



Oxfordshire
Highways

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Oxfordshire Highways

Cogges Link Road Riparian Mammals

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Executive Summary

- Surveys have been undertaken with the aim of clarifying the magnitude and significance of impacts of the Cogges Link Road (CLR) on riparian mammals.
- An initial riparian mammal survey was carried out during May 2002 which provided limited evidence of water vole activity. The original survey was conducted under sub-optimal weather conditions and as such, a second survey was recommended.
- This additional riparian mammal survey was carried out in October 2002. Signs of water vole activity were observed along both of the main channels of the River Windrush in the vicinity of the Witney Lakes and Meadows Country Park. Otter spraint was observed along both the eastern and western channels of the Windrush.
- Surveys in 2006 provided updated information on riparian mammals and are reported for the first time in this document which summarises the findings from each of the surveys.
- As a result of the river crossings the CLR has the potential to result in destruction of water vole burrows, and loss and / or severance of territories. Mitigation measures will be required to offset impacts. These measures will include habitat creation and / or enhancement to compensate for habitat loss and appropriate bridge design to offset potential severance impacts.
- Assuming appropriate mitigation is carried out, all residual impacts will become minor or negligible.

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1 Introduction

1.1 Background

- 1.1.1 Oxfordshire Highways has commissioned an investigation into the potential ecological impacts on protected species and habitats for the proposed Cogges Link Road (CLR). The proposed new road runs south eastwards from the roundabout in Witan Way, Witney, then cross the Witney Meadows Country Park and the River Windrush. It then runs parallel to the A40 south of Cogges and then immediately east of Cogges the road runs northwards, linking with Oxford Hill.
- 1.1.2 A detailed water vole survey and restricted search for evidence of otter activity was carried out during May 2002 (Babtie Group, 2002a). This survey provided limited evidence of water vole activity within the two channels and the mill stream of the Windrush with no direct evidence of otter activity. This first survey was however conducted relatively early in the season and during a period of high water flow. As such a second survey was recommended.
- 1.1.3 The second study undertaken in October 2002 (Babtie Group, 2002b) found evidence of water vole and otter activity along both of the main channels of the Windrush.
- 1.1.4 Water vole activity was restricted to the sections of river where the banks were steeper and where the canopy was more open allowing dense bank side vegetation to establish. Signs of water vole were encountered at relatively infrequent intervals suggesting a low population level within the Windrush. The bank side vegetation is however very dense in places which may have resulted in an under-recording of water vole activity.
- 1.1.5 Surveys in 2006 were undertaken to provide an update on riparian mammal activity for the CLR study area. This report records the 2006 surveys and includes extracts from the 2002 survey report.

2 Methodology

2.1 Desktop Study

2.1.1 Ecological records for the study area were requested from the Thames Valley Environmental Records Centre (TVERC). These records include details of designated sites and protected species within 1km of the site.

2.2 Riparian Mammal Survey

2.2.1 The eastern and western channels of the River Windrush between the old mill house and the A40 were surveyed thoroughly for evidence of otter and water vole activity from within the channels themselves on the 22 June and 25 September 2006 respectively. Both banks of each channel were surveyed in their entirety.

2.2.2 As noted from the previous survey (Babtie 2002b) the mill stream associated with the Windrush tends to be heavily overgrown with vegetation. The mill stream was not accessible during the October 2002 survey, although the survey in May 2002 had surveyed it. This area was surveyed during the June 2006 survey, in fulfilment of a recommendation from the previous report. Access proved difficult with approximately 50% of the stream surveyed.

2.2.3 The surveys followed the standard methodology for water voles as detailed by Strachan (2006). Signs of activity in the form of feeding remains, latrine sites and burrows were searched for and recorded on standard recording forms. Signs of otter activity in the form of footprints, spraints and holts were also searched for and noted on the water vole record forms.

3 Findings

3.1 Desktop Study

- 3.1.1 Results of a request for information from TVERC in March 2006 provided historical records for water vole from pre-1982 for the eastern channel of the River Windrush (SP360091) within Witney Lakes and Meadows Country Park and from Cogges Manor Farm in 1975 (SP362095). Previous surveys carried out for the CLR scheme have provided more recent evidence of water vole presence. There were no TVERC records for otter.

3.2 Riparian Mammal Survey

- 3.2.1 Results from 2006 surveys confirmed the continued presence of both water voles and otters in this part of the Windrush catchment. In addition the presence of mink scats was observed.

- 3.2.2 Survey forms showing the details of the findings are presented in Appendix I.

Eastern Channel of the River Windrush

- 3.2.3 Within the eastern channel of the Windrush three water vole latrines, one burrow and four feeding remains were observed. The feeding remains identified that water voles had generally been feeding on reed sweet grass *Glyceria maxima* and greater pond sedge *Carex riparia*. No otter spraints were observed along the channel. No evidence of an otter holt was observed although the dense scrub cover along the concrete drain offers good habitat for a holt.

Western Channel of the River Windrush

- 3.2.4 Along the western channel of the Windrush, three water vole latrines, two burrows and three feeding stations were observed. Additionally a single otter spraint was observed under one of the disused railway crossings. Dense scrub between the western channel and the mill stream was investigated but no signs of a holt were noted. This area still provides the potential for the location of a holt.
- 3.2.5 A potential kingfisher nesting hole was located on the inside bend of the channel at SP3590 0875.
- 3.2.6 Otter spraint was observed under a disused railway bridge and on top of a mink raft. Mink scats were observed in the same areas.

Mill Stream

- 3.2.7 The stream provided no evidence for water vole presence. As noted in 3.2.4, the scrub between the mill stream and western channel was investigated. No evidence of otter signs or use was observed.

3.2.8 A signal crayfish was observed in the channel of the stream.

3.3 **Summary of Results**

3.3.1 No evidence was found for use of the Mill Stream by otters or water voles. Although difficulties in accessing the whole course of the stream were experienced, the area of primary impact was fully investigated and no evidence for signs of water voles, otters or a holt were found.

3.3.2 Both the east and west channels of the Windrush were being used and almost equally favoured by water voles, as assessed by the number of survey signs. The western channel was favoured for use by otters, as noted by the findings of the September survey.

3.3.3 Results from the 2002 survey are provided in Appendix II.

4 Evaluation

4.1 Desktop Study

4.1.1 Results of the desktop study show a historical presence of water voles in the vicinity of the Windrush. Lack of historical otter records probably reflects the general decrease in populations over the past 50 years. Their current presence reflects the existing upward population trend.

4.2 Riparian Mammal Survey

4.2.1 As well as confirming the continued presence of water vole and otter, the 2006 surveys identified the presence of mink in the area. Water voles are subject to the increased risk of localised extinction as a result of predation by the American mink (Bright & Carter, 2000). Their presence may account for the apparent decrease in water vole signs since the previous October 2002 survey (Table 1). It is understood that Oxford University began a project in 2004 to investigate the trapping of mink on the Lower Windrush, installing mink rafts between Witney and Standlake. Table 1 includes signs from both the eastern and western channels.

Table 1: Comparison of Water Vole survey signs for 2002 and 2006

Water vole signs	Feeding remains		Latrines		Burrows	
	2002	2006	2002	2006	2002	2006
Number of signs	19	7	7	6	17	3

4.2.2 Water voles are still present although numbers appear to have decreased since the previous surveys in 2002. Mink control will have had a positive impact on water voles during the period of trapping. Future water vole numbers will continue to depend on the presence/absence of mink.

4.2.3 As noted by the previous survey (Babtie Group 2002b) water vole activity was restricted to the sections of river where the banks were steeper and where the canopy was more open allowing dense bank side vegetation to establish. Signs of water vole were encountered at relatively infrequent intervals and the relative number of signs encountered by the surveys in 2002 and 2006 suggest a low population level within the Windrush. Bank side vegetation is however very dense in places and this may have resulted in an under recording of water vole activity.

4.2.4 As a result of the river crossings the scheme has the potential to result in destruction of water vole burrows, loss and / or severance of territories.

4.2.5 Otter presence in the form of spraint was noted in both 2002 and 2006 surveys. No holts were found during either survey and there is currently no requirement to obtain a European Protected Species licence.

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Cogges Link Road
Riparian Mammal Survey

- 4.2.6 Kingfishers are listed on Schedule 1 of the Wildlife and Countryside Act (1981) and therefore cannot be disturbed whilst at the nest. There is the potential for delays to implementation of the scheme if nesting kingfishers are present and subject to disturbance.

5 Mitigation and Recommendations

5.1 Summary

- 5.1.1 Mitigation measures will be required to offset impacts. These measures will include habitat creation and / or enhancement to compensate for habitat loss and appropriate bridge design to offset potential severance impacts. Mitigation measures will need to be carried out before works commence.
- 5.1.2 Due to the potential for changes in the legal protection afforded to water voles following the review of the Schedules to the Wildlife and Countryside Act (1981) the mitigation will need to follow the best practice guidelines at the time when development commences.
- 5.1.3 There is potential for otter holts to be found in both channels of the Windrush and the Mill Stream. Prior to the commencement of works a riparian mammal survey will be required to determine the status of both water voles and otters along the Windrush in order to facilitate appropriate mitigation and compensation measures at the time of construction. If an otter holt is subject to impact, a European Protected Species licence will be required.
- 5.1.4 Installation of artificial otter holts in suitable areas should be considered. This measure and other mitigation measures were considered in a previous report and are included in full in Appendix III.

5.2 Direct Mortality

- 5.2.1 Habitat reduction methods will be required to ensure no occupation by water voles of the scheme footprint where it coincides with the river crossings.
- 5.2.2 At areas where road casualties are likely, otter fencing should be installed to prevent animals from gaining access to the road. To prevent road traffic casualties, bridges should include mammal shelves or a similar form of design to allow mammals to pass during periods of spate flow.

5.3 Habitat Loss

- 5.3.1 Bridge crossings of the channels of the Windrush will result in habitat loss. Mitigation will be required to offset impacts and will include measures such as enhancement of the western channel of the Windrush through selective thinning of the bank side canopy to promote diversity in the riparian and emergent vegetation, resulting in habitat suitable for water voles.

5.4 Isolation/Severance/Habitat Fragmentation

- 5.4.1 Bridges over the River Windrush should incorporate mammal ledges to allow them to function as a corridor for riparian mammals and to allow other species to move up and down the River Windrush.

5.5 Schedule 1 Bird Species

- 5.5.1 Kingfishers have the potential to nest in areas close to the proposed route. Vegetation clearance should be carried out prior to the breeding season (March to August) in order to discourage nesting in areas where scheme impacts have the potential to result in disturbance to nesting birds.

6 References

Babtie Group (2002a) Witney Cogges Link Phases 1 & 2. Water Vole Survey (Incorporating a Restricted Otter Survey). Babtie Group, Maidstone.

Babtie Group (2002b) Witney Cogges Link – Additional Riparian Mammal Survey.
Babtie Group, Maidstone.

Bright, P. & Carter, S (2000) English Nature Research Report Number 386: Halting the Declines: Refuges and National Key Sites for Water Voles. English Nature, Peterborough.

Strachan, R. (2006) Water Vole Conservation Handbook 2nd Edition English Nature/ Environment Agency/ Wildlife Conservation Research Unit.

Figure 1

Appendix I Survey Forms 2006 Survey

WATER VOLE SURVEY FORM

BACKGROUND INFORMATION

Site name/river 10km square Grid ref

Site number Water Authority

County Date

Recorder

HABITAT INFORMATION (mark features on map)

Survey distance km

Habitat

Ditch

Dyke

Gravel pit

Pond

Lowland lake

Upland loch

Reservoir

Running water

Marsh/bog

Canal

Shore/bank

Boulders

Stones

Gravel

Sand

Silt

Earth

Rock cliffs

Earth cliffs

Canalized

Poached

Reinforced (man-made)

Vegetation (DAFORN)

Bankside trees

Bushes

Herbs

Submerged weed

Reeds/sedges

Tall grass

Short grass

Bordering land use

Upland grass

Permanent/temporary grass

Mixed broadleaf woodland

Conifer wood

Peat bog

Arable crop

Salt marsh

Urban/industrial

Park/garden/Country Park

Heath

Fen

Cattle/grazing

Bank fenced?

Disturbance:

Bank profile

Flat < 10°

Shallow < 45°

Steep > 45°

Vertical/undercut

Depth

< 0.5m

0.5-1m

1-2m

> 2m

Width

5-10m

1m

10-20m

1-2m

2-5m

> 40m

Current

Slow

Rapid

Sluggish

Fast

Static

WILDLIFE INFORMATION

Water voles

Sightings (count)

Latrines (count)

Burrows (count)

Footprints

Pathway in vegetation

Feeding remains

Cropped grass around tunnel entrance

Rat

Sightings

Droppings

Footprints/runs

Otter

Sightings

Droppings

Footprints/runs

Mink

Sightings

Droppings

Footprints/runs

Other wildlife

Kingfisher

Heron

Coot

Waterfowl

Moorhen

Dipper

Identified plants from feeding remains:

MILL STREAM

SKETCH OF SITE – vole activity indicated (if any)

KEY TO SYMBOLS (mark route surveyed and direction of flow)		ADJACENT LAND-USE CODES
Mature trees		Broadleaved wood BW
Over-hanging branches		Conifer plantation CP
Fallen tree		Moorland/heath MH
Exposed roots		Rough pasture RP
Pollarded tree		Wetland WL
Sapling		Improved grass IG
Scrub		Tilled land (crop) TL
Hedgerow		Suburban/urban devel. (inc. gardens) URB
Fence		OTHER FEATURES
Reed/sedge bed		Roadbridge
Flood bank		Footbridge
Artificial bank		Weir
Earth cliff		Culvert
		Ford
	Outfall	
	Dredgings/spoil	
	Silt bars	
	Islands mark position and size	
ADDITIONAL COMMENTS:	<p>water level management</p> <p>signs of drying out</p> <p>flood debris position</p> <p>evidence of pollution</p> <p>Incidental records: signal crayfish</p> <p>--- Fence</p> <p>① Potential kingfisher hole SP 35962 09267 (Accuracy to 30')</p> <p>② Potentialholt. Overhanging vegetation</p>	

WATER VOLE SURVEY FORM

BACKGROUND INFORMATION

Site name/river

Site number 10km square Grid ref

County Water Authority

Recorder Date

HABITAT INFORMATION (mark features on map)

Survey distance

km

Habitat

- Ditch
- Dyke
- Gravel pit
- Pond
- Lowland lake
- Upland loch
- Reservoir
- Running water
- Marsh/bog
- Canal

Shore/bank

- Boulders
- Stones
- Gravel
- Sand
- Silt
- Earth
- Rock cliffs
- Earth cliffs
- Canalized
- Poached
- Reinforced (man-made)

Bordering land use

- Upland grass
- Permanent/temporary grass
- Mixed broadleaf woodland
- Conifer wood
- Peat bog
- Arable crop
- Salt marsh
- Urban/industrial
- Park/garden/Country Park
- Heath
- Fen
- Cattle/grazing
- Bank fenced?

Vegetation (DAFORN)

- F Bankside trees
- A Bushes
- LD Herbs
- O Submerged weed
- O Reeds/sedges
- R Tall grass
- N Short grass

Disturbance:

Bank profile

- Flat < 10°
- Shallow < 45°
- Steep > 45°
- Vertical/undercut

Depth

- < 0.5m
- 0.5-1m
- 1-2m
- > 2m

Width

- 5-10m
- 10-20m
- 20-40m
- > 40m

Current

- Slow
- Rapid
- Fast
- Sluggish
- Static

WILDLIFE INFORMATION

Water voles

- Sightings (count)
- Latrines (count)
- Burrows (count)
- Footprints
- Pathway in vegetation
- Feeding remains
- Cropped grass around tunnel entrance

Rat

- Sightings
- Droppings
- Footprints/runs

Otter

- Sightings
- Droppings
- Footprints/runs

Mink

- Sightings
- Droppings
- Footprints/runs

Other wildlife

- Kingfisher
- Heron
- Coot
- Waterfowl
- Moorhen
- Dipper

Identified plants from feeding remains:

SKETCH OF SITE – vole activity indicated (if any)

KEY TO SYMBOLS (mark route surveyed and direction of flow)		ADJACENT LAND-USE CODES	
	Mature trees	Broadleaved wood	BW
	Over-hanging branches	Conifer plantation	CP
	Fallen tree	Moorland/heath	MH
	Exposed roots	Rough pasture	RP
	Pollarded tree	Wetland	WL
	Sapling	Improved grass	IG
	Scrub	Tilled land (crop)	TL
	Hedgerow	Suburban/urban devel. (inc. gardens)	URB
	Fence	OTHER FEATURES	
	Reed/sedge bed	Roadbridge	
	Flood bank	Footbridge	
	Artificial bank	Weir	
	Earth cliff	Culvert	
		Ford	
		Outfall	
		Dredgings/spoil	
		Silt bars	
		Islands	
		mark position and size	

A

ADDITIONAL COMMENTS:
water level management signs of drying out flood debris position evidence of pollution
① Water vole feeding remains

WATER VOLE SURVEY FORM

BACKGROUND INFORMATION

Site name/river

Site number 10km square Grid ref

County Water Authority

Recorder Date

HABITAT INFORMATION (mark features on map)

Survey distance

km

Habitat

- Ditch
- Dyke
- Gravel pit
- Pond
- Lowland lake
- Upland loch
- Reservoir
- Running water
- Marsh/bog
- Canal

Shore/bank

- Boulders
- Stones
- Gravel
- Sand
- Silt
- Earth
- Rock cliffs
- Earth cliffs
- Canalized
- Poached
- Reinforced (man-made)

Bordering land use

- Upland grass
- Permanent/temporary grass
- Mixed broadleaf woodland
- Conifer wood
- Peat bog
- Arable crop
- Salt marsh
- Urban/industrial
- Park/garden/Country park
- Heath
- Fen
- Cattle/grazing
- Bank fenced?

Vegetation (DAFORN)

- Bankside trees
- Bushes
- Herbs
- Submerged weed
- Reeds/sedges
- Tall grass
- Short grass

Disturbance:

Bank profile

- Flat < 10°
- Shallow < 45°
- Steep > 45°
- Vertical/undercut

Depth

- < 0.5m
- 0.5-1m
- 1-2m
- > 2m

Width

- 5-10m
- 10-20m
- 20-40m
- > 40m

Current

- Slow
- Rapid
- Fast
- Sluggish
- Static

WILDLIFE INFORMATION

Water voles

- Sightings (count)
- Latrines (count)
- Burrows (count)
- Footprints
- Pathway in vegetation
- Feeding remains
- Cropped grass around tunnel entrance

Rat

- Sightings
- Droppings
- Footprints/runs

Otter

- Sightings
- Droppings
- Footprints/runs

Mink

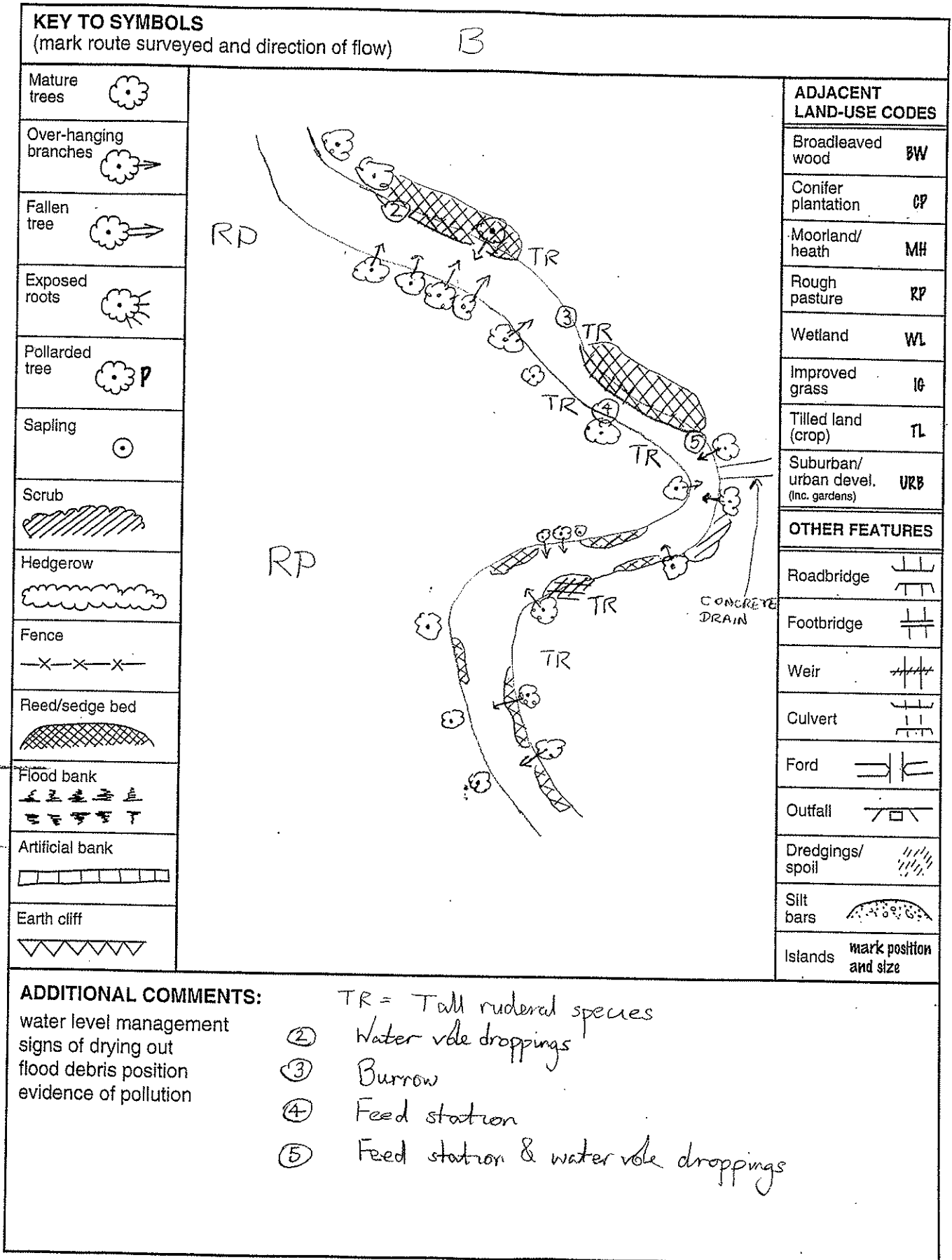
- Sightings
- Droppings
- Footprints/runs

Other wildlife

- Kingfisher
- Heron
- Coot
- Waterfowl
- Moorhen
- Dipper

Identified plants from feeding remains:

SKETCH OF SITE – vole activity indicated (if any)



WATER VOLE SURVEY FORM

BACKGROUND INFORMATION

Site name/river

Site number 10km square Grid ref

County Water Authority

Recorder Date

HABITAT INFORMATION (mark features on map)

Survey distance

km

Habitat

- Ditch
- Dyke
- Gravel pit
- Pond
- Lowland lake
- Upland loch
- Reservoir
- Running water
- Marsh/bog
- Canal

Shore/bank

- Boulders
- Stones
- Gravel
- Sand
- Silt
- Earth
- Rock cliffs
- Earth cliffs
- Canalized
- Poached
- Reinforced (man-made)

Bordering land use

- Upland grass
- Permanent/temporary grass
- Mixed broadleaf woodland
- Conifer wood
- Peat bog
- Arable crop
- Salt marsh
- Urban/industrial
- Park/garden/Country Park
- Heath
- Fen
- Cattle/grazing
- Bank fenced?

Vegetation (DAFORN)

- Bankside trees
- Bushes
- Herbs
- Submerged weed
- Reeds/sedges
- Tall grass
- Short grass

Disturbance:

Bank profile

- Flat < 10°
- Shallow < 45°
- Steep > 45°
- Vertical/undercut

Depth

- < 0.5m
- 0.5-1m
- 1-2m
- > 2m

Width

- | | | | |
|---|---------------------------------|--------------------------------|-------------------------------|
| <input checked="" type="checkbox"/> 5-10m | <input type="checkbox"/> 1m | <input type="checkbox"/> 1-2m | <input type="checkbox"/> 2-5m |
| <input type="checkbox"/> 10-20m | <input type="checkbox"/> 20-40m | <input type="checkbox"/> > 40m | |

Current

- | | | |
|-------------------------------|-----------------------------------|--|
| <input type="checkbox"/> Slow | <input type="checkbox"/> Rapid | <input checked="" type="checkbox"/> Fast |
| | <input type="checkbox"/> Sluggish | <input type="checkbox"/> Static |

WILDLIFE INFORMATION

Water voles

- Sightings (count)
- Latrines (count)
- Burrows (count)
- Footprints
- Pathway in vegetation
- Feeding remains
- Cropped grass around tunnel entrance

Rat

- Sightings
- Droppings
- Footprints/runs

Otter

- Sightings
- Droppings
- Footprints/runs

Mink

- Sightings
- Droppings
- Footprints/runs

Other wildlife

- | | | | |
|-------------------------------------|--------------------------------|------------------------------------|----------------------------------|
| <input type="checkbox"/> Kingfisher | <input type="checkbox"/> Heron | <input type="checkbox"/> Coot | <input type="checkbox"/> Moorhen |
| | | <input type="checkbox"/> Waterfowl | <input type="checkbox"/> Dipper |

Identified plants from feeding remains:

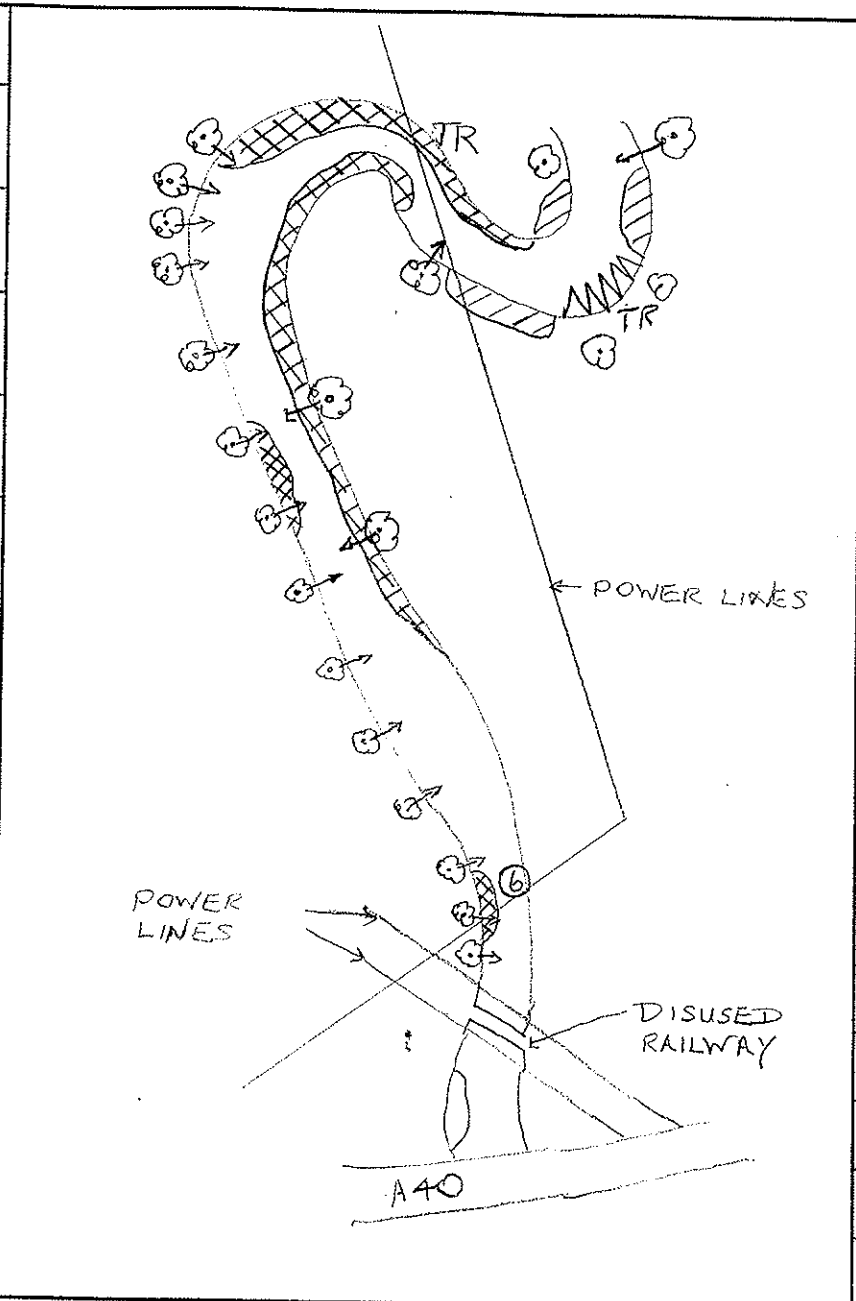
SKETCH OF SITE – vole activity indicated (if any)

KEY TO SYMBOLS

(mark route surveyed and direction of flow)

C

Mature trees	
Over-hanging branches	
Fallen tree	
Exposed roots	
Pollarded tree	
Sapling	
Scrub	
Hedgerow	
Fence	
Reed/sedge bed	
Flood bank	
Artificial bank	
Earth cliff	



ADJACENT LAND-USE CODES	
Broadleaved wood	BW
Conifer plantation	CP
Moorland/heath	MH
Rough pasture	RP
Wetland	WL
Improved grass	IG
Tilled land (crop)	TL
Suburban/urban devel. (inc. gardens)	URB
OTHER FEATURES	
Roadbridge	
Footbridge	
Weir	
Culvert	
Ford	
Outfall	
Dredgings/spoil	
Silt bars	
Islands	mark position and size

ADDITIONAL COMMENTS:

water level management
 signs of drying out
 flood debris position
 evidence of pollution

⑥ Burrow / Latrine / Feeding station

WATER VOLE SURVEY FORM

BACKGROUND INFORMATION

Site name/river River Windrush (western channel @ Witney Meadows Country Park)

Site number A 10km square SP 35 08 Grid ref

County Oxfordshire Water Authority Thames

Recorder Mike Jennings / Alex Hollands Date 25/9/06

HABITAT INFORMATION (mark features on map)

Survey distance

 km

Habitat

- Ditch
- Dyke
- Gravel pit
- Pond
- Lowland lake
- Upland loch
- Reservoir
- Running water
- Marsh/bog
- Canal

Shore/bank

- Boulders
- Stones
- Gravel
- Sand
- Silt
- Earth
- Rock cliffs
- Earth cliffs
- Canalized
- Poached
- Reinforced (man-made)

Bordering land use

- Upland grass
- Permanent/temporary grass
- Mixed broadleaf woodland
- Conifer wood
- Peat bog
- Arable crop
- Salt marsh
- Urban/industrial
- Park/garden/Country Park
- Heath
- Fen
- Cattle/grazing
- Bank fenced?

Vegetation (DAFORN)

- F Bankside trees
- A Bushes
- F Herbs
- O Submerged weed
- O Reeds/sedges
- R Tall grass
- N Short grass

Disturbance:

Bank profile

- Flat < 10°
- Shallow < 45°
- Steep > 45°
- Vertical/undercut

Depth

- < 0.5m
- 0.5-1m
- 1-2m
- > 2m

Width

- 1m
- 1-2m
- 2-5m
- 5-10m
- 10-20m
- 20-40m
- > 40m

Current

- Slow
- Rapid
- Sluggish
- Fast
- Static

WILDLIFE INFORMATION

Water voles

- Sightings (count)
- 2 Latrines (count)
- 2 Burrows (count)
- Footprints
- Pathway in vegetation
- 1 Feeding remains
- Cropped grass around tunnel entrance

Rat

- Sightings
- Droppings
- Footprints/runs

Otter

- Sightings
- Droppings
- Footprints/runs

Mink

- Sightings
- Droppings
- Footprints/runs

Other wildlife


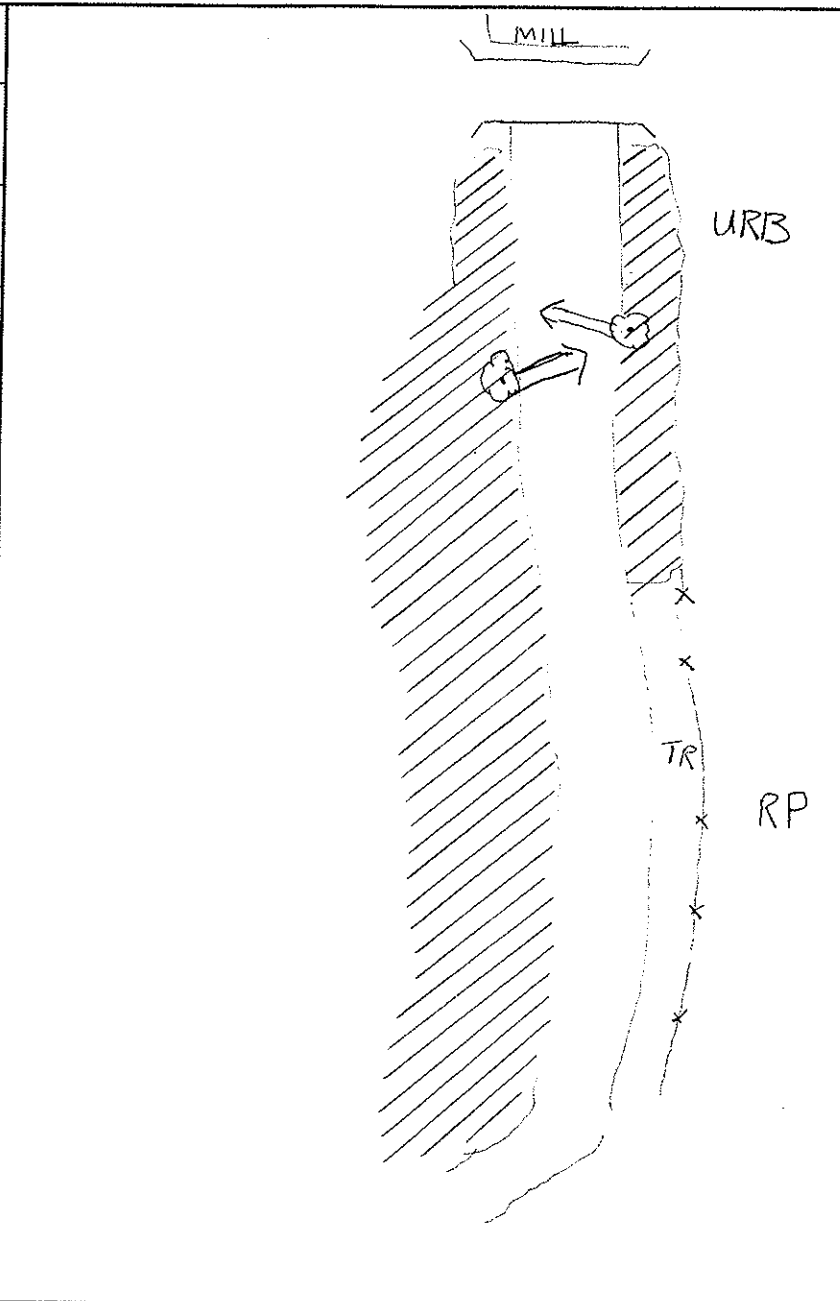






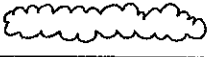
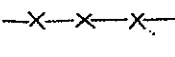


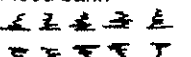

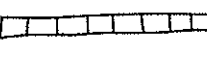



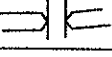


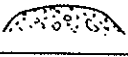
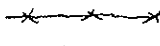
- Kingfisher
- Heron
- Coot
- Waterfowl
- Moorhen
- Dipper

Identified plants from feeding remains:

Glyceria maxima

A

SKETCH OF SITE – vole activity indicated (if any)

KEY TO SYMBOLS (mark route surveyed and direction of flow)		ADJACENT LAND-USE CODES
Mature trees 		Broadleaved wood BW
Over-hanging branches 		Conifer plantation CP
Fallen tree 		Moorland/heath MH
Exposed roots 		Rough pasture RP
Pollarded tree 		Wetland WL
Sapling 		Improved grass IG
Scrub 		Tilled land (crop) TL
Hedgerow 		Suburban/urban devel. (inc. gardens) URB
Fence 		OTHER FEATURES
Reed/sedge bed 		Roadbridge 
Flood bank 		Footbridge 
Artificial bank 		Weir 
Earth cliff 	Culvert 	
	Ford 	
	Outfall 	
	Dredgings/spoil 	
	Silt bars 	
	Islands mark position and size	
ADDITIONAL COMMENTS:	 Post and wire fence TR Tall ruderal species	
water level management		
signs of drying out		
flood debris position		
evidence of pollution		

WATER VOLE SURVEY FORM

BACKGROUND INFORMATION

Site name/river River Windrush (Western channel @ Witney Meadows Country Park)

Site number B 10km square SP 35 08 Grid ref

County Oxfordshire Water Authority Thames

Recorder Mike Jennings / Alex Hollands Date 25/9/06

HABITAT INFORMATION (mark features on map)

Survey distance km

km

Habitat

- Ditch
- Dyke
- Gravel pit
- Pond
- Lowland lake
- Upland loch
- Reservoir
- Running water
- Marsh/bog
- Canal

Shore/bank

- Boulders
- Stones
- Gravel
- Sand
- Silt
- Earth
- Rock cliffs
- Earth cliffs
- Canalized
- Poached
- Reinforced (man-made)

Bordering land use

- Upland grass
- Permanent/temporary grass
- Mixed broadleaf woodland
- Conifer wood
- Peat bog
- Arable crop
- Salt marsh
- Urban/industrial
- Park/garden/Country Park
- Heath
- Fen
- Cattle/grazing
- Bank fenced? WEST BANK

Vegetation (DAFORN)

- Bankside trees
- Bushes
- Herbs
- Submerged weed
- Reeds/sedges
- Tall grass
- Short grass

Disturbance:

Bank profile

- Flat < 10°
- Shallow < 45° EAST
- Steep > 45° WEST
- Vertical/undercut

Depth

- < 0.5m
- 0.5-1m
- 1-2m
- > 2m

Width

- 1m
- 1-2m
- 2-5m
- 5-10m
- 10-20m
- 20-40m
- > 40m

Current

- Slow
- Rapid
- Sluggish
- Fast
- Static

WILDLIFE INFORMATION

Water voles

- Sightings (count)
- Latrines (count)
- Burrows (count)
- Footprints
- Pathway in vegetation
- Feeding remains
- Cropped grass around tunnel entrance

Rat

- Sightings
- Droppings
- Footprints/runs

Otter

- Sightings
- Droppings
- Footprints/runs

Mink

- Sightings
- Droppings
- Footprints/runs

Other wildlife

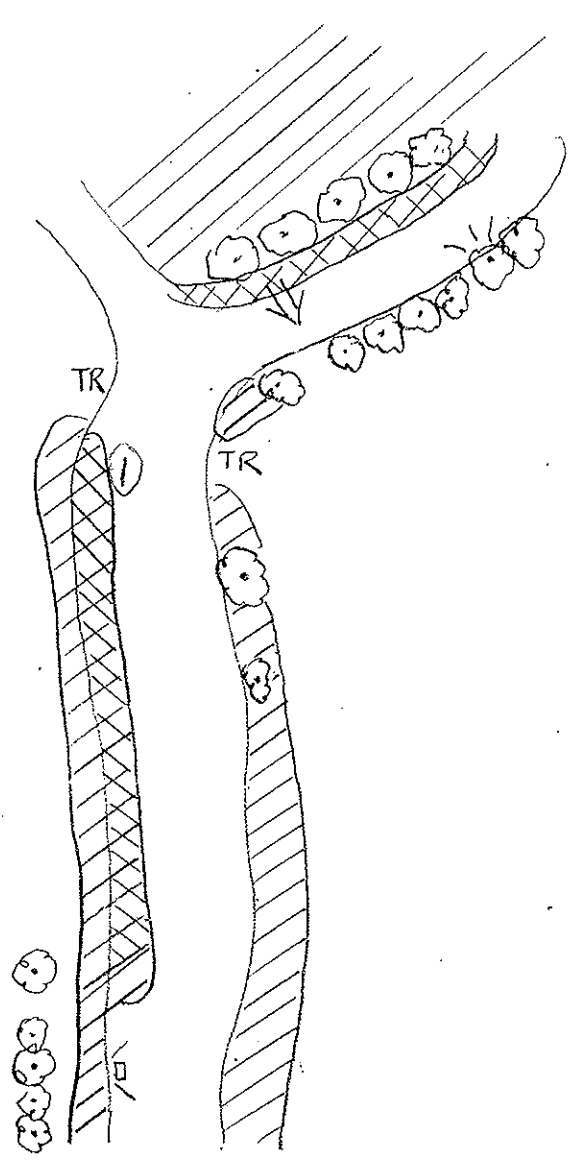
- Kingfisher
- Heron
- Coot
- Waterfowl
- Moorhen
- Dipper

Identified plants from feeding remains:

Glyceria maxima

SKETCH OF SITE – vole activity indicated (if any)

KEY TO SYMBOLS (mark route surveyed and direction of flow)		ADJACENT LAND-USE CODES
Mature trees		Broadleaved wood BW
Over-hanging branches		Conifer plantation CP
Fallen tree		Moorland/heath MH
Exposed roots		Rough pasture RP
Pollarded tree		Wetland WL
Sapling		Improved grass IG
Scrub		Tilled land (crop) TL
Hedgerow		Suburban/urban devel. (inc. gardens) URB
Fence		OTHER FEATURES
Reed/sedge bed		Roadbridge
Flood bank		Footbridge
Artificial bank		Weir
Earth cliff		Culvert
		Ford
		Outfall
		Dredgings/spoil
		Silt bars
		Islands <i>mark position and size</i>



ADDITIONAL COMMENTS:

water level management
 signs of drying out
 flood debris position
 evidence of pollution

TR - Tall ruderal species
 ① SP 35964 0903 Feeding remains

WATER VOLE SURVEY FORM

BACKGROUND INFORMATION

Site name/river

Site number 10km square Grid ref

County Water Authority

Recorder Date

HABITAT INFORMATION (mark features on map)

Survey distance km

Habitat

Ditch
 Dyke
 Gravel pit
 Pond
 Lowland lake
 Upland loch
 Reservoir
 Running water
 Marsh/bog
 Canal

Shore/bank

Boulders
 Stones
 Gravel
 Sand
 Silt
 Earth
 Rock cliffs
 Earth cliffs
 Canalized
 Poached
 Reinforced (man-made)

Bordering land use

Upland grass
 Permanent/temporary grass
 Mixed broadleaf woodland
 Conifer wood
 Peat bog
 Arable crop
 Salt marsh
 Urban/industrial
 Park/garden/country park
 Heath
 Fen
 Cattle/grazing
 Bank fenced?

Vegetation (DAFORN)

Bankside trees
 Bushes
 Herbs
 Submerged weed
 Reeds/sedges
 Tall grass
 Short grass

Disturbance:
 Industrial premises to west.

Bank profile

Flat < 10°
 Shallow < 45°
 Steep > 45°
 Vertical/undercut

Depth

< 0.5m
 0.5-1m
 1-2m
 > 2m

Width

5-10m 1m 1-2m 2-5m
 10-20m 20-40m > 40m

Current

Slow Rapid Fast
 Sluggish Static

WILDLIFE INFORMATION

Water voles

Sightings (count)
 Latrines (count)
 Burrows (count)
 Footprints
 Pathway in vegetation
 Feeding remains
 Cropped grass around tunnel entrance

Rat

Sightings
 Droppings
 Footprints/runs

Otter

Sightings
 Droppings
 Footprints/runs

Mink

Sightings
 Droppings
 Footprints/runs

Other wildlife

Kingfisher Heron Coot Moorhen
 Waterfowl Dipper

Identified plants from feeding remains:

C

SKETCH OF SITE – vole activity indicated (if any)

KEY TO SYMBOLS (mark route surveyed and direction of flow)		ADJACENT LAND-USE CODES
Mature trees		Broadleaved wood BW
Over-hanging branches		Conifer plantation CP
Fallen tree		Moorland/heath MH
Exposed roots		Rough pasture RP
Pollarded tree		Wetland WL
Sapling		Improved grass IG
Scrub		Tilled land (crop) TL
Hedgerow		Suburban/urban devel. (inc. gardens) URB
Fence		OTHER FEATURES
Reed/sedge bed		Roadbridge
Flood bank		Footbridge
Artificial bank		Weir
Earth cliff		Culvert
		Ford
		Outfall
		Dredgings/spoil
		Silt bars
		Islands
		mark position and size

KEY TO SYMBOLS
(mark route surveyed and direction of flow)

ADJACENT LAND-USE CODES

Broadleaved wood **BW**

Conifer plantation **CP**

Moorland/heath **MH**

Rough pasture **RP**

Wetland **WL**

Improved grass **IG**

Tilled land (crop) **TL**

Suburban/urban devel. (inc. gardens) **URB**

OTHER FEATURES

Roadbridge

Footbridge

Weir

Culvert

Ford

Outfall

Dredgings/spoil

Silt bars

Islands

mark position and size

ADDITIONAL COMMENTS:
water level management
signs of drying out
flood debris position
evidence of pollution

TR Tall ruderal species
Post and wire fence

① Water vole droppings on debris (polythene raft)
SP 35946 08928 (Accuracy to ±8')

② Mink raft. Otter & mink droppings

③ Otter & mink droppings

WATER VOLE SURVEY FORM

BACKGROUND INFORMATION

Site name/river River Windrush (western channel @ Witney Country Park)

Site number D 10km square SP35 08 Grid ref SP 3590 0875

County Oxfordshire Water Authority Thames

Recorder Mike Jennings / Alex Hollands Date 25/9/06

HABITAT INFORMATION (mark features on map)

Survey distance

 km

Habitat

- Ditch
- Dyke
- Gravel pit
- Pond
- Lowland lake
- Upland loch
- Reservoir
- Running water
- Marsh/bog
- Canal

Shore/bank

- Boulders
- Stones
- Gravel
- Sand
- Silt
- Earth
- Rock cliffs
- Earth cliffs
- Canalized
- Poached
- Reinforced (man-made)

Bordering land use

- Upland grass
- Permanent/temporary grass
- Mixed broadleaf woodland
- Conifer wood
- Peat bog
- Arable crop
- Salt marsh
- Urban/industrial
- Park/garden/Country Park
- Heath
- Fen
- Cattle/grazing
- Bank fenced?

Vegetation (DAFORN)

- Bankside trees
- Bushes
- Herbs
- Submerged weed
- Reeds/sedges
- Tall grass
- Short grass

Disturbance:

Road noise from A40

Bank profile

- Flat < 10°
- Shallow < 45°
- Steep > 45°
- Vertical/undercut

Depth

- < 0.5m
- 0.5-1m
- 1-2m
- > 2m

Width

- 1m
- 1-2m
- 2-5m
- 5-10m
- 10-20m
- 20-40m
- > 40m

Current

- Slow
- Rapid
- Sluggish
- Fast
- Static

WILDLIFE INFORMATION

Water voles

- Sightings (count)
- Latrines (count)
- Burrows (count)
- Footprints
- Pathway in vegetation
- Feeding remains
- Cropped grass around tunnel entrance

Rat

- Sightings
- Droppings
- Footprints/runs

Otter

- Sightings
- Droppings
- Footprints/runs

Mink

- Sightings
- Droppings
- Footprints/runs

Other wildlife

- Kingfisher
- Heron
- Coot
- Waterfowl
- Moorhen
- Dipper

Identified plants from feeding remains:

D

SKETCH OF SITE – vole activity indicated (if any)

KEY TO SYMBOLS (mark route surveyed and direction of flow)		ADJACENT LAND-USE CODES
Mature trees		Broadleaved wood BW
Over-hanging branches		Conifer plantation CP
Fallen tree		Moorland/heath MH
Exposed roots		Rough pasture RP
Pollarded tree		Wetland WL
Sapling		Improved grass IG
Scrub		Tilled land (crop) TL
Hedgerow		Suburban/urban devel. (inc. gardens) URB
Fence		OTHER FEATURES
Reed/sedge bed		Roadbridge
Flood bank		Footbridge
Artificial bank		Weir
Earth cliff		Culvert
	Ford	
	Outfall	
	Dredgings/spoil	
	Silt bars	
	Islands mark position and size	

ADDITIONAL COMMENTS:

water level management
 signs of drying out
 flood debris position — debris dam ③ ②
 evidence of pollution

TR ≡ Tall ruderal species

① Potential Kingfisher hole under fallen willow root plate

Appendix II Results Section October 2002 survey report.

4. Results

4.1 Copies of the original survey forms are presented in Appendix One. (SEE ORIGINAL REPORT)

4.2 Eastern Channel of the River Windrush

Within the eastern channel of the Windrush two water vole latrines, seven burrows and 13 feeding remains were observed. The feeding remains identified that water voles had been feeding on *Glyceria maxima* and *Carex riparia*. In addition, five otter spraints (one fresh) were observed along the channel. Three were located adjacent to the concrete drain which flows into the eastern channel (Plate 1 and 2) whilst the fourth was located on a silt bar at the base of the river bank further downstream from the drain. A fifth, desiccated otter spraint was observed under the northern most disused railway bridge. No evidence of an otter holt was observed although the dense scrub cover along the concrete drain offers good habitat for a holt.

4.3 Western Channel of the River Windrush

Along the western channel of the Windrush, five water vole latrines, ten burrows and six feeding stations were observed. Additionally a single otter spraint was observed under the disused railway crossing. No evidence of an otter holt was observed although the dense scrub between the western channel and the mill stream has potential for a holt.

Appendix III

Discussion and Recommendations Section October 2002 survey report

5. Discussion and Recommendations

5.1 Water Voles

5.1.1 Evidence of water vole and otter activity was observed along both of the main channels of the Windrush.

5.1.2 Water vole activity was restricted to the sections of river where the banks were steeper and where the canopy was more open allowing dense bankside vegetation to establish. Signs of water vole were encountered at relatively infrequent intervals suggesting a low population level within the Windrush. The bankside vegetation is however very dense in places which may have resulted in an under recording of water vole activity.

5.1.3 Since water voles are present within the river channels to be affected by the development, mitigation will need to be undertaken before the works commence. Due to the probable changes in the legal protection afforded to water voles following the review of the Schedules to the Wildlife and Countryside Act (1981) the mitigation will need to follow the best practice guidelines at the time when development commences.

5.1.4 Habitat enhancements should be carried out within the channels of the Windrush to increase the carrying capacity of the area prior to the displacement of the water voles. The canopy should be selectively opened up allowing riparian vegetation to establish. Where natural re-generation of vegetation is unlikely, seeding of areas using an appropriate seed mix should be considered to establish dense riparian vegetation providing good habitat for water voles.

5.1.5 Due to the variable population dynamics of water voles, an additional survey should be carried out shortly before the development is due to commence to ascertain any changes in both the distribution and abundance of water voles in the intervening period. This survey should be conducted to allow a population estimate to be made based upon the number of latrines within the channel as detailed by Strachan (1998).

5.2 Otters

5.2.1 Otter spraint was observed within both channels of the River Windrush confirming that otters are using the Windrush. In addition whilst the May 2002 survey was being conducted, a member of the public reported that otters are regularly seen in the vicinity of the drain which flows into the eastern channel of the Windrush (Babtie Group, 2002a). No evidence of an otter holt was observed although there is suitable habitat directly adjacent to the river channels.

Oxfordshire Highways
Cogges Link Road
Riparian Mammal Survey

- 5.2.2 An additional otter survey should be carried out to ascertain whether a holt or den is present within the survey area, and if so whether it is to be impacted upon by the development. If an otter holt is to be impacted upon, then a licence application to the Department for Environment Food and Rural Affairs will be required.
- 5.2.3 Habitat enhancements for otters such as the installation of artificial otter holts in suitable areas should be considered. The habitat enhancements as part of the mitigation package for water voles and otters have the potential for conflict since the opening up of the canopy for water voles may impact upon areas where otters are currently using, or could in the future use for holts. As such, the requirements of the two species would need to be fully integrated into an overall mitigation strategy.
- 5.2.4 At areas where road casualties are likely, otter fencing should be installed to funnel animals away from the road. Similarly, the bridges should include mammal shelves to allow mammals to pass during periods of spate flow. All works which may affect the otter should follow the guidance of Grogan *et al.* (2001).