HIGHWAYS AGENCY

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A14 Cambridge to Huntingdon improvement scheme

Environmental Statement

Appendices

Appendix 11.9: Riparian mammals

Date: December 2014

6.3

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Executive summary

This report is an appendix of the *A14 Cambridge to Huntingdon improvement scheme Environmental Statement*. This report presents an evaluation of riparian mammals based on recent surveys. It also presents the policy and legislative context within which the environmental impact assessment (EIA) has been carried out. Likely significant effects on and mitigation for riparian mammals are considered in *Chapter 11* of the *ES.*

Riparian mammals were surveyed in 2013 and 2014 using methodologies described in the *Water Vole Conservation Handbook* (Strachan, Moorhouse and Gelling, 2011). Populations of otters (*Lutra lutra*), and water voles (*Arvicola amphibious*) were evaluated in line with *Interim Advice Note (IAN) 130/10, 'Ecology and Nature Conservation: Criteria for Impact Assessment'* (Highways Agency, 2010).

A low density of both water vole and otter were identified throughout the area of the scheme. Water voles are distributed throughout the entire area and otters have a scattered distribution. Particular concentrations of field signs were located within major waterways, such as the river Great Ouse, Alconbury and Brampton Brook, Cock Brook and West Brook. The study area has been evaluated as being of local value for otters and water voles.

1 Introduction

1.1.1 This report is an appendix of the *A14 Cambridge to Huntingdon improvement scheme Environmental Statement (ES)*. It presents an evaluation of the status of riparian mammals based on a desk-based review of records of riparian mammals and field surveys. It also presents the policy and legislative context within which the environmental impact assessment (EIA) has been carried out. Likely significant effects on and mitigation for riparian mammals are considered in *Chapter 11*.

1.1.2 This report presents the findings of the survey undertaken for the scheme between 2013 and 2014.

1.1.3 The study included a desktop survey to search for records of riparian mammals and field surveys to provide more detailed information. Study or search areas are described for different elements of the study.

2 Riparian mammal ecology

2.1.1 Many mammals live in close association with rivers and streams, including otter (*Lutra lutra*), water vole (*Arvicola amphibious*), water shrew (*Neomys fodiens*) and the reintroduced beaver (*Castor fiber*). The American mink (*Neovison vison*) is also present in the United Kingdom, although this is an introduced species.

2.1.2 Otter and water vole are riparian mammals and the primary focus of this report. These species are known to be present in the area from historical records and are considered to be of conservation concern nationally.

2.1.3 Water shrew (*Neomys fodiens*) is also a riparian mammal and receives partial protection under the *Wildlife and Countryside Act (as amended) 1981*. It is an offence to intentionally or recklessly trap them. There are no records of this species locally near the scheme and it is considered to have a scattered presence in Cambridgeshire. This species was screened out at an early stage in the Highways Agency surveys and will be protected through generic waterway and water vole mitigation measures. As such it is not considered further here. Brown rat (*Rattus norvegicus*) is a common and widespread riparian mammal throughout UK and the local area and as such is also not considered further in this report.

2.2 Otter

2.2.1 Otters are members of the *Mustelidae* family of carnivores, which include badger (*Meles meles*), polecat (*Mustela putorius*), American mink, ferret (*Mustela putorius furo*), stoat (*Mustela ermine*), weasel (*Mustela nivalis*) and pine marten (*Martes martes*). They are solitary animals and are usually active at dusk and during the night, although they are known to be active during the day-time. They are very territorial and can travel over large areas; some have been known to use over 20km of river habitat (Natural England, 2011).

2.2.2 Otters mainly eat fish, although crustaceans, frogs, voles and aquatic birds may also be eaten (Chanin, 2003). Otters produce a characteristic sweet-smelling, musky, faecal pile known as a spraint. Spraints can often be found deposited in prominent places such as on logs, tree roots, rocks and berms.

2.2.3 In addition to rivers, otters are encountered on small streams, ditches, ponds, lakes, canals and marshes and can also be found in coastal areas and estuaries (Natural England, undated (A)). An otter's resting site is known as a holt, which may be in a tree root system, a hole in a bank or under a pile of rocks. Drains and caves have also been recorded as otter holts (Natural England, 2011). They also rest above ground in vegetation, creating flattened areas known as couches (Chanin, 2003).

2.2.4 Otters will return to a holt to breed year after year. Within this holt, the female will use a specific natal den, which can change from year to year. Breeding can occur at any time of year with one to four pups being born; the pups remain dependent on their mother for one year (Natural England, 2011).

2.2.5 Otter populations declined rapidly in the 1960s due to the pollution of watercourses by pesticides. A ban on certain pesticides has resulted in an increase in otter numbers and they are now widely distributed across England, but still rare and uncommon in some areas of the UK (Natural England, undated (A)).

2.3 Water vole

2.3.1 Water voles are members of the *Cricetidae* family of muroid rodents, which include bank voles *(Myodes glareolus)* and field voles *(Microtus agrestis)* in the UK. It is the largest vole species in Britain. They can be found along well vegetated banks of slow moving, relatively deep watercourses, including rivers, ditches, dykes and lakes (Strachan *et al*., 2011). They excavate extensive burrow systems into the banks, which have sleeping chambers at various levels and usually have underwater entrances (Natural England, undated (B)).

2.3.2 Water voles are herbivorous, primarily feeding on the aerial stems and leaves of waterside plants, but vary their diet and eat fruit, underground roots, tubers and bark in the autumn and winter (Strachan *et al.*, 2011).

2.3.3 The water vole breeding season is from March to October and females can have two to five litters per season. During the breeding season water voles live in colonies (Strachan *et al.*, 2011). They do not hibernate, but spend a lot of time sheltering in their burrows in the winter months.

2.3.4 Water voles are found throughout Britain but have undergone a significant reduction in range due to habitat loss and predation by the non-native American mink (Natural England, undated (B)).

3 Policy and legislation

3.1 Legislation

Otter

3.1.1 The otter is fully protected under *Schedule 5* of the *Wildlife and Countryside Act 1981* (as amended) and *Schedule 2* of the *Conservation of Habitats and Species Regulations 2010 (as amended)* making it a European protected species (EPS). Otters and their resting places are fully protected. It is an offence to deliberately capture, injure or kill otters or to damage destroy or obstruct their breeding or resting places. It is also an offence to disturb otters in their breeding or resting places.

3.1.2 Licences can be granted by Natural England (the licensing authority) to allow otherwise illegal activities, including development, to take place if carried out in accordance with the provisions of the licence.

Water vole

3.1.3 The water vole is fully protected 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). It is also an offence to intentionally or recklessly damage, destroy or obstruct access to any structure or place a water vole uses for shelter or disturb water voles in any such a place.

3.1.4 Within the *Wildlife and Countryside Act 1981 (as amended)* there is no provision for licensing actions which would otherwise be an offence committed on water voles, but in some circumstances Natural England may consider there to be genuine grounds for issuing a translocation licence for the purpose of conservation.

3.1.5 *Section 40* of the *Natural Environment and Rural Communities Act 2006* (*NERC Act*) places a duty on all public bodies to have regard to the conservation of biodiversity in England, when carrying out their normal functions (the biodiversity duty).

3.2 National Planning Policy Framework

3.2.1 The *National Planning Policy Framework* (*NPPF*) (Department for Communities and Local Government, 2012) sets out the Government's view on how planners should balance nature conservation with development and helps ensure that Government meets its biodiversity commitments with regard to the operation of the planning system. The *NPPF* states that the planning system should contribute to and enhance the natural and local environment by minimising impacts on biodiversity and providing net gains in biodiversity where possible. If significant harm resulting from a development cannot be avoided, adequately mitigated, or as a last resort, compensated for, then planning consent should be refused.

3.2.2 The *NPPF* states that the wider benefits of an ecosystem should be recognised and the presence of a protected species is a substantial consideration for a development proposal (*Circular 06/2005* (ODPM, *2005*). It is therefore considered essential that the presence of protected species and the extent that they may be affected by the proposed development is established in advance of a planning application in order that planning permission can be granted (*Planning Practice Guidance, 2014*).

3.2.3 The *draft National Policy Statement* (*NPS) for National Networks* (Department for Transport, 2013) sets out the Government's vision and policy for the future development of nationally significant infrastructure projects on the national road and rail networks. It provides guidance for promoters of nationally significant infrastructure projects, the basis for the examination by the examining authority and for decisions by the Secretary of State. The *NPS* includes general principles for the assessment of national networks, including EIA.

3.3 Priority species

3.3.1 Species of principal importance for the conservation of biodiversity in England are listed under *Section 41* of the *NERC Act.* This list is used to guide decision-makers in public bodies, in implementing their biodiversity duty. The species listed are priorities for nature conservation action and therefore for consideration in impact assessment.

3.3.2 The *UK Biodiversity Action Plan* (*UK BAP)* (JNCC, 2012) was the United Kingdom’s response to the *global convention on biological diversity (CBD*) in 1992. It lists priority species and habitats that are identified as being the most threatened and require conservation action. In 2012, the *UK Post-2010 Biodiversity Framework* (JNCC and Defra, 2010) succeeded the *UK BAP* and is the Government’s response to a new strategic plan of the convention which was published in 2010.

3.3.3 Much of the work previously carried out under the *UK BAP* is now focussed at a county level. However, the *UK BAP* lists of priority species and habitats remain important and have been used to draw up the *Section 41* statutory list.

3.3.4 The *Highways Agency Biodiversity Action Plan (HABAP)* lists priority species and habitats of the soft estate of England`s trunk roads and motorways (excluding London). Both otters and water voles are priority species for conservation action as listed in the *HABAP*.

3.3.5 *Local BAPs (LBAPs*) integrate the conservation measures provided in the UK BAP to enhance biodiversity at the local and regional level. The *Cambridgeshire and Peterborough LBAP* (2007) is pertinent to the scheme (Cambridgeshire and Peterborough Biodiversity Partnership, 2014).

3.3.6 Both otter and water voles are listed under *Section 41* and as priority species on the *UK BAP* and the *Cambridgeshire and Peterborough LBAP*.

4 Methodology

4.1 Desktop survey

4.1.1 Records were requested from the Cambridgeshire and Peterborough Environmental Records Centre (CPERC) for records of otter and water vole and any sites of importance for these species within 1km of the scheme. The search area for the desktop survey has been dictated by professional judgement in accordance with best practice guidance (CIEEM, 2013).

4.1.2 Records received from the CPERC were supplemented by a review of the raw data collected for the baseline riparian mammal surveys conducted in 2013.

4.1.3 A database of incidental records of species of interest recorded by other surveyors on the scheme has been reviewed for records of relevance to this report.

4.1.4 Records were requested from the Cambridgeshire and Peterborough Biodiversity Partnership for otter road traffic mortalities within the vicinity of the scheme.

4.2 Field surveys

4.2.1 Surveys were based on best practice guidance including the *Design Manual for Roads and Bridges Volume 10, Section 4, Part 4* (DMRB) (Highways Agency et al., 1999) for otter surveys and the *Water Vole Conservation Handbook* (Strachan *et al*., 2011). All surveys were carried out by qualified and experienced ecologists.

4.2.2 Where possible both banks of all watercourses bisected by the scheme were surveyed. Surveys extended up to 250m in 2013 and up to 500m in 2014, up and downstream of the footprint of the scheme (excluding the borrow pits) to identify the presence/absence of otter and water vole. Where access permitted, habitats within and on the periphery of the borrow pits were assessed for their potential to support otter and water vole and further surveys were undertaken where appropriate.

4.2.3 In 2013 surveys were carried out from the town of Milton to the east of the scheme through to Brampton Hut and Ellington to the west. In 2014 surveys were carried out on the A1 widening section of the scheme. The survey area started south of Brampton Hut and extended north to the village of Alconbury and west to Ellington.

Otter

4.2.4 Field signs that were used as indicative of the presence of otter included:

- actual and/or potential shelters. These include deep underground ‘holts’ e.g. beneath the roots of bankside trees and above-ground ‘couches’ e.g. in reedbeds;
- otter spraint;
- otter tracks (distinguishable paw prints);

- slides or other well-used access points to watercourses. Additional evidence would be required to positively confirm otter presence;
- feeding remains e.g. fish carcasses. Additional evidence would be required to positively confirm otter presence; and
- direct observation of otters and other sightings, such as otter road kills.

Water vole

4.2.5 Field signs that were used as indicative of the presence of water vole included:

- burrows;
- faeces and/or latrines;
- feeding stations;
- paths - additional evidence would be required to positively confirm water vole presence;
- water vole tracks (distinguishable paw prints);
- direct observation of water voles; and
- sounds - characteristic plop when water voles enter water to warn other water voles of possible danger.

4.3 Evaluation

4.3.1 The population of otters and water voles within the study area was evaluated using Chartered Institute of Ecology and Environmental Management (CIEEM) *Guidelines for Ecological Impact Assessment in the United Kingdom* (CIEEM, 2006). This method is consistent with recent published guidance and represents best practice guidance *Interim Advice Note (IAN) 130/10, 'Ecology and Nature Conservation: Criteria for Impact Assessment'* (Highways Agency, 2010). The evaluation uses a framework linked to a geographical scale at which the receptor has been valued i.e. international, national, regional, county, local or site (DMRB, 2010).

4.4 Limitations

4.4.1 2013 surveys were conducted during mid-late September when ditches and water courses were choked with vegetation. The extent of the vegetation meant that surveying for field signs for both otters and water voles was not optimal. Over half of the ditches and water courses surveyed were dry, meaning they were less likely to be occupied by water voles or otters than other times of the year. Furthermore, a total of seven sites could not be surveyed due to access being denied by landowners.

4.4.2 2014 surveys conducted on the A1 widening section of the scheme found over half of the ditches surveyed were dry and therefore less likely to support water voles or otters. A further ten ditches/water bodies were not surveyed due to land owner access issues.

4.4.3 The limitations to the surveys do not represent a significant constraint to adequately assessing the value of riparian mammals for the purposes of undertaking an ecological impact assessment, with a high degree of confidence in the outcome.

4.4.4 An absence of a species record within an area does not necessarily reflect an absence of that species from the same area. Similarly the distribution of species records may reflect survey effort rather than an accurate distribution of that species. As such, historic records should be assessed with caution.

4.4.5 A survey can only assess the site as it was found at the time of the survey. Species may move in and out of the site at different times and habitats are subject to change. While the results of this survey may no longer be fully representative of the site at the time of construction, nationally recognised standard survey methodologies have been used. Likely significant effects on and mitigation for riparian mammals are considered in *Chapter 11* of the *ES*.

5 Results

5.1 Desktop data and incidental records

5.1.1 The results of the biological records centre search and compilation of incidental records are given in *Tables A1.1, A1.2* and *A1.3* in *Annex 1*.

5.1.2 The biological records centre data search returned a total of 58 records for water voles and 23 records for otters. Records for otters were concentrated around the river Cam, river Great Ouse, Ellington Brook and Alconbury Brook and their catchments areas. There are particular concentrations of records for water voles collected northeast of Cambridge, near the town of Milton.

5.1.3 The Cambridgeshire Mammal Group's on-line resource indicates the status of water voles in the Cambridgeshire county as:

"*appearing widespread but nowhere common – related to the main waterway systems*."

5.1.4 Furthermore, the mammal group indicates that otters have a:

"*scattered distribution mainly linked to the Cam, Ouse and Nene River systems*."

5.1.5 The *National Water Vole Database and Mapping Project: Guide to the use of project outputs up to 2010* (Leggett, Perkins and Foy, 2012) indicates that, based on 2006-2010 data, eastern Cambridgeshire supports the highest density of water vole records within the county of Cambridgeshire. Accordingly, eastern Cambridgeshire supports the highest density of potential water vole sites in this region.

5.1.6 The *Fifth Otter Survey of England 2009-2010* (Environment Agency, 2010) indicates that the otter's range in the Anglian region has gone through a major expansion and in particular in the Ancholme, upper Nene and the upper Great Ouse river catchments. The number of sites that reported positive signs for otters increased by 120% since the last surveys in 2000-2002.

5.1.7 The 2009-10 survey report suggests a high level of anthropogenic mortality, particularly on the region's roads. This is further borne out by data collected by the Cambridgeshire and Peterborough biodiversity partnership which found that a total of 19 otters were killed through anthropogenic influences during the period 2004-13. 79% of those incidents were road traffic accidents.

5.1.8 In addition to records obtained from the biological records centre, incidental records have been obtained by ecologists whilst conducting field surveys for other taxa throughout the scheme's assessment. During spring 2014 two sites were identified as positive for otter records. Both sites contained otter spraints found under bridges that straddle Ellington Brook, north of the A14 and Alconbury Brook, close to Huntingdon Racecourse.

5.2 Field survey results

5.2.1 The results of the 2013 otter and water vole survey are given in *Table A1.4* in *Annex 1*.

5.2.2 In 2013 a total of 165 waterbodies were identified for surveying the presence and/or likely absence of water voles and/or otters. The total length of sites surveyed included approximately 88km of ditches, brooks and riverine systems. Seven sites (4%) were excluded from survey due to a lack of permission to access the land. A further 88 sites (53%) sites were dry at the time of the surveys and were considered unlikely to support otters or water voles.

5.2.3 Of the 70 sites surveyed, two sites were positively identified for the presence of otters through identification of spraints. One site was located near to Fenstanton and within a waterway linked to West Brook, and a second site at Fen Drayton.

5.2.4 There were no positive signs of water voles identified within the 2013 survey sites, although at one site, west of Girton, a potential water vole latrine was observed. However, the droppings were in poor condition but as a precautionary measure are being treated as a positive record.

5.2.5 The results of the 2014 otter and water vole survey are given in *Table A1.5* in *Annex 1*.

5.2.6 In 2014 a total of 69 water bodies were identified for surveying the presence and/or likely absence of water voles and/or otters. The total length of sites surveyed in 2014 included approximately 27km of ditches, brooks and riverine systems. Ten sites (14%) were excluded from survey due to lack of permission to access the land and a further 30 sites (43%) were dry at the time of the surveys and considered unlikely to support otters or water voles.

5.2.7 Of the remaining 29 sites, where surveys were possible, seven sites were positively identified for the presence of otters through identification of spraints or footprints or a combination of both. All positive sites included the major tributaries within the area of the scheme.

5.2.8 Three sites were positively identified for the presence of water voles through identification of latrines, burrows, footprints, pathways, feeding remains or by hearing voles enter the water during surveys. At these sites there was a combination of field signs at regular intervals (every 2-5m) along the entire stretch of the waterways surveyed.

6 Evaluation

6.1.1 The surveys conducted in 2013 and 2014 revealed the presence of otters and water voles at few locations across the scheme. However, populations of both species were recorded within the main tributaries and their catchment areas. These include the river Great Ouse, Alconbury to Brampton Brook, Cock Brook, Ellington Brook and West Brook.

6.1.2 In 2014 concentrations of field signs were recorded for water voles within Alconbury Brook especially in the vicinity of OS grid reference TL 193 732 (*Figure 11.11*) and near to the existing south-bound layby of the A1 widening section of the scheme. Field signs at this location included observations of water voles entering the water, pathways, footprints, feeding remains, latrines and burrows.

6.1.3 Similarly otter signs were frequent along Alconbury Brook and Ellington Brook extending from OS grid reference TL 196 721 to the east, to TL 186 719 to the west (*Figure 11.11*). Field signs for otters were also recorded within Cock Brook from OS grid reference TL 190 744 in the south, adjacent to Huntingdon Life Sciences research centre, to TL 186747 in the north (*Figure 11.11*). All field signs were found under bridges, on berms, fallen trees or tree root systems. No otter holts or couches were recorded during the surveys.

6.1.4 During the winter of 2013-2014 the river Great Ouse catchment area was inundated with flood waters to the extent that the majority of the ditches and brooks in the survey area overflowed into adjacent arable land.

6.1.5 The extent of such flooding events is likely to have impacted local populations of water voles and limit their survival whilst overwintering in their subterranean burrow systems. Furthermore, if flooding to the same or similar extent happens annually this may account for their restricted distribution across this part of the region (Leggett *et al.*, 2012).

6.1.6 Results from the 2013 surveys are not consistent with other historic survey records from the same areas and this is considered to be due to the limitations as described in Section 4.4. However, given the historical records identified in the desk study and the findings of the 2014 surveys it is reasonable to conclude that both species are present in low densities across the scheme area.

6.1.7 Given the recent expansion in the range of otters recorded in the Cambridgeshire water bodies (Hawksley, 2012), it is likely that otters would continue to utilise all of the rivers and brooks identified across the scheme. It is also likely that otters would utilise waterways not yet recorded as positive for field signs or the presence of otters.

6.1.8 Any water vole population has an intrinsic value due to the conservation status of the species and the overall national decline in numbers in recent years. However, water voles are still widespread in the east of England and in Cambridgeshire, with eastern Cambridgeshire supporting the greatest density of records (Leggett *et al.*, 2012).

6.1.9 Given this context, the widespread distribution and low populations of both otter and water vole using the water bodies identified throughout the scheme are likely to be of no more than local value (IEEM, 2006).

7 Bibliography

Cambridgeshire and Peterborough Biodiversity Partnership (2007). Biodiversity Action Plans. Available at: http://www.cpbiodiversity.org.uk/biodiversity-action-plans . Accessed May 2014.

Cambridgeshire and Peterborough Biodiversity Partnership (2003). Species Action Plans. Available at: http://www.cpbiodiversity.org.uk/downloads . Accessed July 2014.

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

Chartered Institute of Ecology and Environmental Management (2006). Guidelines for Ecological Impact Assessment in the United Kingdom. Available at; http://www.cieem.net/data/files/Resource_Library/Technical_Guidance_Series/EcIA_Guidelines/TGSEcIA-EcIA_Guidelines-Terestrial_Freshwater_Coastal.pdf. Accessed May 2014.

Chartered Institute of Ecology and Environmental Management (CIEEM) (2013) Guidelines for Preliminary Ecological Appraisal. Available at: http://www.cieem.net/guidance-on-preliminary-ecological-appraisal-gpea . Accessed October 2014.

Conservation of Habitats and Species Regulations (2010) (as amended). Available at: http://www.legislation.gov.uk/uksi/2010/490/contents/made . Accessed June 2014.

Convention on Biological Diversity (1992). Available at: http://www.cbd.int/convention/about.shtml . Accessed May 2014.

Crawford, A. (2011). Fifth otter survey of England 2009-2010, Technical report, Environment Agency, Bristol, UK.

Department for Communities and Local Government (2012). National Planning Policy Framework. Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2 . Accessed May 2014.

Department for Transport (2013). Draft National Policy Statement (NPS) for national networks. Available at: https://www.gov.uk/government/consultations/national-road-and-rail-networks-draft-national-policy-statement. Accessed May 2014.

Hawksley, R. (2012). Cambridgeshire and Peterborough Otter Survey 2012. Bedfordshire, Cambridgeshire and Northamptonshire Wildlife Trust & Cambridgeshire Mammal Group.

Highways Agency (2010). Interim Advice Note 130/10: Ecology and Nature Conservation: Criteria for Impact Assessment (1993). Available at: http://dft.gov.uk/ha/standards/ians/pdfs/ian130.pdf . Accessed May 2014.

Joint Nature Conservation Committee (JNCC) (2012). The UK Biodiversity Action Plan. Available at: http://jncc.defra.gov.uk/ukbap . Accessed May 2014.

Joint Nature Conservation Committee and Defra (on behalf of the Four Countries' Biodiversity Group) (2012). UK Post-2010 Biodiversity Framework. Available at: http://jncc.defra.gov.uk/page-6189 . Accessed May 2014.

Leggett, V., Perkins, H., and Foy, A. (2012). National water vole database and mapping project: Guide to use of project outputs up to 2010.

National Planning Policy Framework (NPPF) (2012). Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2 . Accessed May 2014.

Natural England (undated (A)). Standing Advice Species Sheet: Otter. Natural England, Sheffield. Available at: http://www.naturalengland.org.uk/Images/Otters_tcm6-21615.pdf . Accessed June 2014.

Natural England (undated (B)). Standing Advice Species Sheet: Water vole. Natural England, Sheffield. Available at: http://www.naturalengland.org.uk/Images/WaterVoles_tcm6-21714.pdf . Accessed June 2014.

Natural England (2011). Water voles and development: licensing policy. Natural England Technical Information Note TIN042. Available at: http://publications.naturalengland.org.uk/publication/31013 . Accessed June 2014.

Natural Environment and Rural Communities (NERC) Act (2006). Available at: http://www.legislation.gov.uk/ukpga/2006/16/contents . Accessed June 2014.

Office of the Deputy Prime Minister (ODPM), (2005). Biodiversity and geological conservation – statutory obligations and their impact within the planning system. Government Circular 06/2005. London, UK.

Planning Practice Guidance (2014). Available at: http://planningguidance.planningportal.gov.uk/ . Accessed May 2014.

Strachan, R., Moorhouse, T. and Gelling, M. (2011). Water vole conservation handbook, third edition. Wildlife Conservation Research Unit, Oxon.

Wildlife and Countryside Act (1981) (as amended). HMSO, London.

Annex 1 – Desk study and field survey data

A1.1 Incidental records collected during surveys for other taxa.

Species	Grid reference	Date	Comment
Otter	TL 18617 71961	31-03-14	Spraint under both sides of bridge (Ellington Brook)
Otter	TL 20877 71748	25-03-14	Many spraints under bridge at the race course (Alconbury Brook)

A1.2: Biological records centre data for otters and water voles – A14 only (based on Atkins 2013 data).

Species	Grid Ref.	Date	Comment
Otter	TL212717	Nov-06	Spraint
Otter	TL20887175	21/02/2012	50+ spraints & sighting 9/2/12
Otter	TL208717	Jan-07	Spraint x3
Otter	TL208718	Jan-02	Spraint under bridge
Otter	TL487623	18/12/2011	Spraints on stonework
Otter	TL209718	Jun-04	Spraint
Otter	TL16247209	09/02/2012	Spraints on concrete "rock"
Otter	TL162720	May-04	Prints, Spraint
Otter	TL159713	09/02/2012	Spraint on "rock"
Otter	TL280662	08/01/2012	Prints
Otter	TL30586952	31/01/2012	Fairly fresh spraint
Otter	TL305695	May-04	Prints
Otter	TL305695	Feb-07	Spraint
Otter	TL215672	Jan-97	Spraint
Otter	TL229700	Mar-07	Spraint and possible prints
Otter	TL220699	16/02/2012	Spraints on willow 35m North
Otter	TL220699	Jan-07	Spraint
Otter	TL216671	Jan-02	Possible prints West Side Brook
Otter	TL216671	23/12/2011	Old spraint
Water vole	TL378628	2000	
Water vole	TL378628	16/04/2012	Water vole seen
Water vole	TL379641	2004	Presence recorded, latrine
Water vole	TL384635	2001	Presence recorded
Water vole	TL416626 - TL407622	Jul-97	Latrines and feeding stations
Water vole	TL425633 - TL423630	Jul-97	Latrines and feeding stations
Water vole	TL204707 - TL207706	Jul-97	Possible signs
Water vole	TL468614	05/05/2005	Sighting

Species	Grid Ref.	Date	Comment
Water vole	TL384617	2001	Presence recorded. Large pond constructed 8 years ago.
Water vole	TL370659 - TL373680	22/09/1998	Latrines, footprints, tunnel entrance, chopped grass
Water vole	TL291661	29/06/2005	3 latrines holes
Water vole	TL294664	29/06/2005	Holes, sighting by resident
Water vole	TL388652	2001	Presence recorded
Water vole	TL425594	2001	Presence recorded. Old holes but no fresh signs.
Water vole	TL469616	23/05/2006	1 or 2 seen, First Public Drain
Water vole	TL482622	1996	
Water vole	TL483624	1996	Presence recorded
Water vole	TL486621	1996	Presence recorded
Water vole	TL486622	18/12/2011	Old droppings
Water vole	TL48666228	22/03/2011	Feeding station
Water vole	TL48686227	22/03/2011	Feeding station
Water vole	TL48696226	22/03/2011	Latrine and feeding station
Water vole	TL48706226	22/03/2011	Droppings and feeding station
Water vole	TL48716225	22/03/2011	Latrine and feeding station
Water vole	TL48716225	22/03/2011	Feeding station
Water vole	TL48736224	22/03/2011	Latrine and feeding station
Water vole	TL48746223	22/03/2011	Sighting
Water vole	TL48746223	22/03/2011	Latrine and feeding station
Water vole	TL48756222	22/03/2011	Latrine, feeding station and runs
Water vole	TL487622	24/04/2012	Feeding signs, active holes, a few latrines
Water vole	TL48766222	22/03/2011	Latrine
Water vole	TL48786220	22/03/2011	Latrine, feeding station and holes
Water vole	TL48796218	22/03/2011	2 latrines and 2 feeding stations
Water vole	TL48806217	22/03/2011	2 latrines
Water vole	TL48806217	22/03/2011	Latrine
Water vole	TL48816217	22/03/2011	2 latrines
Water vole	TL488625	2001	Presence recorded
Water vole	TL483624	1997	Present
Water vole	TL48856217	22/03/2011	Latrine
Water vole	TL48866218	22/03/2011	Holes
Water vole	TL48876219	22/03/2011	Latrine

Species	Grid Ref.	Date	Comment
Water vole	TL48876220	22/03/2011	Droppings
Water vole	TL48896223	22/03/2011	Latrine
Water vole	TL48906224	22/03/2011	Droppings
Water vole	TL48906225	22/03/2011	Holes
Water vole	TL48906225	22/03/2011	2 latrines
Water vole	TL48906225	22/03/2011	Droppings
Water vole	TL48906227	22/03/2011	Droppings
Water vole	TL360658 - TL357656	14/04/2005	9 latrines, feeding signs
Water vole	TL358657 - TL359659	29/05/2003	Individuals seen, latrines, feeding platforms
Water vole	TL37516679 - TL37516683	02/04/2002	Droppings, holes in bank, runs in vegetation
Water vole	TL375668	02/04/2002	Droppings, holes in bank, runs in vegetation
Water vole	TL369661	31/08/2005	Dead water vole
Water vole	TL369661	31/08/2005	Feeding signs
Water vole	TL374670	31/08/2005	Used hole
Water vole	TL417620 - TL416616	Jul-97	Latrines and feeding stations
Water vole	TL418623 - TL418621	Jul-97	Latrines and feeding stations
Water vole	TL420603 - TL421599	1997	

A1.3: Biological records centre data for otters and water voles – A1 section only (based on Jacobs 2013 data).

Species	Grid reference	Date	Comment
Otter	TL1891175541	2007	
Otter	TL1915574019	2007	
Otter	TL212717	18/11/2006	Spraint. Recorded with surveyors training group.
Otter	TL189755	Jan-07	Spraint x2
Otter	TL189755	16/02/2012	Spraint on bridge footing
Otter	TL212717	Nov-06	Spraint
Otter	TL208717	Jan-02	Spraint under bridge
Otter	TL208717	Jan-07	Spraint x3
Otter	TL20887175	21/02/2012	50+ spraints and sighting 9/2/12!
Otter	TL209718	Jun-04	Spraint
Water vole	TL204707 - TL207706	Jul-97	Possible signs

A1.4: Otter and water vole survey data 2013.

Waterbody reference	Survey date	Survey distance (m)	OS grid reference (TL)				Water vole present Y/N	Otter present Y/N
			Start		Finish			
1.2	10/09/2013	159	17168	71860	17064	71676	N	N
1.3	10/09/2013	262.43	17357	71555	17104	71613	N	N
1.4	10/09/2013	314	17316	71425	17021	71544	N	N
1.5	10/09/2013	343	17611	71826	17531	71489	N	N
1.6	10/09/2013	239	17845	71820	17807	71571	N	N
2.1	30/09/2013	448	19458	72124	19872	72285	N	N
2.2	30/09/2013	625.5	19534	72003	19928	71750	N	N
2.2	30/09/2013	123.5	19994	71868	20027	71788	N	N
2.3	09/09/2013	709	20006	71616	19599	71396	N	N
2.4	09/09/2013	565	19438	71771	19542	71219	N	N
2.5	09/09/2013	430	19302	71721	19071	71923	N	N
2.6	09/09/2013	163	19147	71329	19233	71185	N	N
2.8	30/09/2013	2358	17060	71921	19348	72109	N	N
2.9	10/09/2013	578	18371	71845	17845	71820	N	N
3.1	09/09/2013	499	20009	71096	20455	70875	N	N
3.2	09/09/2013	723	19673	70866	20317	70765	N	N
3.3	09/09/2013	739	19454	71348	19646	70661	N	N
3.5	09/09/2013	365	19455	70832	19124	70698	N	N
3.6	09/09/2013	611	19124	70698	19288	70104	N	N
3.7	09/09/2013	644	20230	70483	19863	69919	N	N
3.8	09/09/2013	707	20336	70351	20498	69917	N	N
4.1	09/09/2013	679	20498	69917	20336	69262	N	N
4.2	09/09/2013	230	20336	69262	20109	69338	N	N
4.3	09/09/2013	124	19875	69749	19882	69629	N	N
4.4	10/09/2013	537	19839	69592	19735	69069	N	N
4.5	10/09/2013	888	19841	69627	19067	69669	N	N
4.6	10/09/2013	313	19662	69029	19713	68879	N	N
5.1	10/09/2013	88	19300	68774	19721	68863	N	N
6.1	10/09/2013	442	21727	69133	21494	68592	N	N
6.2	13/09/2013	345	21983	69302	21903	68979	N	N
6.3	13/09/2013	371	22222	69532	21983	69302	N	N
6.4	13/09/2013	460	22126	69326	22073	68875	N	N
6.4a	10/09/2013	1150	21701	68765	21627	67714	N	N

Waterbody reference	Survey date	Survey distance (m)	OS grid reference (TL)				Water vole present Y/N	Otter present Y/N
			Start		Finish			
6.5	13/09/2013	500	22253	69374	22227	68843	N	N
6.6	13/09/2013	275	22222	69532	22272	69615	N	N
7.2	10/09/2013	1150	21751	68984	22040	68188	N	N
7.3							N	N
7.4	13/09/2013	698	21760	68608	21801	68004	N	N
7.5							N	N
7.6	10/09/2013	1320	21649	68824	20802	67804	N	N
7.7	10/09/2013	310	21394	68972	21634	68859	N	N
7.8	10/09/2013	112	21557	68074	21455	68051	N	N
7.9	13/09/2013	540	21455	68051	22003	68029	N	N
8.1	10/09/2013	482	20802	67804	20356	68071	N	N
8.2	13/09/2013	145	21671	67569	21806	67581	N	N
8.3	10/09/2013	238	22059	67891	22308	67871	N	N
8.4	10/09/2013	710	22381	67890	23067	61851	N	N
10.1	11/09/2013	509	23909	68979	23806	68501	N	N
10.2	11/09/2013	425	23849	68441	24148	68209	N	N
12.1	11/09/2013	1.14	24899	68709	24807	67618	N	N
12.2	11/09/2013	457	26133	68456	26062	68128	N	N
12.2a	11/09/2013	103.82	26088	68081	26132	67985	N	N
12.3	11/09/2013	607	26139	67976	26683	67818	N	N
12.4	11/09/2013	605	26475	67583	26890	67807	N	N
12.5	11/09/2013	115	25029	68294	25136	68304	N	N
13.1	11/09/2013	188	26219	66936	26243	66740	N	N
13.2	11/09/2013	286	26483	66974	26577	66720	N	N
14.1	11/09/2013	470	26684	67836	26800	68256	N	N
14.2a	11/09/2013	1600	28287	67660	26679	67811	N	N
14.2b	12/09/2013	1260	28287	67666	29530	67751	N	N
14.3	11/09/2013	401	27037	68200	27012	67823	N	N
14.4	11/09/2013	373	27145	67765	27049	67429	N	N
14.5	11/09/2013	462	27731	68125	27502	67780	N	N
14.5a	11/09/2013	228	27350	68214	27561	68228	N	N
14.6	11/09/2013	976	27846	68290	28588	68373	N	N
15.1	12/09/2013	1540	29800	68015	28836	67055	N	N
15.1a	11/09/2013	540	26240	66754	26703	66677	N	N

Waterbody reference	Survey date	Survey distance (m)	OS grid reference (TL)				Water vole present Y/N	Otter present Y/N
			Start		Finish			
16.1	13/09/2013	811	28593	68140	29107	68248	N	N
17.2	12/09/2013	252	28995	67703	29013	67458	N	N
17.3	12/09/2013	163	29422	67317	29533	67272	N	N
17.4	12/09/2013	1142	29503	67646	30457	67476	N	N
17.5	12/09/2013						N	N
17.6	12/09/2013						N	N
17.7	12/09/2013	448	29744	67678	30457	67476	N	N
17.8	12/09/2013	994	30312	67304	30827	68092	N	N
18.1	17/09/2013	782	31588	67431	30882	67874	N	N
18.2	17/09/2013	186	31486	67510	31486	67510	N	N
18.3	12/09/2013	350	30905	67363	31021	67729	N	Y
19.1	12/09/2013	465	30453	66817	30499	67174	N	N
19.2							N	N
19.3	17/09/2013	624	31630	67289	31383	66681	N	N
19.4	11/09/2013	680	30890	67369	30453	66817	N	N
19.5	17/09/2013	408	32221	67439	32286	67853	N	N
20.4							N	N
20.1	17/09/2013	669	33890	67774	33484	67283	N	Y
20.2	18/09/2013	527	33610	67845	33209	67478	N	N
20.3	17/09/2013	185	33057	67497	32909	67335	N	N
21.1	17/09/2013	2750	35679	65666	33403	67261	N	N
21.1a	17/09/2013	943	33405	67261	32924	66453	N	N
21.2	17/09/2013	209	34048	66589	34196	66745	N	N
22.2	18/09/2013	661	35029	67039	34832	66400	N	N
22.5	18/09/2013	655	35472	66464	35172	66841	N	N
23.1	17/09/2013	356	35679	65666	35360	65528	N	N
23.2	17/09/2013	786	34918	65493	35457	65403	N	N
23.3							N	N
23.4	18/09/2013	910	36186	64891	35334	65282	N	N
23.5	18/09/2013	959	3667	66044	35777	65724	N	N
23.9							N	N
23.6	18/09/2013	264	36241	65772	36000	65920	N	N
23.7	18/09/2013	298	36241	65772	36183	65554	N	N
23.8							N	N

Waterbody reference	Survey date	Survey distance (m)	OS grid reference (TL)				Water vole present Y/N	Otter present Y/N
			Start		Finish			
25.1	19/09/2013	1009	37349	64715	36962	65672	N	N
25.3	18/09/2013	566	36854	64921	36941	64517	N	N
25.4	18/09/2013	659	36638	65081	36014	64857	N	N
25.2	18/09/2013	253	36941	64517	37366	64613	N	N
25.6							N	N
25.7	18/09/2013	402	37366	64613	37103	64261	N	N
27.1	18/09/2013	542	37644	64411	37254	64017	N	N
27.2	18/09/2013	854	36955	63359	37620	63905	N	N
27.3	19/09/2013	841	38069	64215	38563	64875	N	N
28.1	19/09/2013	1031	38437	63944	39136	65527	N	N
28.2	19/09/2013	2010	40246	63738	38594	635891	N	N
28.5	19/09/2013						N	N
29.8	19/09/2013		38594	635891	39074	62755	N	N
28.3	19/09/2013	518	41246	63738	39842	64104	N	N
29.1	30/09/2013	1200	38622	63090	39194	62790	N	N
29.2							N	N
29.3							N	N
29.4							N	N
29.5	19/09/2013	1740	38866	62547	39635	62922	N	N
29.6	19/09/2013						N	N
29.7	19/09/2013						N	N
30.1	19/09/2013	1360	39733	62990	40628	63287	N	N
30.1a	19/09/2013	1140	39733	62990	40078	62259	N	N
30.2	19/09/2013	864	39834	63279	40514	62746	N	N
30.3	19/09/2013	1100	40126	62685	41069	62407	N	N
30.4							N	N
30.5	19/09/2013	287	40084	62622	39885	62406	N	N
31.1	19/09/2013	418	40150	62039	39838	62296	N	N
31.2	19/09/2013	501	40353	62130	39968	62481	N	N
31.4	19/09/2013	177	40883	61946	40717	61991	N	N
31.5	19/09/2013	637	40353	62130	40399	61645	N	N
31.3	20/09/2013	292	46643	62183	40883	61946	N	N
31.6	20/09/2013						N	N
32.1	20/09/2013	702	41608	61613	42089	61392	N	N

Waterbody reference	Survey date	Survey distance (m)	OS grid reference (TL)				Water vole present Y/N	Otter present Y/N
			Start		Finish			
32.11	20/09/2013	575	41461	61535	41064	61881	N	N
32.12	20/09/2013	312	41357	61474	41634	61409	N	N
32.2a	20/09/2013	528	41811	62004	41584	61524	N	N
32.2b	23/09/2013	1150	41638	61388	42098	60392	N	N
32.3	20/09/2013	792	40883	60896	41461	61535	N	N
32.4	20/09/2013	244	41237	61450	41647	61248	N	N
32.4a	20/09/2013	437	41047	61248	40658	61492	N	N
32.5	23/09/2013	179	42064	61163	42185	61331	N	N
32.6	23/09/2013	482	41699	60983	41963	61184	N	N
33.1	23/09/2013						N	N
33.11	20/09/2013	311	40817	60329	41140	60317	N	N
33.12	20/09/2013	751	40426	60180	40750	60728	N	N
33.14	20/09/2013	840	4087	60928	40311	60469	N	N
33.17	20/09/2013						N	N
33.15	20/09/2013	881	40656	61465	40668	60808	N	N
33.16	20/09/2013	357	40068	60808	40412	60660	N	N
33.19	20/09/2013	1173	41329	60812	41663	60912	N	N
33.21	20/09/2013						N	N
33.3	20/09/2013	350	40850	60936	40573	60688	N	N
33.8	20/09/2013	185	41048	60666	41030	60473	N	N
35.4	23/09/2013	329	42924	62034	43202	61863	N	N
35.1	23/09/2013	761	43602	62031	43017	61640	Y	N
35.5	23/09/2013							
35.6	23/09/2013	1120	43598	62264	43403	61293	N	N
35.7	23/09/2013	547	43716	61840	44263	61774	N	N
37.3	23/09/2013	361	46756	61904	46824	61855	N	N
37.4	23/09/2013	583	46436	61550	46911	61403	N	N
41.1	10/09/2013	853	24110	71332	23203	71372	N	N
43.3	30/09/2013	1200	18757	72079	19569	72162	N	N
43.4	30/09/2013	1560	18446	71989	19225	72802	N	N

A1.5: Otter and water vole survey data 2014

Waterbody reference	Survey date	Survey distance (m)	OS grid reference (TL)				Water vole present Y/N	Otter present Y/N
			Start		Finish			
Ellington Brook	Apr/Jul 14	1397	18143	71903	19343	72113	N	Y
Alconbury Brook	Apr/Jul 14	201	18651	75706	18889	75564	N	Y
Alconbury Brook	Apr/Jul 14	382	18935	75521	19650	74839	N	Y
Alconbury Brook	-----	1636	19650	74839	19656	74274	N	N
Alconbury Brook	Apr/Jul 14	937	19656	74274	19392	73629	N	N
Cock Brook	-----	355	18377	74932	18724	74691	N	N
Cock Brook	Apr/Jul 14	680	18724	74691	19061	74459	N	Y
Cock Brook	Apr/Jul 14	457	19061	74459	19180	73993	N	Y
Alconbury Brook	Apr/Jul 14	333	19180	73993	19329	73755	N	N
Alconbury Brook	Apr/Jul 14	250	19329	73755	19379	73632	N	N
Alconbury Brook	Apr/Jul 14	574	19379	73632	19266	73219	Y	Y
Alconbury Brook	Apr/Jul 14	607	19266	73219	19713	73063	N	N
Alconbury Brook	-----	110	19713	73063	19918	72286	N	N
Alconbury Brook	Apr/Jul 14	1217	19739	73070	19901	72333	N	N
Alconbury Brook	Apr/Jul 14	385	19673	72200	19914	72276	Y	N
Alconbury Brook	-----	13	19914	72276	20126	72227	N	N
Alconbury Brook	Apr/Jul 14	150	19445	72127	19914	72276	N	Y
NI5	Apr/Jul 14	74	18936	75440	18951	75371	N	N
2	-----	54	18872	75163	18891	75112	N	N

Waterbody reference	Survey date	Survey distance (m)	OS grid reference (TL)				Water vole present Y/N	Otter present Y/N
			Start		Finish			
3	Apr/Jul 14	133	18733	75118	18836	75039	N	N
*A	Apr/Jul 14	235	18652	74081	19036	73973	N	N
*1	Apr/Jul 14	361	19053	73963	19141	73919	N	N
*B	Apr/Jul 14	311	18950	73946	19029	73975	N	N
*3	Apr/Jul 14	270	19329	73756	19236	73743	N	N
*2	Apr/Jul 14	98	18907	73567	19159	73719	N	N
*4	Apr/Jul 14	103	18924	74928	19032	74583	N	N
4	-----	437	19258	72735	19281	72621	N	N
6	-----	85	19372	71903	19401	71883	N	N
5	-----	98	19294	71785	19312	71713	N	N
9	-----	297	19422	71801	19513	71274	N	N
8	Apr/Jul 14	94	19061	74467	19039	74563	N	N
*5	Apr/Jul 14	361	19083	74566	19140	74302	N	N
*6	-----	951	19167	74104	19187	74004	N	N
+25	Apr/Jul 14	725	19180	73966	19245	73611	N	N
+26	Apr/Jul 14	381	19134	73820	19194	72873	N	N
+27	Apr/Jul 14	64	19227	72749	19213	72839	N	N
*C	-----	299	19256	72749	19237	72839	N	N
+28	Apr/Jul 14	234	19230	72733	19279	72486	N	N
*8	Apr/Jul 14	92	18756	74670	18882	74869	N	N
*7	-----	91	18999	74938	19073	74636	N	N
*Ea	-----	611	18872	72981	19161	72899	N	N
+31	Apr/Jul 14	224	19214	72802	18444	72007	N	N

Waterbody reference	Survey date	Survey distance (m)	OS grid reference (TL)				Water vole present Y/N	Otter present Y/N
			Start		Finish			
*10	Apr/Jul 14	116	19107	71712	19109	71715	N	N
*9	Apr/Jul 14	251	19194	72804	18817	72400	N	N
+24	-----	218	19821	71771	19539	71892	N	N
+AE	Apr/Jul 14	338	19033	71585	19124	71372	N	N
+32	Apr/Jul 14	446	19123	71377	19405	71525	N	N
+AV	Apr/Jul 14	376	19381	71644	19381	71644	N	N
+33	Apr/Jul 14	346	19381	71644	19381	71644	N	N
+AW	Apr/Jul 14	335	19217	72668	19272	72457	N	N
*F	Apr/Jul 14	324	19192	73769	19223	73217	N	N
*E	Apr/Jul 14	468	19245	73605	19258	73230	N	N
*12	Apr/Jul 14	39	19501	73283	19562	73266	N	N
*16	Apr/Jul 14	75	19248	72975	19289	72750	N	N
*G	Apr/Jul 14	633	17796	71501	17829	71838	N	N
*Z	Apr/Jul 14	592	17846	71529	17803	71521	N	N
+30	Apr/Jul 14	522	17841	71846	18361	71859	N	N
+29	Apr/Jul 14	341	19284	72738	19329	72518	N	N
+29a	Apr/Jul 14	44	19350	72504	19579	72152	N	N
*G	Apr/Jul 14	633	19525	72018	19853	71946	N	N
*Z	Apr/Jul 14	592	19282	72459	18966	72371	N	N
*18	Apr/Jul 14	677	19288	72447	19341	72115	N	N

Waterbody reference	Survey date	Survey distance (m)	OS grid reference (TL)				Water vole present Y/N	Otter present Y/N
			Start		Finish			
17	Apr/Jul 14	194	19378	72357	19506	72003	N	N
A	Apr/Jul 14	318	19516	72003	19804	71833	N	N
19	Apr/Jul 14	442	19443	71463	19508	71281	N	N
21	Apr/Jul 14	328	19568	71411	19649	70976	N	N
20	Apr/Jul 14	110	19814	71265	19793	71156	N	N
+AD	Apr/Jul 14	383	19660	70863	19729	70880	N	N
*D	-----	1485	19568	71411	19842	71248	N	N