- Run/Pathway
- Feeding Remains
- Dropping
- Latrine

Mink

- Spraint

B1 Watercourse number

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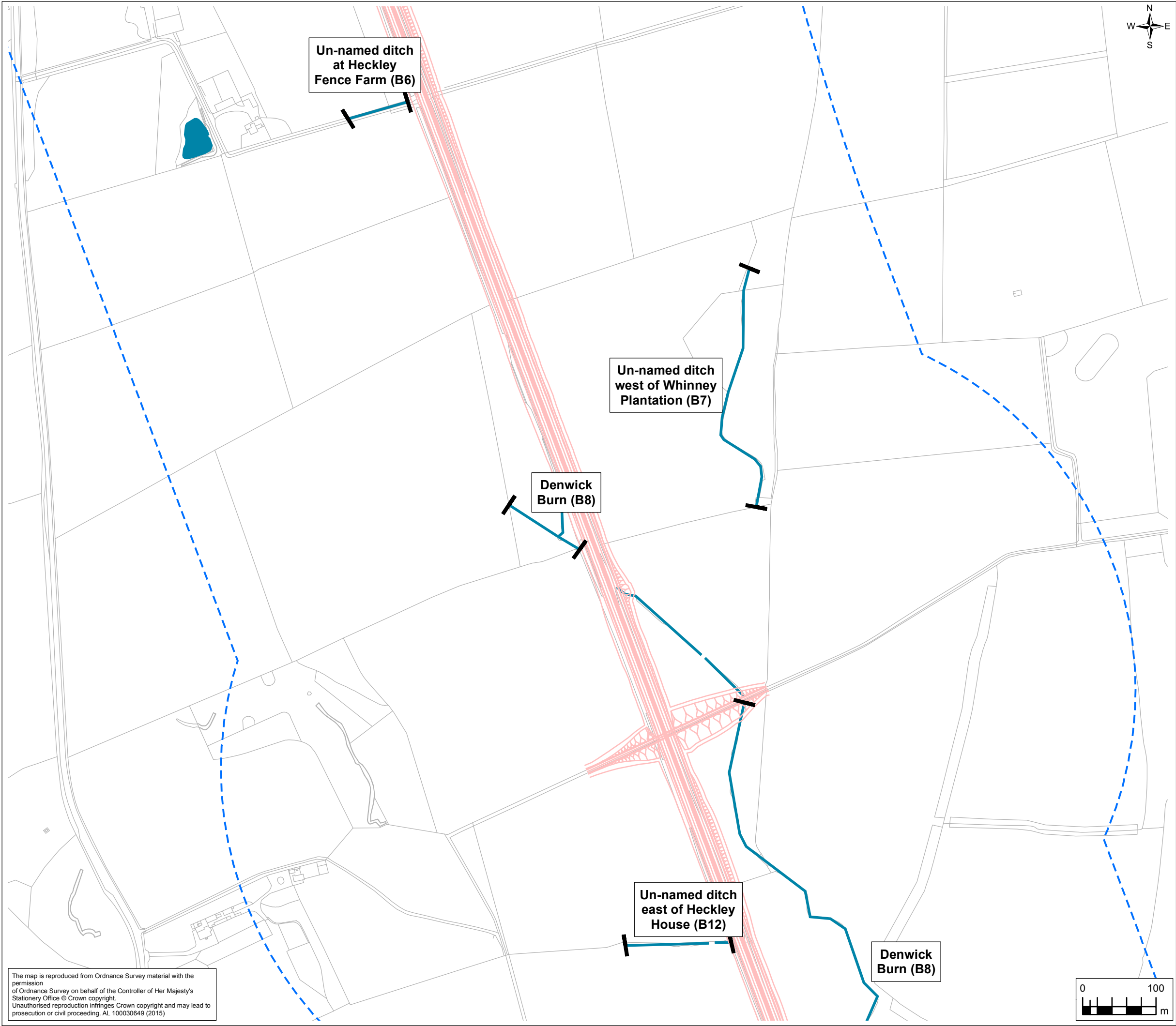
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WATER VOLE AND OTTER SURVEY MAP  
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### FIGURE 3.12

**Legend**

- Extent of Surveyed Waterbody
- Online Option
- Survey
- Watercourse
- Waterbody

**Water Vole Results**

- Burrow
- Print
- Run/Pathway
- Feeding Remains
- Dropping
- Latrine

**Mink**

- Spraint

**B1** Watercourse number

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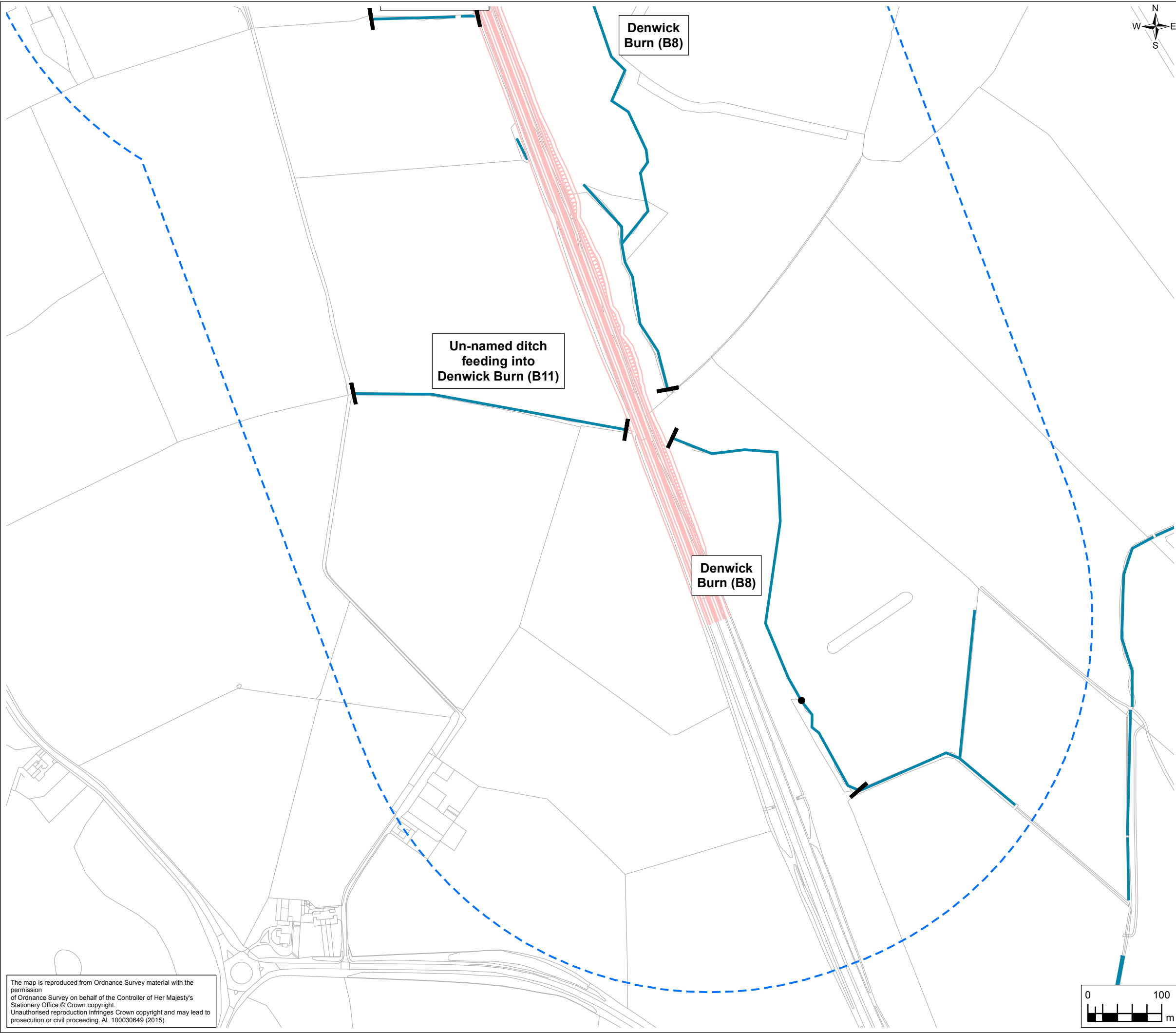
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WATER VOLE AND OTTER SURVEY MAP  
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FIGURE 3.13

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Survey
  - Watercourse
  - Waterbody

Water Vole Results

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

Mink

- Spraint

B1 Watercourse number

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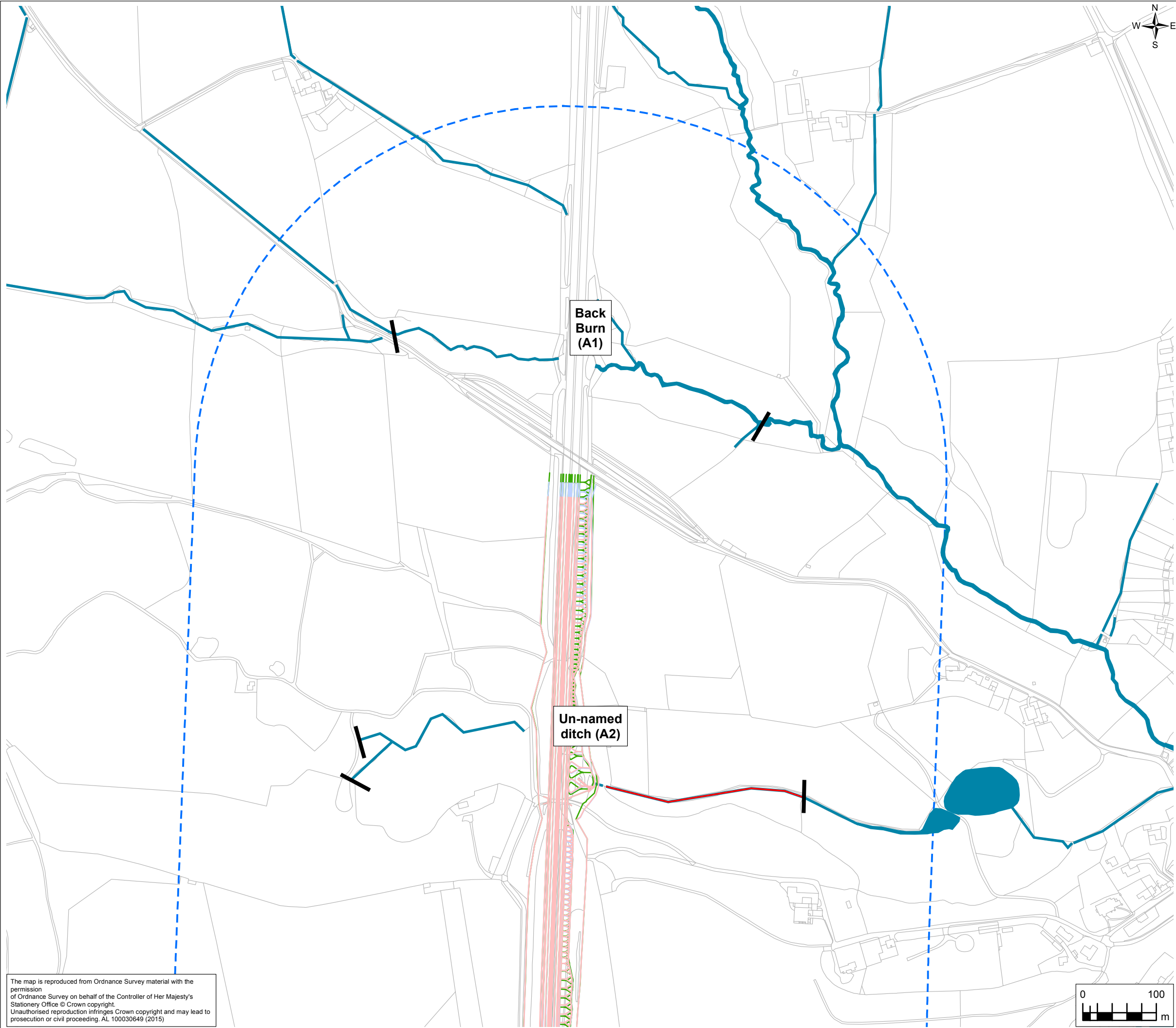


FIGURE 4.2

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Hybrid Option
  - Offline Option
  - 500m Buffer (all options combined)
  - No Access
  - Watercourse
  - Waterbody


Water Vole Results

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

Otter Results

- P Print
- O Otter Sighting
- S Spraint
- H Hover/Holt
- R Run/Slide

A1 Watercourse name/ number

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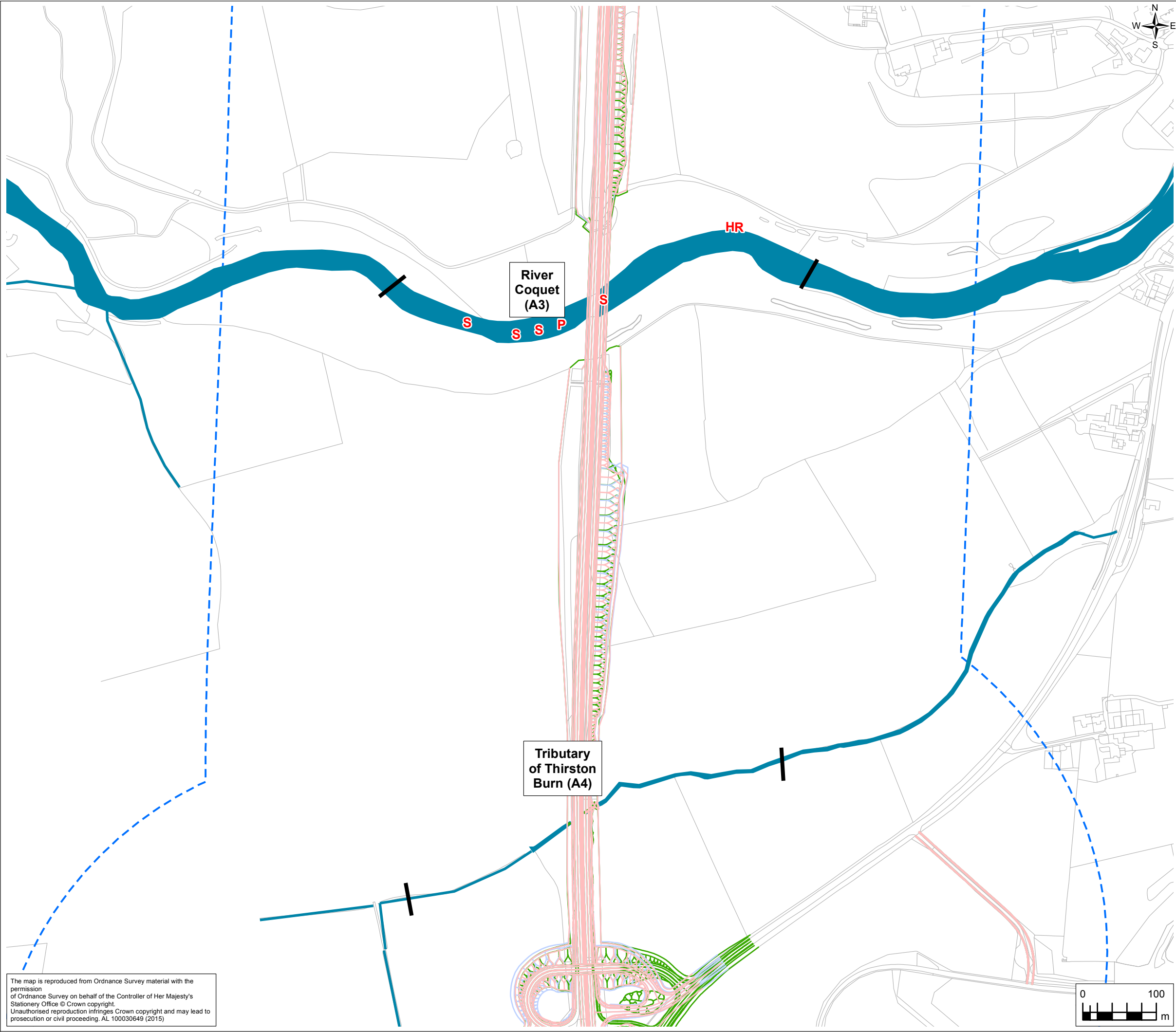


FIGURE 4.3

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Hybrid Option
  - Offline Option
  - 500m Buffer (all options combined)
  - No Access
  - Watercourse
  - Waterbody


Water Vole Results

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

Otter Results

- P Print
- O Otter Sighting
- S Spraint
- H Hover/Holt
- R Run/Slide

A1 Watercourse name/ number

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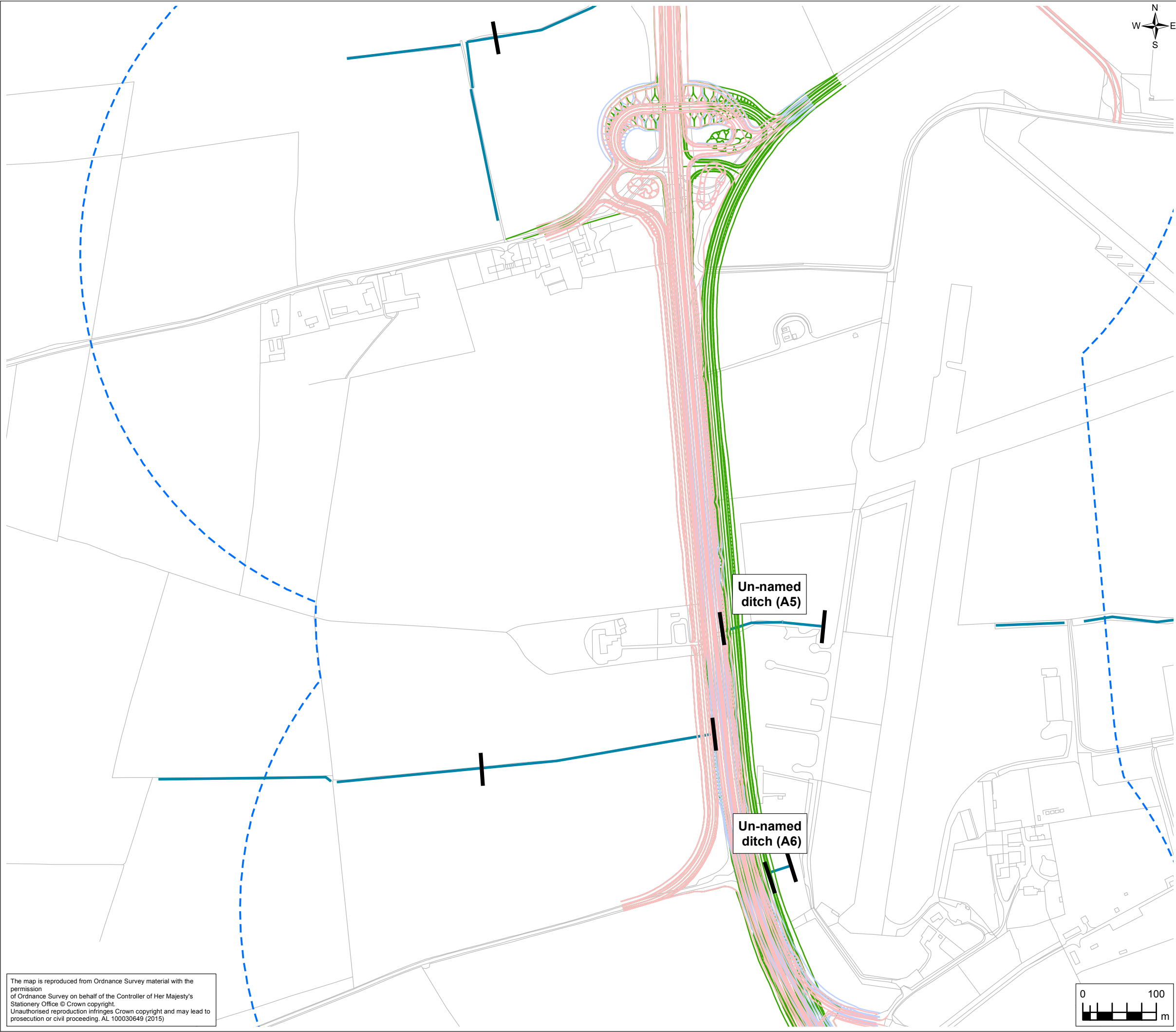


FIGURE 4.4

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Hybrid Option
  - Offline Option
  - 500m Buffer (all options combined)
  - No Access
  - Watercourse
  - Waterbody

Water Vole Results

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

Otter Results

- P Print
- O Otter Sighting
- S Spraint
- H Hover/Holt
- R Run/Slide

A1 Watercourse name/ number

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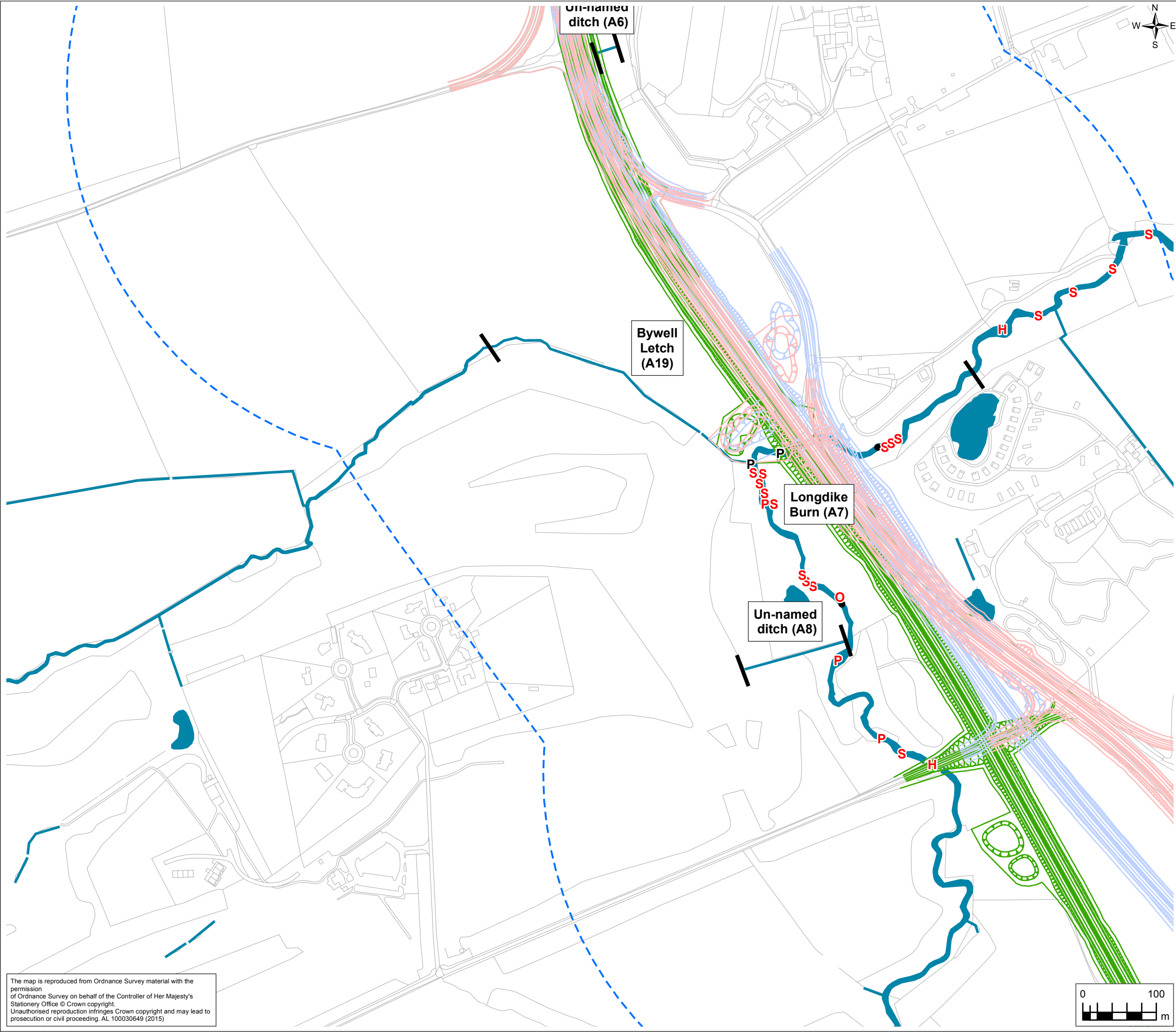


FIGURE 4.5

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Hybrid Option
  - Offline Option
  - 500m Buffer (all options combined)
  - No Access
  - Watercourse
  - Waterbody


Water Vole Results

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

Otter Results

- P Print
- O Otter Sighting
- S Spraint
- H Hover/Holt
- R Run/Slide

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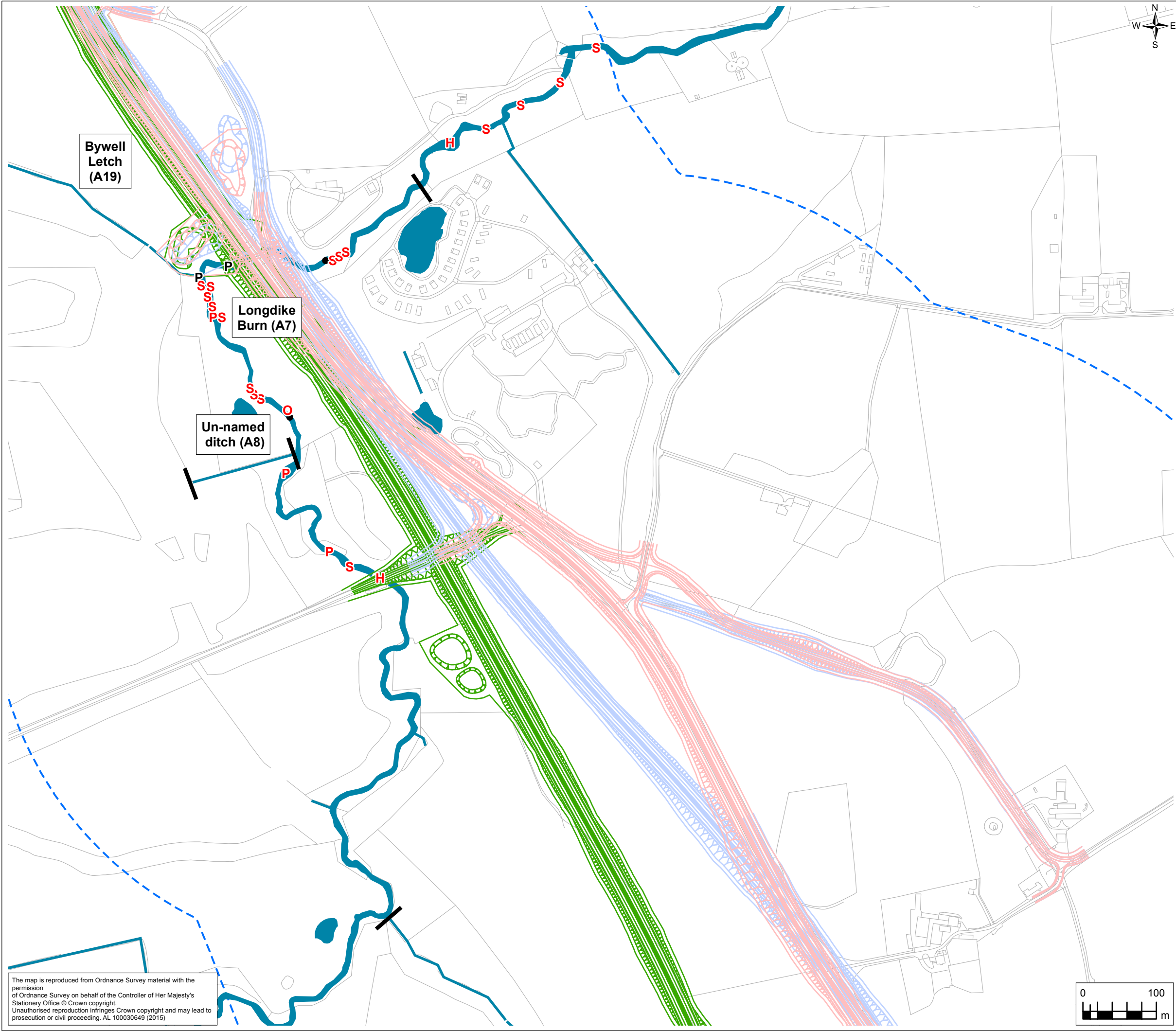


FIGURE 4.6

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Hybrid Option
  - Offline Option
  - 500m Buffer (all options combined)
  - No Access
  - Watercourse
  - Waterbody


Water Vole Results

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

Otter Results

- P Print
- O Otter Sighting
- S Spraint
- H Hover/Holt
- R Run/Slide

A1 Watercourse name/ number

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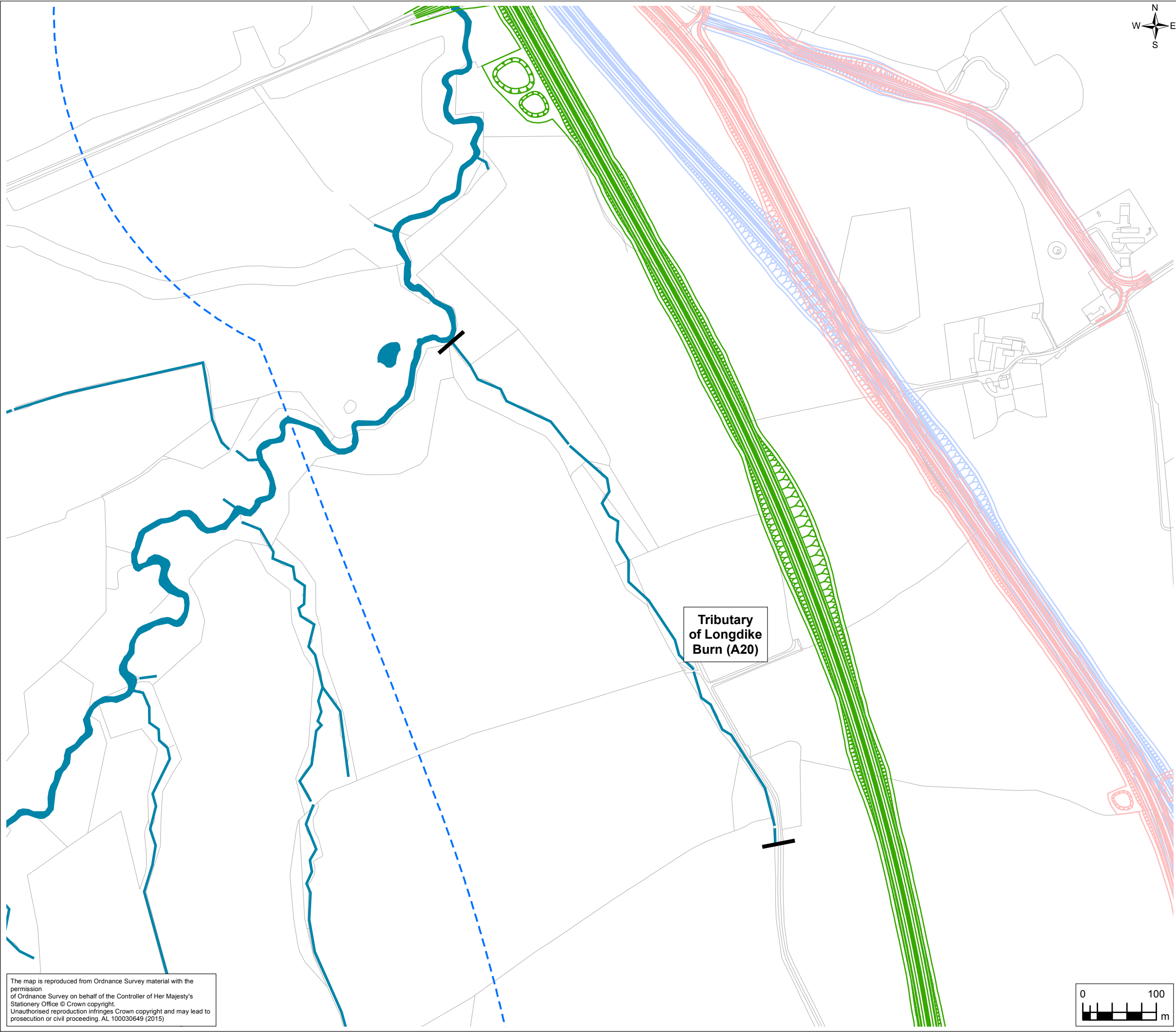


FIGURE 4.7

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Hybrid Option
  - Offline Option
  - 500m Buffer (all options combined)
  - No Access
  - Watercourse
  - Waterbody

Water Vole Results

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

Otter Results

- P Print
- O Otter Sighting
- S Spraint
- H Hover/Holt
- R Run/Slide

A1 Watercourse name/ number

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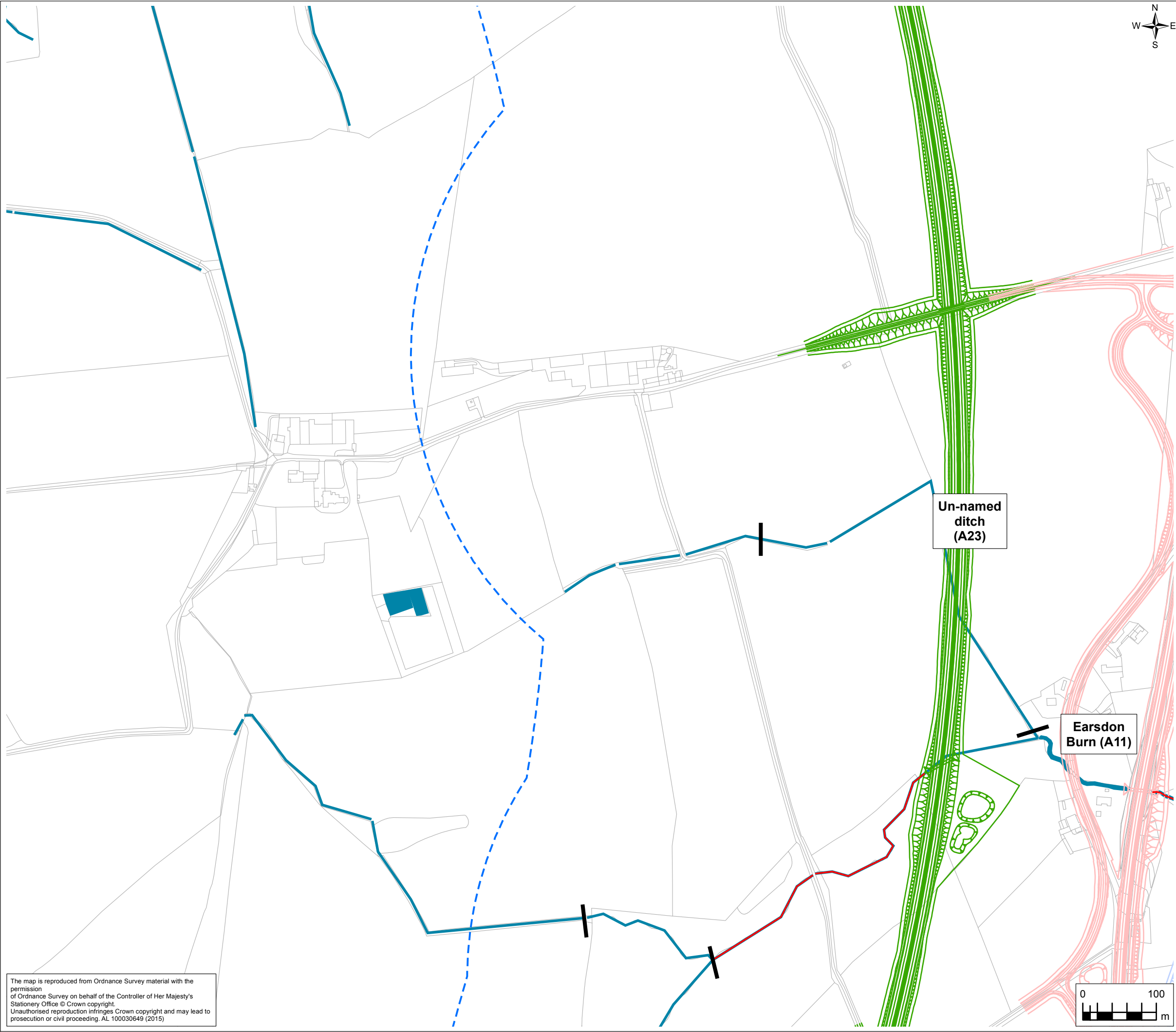
Project  
A1 NORTHUMBERLAND

Drawing Title  
SECTION A  
WATER VOLE AND OTTER SURVEY MAP 2017  
Sheet 6

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**FIGURE 4.8**


- Legend**
- Extent of Surveyed Waterbody
  - Online Option
  - Hybrid Option
  - Offline Option
  - 500m Buffer (all options combined)
  - No Access
  - Watercourse
  - Waterbody

**Water Vole Results**

- Burrow
- Print
- Run/Pathway
- Feeding Remains
- Dropping
- Latrine

**Otter Results**

- Print
- Otter Sighting
- Spraint
- Hover/Holt
- Run/Slide
- A1 Watercourse name/ number

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Project				A1 NORTHUMBERLAND			
Drawing Title				SECTION A WATER VOLE AND OTTER SURVEY MAP 2017 Sheet 7			
Drawing Status							
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Client No.							
Drawing No.		B2104700_EC_WV_SectionA_007					
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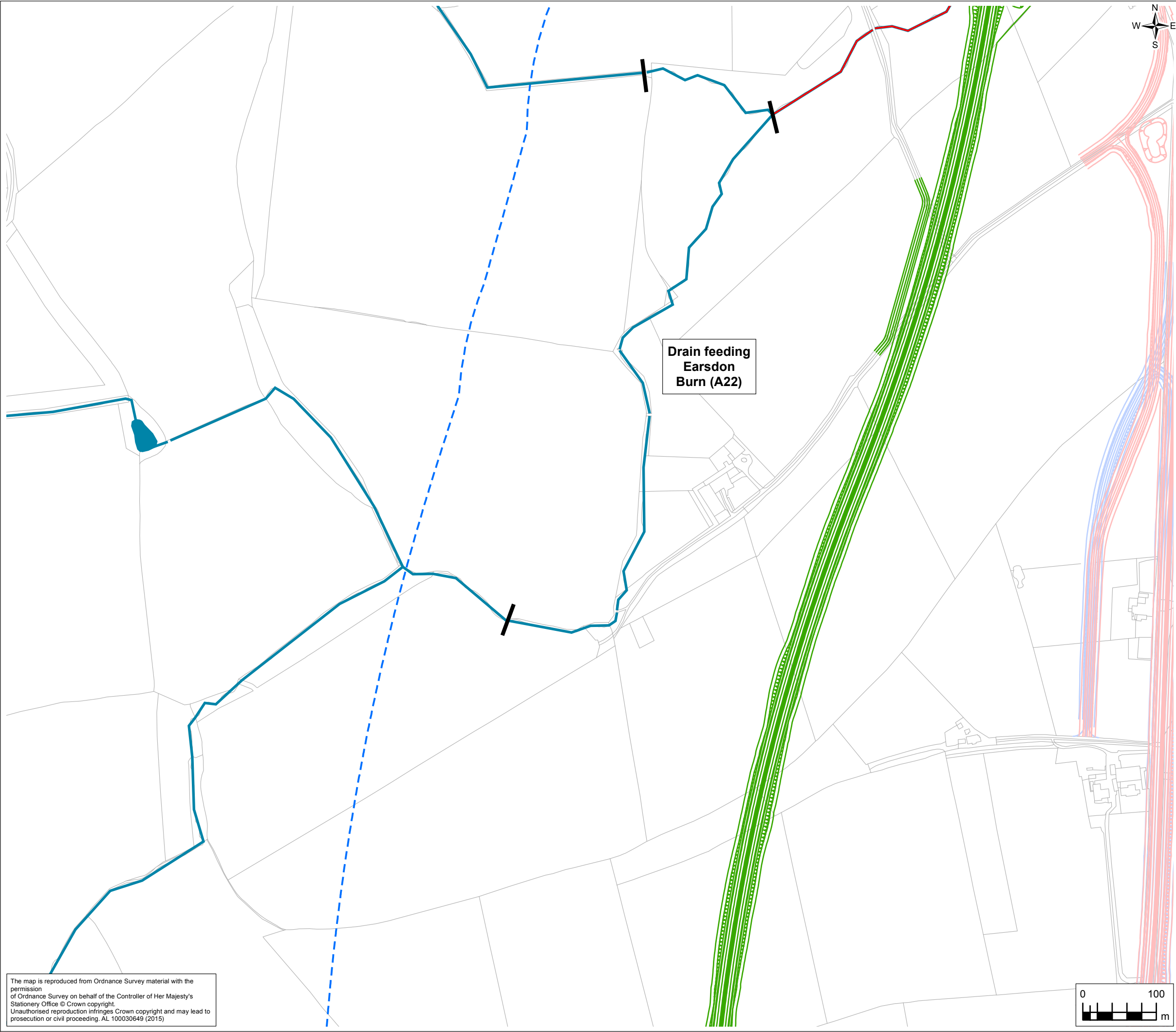



FIGURE 4.9

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Hybrid Option
  - Offline Option
  - 500m Buffer (all options combined)
  - No Access
  - Watercourse
  - Waterbody

- Water Vole Results
- Burrow
  - P Print
  - R Run/Pathway
  - F Feeding Remains
  - D Dropping
  - L Latrine

- Otter Results
- P Print
  - O Otter Sighting
  - S Spraint
  - H Hover/Holt
  - R Run/Slide
  - A1 Watercourse name/ number

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Drawing Title						
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Drawing Status						
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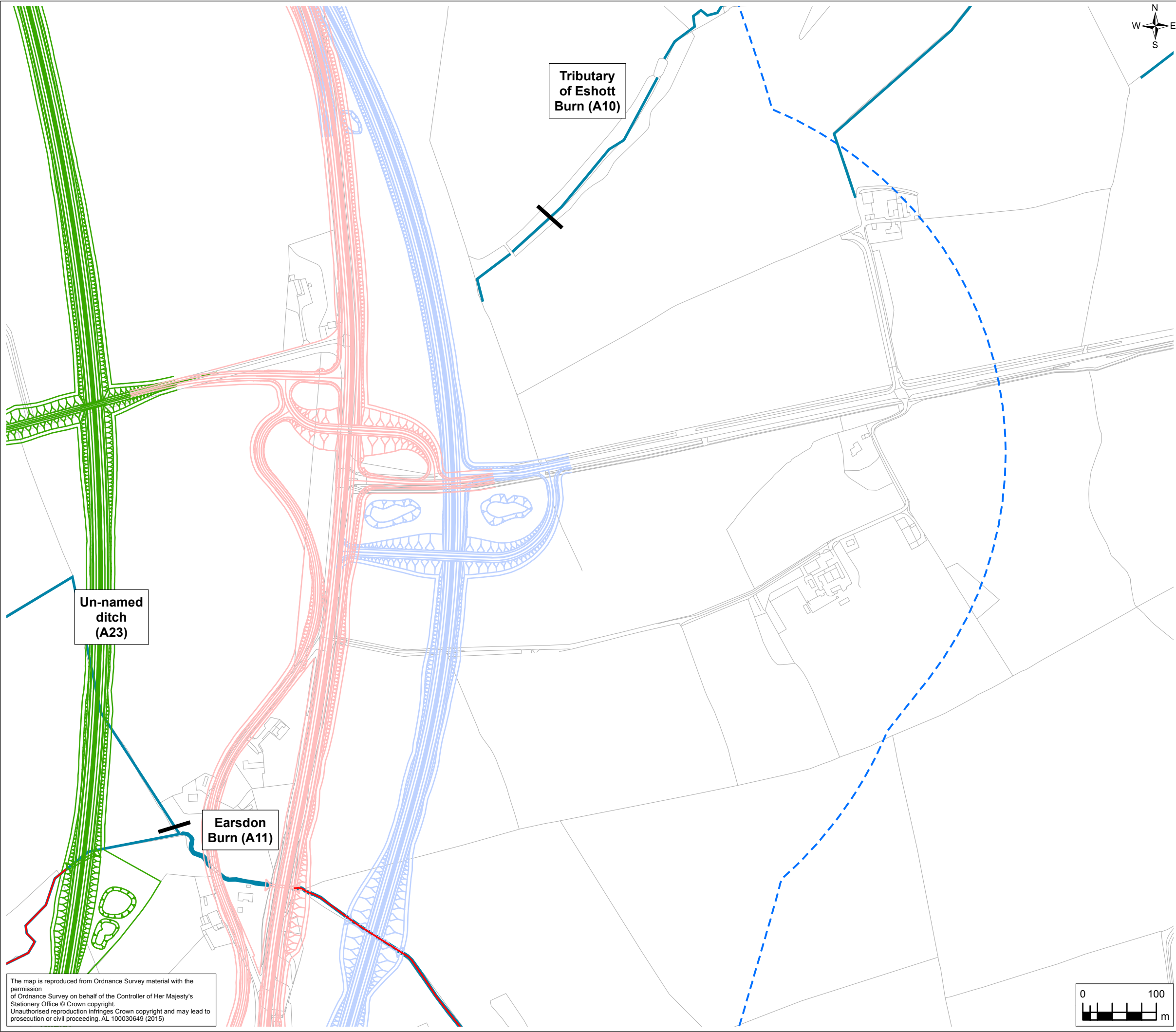


FIGURE 4.12

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Hybrid Option
  - Offline Option
  - 500m Buffer (all options combined)
  - No Access
  - Watercourse
  - Waterbody

Water Vole Results

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

Otter Results

- P Print
- O Otter Sighting
- S Spraint
- H Hover/Holt
- R Run/Slide

A1 Watercourse name/ number

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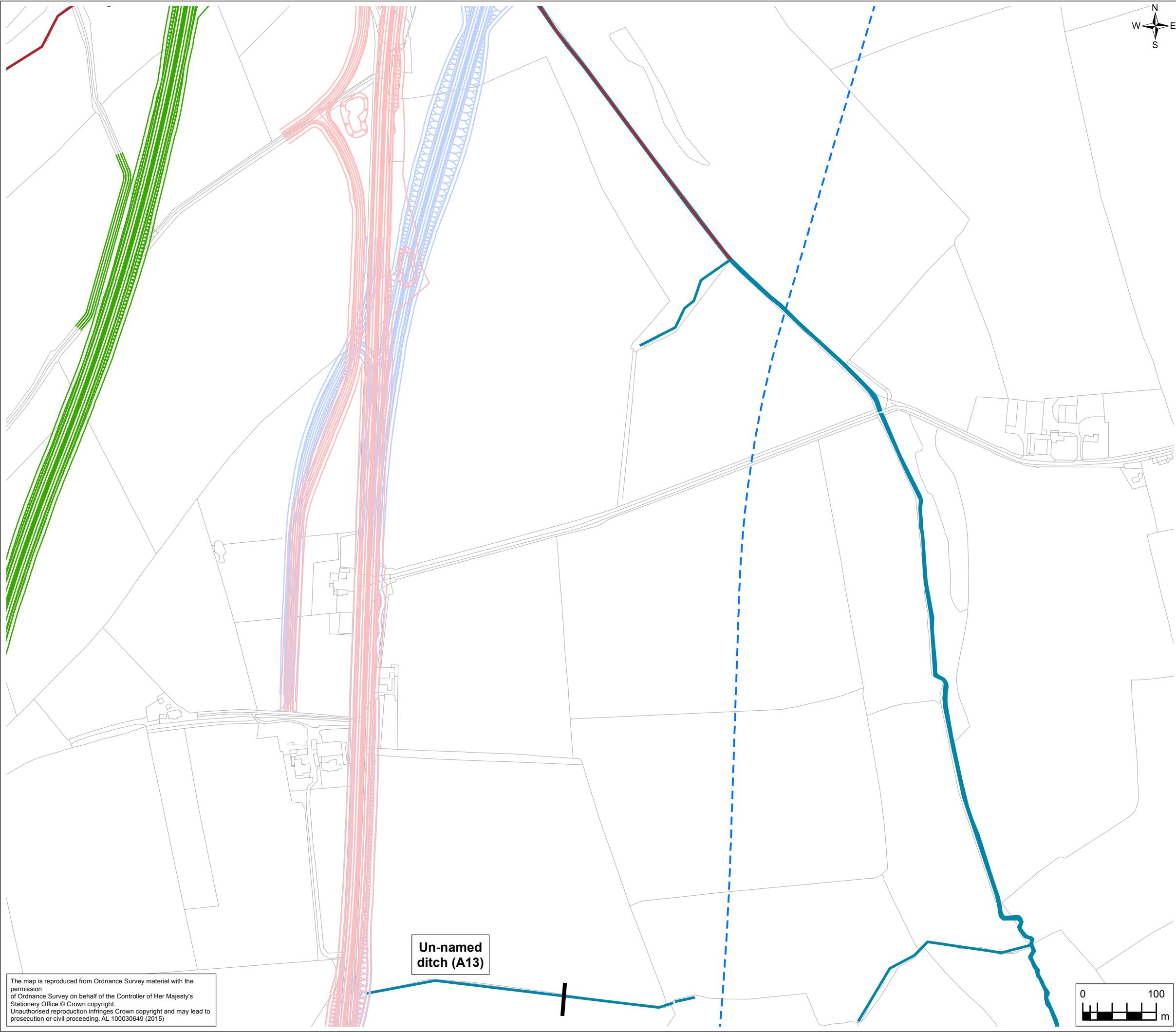


FIGURE 4.13

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Hybrid Option
  - Offline Option
  - 500m Buffer (all options combined)
  - No Access
  - Watercourse
  - Waterbody

Water Vole Results

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

Otter Results

- P Print
- O Otter Sighting
- S Spraint
- H Hover/Holt
- R Run/Slide

A1 Watercourse name/ number

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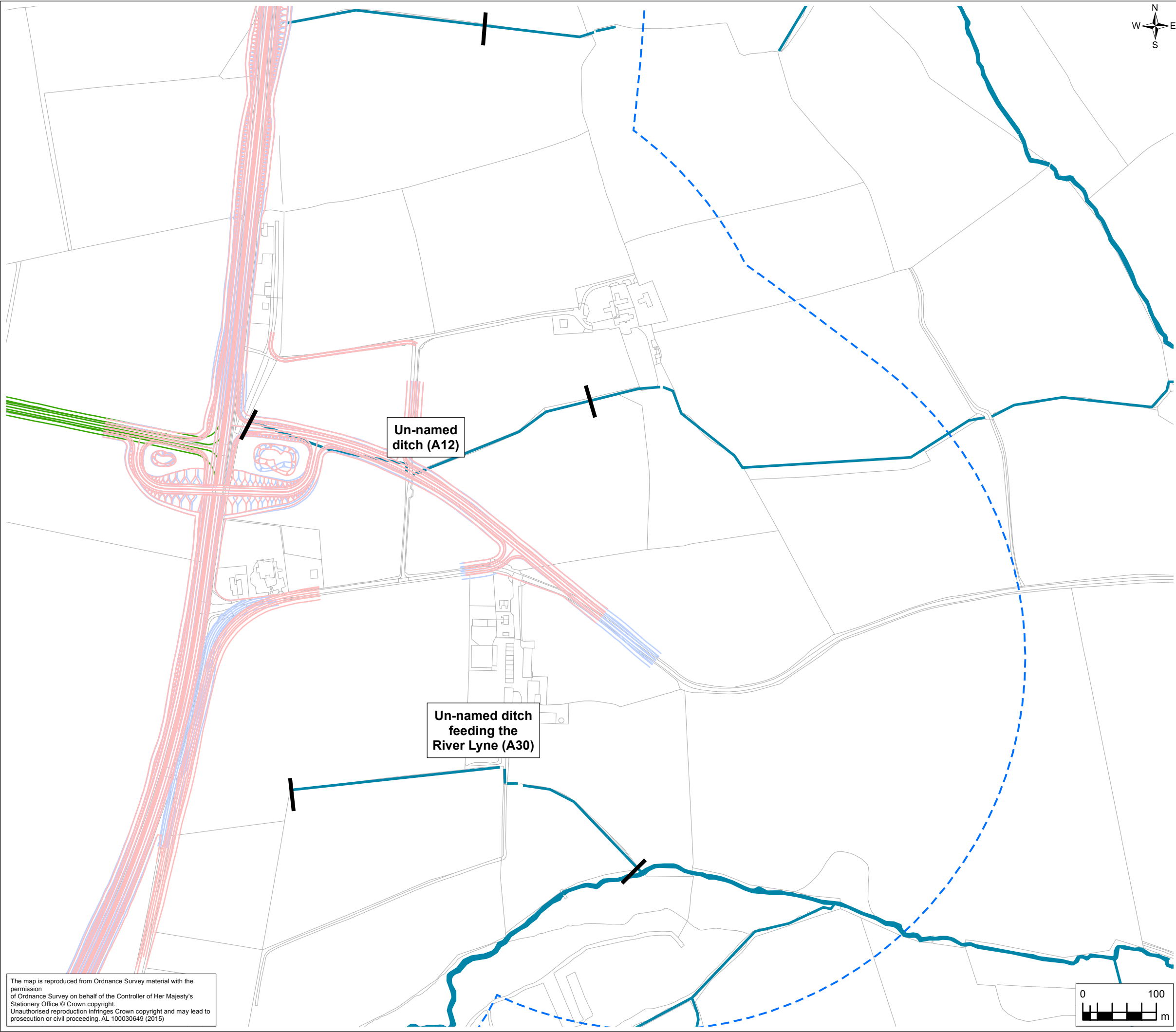


FIGURE 4.14

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Hybrid Option
  - Offline Option
  - 500m Buffer (all options combined)
  - No Access
  - Watercourse
  - Waterbody


Water Vole Results

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

Otter Results

- P Print
- O Otter Sighting
- S Spraint
- H Hover/Holt
- R Run/Slide

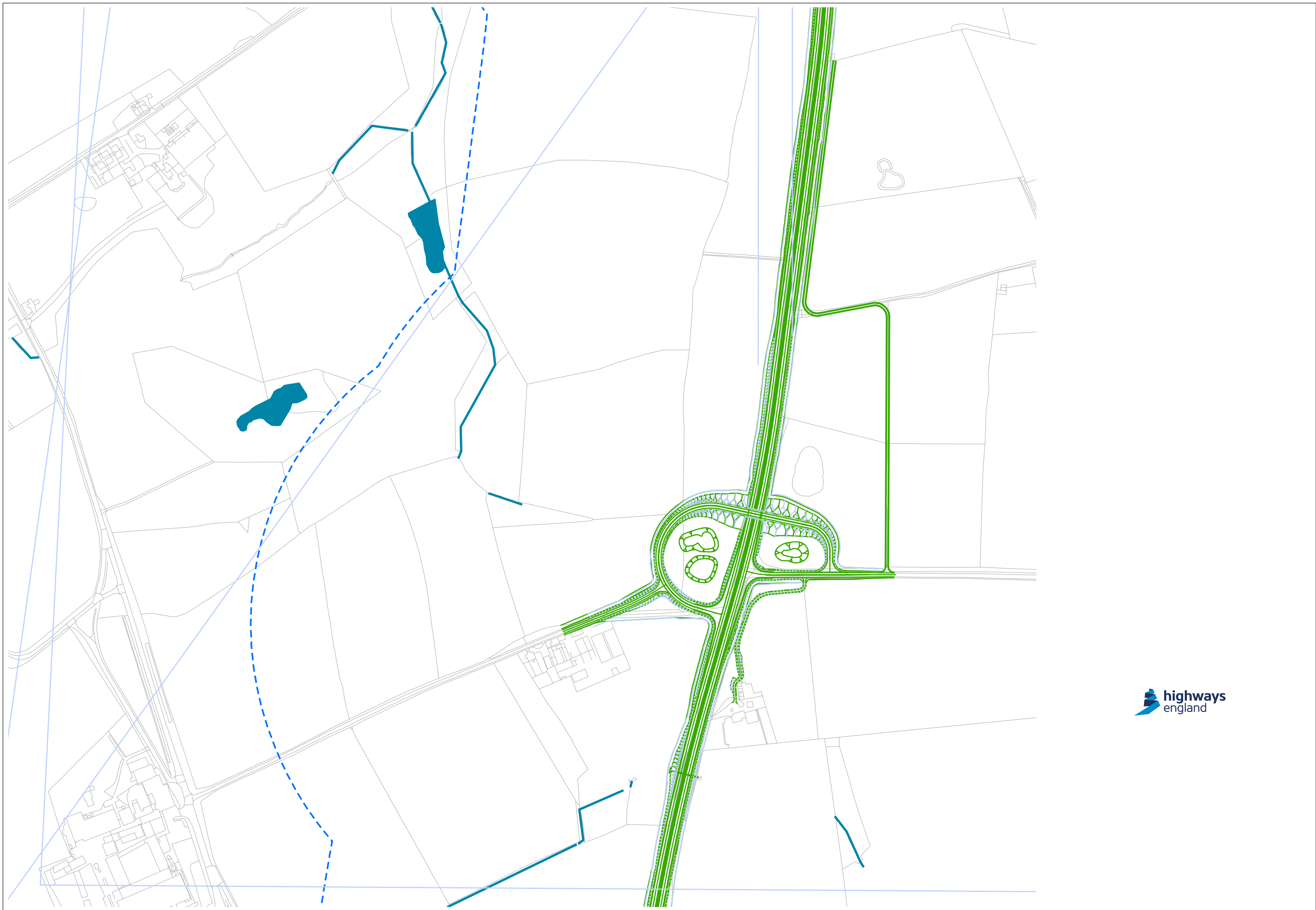
A1 Watercourse name/ number

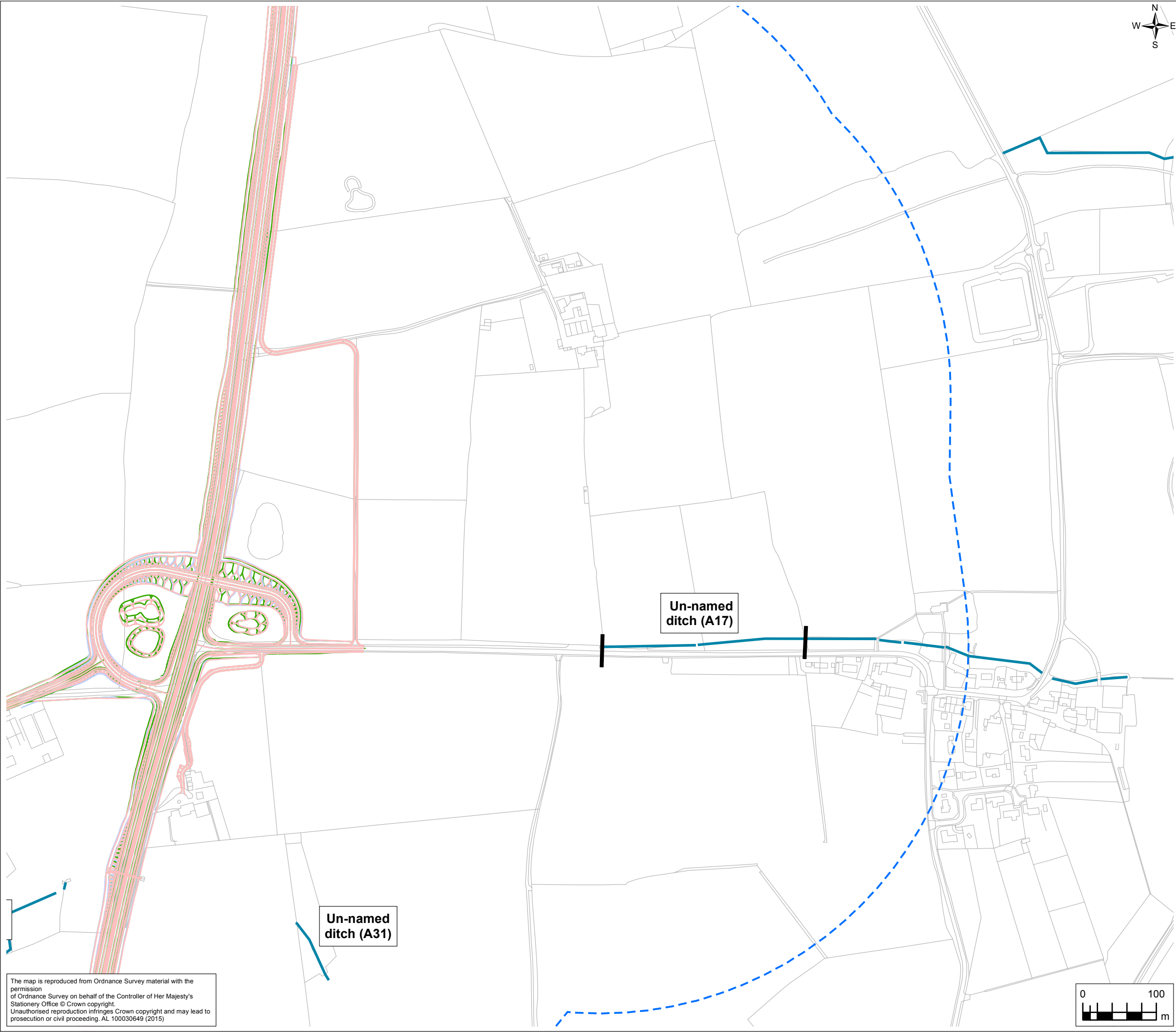
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### FIGURE 4.17

**Legend**

- Extent of Surveyed Waterbody
- Online Option
- Hybrid Option
- Offline Option
- 500m Buffer (all options combined)
- No Access
- Watercourse
- Waterbody

**Water Vole Results**

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

**Otter Results**

- P Print
- O Otter Sighting
- S Spraint
- H Hover/Holt
- R Run/Slide

**A1** Watercourse name/ number

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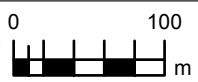
SECTION A  
WATER VOLE AND OTTER SURVEY MAP 2017  
Sheet 16

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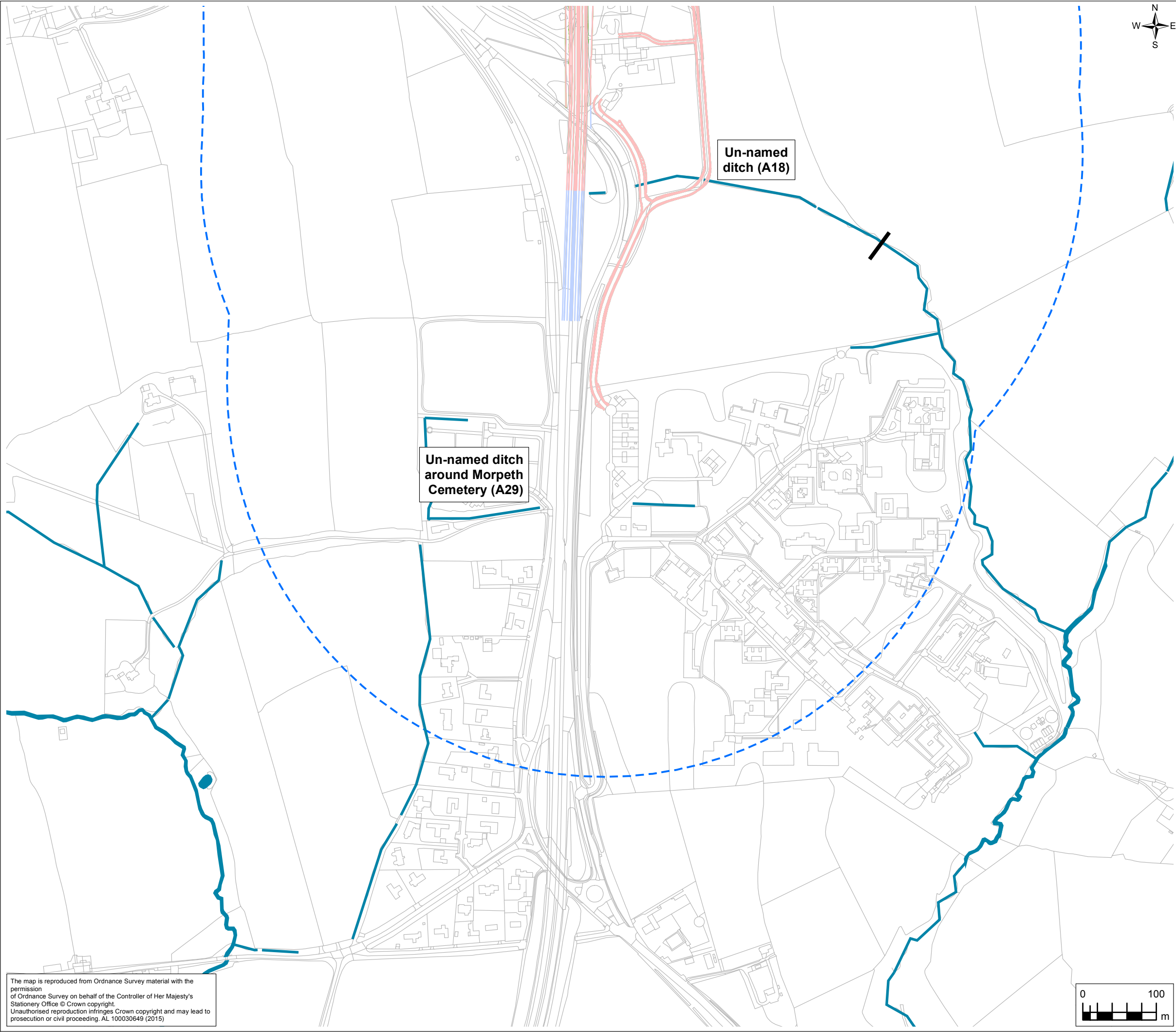


FIGURE 4.19

- Legend
- Extent of Surveyed Waterbody
  - Online Option
  - Hybrid Option
  - Offline Option
  - 500m Buffer (all options combined)
  - No Access
  - Watercourse
  - Waterbody


Water Vole Results

- Burrow
- P Print
- R Run/Pathway
- F Feeding Remains
- D Dropping
- L Latrine

Otter Results

- P Print
- O Otter Sighting
- S Spraint
- H Hover/Holt
- R Run/Slide

A1 Watercourse name/ number

0	JAN 17	Initial Issue	LT	MR	AM	MC
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Project <div>A1 NORTHUMBERLAND</div>						
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Drawing Status						
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## APPENDIX A: WATER VOLE SURVEY RESULTS

### Section A: Water Vole Survey Results 2016.

Section A								
Water Body Reference	Water Body Name	Grid Reference at Start	Grid Reference at End	Field Signs Present (Location Count)				
				Latrines/droppings	Burrows	Prints	Feeding Remains	Runs/Paths
A1	Back Burn	NU177008	NU172009	0	0	0	0	0
A2	Un-named ditch	NU177003	NU171004	0	0	0	0	0
A3	River Coquet	NZ174997	NZ177998	2	0	0	1	0
A4	Tributary of Thirston Burn	NZ171989	NZ176991	0	0	0	0	0
A5	Un-named ditch	NZ174981	NZ176981	0	0	0	0	0
A6	Un-named ditch	NZ175978	NZ175978	0	0	0	0	0
A7	Longdike Burn	NZ179965	NZ181975	0	1	6	0	0
A8	Un-named ditch	NZ180971	NZ180971	0	0	0	0	0
A8	Eshott Burn	NZ190957	NZ192958	0	0	0	0	0
A10	Tributary of Eshott Burn	NZ192953	NZ193954	0	0	0	0	0
A11	Earsdon Burn	NZ183943	NZ193942	3	0	0	0	1
A12	Un-named ditch	NZ189931	NZ191931	0	0	0	0	0
A13	Un-named ditch	NZ188925	NZ195925	0	0	0	0	0
A14	River Lyne	NZ182915	NZ188916	0	0	0	0	0

A1 in Northumberland  
Water Vole and Otter Report

Section A								
Water Body Reference	Water Body Name	Grid Reference at Start	Grid Reference at End	Field Signs Present (Location Count)				
				Latrines/droppings	Burrows	Prints	Feeding Remains	Runs/Paths
A15	Un-named ditch	NZ189897	NZ192897	0	0	0	0	0
A16	Tributary of Kater Dean	NZ182884	NZ185883	0	0	0	0	0
A17	Un-named ditch	NZ182880	NZ183880	0	0	0	0	0
A18	Un-named ditch	NZ172980	NZ174980	0	0	0	0	0
A19	Bywell Letch	NZ173974	NZ177972	0	0	0	0	0
A20	Tributary of Longdike Burn	NZ180964	NZ184957	0	0	0	0	0
A21	Drain feeding Earsdon Burn	NZ184949	NZ188946	0	0	0	0	0
A22	Tributary of Earsdon Burn	NZ182941	NZ183943	0	0	0	0	0
A23	Un-named ditch	NZ179929	NZ183925	0	0	0	0	0
A24	Fenrother Burn	NZ179929	NZ183916	4	0	0	2	0
A25	Canalised section of Fenrother Burn	NZ179922	NZ182924	0	0	0	0	0
A26	Floodgate Burn	NZ182911	NZ188913	0	0	0	0	0
A27	Un-named ditch	NZ180899	NZ180898	0	0	0	0	0



A1 in Northumberland  
Water Vole and Otter Report

Section A								
Water Body Reference	Water Body Name	Grid Reference at Start	Grid Reference at End	Field Signs Present (Location Count)				
				Latrines/droppings	Burrows	Prints	Feeding Remains	Runs/Paths
A28	Shieldhill Burn	NZ179892	NZ182894	0	0	0	0	0
A29	Ditch around cemetery	NZ180881	NZ181879	0	0	0	0	0
A30	Ditch feeding the River Lyne	NZ189920	NZ193920	0	0	0	0	0
A31	Un-named ditch	NZ185893	NZ185893	0	0	0	0	0

**Section B: Water Vole Survey Results 2016.**

Section B								
Water Body Reference	Water Body Name	Grid Reference at Start	Grid Reference at End	Field Signs Present (Location Count)				
				Latrines/droppings	Burrows	Prints	Feeding Remains	Runs/Paths
B1	Shipperton Burn	NU167220	NU174220	0	2	3	0	0
B2	Un-named field ditch at Charlton Mires	NU178212	NU175202	0	1	1	0	0
B3	Un-named field ditch at Craggy Wood	NU170209	NU177210	0	0	0	0	0
B4	Un-named ditch within Kiln Plantation	NU188201	NU191201	0	3	1	0	0
B5	Un-named ditch south west of Heckley House	NU194159	NU194159	0	0	0	0	0

A1 in Northumberland  
Water Vole and Otter Report

Section B								
Water Body Reference	Water Body Name	Grid Reference at Start	Grid Reference at End	Field Signs Present (Location Count)				
				Latrines/droppings	Burrows	Prints	Feeding Remains	Runs/Paths
B6	Un-named ditch at Heckley Fence Farm	NU188172	NU189172	0	0	0	0	0
B7	Un-named ditch west of Whinney Plantation	NU193170	NU194167	0	0	0	0	0
B8	Denwick Burn	NU191167	NU198150	0	1	0	0	0
B9	White House Burn at Heiferlaw Bridge	NU183187	NU186188	2	3	3	0	1
B10	Un-named ditch east of Heiferlaw Bank	NU186181	NU188181	0	0	0	0	0
B11	Un-named ditch feeding into Denwick Burn	NU193156	NU195155	0	0	0	0	0
B12	Un-named ditch east of Heckley House	NU192161	NU193161	0	0	0	0	0
B13	Un-named ditch feeding White House Burn	NU183187	NU184183	0	0	0	0	0

## APPENDIX B: OTTER SURVEY RESULTS

### Section A: Otter Survey Results 2016.

Section A								
Water Body Reference	Water Body Name	Grid Reference at Start	Grid Reference at End	Field Signs Present (Location Count)				
				Spraints	Prints	Sightings	Hover/Holt	Runs/Slides
A1	Back Burn	NU177008	NU172009	0	0	0	0	0
A2	Un-named ditch	NU177003	NU171004	0	0	0	0	0
A3	River Coquet	NZ174997	NZ177998	4	0	0	1	1
A4	Tributary of Thirston Burn	NZ171989	NZ176991	0	0	0	0	0
A5	Un-named ditch	NZ174981	NZ176981	0	0	0	0	0
A6	Un-named ditch	NZ175978	NZ175978	0	0	0	0	0
A7	Longdike Burn	NZ179965	NZ181975	1	1	0	0	0
A8	Un-named ditch	NZ180971	NZ180971	0	0	0	0	0
A8	Eshott Burn	NZ190957	NZ192958	0	0	0	0	0
A10	Tributary of Eshott Burn	NZ192953	NZ193954	0	0	0	0	0
A11	Earsdon Burn	NZ183943	NZ193942	1	0	0	0	0
A12	Un-named ditch	NZ189931	NZ191931	0	0	0	0	0
A13	Un-named ditch	NZ188925	NZ195925	0	0	0	0	0
A14	River Lyne	NZ182915	NZ188916	0	0	0	0	0

A1 in Northumberland  
Water Vole and Otter Report

Section A								
Water Body Reference	Water Body Name	Grid Reference at Start	Grid Reference at End	Field Signs Present (Location Count)				
				Spraints	Prints	Sightings	Hover/Holt	Runs/Slides
A15	Un-named ditch	NZ189897	NZ192897	0	0	0	0	0
A16	Tributary of Kater Dean	NZ182884	NZ185883	0	0	0	0	0
A17	Un-named ditch	NZ182880	NZ183880	0	0	0	0	0
A18	Un-named ditch	NZ172980	NZ174980	0	0	0	0	0
A19	Bywell Letch	NZ173974	NZ177972	0	0	0	0	0
A20	Tributary of Longdike Burn	NZ180964	NZ184957	0	0	0	0	0
A21	Drain feeding Earsdon Burn	NZ184949	NZ188946	0	0	0	0	0
A22	Tributary of Earsdon Burn	NZ182941	NZ183943	0	0	0	0	0
A23	Un-named ditch	NZ179929	NZ183925	0	0	0	0	0
A24	Fenrother Burn	NZ179929	NZ183916	0	0	0	0	0
A25	Canalised section of Fenrother Burn	NZ179922	NZ182924	0	0	0	0	0
A26	Floodgate Burn	NZ182911	NZ188913	0	0	0	0	0
A27	Un-named ditch	NZ180899	NZ180898	0	0	0	0	0



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Section A								
Water Body Reference	Water Body Name	Grid Reference at Start	Grid Reference at End	Field Signs Present (Location Count)				
				Spraints	Prints	Sightings	Hover/Holt	Runs/Slides
A28	Shieldhill Burn	NZ179892	NZ182894	0	0	0	0	0
A29	Ditch around cemetery	NZ180881	NZ181879	0	0	0	0	0
A30	Ditch feeding the River Lyne	NZ189920	NZ193920	0	0	0	0	0
A31	Un-named ditch	NZ185893	NZ185893	0	0	0	0	0

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**Section A: Otter Survey Results 2017.**

Section A								
Water Body Reference	Water Body Name	Grid Reference at Start	Grid Reference at End	Field Signs Present (Location Count)				
				Spraints	Prints	Sightings	Hover/Holt	Runs/Slides
A1	Back Burn	NU177008	NU172009	0	0	0	0	0
A2	Un-named ditch	NU177003	NU171004	0	0	0	0	0
A3	River Coquet	NZ174997	NZ177998	4	1	0	1	1
A4	Tributary of Thirston Burn	NZ171989	NZ176991	0	0	0	0	0
A5	Un-named ditch	NZ174981	NZ176981	0	0	0	0	0
A6	Un-named ditch	NZ175978	NZ175978	0	0	0	0	0
A7	Longdike Burn	NZ179965	NZ181975	14	4	1	2	0
A8	Un-named ditch	NZ180971	NZ180971	0	0	0	0	0
A8	Eshott Burn	NZ190957	NZ192958	0	0	0	0	0
A10	Tributary of Eshott Burn	NZ192953	NZ193954	0	0	0	0	0
A11	Earsdon Burn	NZ183943	NZ193942	0	0	0	0	0
A12	Un-named ditch	NZ189931	NZ191931	0	0	0	0	0
A13	Un-named ditch	NZ188925	NZ195925	0	0	0	0	0
A14	River Lyne	NZ182915	NZ188916	0	0	0	0	0

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Section A								
Water Body Reference	Water Body Name	Grid Reference at Start	Grid Reference at End	Field Signs Present (Location Count)				
				Spraints	Prints	Sightings	Hover/Holt	Runs/Slides
A15	Un-named ditch	NZ189897	NZ192897	0	0	0	0	0
A16	Tributary of Kater Dean	NZ182884	NZ185883	0	0	0	0	0
A17	Un-named ditch	NZ182880	NZ183880	0	0	0	0	0
A18	Un-named ditch	NZ172980	NZ174980	0	0	0	0	0
A19	Bywell Letch	NZ173974	NZ177972	0	0	0	0	0
A20	Tributary of Longdike Burn	NZ180964	NZ184957	0	0	0	0	0
A21	Drain feeding Earsdon Burn	NZ184949	NZ188946	0	0	0	0	0
A22	Tributary of Earsdon Burn	NZ182941	NZ183943	0	0	0	0	0
A23	Un-named ditch	NZ179929	NZ183925	0	0	0	0	0
A24	Fenrother Burn	NZ179929	NZ183916	0	0	0	0	0
A25	Canalised section of Fenrother Burn	NZ179922	NZ182924	0	0	0	0	0
A26	Floodgate Burn	NZ182911	NZ188913	0	0	0	0	0
A27	Un-named ditch	NZ180899	NZ180898	0	0	0	0	0

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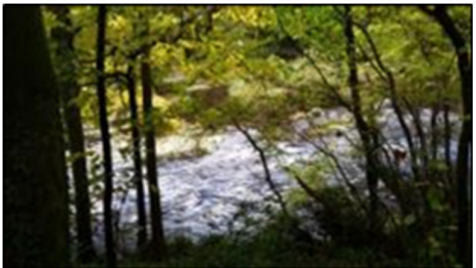
Section A								
Water Body Reference	Water Body Name	Grid Reference at Start	Grid Reference at End	Field Signs Present (Location Count)				
				Spraints	Prints	Sightings	Hover/Holt	Runs/Slides
A28	Shieldhill Burn	NZ179892	NZ182894	0	0	0	0	0
A29	Ditch around cemetery	NZ180881	NZ181879	0	0	0	0	0
A30	Ditch feeding the River Lyne	NZ189920	NZ193920	0	0	0	0	0
A31	Un-named ditch	NZ185893	NZ185893	0	0	0	0	0



## **APPENDIX B: SECTION A WATERBODY LOCATIONS AND PHOTOGRAPHS**




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Waterbody Number	Name (Figure Number in Parenthesis)	Grid reference at start	Grid reference at end	Photo (where available)
A1	Back Burn (Figure 2.2)	NU177008	NU172009	
A2	Un-named ditch (Figure 2.2)	NU177003	NU171004	None Available
A3	River Coquet (Figure 2.3, Figure 2.4)	NZ174997	NZ177998	

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A4	Tributary of Thirston Burn (Figure 2.3)	NZ171989	NZ176991	
A5	Un-named ditch (Figure 2.4)	NZ174981	NZ176981	
A6	Un-named ditch (Figure 2.4)	NZ175978	NZ175978	

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A7	Longdike Burn (Figure 2.5)	NZ179965	NZ181975	
A8	Un-named ditch (Figure 2.5)	NZ180971	NZ180971	
A9	Eshott Burn (Figure 2.11)	NZ190957	NZ192958	






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A10	Tributary of Eshott Burn (Figure 2.12)	NZ192953	NZ193954	
A11	Earsdon Burn (Figure 2.8, Figure 2.9, Figure 2.12, Figure 2.13)	NZ183943	NZ193942	
A12	Un-named ditch (Figure 2.14)	NZ189931	NZ191931	

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A13	Un-named ditch (Figure 2.13)	NZ188925	NZ195925	
A14	River Lyne (Figure 2.15)	NZ182915	NZ188916	
A15	Un-named ditch (Figure 2.17)	NZ189897	NZ192897	

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A16	Tributary of Kater Dean (Figure 2.18)	NZ182884	NZ185883	
A17	Un-named ditch (Figure 2.19)	NZ182880	NZ183880	
A18	Un-named ditch (Figure 2.4)	NZ172980	NZ174980	

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A19	Bywell Letch (Figure 2.5)	NZ173974	NZ177972	
A20	Tributary of Longdike Burn (Figure 2.6, Figure 2.7)	NZ180964	NZ184957	
A21	Drain feeding Earsdon Burn (Figure 2.8)	NZ184949	NZ188946	



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A22	Tributary of Earsdon Burn (Figure 2.9)	NZ182941	NZ183943	
A23	Un-named ditch (Figure 2.8)	NZ179929	NZ183925	

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A24	Fenrother Burn (Figure 2.10, Figure 2.15)	NZ179929	NZ183916	
A25	Canalised section of Fenrother Burn (Figure 2.10)	NZ179922	NZ182924	
A26	Floodgate Burn (Figure 2.9)	NZ182911	NZ188913	

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A27	Un-named ditch (Figure 2.16)	NZ180899	NZ180898	None Available
A28	Shieldhill Burn (Figure 2.18)	NZ179892	NZ182894	
A29	Ditch around cemetery (Figure 2.19)	NZ180881	NZ181879	
A30	Ditch feeding the River Lyne (Figure 2.14)	NZ189920	NZ193920	

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A31	Un-named ditch (Figure 2.18)	NZ185893	NZ185893	
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## APPENDIX C: SECTION B WATERBODY LOCATIONS AND PHOTOGRAPHS

Waterbody Number	Name (Figure Number in Parenthesis)	Grid reference at start	Grid reference at end	Photo
B1	Shipperton Burn (Figure 3.2, Figure 3.3)	NU167220	NU174220	
B2	Un-named field ditch at Charlton Mires (Figure 3.4, Figure 3.5, Figure 3.6)	NU178212	NU175202	

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B3	Un-named field ditch at Craggy Wood (Figure 3.4)	NU170209	NU177210	
B4	Un-named ditch within Kiln Plantation (Figure 3.7)	NU188201	NU191201	
B5	Un-named ditch south west of Heckley House (Figure 3.13)	NU194159	NU194159	

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B6	Un-named ditch at Heckley Fence Farm (Figure 3.10, Figure 3.11, Figure 3.12)	NU188172	NU189172	
B7	Un-named ditch west of Whinney Plantation (Figure 3.12, Figure 3.13)	NU193170	NU194167	
B8	Denwick Burn (Figure 3.12)	NU191167	NU198150	

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B9	White House Burn at Heiferlaw Bridge (Figure 3.8, Figure 3.9)	NU183187	NU186188	
B10	Un-named ditch east of Heiferlaw Bank (Figure 3.10, Figure 3.11)	NU186181	NU188181	

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B11	Un-named ditch feeding into Denwick Burn (Figure 3.13)	NU193156	NU195155	
B12	Un-named ditch east of Heckley House (Figure 3.12)	NU192161	NU193161	
B13	Un-named ditch feeding White House Burn (Figure 3.8)	NU183187	NU184183	

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