

# **M3 Junction 9 Improvement**

**Scheme Number: TR010055**

## **6.3 Environmental Statement Appendix 8.1I - Water Vole Survey Report 2017**

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M3 Junction 9 Improvement  
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<b>6.3 ENVIRONMENTAL STATEMENT- APPENDIX 8.1I: WATER VOLE SURVEY REPORT 2017</b>
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# M3 JUNCTION 9 IMPROVEMENT SCHEME

## PCF STAGE 3 - WATER VOLE SURVEY REPORT

**Highways England**

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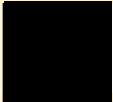


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## EXECUTIVE SUMMARY

M3 Junction 9 has been highlighted as requiring redevelopment in order to help reduce congestion. This will be achieved by improving the flow of traffic and three options are currently being considered for implementation.

The Proposed Works will cross the River Itchen which currently passes under the A34 and A33 at multiple locations north of Junction 9. WSP was commissioned by Highways England to undertake water vole surveys to detect the presence, or confirm the likely absence, of water voles within land adjacent to the junction. A Survey Area comprising land within 250m of the proposed works area was used. The survey was completed in line with current good practice guidance (Strachan et al, 2011 and Dean et al, 2016). All wetland habitats along the lengths of ditch and river within the Survey Area were visually inspected for evidence indicating the presence of water voles (latrines, burrows, feeding remains etc). Bankside habitat within 5m of the banktop was also included in the survey. Two surveys were undertaken, one in June 2017 and one in August 2017.

Water voles were confirmed to be present within the River Itchen and its associated channels west of the A34. The river channels west of the A34 are part of a wetland habitat that includes springs, flushes and wetland meadows managed by the Hampshire and Isle of Wight Wildlife Trust. The majority of these channels exhibit some water vole activity, although the abundance of activity greatly varies. The River Itchen also exhibits limited activity signs, east of the A34 and A33, though the suitability of these habitats is limited due to the presence of broadleaved woodland and management relating to angling.

Current indications are that the Proposed Works should not directly affect water vole on the basis that soft estate within 10m of occupied watercourses should not be directly affected. This conclusion should be revisited in Project Control Framework Stage 3. Should proposals emerge that may affect habitat close to occupied watercourses, outline recommendations for mitigation are provided in this report. In addition, recommendations are made for ecological enhancement measures which could be incorporated into the design, such as including native planting in existing and new channels, the restoration of channels that are currently unsuitable for water voles and the incorporation of suitable features in new drainage systems.



# 1 INTRODUCTION

## 1.1 CIRCUMSTANCES OF THE PROJECT

1.1.1 Junction 9 of the M3 is a key transport interchange on the strategic road network which connects South Hampshire and the wider sub-region, with London via the M3 and the Midlands via the A34 (which also links to the principal east-west A303 corridor). A large volume of traffic currently uses the interchange (approximately 6,000 vehicles per hour during the peak periods), which acts as a bottleneck on the local and strategic highway network, causing significant delays. M3 Junction 9 has been proposed for redevelopment in order to help reduce congestion around this stretch of the road by improving the flow of traffic.

1.1.2 Three options have been taken forward to Project Control Framework (PCF) Stage 2 and assessed within this report, namely:

- Option 14: Northbound and Southbound A34 Free Flow Design
- Option 16B: Incremental Delivery – Northbound A34 Free Flow Link
- Option 16C: Incremental Delivery – Southbound A34 Free Flow Design

1.1.3 The works are hereafter referred to as the 'Proposed Works'. Further details of the Proposed Works are presented within the PCF Stage 2 Environmental Assessment Report (EAR) (HE551511-WSP-GEN-M3J9PCF2-RP-LE-00041). The anticipated maximum extent of the works is shown on Figure 8.1, and is hereafter referred to as 'the Site.' An ecological Survey Area has been defined comprising land within 250m of the Site.

## 1.2 ECOLOGICAL BACKGROUND

1.2.1 A desk study undertaken for the M3J9 PCF Stage 1 identified 357 water vole *Arvicola amphibious* records within a 2km search area of the works extent (WSP 2016).

1.2.2 An extended Phase 1 habitat survey was conducted during the spring of 2017 (WSP, 2017), which confirmed the presence of habitats suitable for water vole. These include river channels of the River Itchen and associated ditches and reedbeds. The River Itchen flows through the north of the Survey Area passing under the A34 and A33. The River Itchen has a number of tributaries and multiple channels, creating a complex stream network.

## 1.3 BRIEF AND OBJECTIVES

1.3.1 Highways England commissioned WSP UK Limited to:

- Complete a water vole survey in accordance with good practice guidance (Strachan *et al*, 2011) to establish whether water vole are present or likely absent from the Survey Area
- Provide a concise technical report setting out the survey methods used, reporting the survey results, and providing outline recommendations in relation to the project and water voles (with reference to legislation and planning policy relevant to this species)

1.3.2 The results of this survey, and subsequent recommendations, are included within this report.

# 2 METHODS

## 2.1 OVERVIEW

2.1.1 To establish whether water vole are present or likely absent, a survey was completed in line with current good practice guidance (Strachan *et al*, 2011). This survey comprised two survey visits to search for water vole field signs within the habitats present.

## 2.2 WATER VOLE SURVEY

2.2.1 Watercourses and waterbodies identified during the extended Phase 1 habitat survey within the Survey Area were included within the water vole presence and likely absence survey, where access was possible. The locations of the waterbodies surveyed are shown on Figure 8.2.

2.2.2 The survey comprised two visits to each surveyed watercourse within the appropriate season for water vole survey (late April to early October), each incorporating three elements:

- A walked survey of the entire length of the watercourses within the survey area to conduct a thorough visual inspection of the banks and immediate vicinity for water voles or their field signs (field signs include faeces, latrines, feeding remains, burrows, 'lawns', nests, footprints and runways in vegetation)
- The recording of habitat variables and features relevant to water voles (for example general habitat type, shore or bank substrate, bordering land use, vegetation, disturbance level, bank profile, water depth)
- The recording of any field signs or evidence relating to other relevant wildlife (for example otter *Lutra lutra*, mink *Neovison vison* or brown rat *Rattus novegicus*)

## 2.3 DATES OF SURVEY AND PERSONNEL

2.3.1 The water vole survey was led by an experienced consultant ecologist with extensive water vole survey experience. Surveys were completed on the following dates:

**Table 2-1 Survey Dates and Weather Conditions**

DATE	START TIME	WEATHER CONDITIONS SUMMARY
28 <sup>th</sup> & 29 <sup>th</sup> June 2017	08:00	Rain in the early morning before the first survey. Some light showers during the surveys. Low wind speeds throughout the both days with cloud cover 6/8.
30 <sup>th</sup> & 31 <sup>st</sup> August 2017	09:00	Warm days, with occasional cloud cover and one short rain shower on first day. Low winds throughout both days with cloud cover 5/8.

## 2.4 EVALUATION

2.4.1 The value of the Survey Area for water vole was preliminarily evaluated with reference to good practice guidance (CIEEM, 2016). This guidance recommends that valuation of site importance is made with reference to a geographical framework e.g. a site is of local, regional or national value. To inform the assessment in this report, the extent and quality of habitat present was considered in the context of the distribution and abundance of water vole locally and nationally.

## 2.5 NOTES AND LIMITATIONS

- 2.5.1 Light rain fell on the evening of 27<sup>th</sup> and early morning of 28<sup>th</sup> June. It is likely that some evidence of water vole activity was lost with this rainfall. However, the rainfall was considered not heavy enough to wash away all water vole signs. Water vole signs were recorded along a number of river sections despite this limitation.
- 2.5.2 Due to high water levels and light rainfall during the surveys, water vole latrines may have been recently washed away leaving only fresh faeces present at the time of survey. Many of the faeces piles recorded during the surveys are therefore considered latrines and have subsequently been recorded as such.
- 2.5.3 The majority of watercourses within the Survey Area could be accessed sufficiently to assess the habitat present, and search for signs of water vole presence. However, in some places the depth of the River Itchen channels and density of some reed beds meant that not all parts of the channels could be safely accessed. In these cases the survey was completed from the banks. It is probable that some burrow entrances and evidence of water vole activity will not have been visible from the bankside and therefore will not have been recorded. This is not considered a significant limitation to the survey objectives as water vole signs were recorded frequently along the channels. It is concluded that the entire length of the water course is occupied by water vole for the purpose of designing mitigation.
- 2.5.4 Drainage ditches associated with the A34 were not accessible for health and safety reasons during the water vole surveys (see Figure 8.2), and were not assessed within this report. The drainage ditches are considered unlikely to support water voles due to their shallow water depth, low engineered profiles and prevalence of over-shading vegetation. The ditches, however, could provide suitable foraging habitat for water vole. This limitation is not significant because the Proposed Works should not affect these habitats. Should proposals emerge that may affect these watercourses, it is advised that a water vole survey should be undertaken of these areas.

# 3 RESULTS AND EVALUATION

## 3.1 OVERVIEW

3.1.1 Water voles and their signs were recorded within the Survey Area. Evidence was particularly prominent within the Hampshire and Isle of Wight Wildlife Trust (HIWWT) Winnall Moors Nature Reserve west of the A33/A34, whilst occasional evidence was located in the north-east of the Survey Area.

## 3.2 RESULTS OF WATER VOLE SURVEY

3.2.1 The watercourses surveyed included: channels, forming the River Itchen system; and ditches, which included those associated with the water meadow habitats west of the road, in addition to some highways drainage ditches. For the purposes of reporting, each surveyed watercourse has been assigned a letter (A-V) as shown on Figure 8.3 and described within Appendix A.

3.2.2 The majority of the banks of the River Itchen channels were shallow and densely vegetated, whilst the channels themselves were deep and open. Bankside vegetation most often consisted of common reed *Phragmites australis* and sedge species *Carex sp.* with intermittent grass and herb species. The majority of the bank profiles are considered sub-optimal for water vole burrows due to their low gradients. Feeding opportunities for water vole are high among the majority of the channels due to the abundance of food plants.

3.2.3 Many of the channel banks observe some vegetation maintenance for angling, as well as being grazed by cattle in some cases. In areas where angling or grazing was prominent water vole evidence was limited. This is likely because of lower availability of foraging resources. Management for angling was particularly prominent to the east of the A33/A34 with grazing noted west of the road.

3.2.4 Significantly fewer signs of water vole were observed to the east of the A33/A34. This is likely to be due to the higher cover of woodland, creating shading and a lower cover of emergent aquatic vegetation (which water vole rely upon for food). In addition, most of the banks in this area are reinforced and not conducive to burrowing, and there is a greater degree of habitat management.

3.2.5 With respect to the ditches within the Survey Area, in general these did not hold sufficient water to be suitable for water voles although do provide foraging opportunities.

3.2.6 A total of seven channels were identified as having occasional to abundant activity signs (J, K, N, P, T, U and V). Details of water vole evidence recorded are summarised in Table 3-1 below, with detailed descriptions included in Appendix B. The results are also displayed on Figure 8.3.

3.2.7 Evidence of otter was identified under the bridges of the A34 and A33 along ledges. Small mammal evidence was also identified along the river channels surveyed. These included sightings, droppings and feeding remains of field vole *Microtus agrestis* and shrews *Sorex sp.*

**Table 3-1 Summary of Water Vole Evidence at each section**

Water course section	Habitat Suitability	ABUNDANCE OF WATER VOLE EVIDENCE				
		Latrines	Feeding stations	Tunnel entrances/ burrows	Paths and runs	Sightings/ sounds
A	Moderate	No Evidence Found				
B	Moderate	-	-	Scarce	-	-
C	Moderate	No Evidence Found				
D	Moderate	No Evidence Found				
E	Moderate	No Evidence Found				
F	Moderate	No Evidence Found				
G	Low	No Evidence Found				
H	Moderate	No Evidence Found				
I	Low	No Evidence Found				
J	High	Scarce	Occasional	-	Occasional	-
K	High	Occasional	Occasional	Scarce	Occasional	-
L	Low	No Evidence Found				
M	Low	No Evidence Found				
N	High	Abundant	Abundant	Scarce	Abundant	Frequent/ scarce
O	Moderate	No Evidence Found				
P	High	Occasional	Occasional	-	Occasional	-
Q	Low	No Evidence Found				
R	Moderate	No Evidence Found				
S	Moderate	No Evidence Found				
T	High	Occasional	Occasional	Scarce	Abundant	-
U	High	Occasional	Occasional	-	Occasional	-
V	High	Abundant	Abundant	Scarce	Abundant	-

### 3.3 EVALUATION OF THE SITE FOR WATER VOLE

#### 3.3.1

Water voles are a widespread species but are of conservation concern having undergone significant population decline and local extinctions (Strachan et al, 2011). Hampshire in general and the River Itchen in particular, support strong populations, as evidenced by the desk study (WSP, 2016) which noted 367 records within a 2km radius of the Survey Area. Therefore, in the context of a strong local population, the population within the Survey Area is considered to be of importance at above the Local level.

# 4 IMPLICATIONS FOR DEVELOPMENT

## 4.1 OVERVIEW

4.1.1 Water voles are protected from killing and injury under UK legislation. In addition, planning policy affords further protection within the planning system, as described below. Dependent on the nature of detailed designs, it may be necessary to adopt appropriate avoidance or mitigation measures as part of the Proposed Works as outlined in Section 6.

## 4.2 LEGAL COMPLIANCE

4.2.1 Water vole are fully protected under The Wildlife and Countryside Act (1981) (as amended), meaning: it is an offence to kill, injure or take this species; damage or destroy places of rest or shelter; or disturb this species whilst occupying a place of rest of shelter.

4.2.2 The water vole is also listed as a Species of Principal Importance (SPI) for the Conservation of Biodiversity in England, in accordance with Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Under Section 40 of the NERC Act (2006) public bodies (including local planning authorities) have a duty to have regard for the conservation of SPI when carrying out their functions, including determining planning applications.

## 4.3 PLANNING POLICY COMPLIANCE

4.3.1 As the project qualifies as a Nationally Significant Infrastructure Project (NSIP), it must adhere to the National Policy Statement (NPS) for National Networks (Department for Transport, 2014). This states *inter alia* that the principles and objectives of the government's 2012 Natural Environment White Paper (NEWP) and Biodiversity 2020 strategy should be adhered to. These promote moving progressively from net biodiversity loss to net gain by supporting healthy, well-functioning ecosystems and establishing more coherent ecological networks that are more resilient to current and future pressures. The NPS also states that the likely significant effects on the following should be clearly set out:

- Internationally, nationally and locally designated sites of ecological conservation importance
- Protected species and habitats
- Other species identified as being of principal importance for the conservation of biodiversity
- Ecosystems

4.3.2 At the national level, the National Planning Policy Framework (NPPF, 2012) forms the basis for planning system decisions with respect to conserving and enhancing the natural environment, including water vole. The ODPM circular 06/2005 also provides supplementary guidance, including confirmation that '*the presence of a protected species is a material consideration when a planning authority is considering a development proposal*'.

4.3.3 The NPPF sets out, amongst other points, how at an overview level the '*planning system should contribute to and enhance the national and local environment by:*

- *...recognising the wider benefits of ecosystem services; and*
- *minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures...*

4.3.4 A list of principles which local planning authorities should follow when determining planning applications is included in the NPPF, and includes the following:

- *'- if significant harm resulting from a development cannot be avoided...adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;*
- *- ...opportunities to incorporate biodiversity in and around developments should be encouraged.'*

4.3.5 At a local level, Winchester City Council and the South Downs National Park have adopted the Winchester District Local Plan Part 1 (Adopted 2013). Chapter 9 is entitled 'High Quality Environment' with policy CP16 entitled Biodiversity. This states 'The Local Planning Authority will support development which maintains, protects and enhances biodiversity across the District, delivering a net gain in biodiversity, and has regard to the following:

- Protecting sites of international, European, and national importance, and local nature conservation sites, from inappropriate development.
- Supporting habitats that are important to maintain the integrity of European sites.
- New development will be required to show how biodiversity can be retained, protected and enhanced through its design and implementation, for example by designing for wildlife, delivering BAP targets and enhancing Biodiversity Opportunity Areas.
- New development will be required to avoid adverse impacts, or if unavoidable ensure that impacts are appropriately mitigated, with compensation measures used only as a last resort.
- Development proposals will only be supported if the benefits of the development clearly outweigh the harm to the habitat and/or species.
- Maintaining a District wide network of local wildlife sites and corridors to support the integrity of the biodiversity network, prevent fragmentation, and enable biodiversity to respond and adapt to the impacts of climate change.
- Supporting and contributing to the targets set out in the District's Biodiversity Action Plan (BAP) for priority habitats and species.
- Planning proposals that have the potential to affect priority habitats and/or species or sites of geological importance will be required to take account of evidence and relevant assessments or surveys.'

4.3.6 Water vole is recognised as a priority species within the Hampshire Biodiversity Action Plan (BAP). Mitigation, compensation and enhancement measures are recommended in Section 6 to enable the Proposed Works to be compliant with the above legislation and planning policy.



# 5 RECOMMENDATIONS

## 5.1 OVERVIEW

- 5.1.1 The Proposed Works will likely require works near to the River Itchen watercourse which is occupied by water voles. However, a review of the design drawings indicates that direct impacts to watercourses are unlikely to occur, and therefore it should be possible to avoid impacts to water vole altogether. However, should proposals emerge that affect soft estate within approximately 10m of watercourses, it would be necessary to give consideration as to whether water vole could be affected.

## 5.2 AVOIDANCE AND MITIGATION MEASURES

### DESIGN MITIGATION MEASURES

- 5.2.1 As the Proposed Works do not currently include watercourse crossing points, no specific design mitigation recommendations are made. However, should proposals emerge to affect bridge and culvert structures over watercourses that support water vole, the following recommendations are made:

- They should be designed to maximise permeability to water voles, with a preference for bridges rather than pipes or small culverts
- The height of the structure above the water should be maximised
- Where possible, an area of water course bank should also run through the structure.

- 5.2.2 In addition, recommendations for ecological enhancement measures are made within Section 5.3 below, which may be of relevance to drainage design.

### CONSTRUCTION AVOIDANCE MEASURES

- 5.2.3 If possible, construction methods should be devised to ensure that soft estate within 10m of watercourses is avoided. This should include avoiding the storage of materials and operation of machinery from within this area. Present indications are that this should be possible for all design options, although this conclusion will need to be revisited as detailed proposals emerge in PCF Stage 3.

- 5.2.4 If proposals emerge that affect soft estate within 10m of watercourses, it may be necessary to implement mitigation measures outlined below.

### CONSTRUCTION MITIGATION MEASURES

- 5.2.5 Where it is not possible to avoid works within 10m of a watercourse it will be necessary to design and implement a mitigation strategy to avoid an offence under the Wildlife and Countryside Act 1981 (as amended). Where effects are limited to areas of bankside habitat totalling less than 50m, it is likely to be appropriate to displace water voles from the works area (as opposed to translocation where greater extents of habitat are affected) in order to avoid the disturbance or harm of individuals water voles.

- 5.2.6 To displace animals from the works area the following will be required:



- Displacement will need to occur in spring (i.e. between 15<sup>th</sup> February and 15<sup>th</sup> April) during warm conditions (i.e. >5°C). If spring clearance is not possible, it may be possible to agree an autumn habitat clearance programme with Natural England<sup>1</sup>.
- All vegetation will need to be removed from the displacement area, to include bankside, bank top (to a minimum of 3m back) and in-channel vegetation with arisings removed.
- The area will need to be left for a minimum of five days and re-surveyed to check for the presence of water voles (such as latrines, feeding remains and pathways).
- If water voles remain present, or there is uncertainty as to whether burrows remain occupied or not, a destructive search would need to be completed to excavate burrows (using hand tools where possible) and remove suitable habitat for water voles. The destructive search would need to be completed under an ecological watching brief.

5.2.7 During the construction stage, the cleared area must remain unsuitable for water voles. This could be achieved by regularly managing any vegetation regrowth and/or laying matting or other material to prevent regrowth. It is likely that matting or similar will be preferable to also function to prevent sediment run-off towards watercourses where bare substrate is exposed to rainfall.

5.2.8 Furthermore, in order to carry out work under a Natural England licence, it is necessary to include an element of ecological enhancement, such as measures included within Section 5.3 below.

## 5.3 ECOLOGICAL ENHANCEMENT MEASURES

5.3.1 Biodiversity gain in association with development is encouraged by planning policy including NPPF (2012) and NNNPS (2014). In accordance with this policy it is recommended the following opportunities for enhancing the Site for water vole should be considered:

- The planting of native wetland plants, reeds, grasses, rushes and sedges along new channels, drainage ditches and attenuation ponds; for which a list of suitable native species is included in Appendix C. If created, these features should have sections of steep bank (for burrowing) and marginal vegetation to provide fodder and cover. The new features should be incorporated into the drainage design for the Proposed Works, and seek to maintain and extend the network of drainage channels providing suitable habitat for water voles.
- The removal of areas of dense woody vegetation on existing watercourses, to allow increased light to reach watercourses and thereby enable an increase in in-stream and marginal wetland plants.
- The restoration of water channels; with deepening or alteration of bank profile where appropriate to maximise their suitability for water voles. This could be through ensuring a sufficient depth of water remains present throughout the year or providing a suitable bank profile and substrate for burrowing. The removal of reeds from choked channels (and subsequent management) should be considered to provide open water and growth opportunity for other macrophytes and emergent aquatic vegetation.
- The implementation of long term management to enhance existing watercourses east of the A34. The suitability for water voles can be enhanced within this area through implementing opportunities discussed above, thus resulting in a gain of suitable water vole habitat.

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<sup>1</sup> Spring displacement is favoured because water vole population density is at its lowest. During autumn, population density will be significantly higher and water voles, which are territorial animals, may be more reluctant to move to adjacent habitats. Unlike spring clearance (which can be undertaken by a registered individual operating under the class licencing system), autumn clearance would require a licence application to be made to Natural England.

# 6 CONCLUSION

## 6.1.1

The water vole survey confirmed the presence of water vole in association with the River Itchen and its channels. Current indications are that the Proposed Works should not affect water vole although this conclusion should be kept under review. Consideration should be given to including ecological enhancement measures within the Proposed Works.

# 7 REFERENCES

## 7.1 PROJECT REFERENCES

- WSP (2016) M3J9 Desk Study
- WSP (2017) M3J9 Phase 1 Habitat Survey

## 7.2 TECHNICAL REFERENCES

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# 8


## FIGURES


8.1

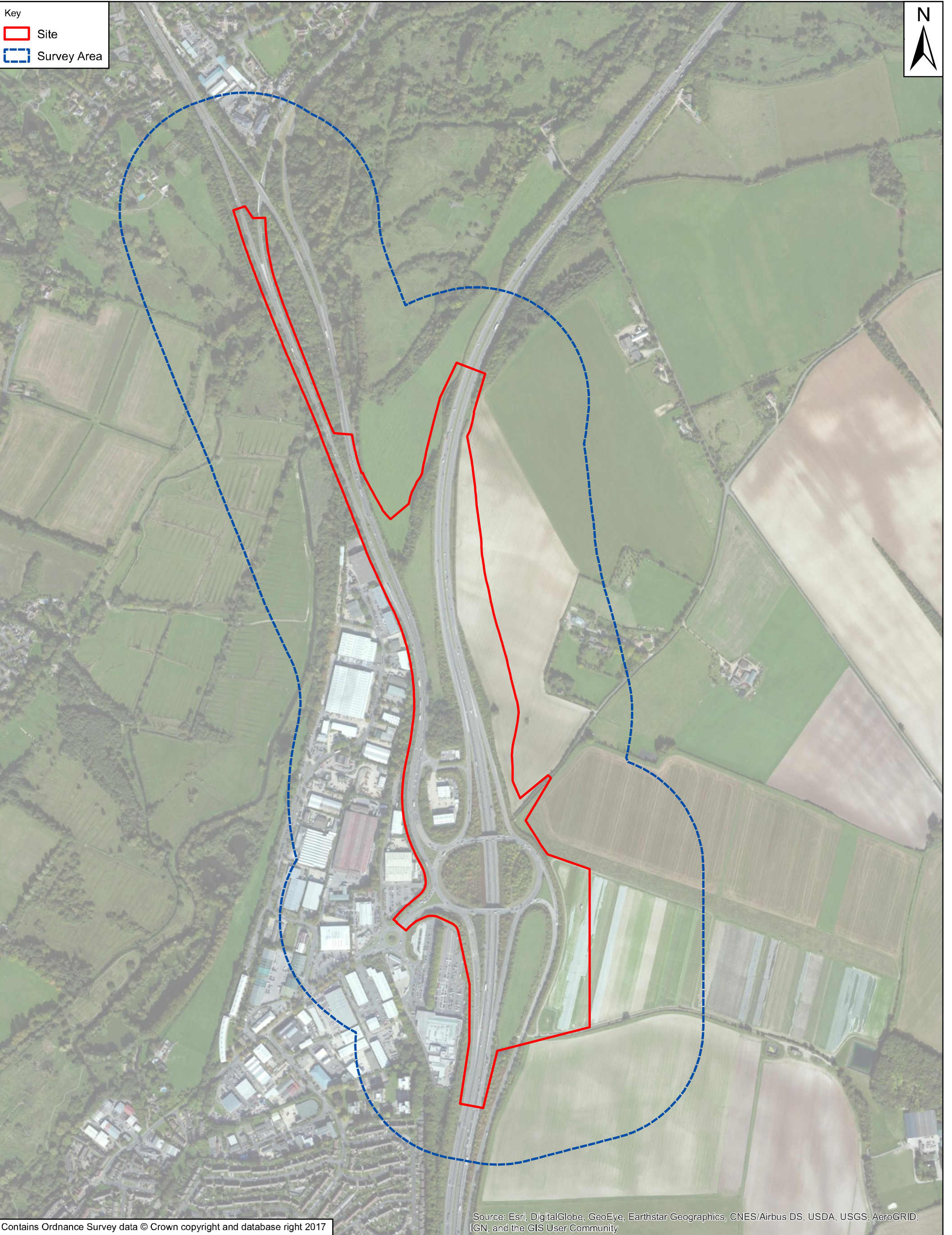
**FIGURE 8.1 – SITE LOCATION PLAN**



Key

 Site

 Survey Area



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

REV	DATE	BY	DESCRIPTION	CHK	APP

DRAWING STATUS:      DRAWING STATUS


PROJECT: M3 Junction 9

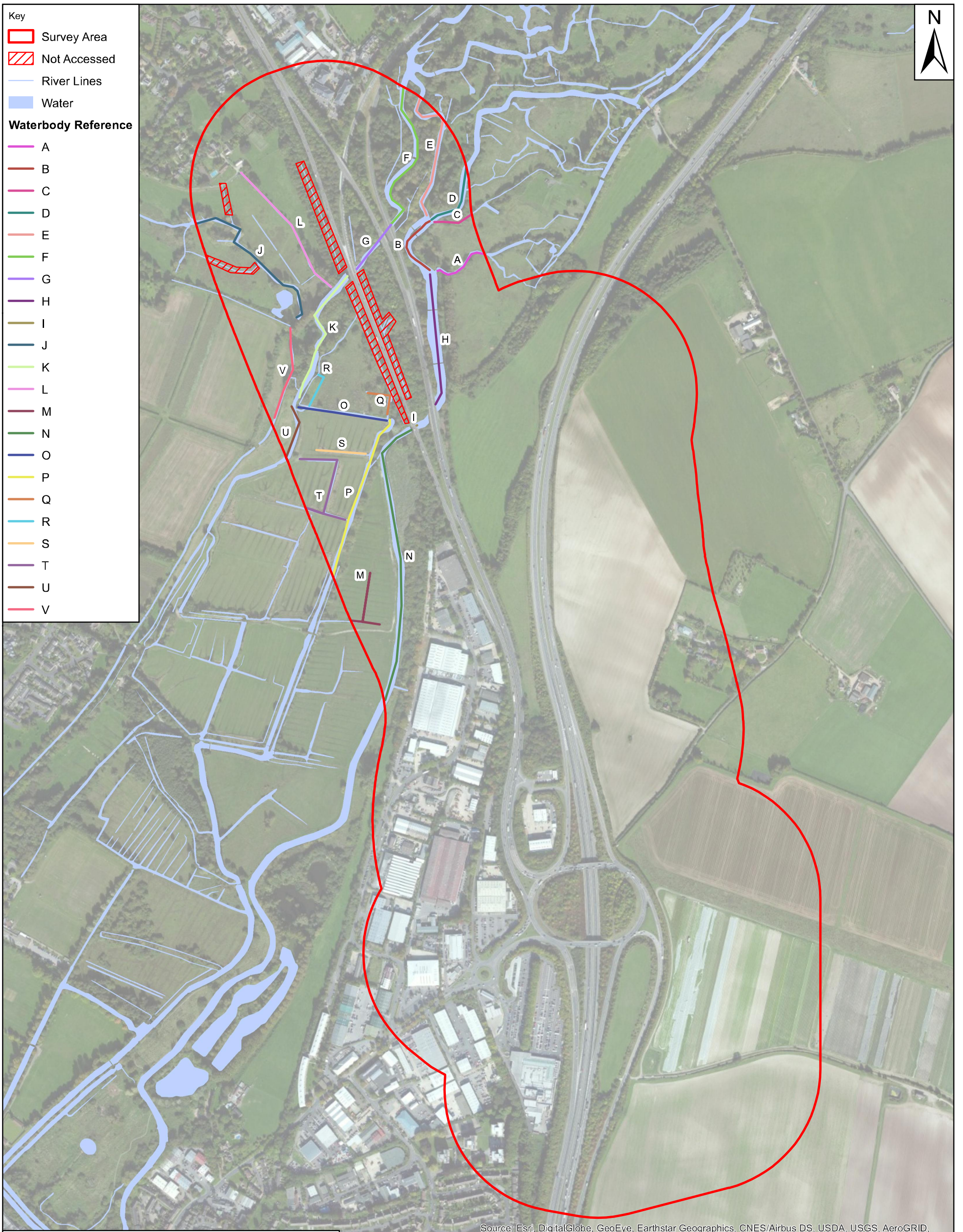
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SCALE @ A3: 7,500	CHECKED: LR	APPROVED: HS
FILE: A3 Template	DRAWN: BW	DATE: August 2017
PROJECT No: 70016638	DRAWING No: 1	REV: A
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**8.2**      **FIGURE 8.2 WATER VOLE SURVEY AREA**





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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

REV	DATE	BY	DESCRIPTION	CHK	APP
DRAWING STATUS: FINAL					



PROJECT: M3 Junction 9

TITLE: Figure 8.2 Water Vole Survey Area

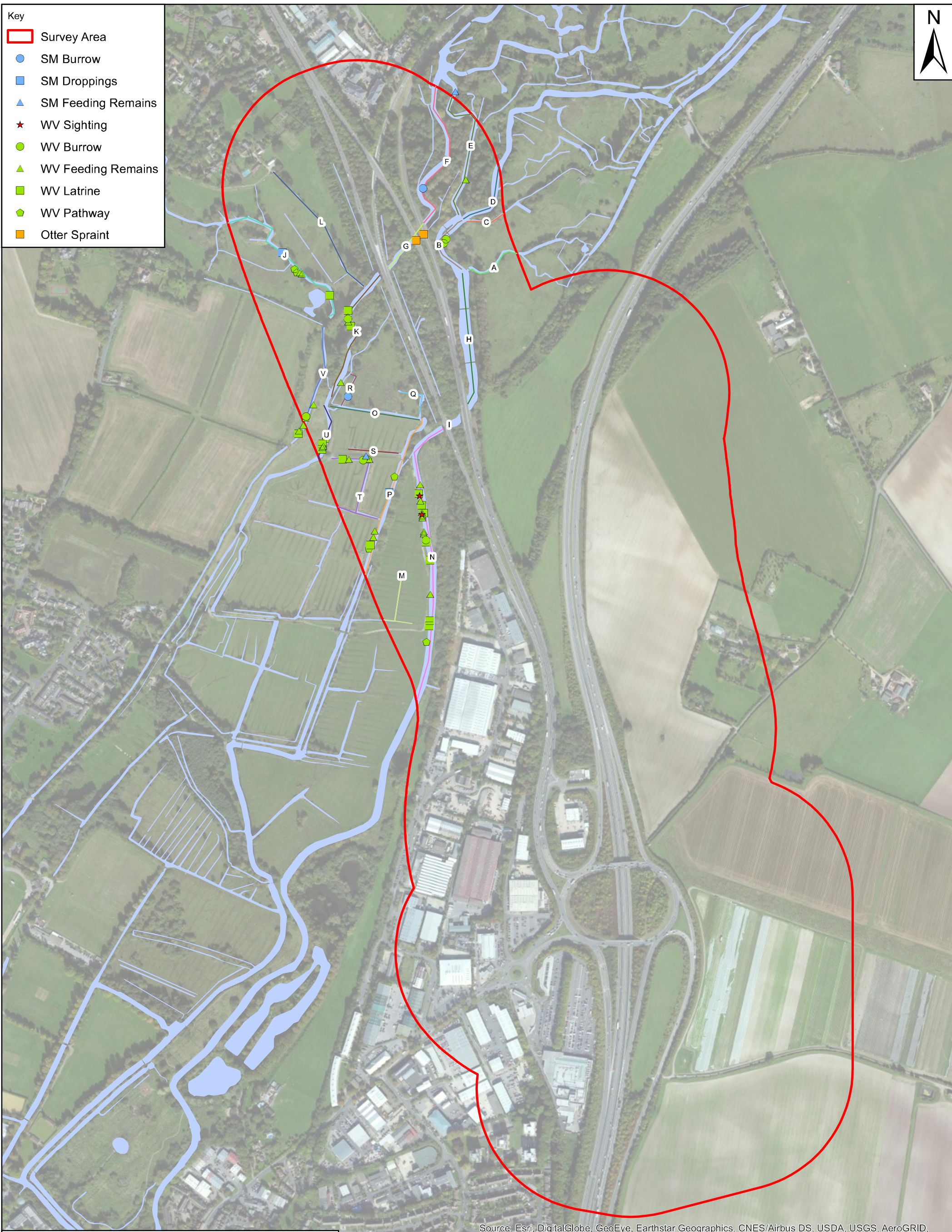
SCALE @ A3: 7,000	CHECKED: LR	APPROVED:
FILE: WV Survey	DRAWN: BW	DATE: September 2017
PROJECT No: 70016638	DRAWING No: 2	REV: A
© WSP Group plc		



**8.3**      **FIGURE 8.3 WATER VOLE SURVEY RESULTS**



- Key
- Survey Area
  - SM Burrow
  - SM Droppings
  - ▲ SM Feeding Remains
  - ★ WV Sighting
  - WV Burrow
  - ▲ WV Feeding Remains
  - WV Latrine
  - ◆ WV Pathway
  - Otter Spraint



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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		PROJECT: M3 Junction 9	SCALE @ A3: 7,000	CHECKED: LR	APPROVED:												
			FILE: WV Results	DRAWN: BW	DATE: September 2017												
		TITLE: Figure 8.3 Water Vole Survey Results	PROJECT No: 70016638	DRAWING No: 3	REV: A												
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REV</th> <th>DATE</th> <th>BY</th> <th>DESCRIPTION</th> <th>CHK</th> <th>APP</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		REV	DATE	BY	DESCRIPTION	CHK	APP									© WSP Group plc	
REV	DATE	BY	DESCRIPTION	CHK	APP												
DRAWING STATUS: FINAL																	



# Appendix A

**WATER BODY DESCRIPTIONS**

**Table A1 Water body Descriptions**

REF	HABITAT	BANK MATERIAL	BORDERING LAND USE	VEGETATION <sup>2</sup>							BANK PROFILE				WATER SPEED	WATER DEPTH	WIDTH	DESCRIPTION	WATER VOLE SUITABILITY		
				Bankside trees	Bushes	Herbs	Submerged Weeds	Reeds/ sedges	Tall grass	Short grass	Fiat (<10°)	Shallow (<45°)	Steep (>45°)	Vertical							
A	Running Water	Earth	Permanent/ temporary grass. Grazed with bank fenced.	O	A		O	A		F			✓				Slow	<0.5-1m	1-2m	Shallow, narrow, tributary to the River Itchen. North bank has been grazed and poached quite heavily with the south bank entirely vegetated with trees and bushes. The channel is relatively open with some shading from nearby bushes. Emergent vegetation present along the north bank and floating vegetation is present in the east.	Moderate
B	Running Water	Earth/ Reinforced	Permanent/ temporary grass. Mixed broadleaved woodland. Regularly mowed bankside angling paths.	O	O	R	F	F		A			✓		✓		Rapid	<0.5-2m	10-20m	Main channel of the River Itchen flowing through broadleaved woodland. The banks are flat along much of the channel with vertical reinforced sections. The channel is wide, deep and over shaded. Maintained angling pathways are located with side of the channel along with scattered bridged crossings. Sedge <i>Carex sp.</i> reed and herb species along banks regularly cut back for angling.	Moderate
C	Running Water	Earth	Permanent/ temporary grass. Mixed broadleaved woodland. Both banks fenced.	A				A	O				✓				Slow	<0.5m	1m	Shallow, narrow, over shaded channel flowing into the Itchen. Flowing through dense wet willow <i>Salix sp.</i> and reed <i>Phragmites australis</i> . The banks are flat on either side.	Moderate
D	Running Water	Earth/ Reinforced	Permanent/ temporary grass. Mixed broadleaved woodland. Regularly mowed bankside angling paths.	A		O	F	F		F			✓		✓		Rapid	<0.5-2m	10-20m	Tributary to the River Itchen, flowing through broadleaved woodland. Fenced on south bank with dense willow and reed. Angling pathway maintained on north bank. Soft reinforcement within some of the banks. Sedge, reed and herbs along banks regularly cut back for angling.	Moderate
E	Running Water	Earth/ Reinforced	Permanent/ temporary grass. Mixed broadleaved woodland. Regularly mowed bankside angling paths.	R			A	F		A			✓		✓		Rapid	<0.5-2m	5-20m	Tributary to the River Itchen, flowing through broadleaved woodland. Angling pathway maintained on both banks. Soft reinforcement within some of the banks. Sedge, reed and herbs along banks regularly cut back for angling. Some undercutting of the bank	Moderate






<sup>2</sup> The DAFOR scale has been used to estimate the frequency and cover of the different plant types as follows: Dominant (D) - >75% cover, Abundant (A) – 51-75% cover, Frequent (F) – 26-50% cover, Occasional (O) – 11-25% cover, Rare (R) – 1-10% cover.

REF	HABITAT	BANK MATERIAL	BORDERING LAND USE	VEGETATION <sup>2</sup>										BANK PROFILE			WATER SPEED	WATER DEPTH	WIDTH	DESCRIPTION	WATER VOLE SUITABILITY
				Bankside trees	Bushes	Herbs	Submerged Weeds	Reeds/ sedges	Tall grass	Short grass	Flat (<10°)	Shallow (<45°)	Steep (>45°)	Vertical							
																		present on north bend where reinforcement has occurred.			
F	Running Water	Earth/Silt/ Reinforced	Permanent/ temporary grass. Mixed broadleaved woodland. Regularly mowed bankside angling paths.	O		F	F	O			A	✓	✓				Rapid	<0.5-2m	5-20m	Tributary to the River Itchen, flowing through broadleaved woodland. Angling pathway maintained on both banks north of the bridge. East bank maintained for angling south of the bridge. Soft reinforcement within some of the banks. More natural banks located along the channel compared to the similar B, D & E. High silt deposition in places with presence of water mint <i>Mentha aquatica</i> .	Moderate
G	Running Water	Earth/Stones/ Canalized/ Reinforced	Mixed broadleaved woodland. Road bridges.	D		F	O						✓	✓	✓		Fast	<0.5-1m	5-10m	Short section of the Itchen following on from F flowing under the A33 & A34 roads. Two concrete bridges are present with installed otter ledges. Flow is considerably faster within this section. Earth and stone banks with a mixture of shallow to steep banks.	Low
H	Running Water	Earth/ Reinforced	Permanent/ temporary grass. Mixed broadleaved woodland. Regularly mowed bankside angling paths.	R		O	F	A		F	✓		✓				Rapid	<0.5-2m	10-20m	Main channel of the River Itchen. Wide, deep, not very shaded. Reed and sedge prevalent along east bank. Angling pathways regularly maintained on either side. Concrete reinforcement on west bank closet to A34.	Moderate
I	Running Water	Earth/Stones/ Canalized/ Reinforced	Mixed broadleaved woodland. Road bridges.	D	F	F	O						✓				Rapid	<0.5-1m	5-10m	Similar to G, flowing underneath the A34 north and south bound carriageways. Heavily wooded on either bank. Gravel bars located within the channel.	Low
J	Running Water	Earth	Permanent/ temporary grass. Grazed and cut for angling.	R	O	R	R	A	F	F	✓	✓					Slow	<0.5-2m	2-5m	Narrow, deep and slow channel. The south bank of this channel whilst the north bank is shallow. South bank is maintained for angling, north bank reed and sedge abundant. The banks get steeper as the channel flows south. Noticeable change from reed to sedge from north to south.	High
K	Running Water	Earth	Permanent/ temporary grass. Mixed broadleaved woodland. Regularly mowed bankside angling paths.	O	R	R	F	A	F	A		✓					Rapid	0.5-1m	5-20m	Continuation from section G. Deep and wide channel, bordered by woodland on the west and reedbed on the east. Shallow earth banks with dense sedge and reed. West bank is maintained for angling 50m after the bridge.	High
L	Ditch	Earth	Permanent/ temporary grass. Grazed by cattle and fenced on one side	F	F			O	F		✓	✓					Static	<0.5m	1m	Wet drainage ditch between two grazed fields. Very shallow (<10cm) in depth and lined with trees and bushes. Dries out at its northern end. Reed and yellow iris <i>Iris psuedacorus</i> located in wetter areas.	Low






REF	HABITAT	BANK MATERIAL	BORDERING LAND USE	VEGETATION <sup>2</sup>										BANK PROFILE				WATER SPEED	WATER DEPTH	WIDTH	DESCRIPTION	WATER VOLE SUITABILITY
				Bankside trees	Bushes	Herbs	Submerged Weeds	Reeds/ sedges	Tall grass	Short grass	Flat (<10°)	Shallow (<45°)	Steep (>45°)	Vertical								
M	Ditch	Earth/ Poached	Permanent/ temporary grass. Grazed by cattle.			A		D	A			✓						Static	<0.5m	1m	Wet flushes within marshy grassland. Very shallow channel choked with vegetation. Heavily poached by cattle.	Low
N	Running Water	Earth/Gravel	Permanent/ temporary grass. Grazed by cattle. Angling pathways	F	F	F	A	A	O	A			✓				Rapid	<0.5m – 2m	10-20m	Main channel of the River Itchen. Wide, deep and fast flowing channel. Very large, dense reed bed to the east of the channel with will further south. West bank is maintained for angling, with a sedge and reed dominant. Gravel river bed. Banks are shallow with plenty of food sources. West bank was not accessed due to reed bed.	High	
O	Running Water	Earth/ Poached	Permanent/ temporary grass. Grazed by cattle.	R			O	D				✓	✓				Rapid	0.5-1m	2-5m	Narrow, fast flowing open channel lined with reed. Poaching on the north bank. The banks are relatively flat and with some shallower sections.  Access limited due to breeding warblers and buntings.	Moderate	
P	Running Water	Earth/ Poached	Permanent/ temporary grass. Grazed by cattle. Banks maintained for angling.	R		A	A	D	F	F		✓	✓				Rapid	<0.5-2m	2-10m	Very thick reed chokes the channel in the north and opens out in the south. West bank is mown for angling, however 2m strip of herb, sedge and reed is maintained. East bank is dense with reed. Very flat banks towards the south.	High	
Q	Running Water/Pond	Earth/ Poached	Permanent/ temporary grass. Mixed broadleaved woodland. Grazed by cattle.	F			A		F			✓					Static/ Sluggish	<0.5-1m1	1-5m	Wooded pond with sluiced southern point, trickling into P. Very shaded and flat banks with some submerged vegetation. Channel extends west of the pond into the cattle grazed field. This channel is sluggish and choked with sedge and tall grasses.	Low	
R	Running Water	Earth/ Poached	Permanent/ temporary grass. Mixed broadleaved woodland. Grazed by cattle. Fenced on both banks.	A	F		F	A				✓	✓				Slow	<0.5-1m	1-2m	Narrow, shallow channel with reed bed to the west and grazed field to east. The channel has flat banks on either side. The channel begins flowing through woodland and into section O. A dry ditch extends north of R from the A34 highways ditch.	Moderate	
S	Ditch	Earth	Permanent/ temporary grass. Reed bed.	R				D				✓					Static	<0.5-1m	1m	Flush within marshy grassland flowing into section P. Dense reeds on either side of the flat banks. Completely shaded channel, which gradually deepens from west to east.	Moderate	
T	Running Water	Earth	Permanent/ temporary grass. Reed bed.			F	R	A	F			✓	✓				Rapid	<0.5m	1-2m	Narrow, shallow and rapid channel with some reed and sedge along northern stretch. The channel is open. Some large sedge tussocks located along the northern section flowing west to east. Southern section banks are densely covered in reed. The channel remains open and fast flowing.	High	

REF	HABITAT	BANK MATERIAL	BORDERING LAND USE	VEGETATION <sup>2</sup>								BANK PROFILE				WATER SPEED	WATER DEPTH	WIDTH	DESCRIPTION	WATER VOLE SUITABILITY
				Bankside trees	Bushes	Herbs	Submerged Weeds	Reeds/ sedges	Tall grass	Short grass	Flat (<10°)	Shallow (<45°)	Steep (>45°)	Vertical						
U	Running Water	Earth/ Poached	Permanent/ temporary grass. Grazed by cattle. Banks maintained for angling.			F	A	A	F				✓		Rapid	0.5-2m	2-5m	Fast flowing and deep channel extending south from K. No longer wooded, but cattle grazing and angling pathways either side. Some poaching identified on west bank. The banks are shallow with 2-3m of vegetation including sedge and reed.	High	
V	Running Water	Earth/ Poached	Permanent/ temporary grass. Grazed by cattle.			R	F	D	A				✓		Sluggish	<0.5m	1-5m	Narrow, slow flowing, open channel flowing through grazed fields. Heavily poached either side. Predominately reed on the bank sides, with very flat bank on east. The bank is steeper on the west, however more heavily poached.	High	

**Table A2 Waterbody Photos**

WATERBODY REFERENCE	PHOTO
A	N/A
B	N/A
C	N/A
D	
E	
F	 
G	



WATERBODY REFERENCE	PHOTO	
H		
I		
J		
K		
L	N/A	
M	N/A	
N		




WATERBODY REFERENCE	PHOTO	
O		
P		
Q	N/A	
R		
S		
T	N/A	
U		



WATERBODY REFERENCE	PHOTO
V	N/A



# Appendix B

**WATER VOLE EVIDENCE**



**Table B1 Waterbody Photos**



WATER COURSE	SURVEY DATE	DESCRIPTION OF EVIDENCE PRESENT	PHOTO
A	28/06/17	Mammal path through sedge and marginal vegetation. No droppings or slide present.	
B	28/06/17	Two burrows located on the east bank approximately 7-8cm in diameter. One burrow is under and filled with water, whilst the other has some collapsing.	
	30/08/17	Burrow described above located again – further collapsing occurred since Survey 1.	
C		No evidence found	
D		No evidence found	
E	30/07/17	Runs within the vegetation, two small feeding stations identified. Droppings present are not from water vole, likely bank vole.	

WATER COURSE	SURVEY DATE	DESCRIPTION OF EVIDENCE PRESENT	PHOTO
F	28/06/17	Burrow located 2m from the water's edge within the mowed pathway. It is approximately 4-5cm wide the lower limit to water vole burrows. The burrow leads straight to the water, however no entrance was located.	
G	28/06/17	Otter spraints located under the bridges of the A34 & A33. Four spraints located under the A33 bridge along an otter ledge (668). Five spraints located under the A34 (667) these being fresher than those aforementioned.	
	30/07/17	Otter spraints identified as before, no fresh spraints on Survey 2.	
H		No evidence found	
I		No evidence found	



WATER COURSE	SURVEY DATE	DESCRIPTION OF EVIDENCE PRESENT	PHOTO
J	28/06/17	<p>Small mammal runs located through the bankside vegetation, likely to be used by water voles and other small mammals. Droppings of small mammals located within sedge, unlikely to be water vole.</p> <p>Water vole feeding remains located at feeding stations within the west bank. Vegetation remains include reed and Yorkshire fog cut to 10cm pieces with 45° ends.</p>	
	30/07/17	Feeding remains identified on the east and west banks of the stream with prominent pathways intermittent.	
K	28/06/17	Water vole burrow located in the east west bank of section K. Droppings and well used pathways also identified within the immediate vicinity.	






WATER COURSE	SURVEY DATE	DESCRIPTION OF EVIDENCE PRESENT	PHOTO
	30/07/17	<p>Water vole feeding stations and runs identified on the north bank of the river corner. Latrines identified within close proximity to the feeding remains. Fresh water vole droppings identified on an in stream log (K5).</p>	
L		No evidence found	
M		No evidence found	
N	29/06/17	<p>A high density of water vole activity signs were identified all along the west bank of section N.</p> <p>Two water voles were sighted within the reed and sedge bank.</p> <p>A floating platform is located within the section, with water vole droppings identified on the platform. Water vole runs and feeding platforms are located along section N in high density.</p> <p>Water vole droppings are also located amongst the feeding remains and along the pathways.</p> <p>No burrows were identified on the west bank, however the east bank was not accessed due to water depth and dense reed bed.</p> <p>Map reference 687 is a potential otter slide. It is wide enough for otter use, however it does not exhibit other characteristics associated with otter.</p>	



WATER COURSE	SURVEY DATE	DESCRIPTION OF EVIDENCE PRESENT	PHOTO
			
	31/07/17	<p>As in Survey 1, a high density of water vole activity signs identified along the west bank of the channel.</p> <p>Seven feeding stations were identified with associated latrines in close proximity. Fresh water vole droppings present within the latrines. Fresh water vole droppings also present on the floating platform.</p> <p>Water vole burrow identified at N6, with entrance higher on the bank and tunnel leading westwards.</p> <p>Prominent runs were identified all along the west bank of the channel.</p>	




WATER COURSE	SURVEY DATE	DESCRIPTION OF EVIDENCE PRESENT	PHOTO
O			
	No evidence found		
P	29/06/17	Small mammal droppings identified.	
	31/08/17	<p>Water vole feeding stations identified along the west bank of the channel, with vegetation cuttings of over 10cm in length.</p> <p>One water vole latrine was identified with fresh droppings in close proximity to a large feeding station.</p> <p>Water vole runs are present along the bank connecting feeding stations together.</p>	

WATER COURSE	SURVEY DATE	DESCRIPTION OF EVIDENCE PRESENT	PHOTO
			
Q		No evidence found	
R	29/06/17	Potential small mammal runs identified on west bank leading to the water's edge. These were not directly accessed.	
S		No evidence found	

WATER COURSE	SURVEY DATE	DESCRIPTION OF EVIDENCE PRESENT	PHOTO
T	29/06/17	<p>Water vole and field vole feeding stations, prominent runs and water vole droppings identified on the north and south sides of the channel. Feeding remains include reed, sedge and horsetail.</p> <p>Water vole burrow identified within the tussock of sedge, the entrance approximately 10cm in diameter.</p>	
	31/08/17	Feeding remains present on both banks, however small cuttings indicate likely bank vole presence.	

WATER COURSE	SURVEY DATE	DESCRIPTION OF EVIDENCE PRESENT	PHOTO
U	29/06/17	<p>Water vole and small mammal droppings located on the west bank of the channel.  Feeding remains of water vole and small mammals present.  Numerous water vole feeding stations identified along the length of section U.</p>	
	31/08/17	<p>Water vole pathway identified leading to a feeding station and latrine.</p>	
V	29/06/17	<p>Feeding remains and pathways of water vole present. Feeding remains approximately 10cm in length consisting primarily of reed.</p>	
	31/08/17	<p>A number of water vole activity signs identified along the channel, up to the wooded section. Water vole feeding stations located along the channel connected by runways. One latrine identified in close proximity a large feeding station. One water vole burrow identified at 320.</p>	



WATER COURSE	SURVEY DATE	DESCRIPTION OF EVIDENCE PRESENT	PHOTO
[Yellow Cell]			

# Appendix C

**INDICATIVE SPECIES LIST FOR RIPARIAN PLANTING**

**Table C1 Indicative Species List for Riparian Planting** <sup>3</sup>

COMMON NAME	LATIN NAME
<b>Reeds/Grasses</b>	
Reed canary grass	<i>Phalaris arundinacea</i>
Common reed	<i>Phragmites australis</i>
Reed sweet grass	<i>Glyceria maxima</i>
Meadow grasses	<i>Poa trivialis, P. pratensis</i>
Cocksfoot	<i>Dactylis glomerata</i>
Sweet grasses	<i>Glyceria fluitans, G. notata</i>
False oat-grass	<i>Arrhenatherum elatius</i>
Tufted hair-grass	<i>Deschampsia caespitosa</i>
Sweet vernal-grass	<i>Anthoxanthum odoratum</i>
Yorkshire fog	<i>Holcus lanatus</i>
Creeping soft grass	<i>H. mollis</i>
Creeping bent	<i>Agrostis stolonifera</i>
Timothy	<i>Phleum pratense</i>
Marsh foxtail	<i>Alopecurus geniculatus</i>
Meadow foxtail	<i>A. pratensis</i>
Purple moor-grass	<i>Molinia caerulea</i>
<b>Rushes</b>	
Hard rush	<i>Juncus inflexus</i>
Soft rush	<i>J. effusus</i>
Conglomerated rush	<i>J. conglomeratus</i>
Sharp-flowered rush	<i>J. acutiflorus</i>
Jointed rush	<i>J. articulatus</i>
<b>Sedges</b>	
Greater tussock sedge	<i>Carex paniculata</i>
False fox-sedge	<i>C. otrubae Podp.</i>
Hairy sedge	<i>C. hirta</i>
Bottle sedge	<i>C. rostrata</i>
Pendulous sedge	<i>C. pendula</i>
Black sedge	<i>C. nigra</i>
Greater pond-sedge	<i>C. riparia</i>
<b>Water Plants</b>	
Branched bur-reed	<i>Sparganium erectum</i>
Unbranched bur-reed	<i>S. emersum</i>
Common water-plantain	<i>Alisma plantago-aquatica</i>
Flowering rush	<i>Butomus umbellatus</i>
Broad-leaved pondweed	<i>Potamogeton natans</i>
Hornwort	<i>Ceratophyllum demersum</i>
Yellow flag iris	<i>Iris pseudacorus</i>
Bogbean	<i>Menyanthes trifoliata</i>
Pond lilies	<i>Nymphaea peltata, Nuphar lutea, Nymphaea alba</i>
Bulrush	<i>Schoenoplectus lacustris</i>

<sup>3</sup> (Based on Strachan *et al*, 2011)

COMMON NAME	LATIN NAME
Water crowfoots	<i>Ranunculus peltatus, R. aquatilis, R. penicillatus,</i>
Watercress	<i>Nasturtium officinale</i>
Wetland / Riparian edge plants	
Bistort	<i>Polygonum amphibium</i>
Marsh marigold	<i>Caltha palustris</i>
Celery-leaved buttercup	<i>Ranunculus sceleratus</i>
Lesser spearwort	<i>R. flammula</i>
Greater spearwort	<i>R. lingua</i>
Cuckoo flower	<i>Cardamine pratensis</i>
Meadowsweet	<i>Filipendula ulmaria</i>
Water avens	<i>Geum rivale</i>
Purple loosestrife	<i>Lythrum salicaria</i>
Fools watercress	<i>Apium nodiflorum</i>
Angelica	<i>Angelica sylvestris</i>
Marsh bedstraw	<i>Galium palustre</i>
Water forget-me-not	<i>Myosotis scorpioides</i>
Water mint	<i>Mentha aquatica</i>
Brooklime	<i>Veronica beccabunga</i>
Marsh valerian	<i>Valeriana officinalis</i>
Marsh sowthistle	<i>Sonchus palustris</i>
Water figwort	<i>Scrophularia auriculata</i>
Gypsywort	<i>Lycopus europaeus</i>