

M60/M62/M66 Simister Island Interchange

TR010064

ENVIRONMENTAL STATEMENT APPENDICES

APPENDIX 8.9 RIPARIAN MAMMAL SURVEY REPORT

APFP Regulation 5(2)(a)

Planning Act 2008

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

Infrastructure Planning

Planning Act 2008

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

**M60/M62/M66 Simister Island Interchange
Development Consent Order 202[]**

**ENVIRONMENTAL STATEMENT APPENDICES
APPENDIX 8.9 RIPARIAN MAMMAL SURVEY REPORT**

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Appendix 8.9 Riparian mammal survey report

Executive summary

This report presents the findings of desk study and riparian mammal field surveys undertaken as part of the M60/M62/M66 Simister Island Interchange (the 'Scheme'). The aim is to establish an ecological baseline for the native otter *Lutra lutra* and water vole *Arvicola amphibius* and the non-native invasive American mink *Neovison vison* to provide supporting information for Chapter 8: Biodiversity of the Environmental Statement (TR010064/APP/6.1).

Field surveys were conducted between May 2021 and September 2021 based on a 250m survey area around the provisional Order Limits available at the time of survey.

Castle Brook and Bradley Brook offered limited potential to support otter and water vole and no evidence of otter or water vole presence were identified in any field survey. No signs or evidence of American mink were recorded. As a result, otter, water vole and American mink are considered likely absent from the survey area.

1 Introduction

1.1 Purpose of the report

- 1.1.1 This report sets out the results of desk-based study and riparian mammal field surveys undertaken as part of the M60/M62/M66 Simister Island Interchange (the 'Scheme'). The aim is to establish an ecological baseline for the native otter *Lutra lutra* and water vole *Arvicola amphibius* and the non-native invasive American mink *Neovison vison* to provide supporting information for Chapter 8: Biodiversity of the Environmental Statement (TR010064/APP/6.1).
- 1.1.2 This report is supported by Figure 8.9.1: Riparian Mammals Survey Results in Annex B.

1.2 Definitions

- 1.2.1 The study area relates to the area in which desk study information has been collated via online and third-party sources. This area is comprised of a 2km buffer around the provisional Order Limits which were available at the time.
- 1.2.2 The survey area refers to the area in which riparian mammal surveys were undertaken. This area is a 250m buffer around the provisional Order Limits which were available at the time of survey (the provisional Order Limits at time of survey are discussed and presented in detail in the Environmental Scoping Report (TR010064/APP/6.6)).
- 1.2.3 The provisional Order Limits are largely concurrent with the Order Limits and any substantial deviations are included within the wider study area and captured within the overall baseline.

1.3 Legislative and regulatory context

Otter

- 1.3.1 Otter receive full protection under Schedule 5 of the Wildlife and Countryside Act 1981 (amended) and Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended) which makes it a European Protected Species (EPS). In addition, Schedule 12 of the Countryside and Rights of Way Act 2000 amends the species provision of the Wildlife and Countryside Act 1981 (as amended) by strengthening legal protection for threatened species.
- 1.3.2 The relevant sections of the Wildlife and Countryside Act 1981 (as amended) make it an offence to:
- Intentionally kill, injure or take an otter, to possess or sell one (whether live or dead)
 - Intentionally or recklessly damage, destroy or obstruct access to any structure or place which any otter uses for shelter or protection
 - Intentionally or recklessly disturb an otter while it is occupying a structure or place which it uses for shelter or protection

1.3.3 The relevant sections of the Conservation of Habitats and Species Regulations 2017 (as amended) make it an offence to:

- Deliberately capture, injure or kill an otter
- Deliberately disturb otter which is likely to impair their ability to:
 - Survive, to breed or reproduce, or to rear or nurture their young; or
 - Hibernate or migrate
- Affect significantly the local distribution or abundance of otter
- Damage or destroy an otter's breeding site or resting place

Water vole

1.3.4 Water vole receive full protection under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). It is an offence to:

- Intentionally kill, injure or capture a water vole or to possess or sell one (whether live or dead)
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place a water vole uses for shelter or protection
- Intentionally or recklessly disturb water voles whilst they are occupying a structure or place which it uses for shelter or protection

American mink

1.3.5 American mink is listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) making it an offence to release or allow the escape of the species into the wild.

Nature conservation status

1.3.6 Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 requires the Secretary of State to publish a list of habitats and species which are of Principal Importance for the conservation of biodiversity in England. There are 56 habitats and 943 species of Principal Importance which were initially identified as requiring conservation action under the UK Biodiversity Action Plan (BAP) and which continue to be regarded as priorities under the UK Post-2010 Biodiversity Framework (Joint Nature Conservation Committee (JNCC) and Department for Environment Food and Rural Affairs (Defra), 2012). The Section 41 list is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under Section 40 of NERC Act 2006 "to have regard" to the conservation of biodiversity in England, when carrying out their normal functions. This is strengthened by Environment Act 2021. Both water vole and otter are Species of Principal Importance (SoPI).

- 1.3.7 The Greater Manchester BAP (Greater Manchester Biodiversity Partnership, 2009) identifies those species and habitats that are most at risk in Greater Manchester and actions required for their conservation. Water vole is listed on the species list.
- 1.3.8 American mink is an invasive non-native species in England which can have significant adverse effects once established in an area, predominantly through predation and competition. They are capable of decimating entire populations of ground nesting birds and have had detrimental impacts on water vole, fowl and fish through predation.

2 Methodology

2.1 Desk study

- 2.1.1 The Multi-Agency Geographic Information for the Countryside (MAGIC) (Defra, 2022) map was used to gather information on statutory designated sites designated for riparian mammals within a 2km radius of the provisional Order Limits. This data was last revised for inclusion within the report in February 2022.
- 2.1.2 Data were obtained from the Greater Manchester Ecology Unit (GMEU) in April 2021. Requests for non-statutory designated sites and protected species records were made within 2km of the provisional Order Limits as of 6 April 2021. These were both reviewed for riparian mammal species.
- 2.1.3 MAGIC (Defra, 2022) map was also used to gather information relating to granted EPS mitigation licences within the study area. This data was last reviewed for inclusion within the report in February 2022.

2.2 Field survey

Watercourses

- 2.2.1 The UK Habitat Classification survey (Appendix 8.1: UK Habitat Classification Report of the Environmental Statement Appendices (TR010064/APP/6.3)) identified two watercourses with potential to be impacted by the Scheme that were suitable to support otter and water vole: Castle Brook and Bradley Brook. These watercourses were surveyed for riparian mammals on 7 May and 13 September 2021 by suitably qualified ecologists.
- 2.2.2 Each watercourse were photographed and information collated on their suitability to support riparian mammals. Habitat information for each watercourse included:
- Water depth
 - Width
 - Presence of a current
 - Bank profile and substrate
 - Adjacent land use

Otter field survey

- 2.2.3 Otter surveys were conducted in accordance with standard otter survey methods (National Rivers Authority, 1993; Highways Agency, 1999). Surveys included a search for evidence of otter along each watercourse which comprises: spraints, footprints, feeding remains and slides. The surveys also concentrated on the identification of potential resting sites. Potential resting sites were defined as 'holts' or 'couches'. Description of these terms are provided in Table 2.1.

2.2.4 If otter signs were found, description of their resting sites, evidence of use, photograph and grid reference were recorded.

Table 2.1 Terms used for otter resting sites (amended from Chanin (2003) and Liles (2003))

Otter Resting Site Terms	Description
Holt	<p>A holt is a 'covered' resting site an otter will use for shelter and protection. Typically, holts are located under the roots of a bankside tree. However, holts can be found in artificial embankments formed by boulders; cavities within stonework; tunnels; field drains; and in enlarged rabbit holes. Dense stands of woody vegetation may also provide enough dry cover for a holt. Many holts also have more than one entrance to protect against flooding.</p> <p>A common feature is that many holts are in places where the risk of direct physical disturbance is low. Evidence of potential use of a holt includes spraints within or adjacent to the holt and slides leading from the holt to a watercourse. A breeding holt (referred to as a natal den) is a holt in which otter pups are born and reared. Natal dens are often associated with a greater level of protective cover and evidence of use can be inconspicuous. Natal dens can also be located some distance from a watercourse.</p>
Couch	<p>A couch is an 'uncovered' resting site. Couches are usually used for day-resting and include dense vegetation such as thick reedbeds, shrubs, rushes or amongst rock piles. Similar to holts, a common feature is that couches are typically in places where the risk of direct disturbance is low.</p>

Water vole field survey

- 2.2.5 Surveys to determine the presence / likely absence of water vole were undertaken with reference to standard practice guidance (Strachan *et al.*, 2011 and Dean *et al.*, 2016). Both watercourses were walked on both banks and from within the channel (if safe to do so) to search for evidence of water vole presence.
- 2.2.6 Definitive water vole field signs include droppings or latrines, 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*.
- 2.2.7 Any limitations to the presence of water vole were recorded where relevant.
- 2.2.8 Any signs of American mink *Neovison vison* were also recorded as they are a major predator of water vole. American mink presence on a watercourse will greatly reduce the suitability of that watercourse for water vole.
- 2.2.9 The optimum window for water vole surveys is during the breeding season (late March – September inclusive in the north of England). Consequently, surveys were undertaken during the optimal survey window.

2.3 Evaluation of importance of ecological resource

- 2.3.1 Ecological Impact Assessment (EclA) uses a hierarchical geographic framework to assign importance to ecological resources. This is based on an understanding of how the ecological resource may contribute to the conservation status or distribution of the species or habitat at a particular geographic scale.
- 2.3.2 The following geographical frame of reference is based on Design Manual for Roads and Bridges (DMRB) LA 108 Biodiversity (Highways England, 2020) to assess the importance of the individual riparian mammals recorded within the study area:
- International or European
 - UK or national
 - Regional e.g. north-west England
 - County (e.g. Greater Manchester)
 - Local e.g. within 2km of the Scheme

2.4 Limitations

- 2.4.1 There were some very limited areas of Castle Brook where the banks were not passable for survey. However, this is not considered to be a significant constraint as the majority of the channel was surveyed and, ultimately, the habitat was not suitable for otter holts or couches.
- 2.4.2 Riparian mammal surveys were undertaken in May and September 2021. Walkover surveys and UK Habitat Classification survey updates undertaken in October 2022 and April/May 2023 respectively (see Appendix 8.1: UK Habitat Classification Report of the Environmental Statement Appendices (TR010064/APP/6.3)), recorded no significant change in habitat types or condition within the survey area to that recorded in 2021. Therefore, no significant change to the riparian mammal survey data recorded in 2021 is anticipated and the riparian mammal survey data obtained in 2021 is considered sufficiently robust to inform the assessment.

3 Results

3.1 Desk study

- 3.1.1 No statutory or non-statutory designated sites were identified as being designated due to their otter or water vole populations or were identified as supporting either species.
- 3.1.2 Two records of otter were returned in the desk study. These are listed in Table 3.1 and shown in Figure 8.9.1 in Annex B of this report. The records indicate the continued presence of otter in the River Irwell which is located on the outer north western edges of the study area. None of the River Irwell tributaries coincide with the survey area.

Table 3.1 Desk study records of otter

Date	Ordnance Survey (OS) grid reference	Location	Description
12 June 2020	SD80210705	River Irwell, Springwater Park	Observed swimming in water then moving along the bank on far side of river.
29 January 2009	SD802084	River Irwell	Spraint and footprint observed.

- 3.1.3 Four records of water vole were returned in the desk study, the most recent of which was from 2009 (see Table 3.2 and Figure 8.9.1 in Annex B of this report). The records are all at distance from the Order Limits, in waterbodies not directly linked to ones surveyed and potentially impacted by the Scheme.

Table 3.2 Desk study records of water vole

Date	OS grid reference	Location	Description
08 April 2009	SD81940847	Hollins Vale SBI - Pond 241	Droppings and runs
17 October 2007	SD7835903955	Rhodes Farm	No information
17 October 2007	SD7894103616	Sludge bed Thirteen Arches	No information
25 April 2005	SD83590400	Lakeside Wood Heaton Park	No information

- 3.1.4 No records of American mink were returned in the study area.

3.2 Field survey

Watercourses

3.2.1 Both watercourses had observable man-made influences and extensive coverage of invasive species in parts. Full detailed descriptions of the watercourses can be found in Table 3.3 with photographs in Annex A of this report. The different sections of Castle Brook are identified in Figure 8.9.1 in Annex B of this report.

Table 3.3 Watercourse habitat descriptions

Watercourse	Description
Castle Brook	<p>Castle Brook is located to the east of the Order Limits within the grassland habitat of Pike Fold Golf Course.</p> <p>The bank profile varied between 20 and 60 degrees. The north of the watercourse was approximately 1.2m wide, narrowing to 1m to the south. The watercourse was heavily managed and had a silt and mud substrate. The water quality was poor and turbid with what looked to be an iron oxide present (vivid rusty colour). The banks were significantly managed in part, although some areas were surrounded by dense tall ruderal and scrub vegetation including: willowherb <i>Epilobium sp.</i>, broad buckler fern <i>Dryopteris dilatata</i>, reed canary grass <i>Phalaris arundinacea</i>, rush <i>Juncus sp.</i> (soft rush <i>Juncus effusus</i> predominantly), hemlock water dropwort <i>Oenanthe crocata</i>, bulrush <i>Typha sp.</i>, yellow flag iris <i>Iris pseudacorus</i>, tufted hair grass <i>Deschampsia cespitosa</i>, hawthorn <i>Crataegus monogyna</i> and bramble <i>Rubus fruticosus sp.</i></p> <p>Water depth varied between the surveys. The highest depth of approximately 30cm was recorded in May, reducing to less than 10cm in September. A section of channel was completely dry in September where the watercourse splits into two to travel south-west (SD 82882 06624) and north-east (SD 82948 06654). The water flowed in a south to north direction, with a slow current in May and no noticeable flow in September.</p>
Bradley Brook	<p>Bradley Brook is located within an area of woodland to the south-west of the scheme and flows through Philips Park and North Wood Site of Biological Importance. The bank profile varied between 20 and 45 degrees. The watercourse was approximately 1.2m wide, with a bank width of approximately 3.5m. The brook had water level averaging 10-20cm on both surveys with a generally slow flow rate, although this was localised moderate in some areas. The banks were well vegetated and included a number of ancient woodland indicator species such as remote sedge <i>Carex remota</i>, ramsons <i>Allium ursinum</i> and wood anemone <i>Anemone nemorosa</i>. Himalayan balsam <i>Impatiens glandulifera</i> was abundant along the majority of the watercourse with new stands of Japanese knotweed <i>Reynoutria japonica</i> emerging.</p> <p>On the eastern end of the brook the bank comprised wooden revetments, bare earth, cobbles, silt and sand. Species present comprised Japanese knotweed, Himalayan balsam, broad buckler fern and common grass and forb species.</p>

Otter

- 3.2.2 No evidence of otter presence was recorded along either of the two watercourses surveyed.
- 3.2.3 Castle Brook was considered to have limited suitability for otter due to its size and depth of water, offering limited foraging availability. The watercourse did have some suitability for occasional commuting of otter.
- 3.2.4 Bradley Brook was considered suitable to support otter due to the surrounding habitat offering foraging and resting potential.

Water vole

- 3.2.5 Castle Brook was considered suitable habitat to support water vole as a result of the steep bank profile and bank substrate providing areas for burrow systems. Herbaceous vegetation within and adjacent to the channel provided food and cover resources. Some areas were less suitable to support water vole than others due to the shallowness of the water, with some areas being dry. Although water quality appeared poor, water vole are not known to be overly selective about the quality of the water they inhabit. Despite the suitability of the habitat for water vole, no signs of water vole presence were recorded.
- 3.2.6 Bradley Brook was considered to have very limited suitability to support water vole as a result of its high shading, limited in-channel vegetation, shallow banks and depth of water. No signs of water vole were recorded.
- 3.2.7 No signs of mink were identified on either watercourse.

4 Evaluation

- 4.1.1 Castle Brook and Bradley Brook offered limited potential to support otter. Although the desktop survey identified some records of otter within the wider landscape, no evidence of otter presence were found during the field surveys. Therefore the species are considered likely absent from the survey area.
- 4.1.2 Although Castle Brook was deemed suitable for supporting water vole, no evidence of the species was found during surveys. Bradley Brook was considered to offer suboptimal habitat for water vole and no evidence of the species were identified during survey. As a result, water vole are considered likely absent from the survey area.
- 4.1.3 No evidence of the presence of American mink was recorded and are considered likely absent from the survey area.

Acronyms and initialisms

Acronym or initialism	Term
BAP	Biodiversity Action Plan
Defra	Department for Environment Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges
EclA	Ecological Impact Assessment
EPS	European Protected Species
GMEU	Greater Manchester Ecology Unit
JNCC	Joint Nature Conservation Committee
MAGIC	Multi-Agency Geographic Information for the Countryside
PCF	Project Control Framework
NERC	Natural Environment and Rural Communities
OS	Ordnance Survey
SoPI	Species of Principal Importance

References

Chanin P (2003). Ecology of the European Otter. Conserving Natura 2000. Rivers Ecology Series No. 10. English Nature, Peterborough.

Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016). Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.

Department for Environment, Food and Rural Affairs (2022). MAGIC Map Application. Accessed February 2022. <https://magic.defra.gov.uk/magicmap.aspx>.

Greater Manchester Biodiversity Project (2009). Greater Manchester Biodiversity Action Plan. Accessed June 2023. https://gmllrc.org/projects/gm_bap/.

Highways Agency (1999). Design Manual for Roads and Bridges, Volume 10, Nature Conservation Advice in Relation to Otters.

Highways England (2020). Design Manual for Roads and Bridges, LA 108 Biodiversity. Revision 1.

Joint Nature Conservation Committee and Department for the Environment and Rural Affairs (Defra) (on behalf of the Four Countries' Biodiversity Group) (2012). UK Post-2010 Biodiversity Framework. July 2012. Accessed February 2022. <http://jncc.defra.gov.uk/page-6189>.

National Rivers Authority (1993). Otters and River Habitat Management. Conservation Technical Handbook Number 3.

Liles G (2003). Otter Breeding Sites. Conservation and Management. Conserving Natura 2000 Rivers Conservation Techniques Series No. 5. English Nature, Peterborough.

Strachan R., Moorhouse, T. Gelling, M. (2011). Water Vole Conservation Handbook, 3rd Edition, Wildlife Conservation Research Unit, Great Britain.

Annex A Watercourse photographs

Watercourse	Photographs	
Castle Brook section 1		
		

Watercourse	Photographs	
Castle Brook section 2		
		

Watercourse	Photographs	
Castle Brook section 3		
		

Watercourse	Photographs	
Bradley Brook		
		

Annex B Figures

Figure 8.9.1: Riparian Mammals Survey Results

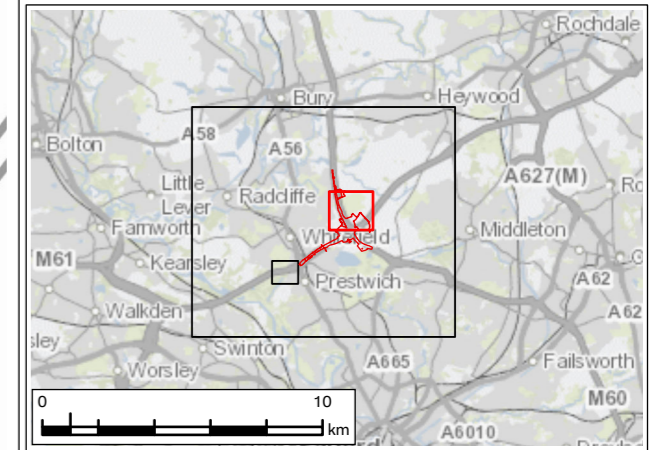
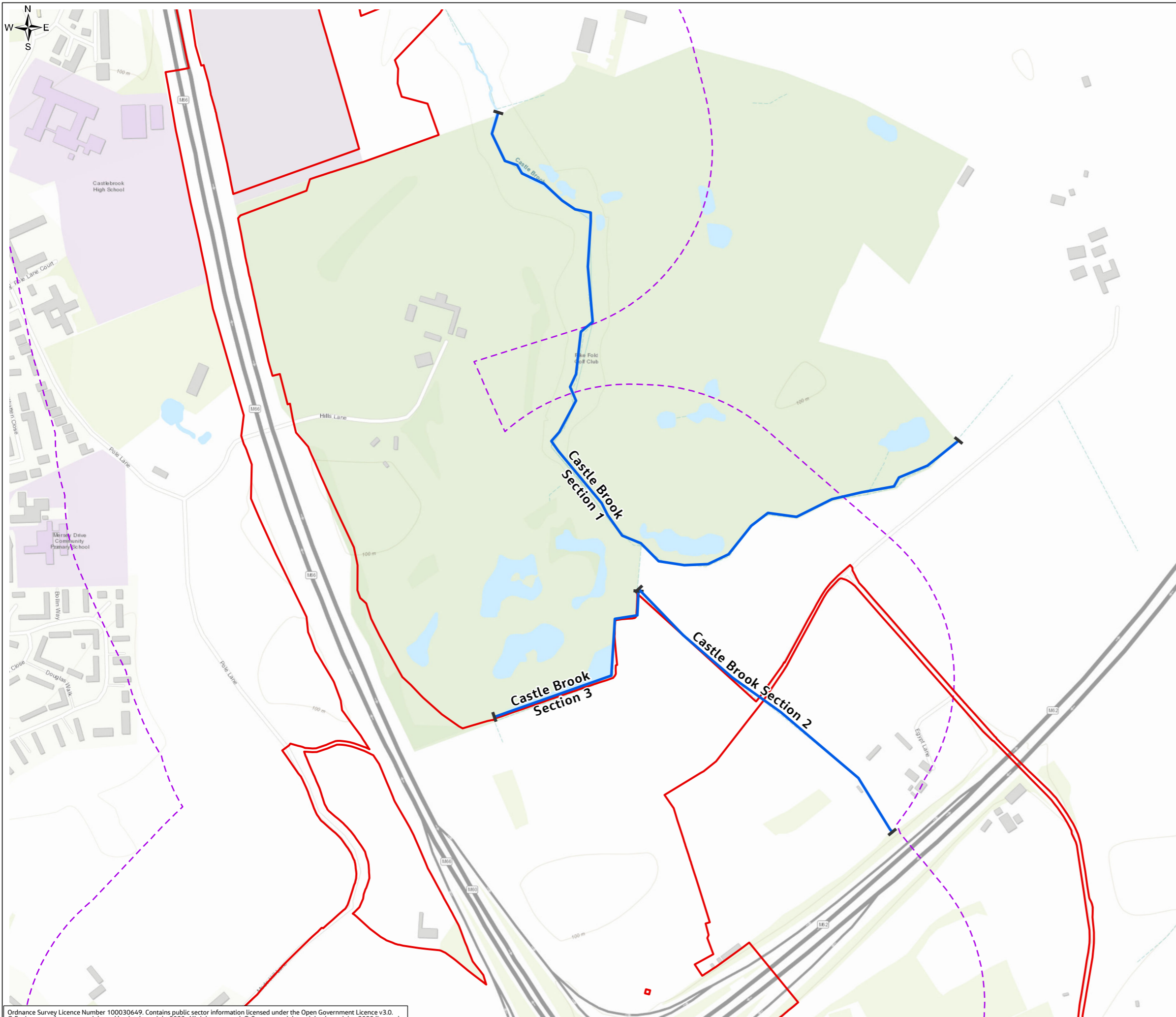
ENVIRONMENTAL STATEMENT APPENDIX 8.9 FIGURE 8.9.1

Legend

- Order Limits
- Survey Area based on 250m area around Provisional Order Limits
- Survey Area based on 2km area around Provisional Order Limits
- Watercourses Surveyed
- European Otter
- European Water Vole

Desk Study Results

- European Otter
- European Water Vole



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Development Consent Order Number: TR010064			Development Consent Order Drawing Number: 6.3			

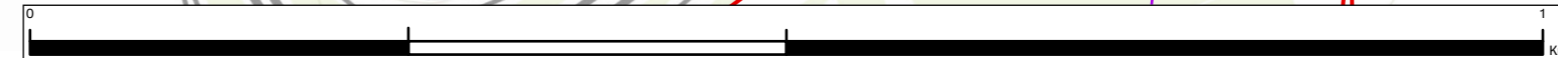
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Project
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Drawing Title
**RIPARIAN MAMMALS SURVEY RESULTS
PAGE 2 OF 3**

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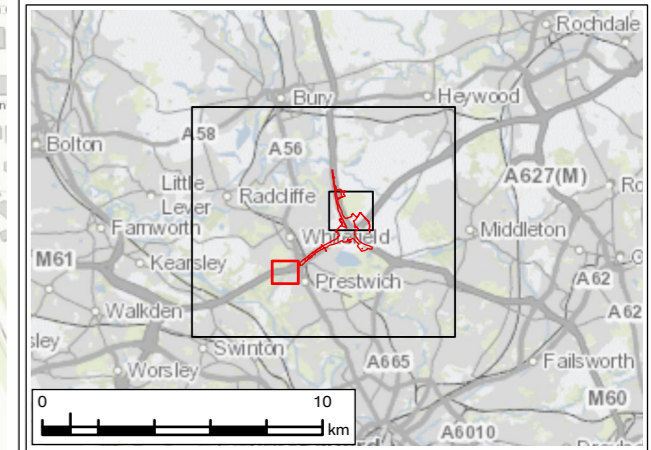
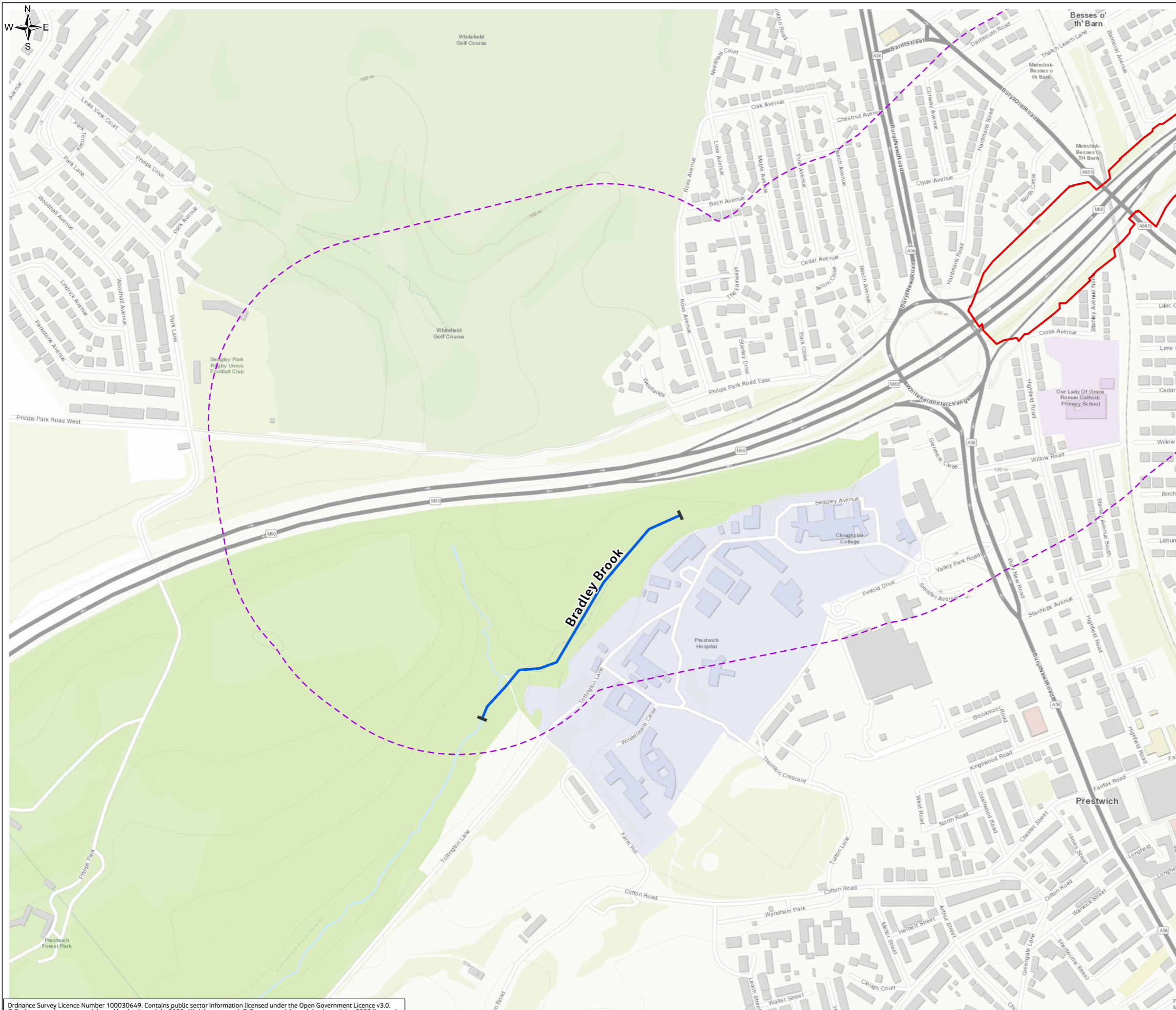
ENVIRONMENTAL STATEMENT APPENDIX 8.9 FIGURE 8.9.1

Legend

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- European Water Vole

Desk Study Results

- European Otter
- European Water Vole



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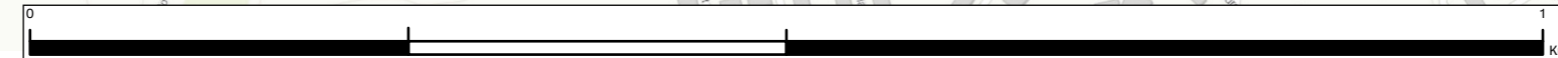
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Drawing Title
**RIPARIAN MAMMALS SURVEY RESULTS
PAGE 3 OF 3**

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