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1. INTRODUCTION

- 1.1.1 British Waterways and the Grantham Canal Partnership propose to restore the Grantham Canal to navigation. The proposals will require detailed ecological survey and assessment of impacts of the proposed scheme on identified ecological features associated with the canal corridor.
- 1.1.2 As part of this process ECUS Ltd have undertaken baseline survey and more detailed species-specific surveys of 50 km of the canal from the A52 at West Bridgeford to Grantham basin. The preliminary findings of these surveys are presented in this report.

2. Methodology

- 2.1.1 In order to identify and evaluate the ecological interests of the Grantham Canal, the following works have been undertaken.

2.2 Desk Study and Data Consultation

- 2.2.1 A programme of desk study and data consultation has been undertaken immediately following award of contract and included consideration of all known biological records within 1 km of the canal corridor. This included particular consideration of biological records compiled by British Waterways and supplied to ECUS as part of the contract, along with data from other sources including prior knowledge of the canal by the project team. The MAGIC website (www.magic.gov.uk) was consulted to identify any statutory protected sites within 1 km of the route.
- 2.2.2 Records supplied by consultees were used to target key areas for species surveys, in particular water vole and badger.

2.3 Walkthrough/Extended Phase I Survey

- 2.3.1 Walkthrough survey was undertaken in August and early September to ensure completion of botanical and species surveys within their optimal survey periods.
- 2.3.2 Walkthrough survey of the canal corridor was undertaken based on the standard extended Phase I habitat survey methodology, and identified ecological interest features associated with the canal corridor. Habitats were mapped at an appropriate scale and note was made of any features or species of particular interest.
- 2.3.3 Recording of aquatic and marginal vegetation was undertaken based on the 'extensive length' canal survey methodology developed by Eaton and Wilby (2002). The canal was divided into 0.5 - 1 km sections, delineated by key features such as bridges and locks. Sections were steadily walked and records made of emergent, floating-leaved and submerged plant species with DAFOR abundance ratings assigned for each species within each section as a whole. Physical characteristics were recorded including bank type, shading, water clarity/colour, key features including feeders, moorings and recent management works.
- 2.3.4 Submerged vegetation was recorded by taking grapnel samples at regular intervals (100 m approx), with additional sampling being undertaken where areas of submerged vegetation were apparent from the bank. Where possible and appropriate, more intensive grapnel searches were made over a 20 m length of channel approximately halfway along each section in a representative section of channel. Five samples were taken and all emergent and floating vegetation recorded.
- 2.3.5 In addition to mapping the species and habitats present, results of walkthrough survey were recorded on a section by section basis on field recording sheets.

2.4 Phase II surveys

2.4.1 The intention of Phase II surveys was to identify all potential ecological receptors that will require consideration during the ecological assessment process and ensure that sufficient information is gathered to enable suitably robust assessment to be undertaken.

2.4.2 Phase II surveys undertaken comprised surveys for the following species and groups:

- aquatic macrophytes and emergent vegetation
- invertebrates
- otter and water vole
- bats, and
- badger

Aquatic macrophytes and marginal/emergent communities.

2.4.3 To ensure that survey of aquatic macrophyte communities were recorded in sufficient detail to satisfy Natural England that the assessment was robust, the 'extensive' survey method was supplemented in areas identified as supporting aquatic macrophyte communities of nature conservation importance using the 'intensive' survey methodology for assessment of canal SSSI (Wilby and Eaton, 2002). Three intensive surveys were undertaken, focussing on the area between Redmile and Stenwith as this area was found to be of greatest ecological interest in terms of its plant communities.

Invertebrates

2.4.4 Baseline terrestrial and aquatic macroinvertebrate survey was undertaken within the SSSI.

2.4.5 For terrestrial invertebrates this comprised an assessment of the value of key terrestrial habitats along the canal corridor integrated with searches of existing records to identify likely entomological interests. In view of the timescales of the contract no detailed sampling for terrestrial invertebrates was undertaken, but evaluation of key habitats was made.

2.4.6 For aquatic macroinvertebrates sampling was undertaken at key locations throughout the SSSI. Sites were selected to reflect water quality features such as inflows and the range of habitats present in the canal. At each site representative samples were obtained through proportional sampling of habitats. Survey was undertaken using standard EA methodologies appropriate to the local conditions, based on 3-minute kick-sampling and/or hand net-sweeping.

2.4.7 Invertebrate samples were identified to species level where possible. The samples were inspected in the field and notable species recorded before the samples were preserved and retained for identification in ECUS laboratories. This will include identification of European and UK protected species, Red Data Book species, national Biodiversity Action Plan species (BAP) and local BAP species. Organisms for which no key exists or that were too small were not identified to species level.

Water vole

- 2.4.8 The findings of initial walkthrough survey and data consultation were used to inform the selection of sites for more detailed water vole survey. At these locations, water vole survey of the canal banks was undertaken following the methodology detailed in the water-vole conservation handbook (Strachan, 1998). Water vole survey included searching for signs of water vole activity including burrows, latrines, feeding stations and footprints.

Otter

- 2.4.9 As otter activity has previously been recorded from the Grantham Canal, survey of potential habitat (identified during the Phase I survey) was carried out following the National Otter Survey methodology (Strachan and Jefferies, 1996). This included searches for signs of otter activity including presence of footprints, feeding remains and latrines, along with 'resting up' areas and otter holts.

Amphibians

- 2.4.10 An assessment of the potential of the canal and adjacent wetland habitats to support amphibians, in particular great-crested newt was undertaken as part of the Phase I survey. This included egg and larval searches of potentially suitable waterbodies.

Bat Survey

- 2.4.11 The potential for features such as cracks and crevices associated with trees and structures (e.g. bridges and culverts) along the canal corridor to support roosting bats was assessed utilising close-focusing binoculars to inspect structures and vegetation for potential roosting areas.
- 2.4.12 An initial appraisal of trees and structures along the entire route was undertaken as part of the Phase I survey to identify whether features likely to be of interest to roosting bats were present.
- 2.4.13 Where trees or structures found to contain features of some potential interest to roosting bats were identified, these were subject to more detailed bat roost potential survey. Each feature was assigned to a defined category of roosting potential as follows:
- **Negligible:** a feature that appears initially to have significant bat roost potential, but is considered on closer inspection to have negligible potential to support roosting bats.
 - **Low:** a feature that may have some superficial interest to roosting bats, but is considered suboptimal to the extent that bats are not considered likely to use the feature for shelter.
 - **Moderate:** a feature that has some potential to support roosting bats, but is considered to be less than ideal in some way.
 - **High:** This category is used to describe an optimal feature considered to be ideally suitable for use by roosting bats where no evidence of occupation by bats has been found.

- **Confirmed:** positive evidence of bats usage has been recorded from a feature.

2.4.14 Where features considered to have high or very high potential to support roosting bats were identified bat survey was supplemented with evening emergence surveys utilising electronic bat detectors to enable identification of any bat species present. The surrounding habitats were also recorded and evaluated for their suitability as foraging habitat for bats. The evening survey was carried out on Wednesday 11th October 2006 using Pettersson D100 and D230 bat detectors and a Wolf-3 Supergen 2 night vision scope with additional 120 l.e.d. 12v. infra red illumination. The evening was overcast with initial occasional light rain.

Badger Survey

2.4.15 Badger survey of the canal was undertaken following methods detailed in Surveying Badgers (Harris, Cresswell and Jefferies, 1989). This included survey for badger setts including assessment of sett size and status along with survey of linear features and boundaries for signs of badger activity including dung pits, scrapes, feeding signs and pathways.

Birds

2.4.16 Due to seasonal constraints no formal breeding bird survey was undertaken. However, the opportunity was taken during walkthrough survey to record bird species along the entire canal, and particularly within the SSSI. Note was made of any protected, rare or notable species in addition to areas of key habitat for breeding and foraging birds.

3. Survey Findings

3.1.1 Raw data obtained from surveys are included as the following Appendices:

- Sub-appendix 1: Figures 1 – 56. Habitat/vegetation maps
- Sub-appendix 2: Survey section summary sheets.
- Sub-appendix 3: Summary of plant records by section
- Sub-appendix 4: Summary of bat records
- Sub-appendix 5: Intensive macrophyte survey results

3.1.2 The findings of individual surveys are briefly summarised in the Sections below.

3.2 Walkthrough/Phase I Survey

3.2.1 The Grantham Canal is a contour canal, largely following the topography of the surrounding landscape and is characterised by long pounds flowing broadly east to west through gently rolling, low-lying agricultural land. The surrounding landuse is predominantly arable with some improved and semi-improved pasture fields.

Aquatic vegetation

3.2.2 The aquatic macrophyte communities of the Grantham Canal are characteristic of lowland canal communities, being dominated by species typically of still or slow-flowing nutrient-rich waters. Rigid hornwort (*Ceratophyllum demersum*) dominates extensive sections of the canal, sometimes occurring with Canadian and/or Nuttall's pondweed (*Elodea* spp.). Common duckweed (*Lemna minor*) also dominates in some stretches, often with frequently occurring fat duckweed (*Lemna gibba*).

3.2.3 Areas supporting more diverse aquatic vegetation communities exist locally, with such communities typically occurring between Redmile and Woolsthorpe, to the west of the SSSI. Species present include fan-leaved water-crowfoot (*Ranunculus circinatus*), which occurs between Muston gorse and Muston Bridge, and various pondweed species including broad-leaved pondweed (*Potamogeton natans*), fennel pondweed (*Potamogeton pectinatus*), and perfoliate pondweed (*Potamogeton perfoliatus*) and curled pondweed (*Potamogeton crispus*). Common water starwort (*Callitriche stagnalis*) dominates the aquatic vegetation in the shaded section towards the eastern limit of the canal in Grantham

3.2.4 The rare aquatic plant grass-wrack pondweed (*Potamogeton compressus*) is present to the east of the SSSI between Redmile and Muston Bridge (Sections 28 to 30). This species is scattered throughout this length and is locally frequent to locally abundant in some areas.

3.2.5 Two invasive macrophyte species were recorded during survey, comprising water hyacinth (*Eichhornia crassipes*) and water fern (*Azolla filiculoides*). Water hyacinth was recorded between Longmoor and Denton Bridges, where it scattered over the length of the section in relatively small amounts. Water

fern was present occasionally between Woolsthorpe Bridge and Woolsthorpe Wharfe (Section 31).

Marginal and emergent vegetation

- 3.2.6 The Grantham Canal supports diverse assemblages of marginal and emergent vegetation communities. Emergent vegetation fringes are present throughout much of the length of the canal and are typified by locally dominant reed sweet-grass (*Glyceria maxima*) and branched bur-reed (*Sparganium erectum*) with yellow iris (*Iris pseudacorus*) and flowering rush (*Butomus umbellatus*) occurring occasionally. Lesser water parsnip (*Berula erectum*) is a frequent and sometimes abundant component of the emergent fringes and bulrush (*Typha latifolia*) is also locally abundant. Common reed (*Phragmites australis*) dominates the marginal vegetation in some areas, where it is often present at up to 100% cover of the canal.
- 3.2.7 Other marginal and emergent species present either infrequently or at low abundance include watermint (*Mentha aquatica*), gypsywort (*Lycopus europaeus*), arrowhead (*Sagittaria sagittifolia*), water plantain (*Alisma plantago-aquatica*) and various sedge and rush species.

Terrestrial Habitats

- 3.2.8 Bankside and towpath vegetation is typically dominated by tall or mown grass and herb communities and ruderal vegetation. Species typically include coarse grasses such as perennial rye-grass (*Lolium perenne*), false oat-grass (*Arrhenatherum elatius*), Yorkshire fog (*Holcus lanatus*), cock's-foot (*Dactylis glomerata*) and common couch (*Elymus repens*), with common herb and ruderal species such as red clover (*Trifolium pratense*), white clover (*Trifolium repens*), white dead nettle (*Lamium alba*), creeping buttercup (*Ranunculus repens*) and meadow buttercup (*Ranunculus acris*). Some more diverse areas are present supporting species such as reed canary-grass (*Phalaris arundinacea*), meadowsweet (*Filipendula ulmaria*), hedge woundwort, (*Stachys sylvatica*), bittersweet (*Solanum dulcamara*), sedges (*Carex* spp.) and meadow vetchling (*Lathyrus pratensis*).
- 3.2.9 Species-poor hawthorn or blackthorn dominated hedgerows are present on the towpath side of the canal through most of its length. These are typically 1-2 m in height and are box-flailed and largely intact with occasional gap planting. Hedgerow trees dominated by ash (*Fraxinus excelsior*) are present in many of the hedgerows. The offside banks are typically dominated by grown-out hawthorn-dominated hedgerows and bankside trees including willow (*Salix* spp.), alder (*Alnus glutinosa*) and ash.

3.3 Water vole

- 3.3.1 The majority of the banks of the canal are broadly suitable for water vole, particularly on the offside, being dominated by soft, grassed earth banks with abundant marginal vegetation suitable for water vole foraging, which also provides cover for individual animals. Comprehensive survey for water vole was made difficult by limited access to the offside in many areas and dense emergent and/or bankside vegetation, which restricted visibility in many areas.

- 3.3.2 Historic records of water vole on the Grantham Canal exist predominantly from the western end of the canal, with records existing from all sections between the A52 road bridge and Hollygate Bridge. Whilst the habitat present in all these sections is suitable for water vole, no signs of water vole activity were recorded from the majority of these sections, although access to the offside banks was often limited. Small mammal burrows and footprints were recorded from Section 5 near Hollygate Bridge and are thought to represent signs of water vole activity although no droppings or feeding signs were present.
- 3.3.3 Historic records of water vole also exist from Section 12, and the habitat here is suitable, although no signs were noted at the time of survey. Collapsed small mammal burrows were recorded from Section 25, where water vole have also been recorded previously, but no signs of active burrows were recorded, although visibility in this section was restricted by dense vegetation.
- 3.3.4 Signs of small mammal activity, including burrows were recorded from Sections 29 to 31, between Muston Gorse and Stenwith Bridge. No previous records of water vole exist from these sections and no further signs of activity were present to confirm whether these burrows represented active water vole burrows.
- 3.3.5 Further checks of areas previously supporting water vole, where presence or absence of the species could not be confirmed due to dense vegetation are currently being undertaken now that vegetation has largely died back and more comprehensive coverage of these areas can be obtained.

3.4 Grass snake

- 3.4.1 Whilst no specific reptile survey was undertaken, incidental records of grass snake were made from several sections of the Grantham Canal including from Section 1 adjacent to the A52 road bridge, the dry section between and Section 30, to the east of Muston Bridge. The habitats throughout the canal are suitable for grass snake, and it is likely that this species is present throughout the length of the canal.

3.5 Badger

- 3.5.1 Five badger setts were recorded from the Grantham Canal during survey. These comprising a single hole sett in Section 1, which was located on the offside bank near to the A52 road bridge; single hole setts in Sections 7 and 17, and a six hole sett in Section 9. A further confirmed sett is present in Section 36, with a possible sett in Section 37.

3.6 Bats

- 3.6.1 The majority of bridges on the Grantham Canal are not particularly suitable for roosting bats as they typically comprise concrete piped culverts of around 0.6 m diameter.
- 3.6.2 A number of trees with potential to support roosting bats were identified during walkover survey and these were subject to more detailed assessment and evening emergence survey. A small number of canal side buildings also have some potential to support roosting bats, and further survey of these

structures would be required if works to these structures was planned as part of the restoration. Findings of bat survey of identified features are included in the table below.

Map	Section	Tree/structure	Grid Ref.	Comment
12	3	ash	SK62748 36699	Well clear of canal bank on south side – hollow trunk, moderate potential
12	o	Oak	SK63121 36570	Within a small copse on north bank - moderate
12	3	beech	SK63267 36520	Broken branches –Moderate
16 - 18	5	willow	SK65682 35918, SK65841 35971 and SK66245 35972 to SK 66501 36206	Two long narrow plantations of Crack Willow with low potential at the moment – however should any succumb to damage through lightening etc. potential increases
16 - 18	5	ash	SK66037 35978	Between the two willow plantations - moderate
16 - 18	5	ash	SK66177 35978	Also between the Willow plantations –dead with high potential
19	6	ash	SK67236 36836	Several dead branches with high potential
2	12b	weeping willow	SK67591 30631	Negligible potential with no obvious roost possibilities
2	12b	ash	SK67627 30586	Moderate potential
2	12b	ash	SK67656 30564	Moderate potential
45	19	ash	SK74607 31622	A mature tree with moderate potential
46	19	Willow	SK74749 31672	Located just before bridge 44 – low potential
44	20	ash	SK75223 31918	Some broken off branches with moderate potential
53	23	willow + aspen	SK77533 35277	Group of willows plus aspen – the aspen having more potential than the willows
54	24	ash	SK78086 35748	Although some cracks considered low potential
65	29	Bridge 59	SK83355 36801	Considered low potential
66	30	willow	SK83713 36622	Negligible potential
66	30	ash	SK83751 36596	Negligible potential
73	35	oak	SK87112 34211	Moderate potential
74	35	oak x 3	SK87308 34178	A group of three Oaks, one with staining from a 'wound'.

Map	Section	Tree/structure	Grid Ref.	Comment
				However a larger hole a little higher had more potential and during the evening survey something was inside but wouldn't 'show'.
74	35	oak	SK87394 34127	Moderate potential –location opposite an area of Sycamore scrub
74	35	oak x 3	SK87415 34111	Moderate potential in this group
74	35	horse chestnut	SK87497 34071	Several fissures in bark
74	35	horse chestnut	SK87537 34012	As above
74	35	ash + alder	SK87578 33941	Moderate potential
74	35	horse chestnut	SK87625 33895	Group of trees with moderate potential
75	36	horse chestnut	SK88335 33840	Some fissures within bark low potential
75	36	horse chestnut	SK89072 33934	Some holes but low potential
75	36	ash	SK89713 34207	Moderate potential –location close to the A1

3.6.3 The canal corridor in general is highly suitable for use by bats, as they species typically utilise linear features such as hedgerows and watercourses as foraging and commuting routes.

3.6.4 Evening emergence survey concentrated along the stretch covering sections 35 to 37, as these were considered to be the sections within which bats were most likely to be located. The oak tree with the staining located in Section 35 was particularly targeted including use of bat detectors and night vision scopes and activity was detected within the upper hole but no bats emerged and therefore no positive identification could be undertaken.

3.6.5 A number of common pipistrelle (*Pipistrellus pipistrellus*) were recorded flying along the towpath and one *Myotis* sp was detected near to Denton Bridge at the commencement of Section 35.

3.6.6 It is likely that the numbers of bats seen/detected would have been higher if survey had been undertaken earlier in the year, for example prior to the dispersal of tree roosts, which typically occurs by the end of June.

3.7 Birds

3.7.1 Bird species recorded during walkthrough survey of the Grantham Canal, along with any conservation designations are included in the Table below. A section by section breakdown of the species recorded is included as Sub-appendix 3.

English Name	Latin Name	UKBAP	RSPB	Schedule 1 (WCA)	Annex 1 (Hab Reg)
Blackbird	<i>Turdus merula</i>		G		
Blue tit	<i>Parus caeruleus</i>		G		
Bullfinch	<i>Pyrrhula pyrrhula</i>	1	R		
Buzzard	<i>Buteo buteo</i>		G		
Carrion crow	<i>Corvus corone</i>		G		
Chaffinch	<i>Fringilla coelebs</i>		G		
Collared dove	<i>Streptopelia decaocto</i>		G		
Coot	<i>Fulica atra</i>		G		
Dunnock	<i>Prunella modularis</i>		A		
Fieldfare	<i>Turdus pilaris</i>		A	1	
Goldfinch	<i>Carduelis carduelis</i>		G		
Grey wagtail	<i>Motacilla cinerea</i>		A		
Great tit	<i>Parus major</i>		G		
Green woodpecker	<i>Picus viridis</i>		A		
Greenfinch	<i>Carduelis chloris</i>		G		
Grey heron	<i>Ardea cinerea</i>		G		
House martin	<i>Delicon urbica</i>		A		
House sparrow	<i>Passer domesticus</i>		R		
Kestrel	<i>Falco tinnunculus</i>		A		
Kingfisher	<i>Alcedo atthis</i>		A	1	1
Lapwing	<i>Vanellus vanellus</i>		A		
Linnet	<i>Carduelis cannabina</i>	1	R		
Long-tailed tit	<i>Aegithalos caudatus</i>		G		
Magpie	<i>Pica pica</i>		G		
Mallard	<i>Anas platyrhynchos</i>		G		
Mistle thrush	<i>Turdus viscivorus</i>		A		
Moorhen	<i>Gallinula chloropus</i>		G		
Mute swan	<i>Cygnus olor</i>		A		
Peregrine falcon	<i>Falco peregrinus</i>		A		
Pheasant	<i>Phasianus colchicus</i>		Introduced		
Reed bunting	<i>Emberiza</i>	1	R		

English Name	Latin Name	UKBAP	RSPB	Schedule 1 (WCA)	Annex 1 (Hab Reg)
	<i>schoeniclus</i>				
Reed warbler	<i>Acrocephalus scirpaceus</i>		G		
Robin	<i>Erithacus rubecula</i>		G		
Rook	<i>Corvus frugilegus</i>		G		
Sedge warbler	<i>Acrocephalus schoenobaenus</i>		G		
Sparrowhawk	<i>Accipiter nisus</i>		G		
Starling	<i>Sturnus vulgaris</i>		R		
Swallow	<i>Hirundo rustica</i>		A		
Tawny owl	<i>Strix aluco</i>		G		
Whitethroat	<i>Sylvia communis</i>		G		
Willow warbler	<i>Phylloscopus trochilus</i>		A		
Wood pigeon	<i>Columba palumbus</i>		G		
Wren	<i>Trogladites trogladites</i>		G		
Yellowhammer	<i>Emberiza citrinella</i>		R		

3.7.2 A total of forty four bird species were recorded during walkthrough survey of the canal comprising a moderately diverse assemblage of species from a variety of habitat types. The majority of species recorded were those typically associated with woodland habitats and these were generally observed along the canal utilising the wooded fringes and hedgerows found along the canal. Species reliant on aquatic and semi aquatic habitats included coot, moorhen, grey heron, mallard, kingfisher and mute swan, observed within areas of open water and reed bunting, reed warbler and sedge warbler found in the dryer sections or sections containing reed swamp/fringe.

3.7.3 A number of species were observed outside of the immediate canal corridor or were observed flying over the canal. This included swallow and house martin which were observed foraging along the canal and a number of raptor species included kestrel, sparrowhawk, buzzard and peregrine falcon.

Birds of Conservation Concern

3.7.4 In 2002, a re-assessment of birds of conservation concern was published (The population status of birds in the United Kingdom, Channel Islands and Isle of Man analysis of conservation concern 2002-2007). This updates the 1996 Birds of Conservation Concern in the UK, Channel Islands and Isle of Man (RSPB 1996), which defined rare and threatened bird species on two lists (Red and Amber) describing the level of threat to each species of concern. "Red" is the highest conservation priority, with species needing urgent action. "Amber" is the next most critical group, followed by Green.

- 3.7.5 Out of the forty four bird species recorded, pheasant is an introduced species and therefore not included in the assessment of conservation concern. The remaining forty three species are all native birds, twenty four of which are on the green list and are considered stable with no identified threats to their population status.
- 3.7.6 Twelve species of bird recorded along the canal, the dunnoek, fieldfare, grey wagtail, green woodpecker, house martin, kestrel, kingfisher, lapwing, mistle thrush, mute swan, swallow and willow warbler are included on the amber list of concern which are considered to have suffered historical population decline, but are now thought to be in a period of recovery. The remaining six birds recorded on site, the bullfinch, house sparrow, linnet, reed bunting, starling and yellowhammer are all red listed species of the highest conservation concern, having suffered a rapid decline in breeding range and population over the last 25 years. As well as being included on the red list the bullfinch, linnet and reed bunting are also UK BAP priority species.

Schedule 1 & Annex 1 Species

- 3.7.7 Birds listed on Annex 1 of the EC Birds Directive are subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution. Out of the 44 species recorded along the canal during the survey kingfisher and fieldfare are schedule 1 species.
- 3.7.8 In addition, these two species are also listed on Schedule 1 of the Wildlife & Countryside Act 1981 (As amended) are given special protection which makes it an offence to intentionally or recklessly disturb them whilst building a nest or whilst in, or near a nest containing eggs or young.

3.8 Amphibians

- 3.8.1 Egg and larval searches were carried out in several waterbodies within the dry section of the canal. These searches did not record great-crested newt, although this does not necessarily mean that this species is not present. No other water bodies considered to be particularly suitable for supporting great-crested newt were identified within the canal corridor, although unidentified ponds may exist on privately owned adjacent land.
- 3.8.2 It is recommended that full amphibian survey of potentially suitable watercourses within the dry section is undertaken at an appropriate time of year prior to restoration to ensure that no impacts to great-crested newt will occur. Survey should include assessment of the suitability of all ponds within 500 m of the canal corridor.

3.9 Invertebrates

- 3.9.1 Historically, working canals were routinely maintained by desilting and by dredging of emergent/marginal vegetation. The invertebrate fauna associated with working canals would have been adapted to living in fairly deep water with little associated emergent/marginal vegetation. Furthermore, because canals were man-made extensions of river systems (essentially constantly slow-flowing waterbodies), the flow and wash (created by canal traffic) would also have significantly influenced the type of fauna present.

3.9.2 Disused and abandoned canals typically undergo successional change to a much more vegetated state with a subsequent build up of organic matter (usually as silt), together with a significantly reduced water depth, reduced flow, and loss of wash. These changes may result in the loss of much of the canal invertebrate fauna and will encourage the establishment of a fauna more typically associated with the new conditions. Over time, disused canals may become reduced to little more than linear ponds and will support an invertebrate fauna typical of such.

3.9.3 A very limited amount of information has been obtained from the Invertebrate Site Register (ISR) which lists two damselflies and three water beetles, mainly from poorly specified areas of the Grantham Canal.

ODONATA (damselflies, dragonflies)					
Species	Status	NGR	Date	Recorder	Source
<i>Coenagrion pulchellum</i> Variable Damselfly	Nationally Scarce N(b)	(none)	1976	(none)	ISR
<i>Erythromma najas</i> Red-eyed Damselfly	Nationally Local	SK83	1986	John Redshaw	ISR
2					
COLEOPTERA (beetles)					
Species	Status	NGR	Date	Recorder	Source
<i>Hygrobia herrmanni</i> Screech Beetle	Nationally Local	SK7431	1982	Derek Lott	ISR
<i>Ilybius fenestratus</i> a water beetle	Nationally Scarce N(b)	SK7431	1982	Derek Lott	ISR
<i>Ilybius quadriguttatus</i> a water beetle	Local: Leicestershire	SK7431	1982	Derek Lott	ISR
3					
5					

3.9.4 Discussion of the invertebrate interest of the Grantham Canal has been divided into consideration of aquatic/marginal habitats and terrestrial habitats.

Aquatic/marginal habitats

3.9.5 The aquatic invertebrate species recorded from the Grantham Canal SSSI are detailed in the table below. The location of individual survey points is shown in Figure 62.

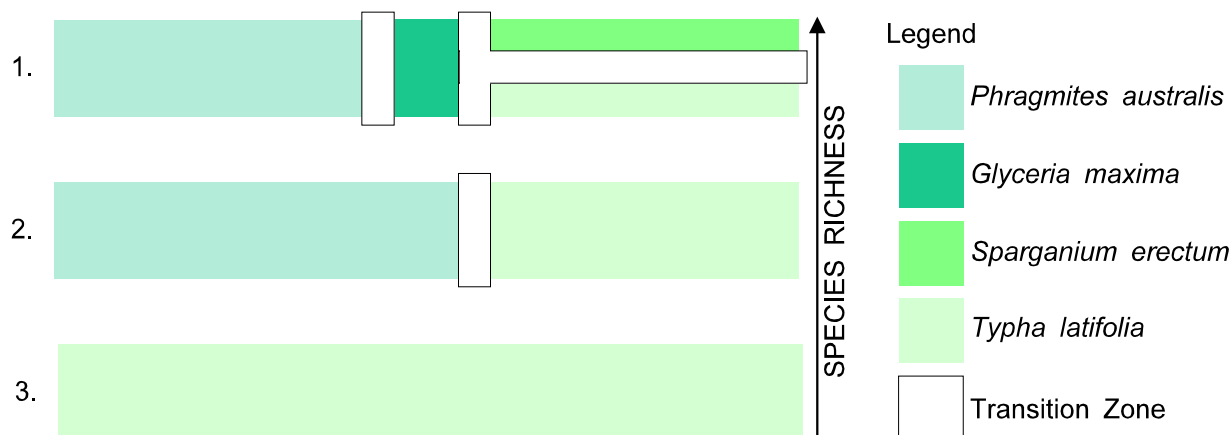
Taxa	Harby/Plungar Section					Plungar/Redmile Section				
	SO1	SO2	SO3	SO4	SO5	SO6	SO7	SO8	SO9	SO10
<i>Polycelis nigra/tenuis</i>								2	2	
<i>Valvata piscinalis</i>						1				
<i>Bithynia tentaculata</i>		2		1	5	3	2			
<i>Physa fontinalis</i>		1			6		2			3
<i>Lymnaea peregra</i>	1	1			2	2				2
<i>Lymnaea stagnalis</i>				1	1	1				1
<i>Planorbis carinatus</i>		3	3		8	5	1	1		
<i>Anisus leucostoma</i>	5		12		6	6	3			
<i>Planorbarius corneus</i>	6	3			2	1				3
<i>Acroloxus lacustris</i>						1				1
<i>Sphaeriidae</i>					2			2		
<i>Oligochaeta</i>					1		1			
<i>Erpobdella octoculata</i>	2				3	1				
<i>Asellus aquaticus</i>	1	5	1	1	8	3	4		2	1
<i>Crangonyx pseudogracilis</i>	2		6		6	14	9		6	
<i>Procladius bifidus</i>									1	
<i>Coenagrion pulchellum</i>	1		2		3	1	1			
<i>Ilyocoris cimicoides</i>	1									
<i>Notonecta glauca</i>	2				8		2			3
<i>Haliphus ruficollis</i> gp.							3			
<i>Hyphydrus ovatus</i>		1			6	3				
<i>Sialis lutaria</i>	2	2								
<i>Limephilidae</i>							1			
<i>Limnephilus flavicornis/marmoratus</i>	5	2	1	3	7	4	6			1
<i>Tanypodinae</i>					2	1			1	
<i>Orthocladinae</i>					1	1				
<i>Chironominae</i>					1					

3.9.6 The aquatic and marginal habitats of the Grantham canal are characterised by still or slow-flowing nutrient-rich waters, and these habitat characteristics are evident in the invertebrate assemblage recorded, which is dominated by species typical of lowland, nutrient-rich 'ponds'. The taxa recorded are typically both common and widespread in nutrient-rich lowland waters and as such are of limited intrinsic nature conservation importance.

3.9.7 The key habitat of value to invertebrates associated with the canal corridor is the emergent vegetation fringe.

3.9.8 Although a large stand of a single emergent/marginal plant species is more likely to support a characteristic fauna for that vegetation type, the species richness of the Grantham Canal SSSI is likely to be highest in areas where plant communities are either well integrated or where distinct communities of predominantly different species lie proximal to each other (see Figure 1. below).

Schematic showing increasing species richness (for an equivalent length of canal) with increasing number of proximal vegetation types.



3.9.9 The more varied the canal structure, the greater the number of niches and the greater the number of species (species richness) likely to be present. Whilst well integrated or distinct communities of predominantly different species lying proximal to each other will increase the local species richness (within that given area); the overall species richness of the canal will not only depend upon the number of different emergent/marginal species present along the entire canal but also upon variation in other features such as light and shade. Furthermore, the presence of weakly vegetated areas and transitional areas ranging from weakly vegetated to densely vegetated will also increase the number of species likely to be present.

3.9.10 The importance of a varied vegetation structure cannot be overstated. Different stages in the life cycles of invertebrates may have different habitat requirements. Some species may be confined to transition zones between habitats, others may breed in one habitat but forage in another. Transitions between habitats are better than sudden changes, and sites containing a variety of habitats (especially if intermixed as a mosaic) are often of extremely high value to invertebrates. Similarly, several habitats adjoining each other are much more valuable than equal areas of the same habitats at separate sites. The greater the number of habitats at a single site, the greater the number of transitions and the greater the number of available niches.

3.9.11 The vegetation lying immediately outside the emergent/marginal vegetation zone may also vary from bare mud to floristically rich areas supporting a wide range of typical terrestrial species and an associated terrestrial invertebrate fauna. These areas may be extremely valuable to invertebrates such as damselflies and dragonflies by providing pollen and nectar sources to their prey species and reducing their need to forage over great distances. The energy budgets of dragonflies are thus conserved for other purposes such as reproduction and territorial defence.

Terrestrial habitats

3.9.12 The immediate wider environs of the canal corridor comprise hedgelines dominated by Hawthorn *Crataegus monogyna* together with much Bramble

Rubus fruticosus agg.. Other trees present within these hedgelines include Ash *Fraxinus excelsior* and willows *Salix* spp. including Crack Willow *Salix fragilis*.

3.9.13 The hedgeline structure varies considerably from long continuous sections, through gappy, to long sections with little if any hedgeline present.

3.9.14 Although Hawthorn is a valuable nectar source for many terrestrial invertebrates, the removal and loss of relatively small quantities (in order to provide access to machinery for restoration work such as dredging and desilting) will have a small negative ecological impact upon the associated terrestrial invertebrate fauna in the short-term. In the middle and longer terms this impact could be reduced to negligible by appropriate (replacement) planting. However, if the planting mixture within these removed or gappy areas was to contain some or all of the following species (below), the structural diversity of the hedgelines would be greatly increased and would significantly benefit terrestrial invertebrates, resulting in an overall positive impacts on terrestrial invertebrates:

- Hazel *Corylus avellana*
- Wych Elm *Ulmus glabra*
- Crab Apple *Malus sylvestris*
- Blackthorn *Prunus spinosa*
- Dog Rose *Rosa canina*
- Rowan *Sorbus acuparia*
- Field Maple *Acer campestre*
- Holly *Ilex aquifolium*
- Elder *Sambucus nigra*

3.9.15 Surrounding trees may also directly influence the invertebrate fauna by providing areas of shade and/or accumulations of debris (fallen leaves and branches etc.) within the body of the canal. Such debris may provide sites of attachment or shelter for some invertebrate species whilst shaded conditions may range from dense through moderate to light and may provide small but sufficiently significant variations in water temperature that some species prefer.

3.9.16 Crack willow, which is present in many locations throughout the canal corridor is an important resource for a wide range of saproxylic (dead wood dependent) invertebrates (particularly beetles and flies) and the coarse fissate bark of older trees provides important overwintering shelter for a wide-range of terrestrial invertebrate species. The removal of crack willows should be avoided wherever possible.



Sub-appendix 1: Walkover Survey Maps

Sub-appendix 2: Field Survey Sheets

Date:	Surveyors:			
Section number: 1	Map numbers: 8/9			
Photograph taken: (Yes/No)				
% canal bed visible at 1m or deepest:				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
Lmin (A) Lgib (A) FGA (O)	Lmin (A) Lgib (A) FGA (O)	Lmin (A) Lgib (A) FGA (O)	Lmin (A) Lgib (A) FGA (O)	Lmin (A) Lgib (A) FGA (O)
6	7	8	9	10
Lmin (A) Lgib (A) FGA (O)	None	Lmin (F) Lgib (A) FGA (F)	Lmin (F) Lgib (A) FGA (F)	Lmin (O) Lgib (O) FGA (F) Cdem (A)
Lowered water table: (Yes/No)				
More than 5% channel shading: (Yes/No)				
Bank type: Steep sided channel.				
20m grapnel sample: All throws returned – <i>Lemna minor</i> (A), <i>Lemna gibba</i> (A), FGA (F)				
Aquatic vegetation summary (DAFOR): <i>Lemna minor</i> (CD), <i>Lemna gibba</i> (CD), FGA, (F), <i>Ceratophyllum demersum</i> (D)				
Marginal vegetation summary (DAFOR): <i>Carex riparia</i> (LA), <i>Sparganium erectum</i> (A), <i>Typha latifolia</i> (R).				
Bankside vegetation summary (DAFOR): <i>Epilobium hirsutum</i> (A), <i>Urtica dioica</i> (A), <i>Calystegia sepium</i> (LF), <i>Stachys sylvatica</i> (R), <i>Scrophularia auriculata</i> (R), <i>Fraxinus excelsior</i> (O), <i>Acer</i> sp (O), <i>Crataegus monogyna</i> (LA), <i>Rubus fruticosus</i> (LA), <i>Senecio jacobaea</i> (O), <i>Prunus spinosa</i> (LA), <i>Vicia sepia</i> (O), <i>Lolium perenne</i> (F), <i>Holcus lanatus</i> (F), <i>Tussilago farfara</i> (O), <i>Dactylis glomerata</i> (O), <i>Trifolium repens</i> (O), <i>Senecio jacobaea</i> (O).				
Water vole summary: Favourable habitat, no field signs.				
Bat summary:				
Birds: Mute swan, Coot, Goldfinch, Moorhen, Sedge warbler, Blackbird, Wren, Sparrow hawk, Magpie, Crow, Dunnock				
Other notable species: Grass snake present, possible badger set on offside.				
Notes: (1) Double pipe culvert, (2) Double pipe culvert, (3) Possible badger hole, (4) Grass snake, (5) Steel pile, (6) Mammal tracks.				

Date:	Surveyors:			
Section number: 2	Map numbers: 10/11			
Photograph taken: (Yes/No)				
% canal bed visible at 1m or deepest:				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
FGA (A) Lmin (F) Lgib (F) Cdem (R)	FGA (O) Lmin (F) Lgib (F) Cdem (O)	FGA (D) Lmin (O) Lgib (O) Cdem (O)	FGA (D)	FGA (D) Cdem (R) Lgib (A)
6	7	8	9	10
FGA (D) Lmin (F) Lgib (F)	FGA (D) Lmin (F)	n/a	n/a	n/a
Lowered water table: (Yes/No)				
More than 5% channel shading: (Yes/No)				
Bank type:				
20m grapnel sample: FGA, (D); <i>Lemna gibba</i> (A); <i>Lemna minor</i> (A); <i>Ceratophyllum demersum</i> (O)				
Aquatic vegetation summary (DAFOR): <i>Ceratophyllum demersum</i> , (O); <i>Lemna minor</i> , (A); <i>Lemna gibba</i> , (A); FGA, (A), <i>Rorippa nasturtium-aquaticum</i> (R).				
Marginal vegetation summary (DAFOR): <i>Glyceria maxima</i> (LD), <i>Sparganium erectum</i> (LD), <i>Carex riparia</i> (LA), <i>Phragmites australis</i> (LD), <i>Juncus inflexus</i> (R), <i>Phalaris arundinacea</i> LF, <i>Solanum dulcamara</i> (R), <i>Senecio aquaticus</i> (R), <i>Persicaria amphibia</i> (O), <i>Typha latifolia</i> (LA), <i>Scrophularia auriculata</i> (R), <i>Persicaria amphibia</i> (O), <i>Juncus inflexus</i> (O), <i>Equisetum</i> sp (O),				
Bankside vegetation summary (DAFOR): <i>Lamium album</i> (O), <i>Holcus lanatus</i> (F), <i>Dactylis glomerata</i> (F), <i>Arrhenatherum elatius</i> (A), <i>Lolium perenne</i> (LA), <i>Convolvulus arvensis</i> (O), <i>Stachys sylvatica</i> (R), <i>Trifolium repens</i> (LF), <i>Epilobium hirsutum</i> (LF), <i>Sambucus nigra</i> (O), <i>Urtica dioica</i> (LA), <i>Salix</i> sp (LA), <i>Crataegus monogyna</i> (O), <i>Rubus fruticosus</i> (LF), <i>Prunus spinosa</i> (LF).				
Water vole summary: Favourable habitat but no field signs.				
Bat summary: (1) Woodpecker holes, low BRP. (4) Ash with broken limb with holes, low bat roost potential, no clear drop from hole.				
Birds: Collared dove, Wood pigeon, Moorhen, Swallow, Coot, Herron.				
Other notable species:				
Notes: (2) Double pipe culvert. (3) Defunct <i>Crataegus monogyna</i> hedge with <i>Fraxinus excelsior</i> standards. (5) Smell of badger.				

Date:	Surveyors:			
Section number: 3	Map numbers: 12/13			
Photograph taken: (Yes/No)				
% canal bed visible at 1m or deepest: 20%				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
FGA (D) Ltri (A) Lgib (O) Enut (O)	FGA (D) Ltri (A) Lgib (O) Enut (O)	FGA (D) Ltri (A) Lgib (O)	FGA (D) Ltri (A) Lgib (O)	None
6	7	8	9	10
None	None	Cdem (D)	Cdem (D)	Cdem (D)
Lowered water table: (Yes/No)				
More than 5% channel shading: (Yes/No)				
Bank type: Soft				
20m grapnel sample: filamentous green algae (R). Intensive grapnel none due to cyprinids.				
Aquatic vegetation summary (DAFOR): filamentous green algae in shallow start of section, with <i>Lemna minor</i> over mid section. After lock cottage more <i>Lemna</i> . Top section influenced by fish. <i>Phragmites australis</i> section, only <i>Ceratophyllum demersum</i> .				
Marginal vegetation summary (DAFOR): Start dominated by <i>Carex riparia</i> and <i>Glyceria maxima</i> . Top section has two distinct zones of <i>Typha angustifolia</i> and <i>Phragmites australis</i> . Vegetation communities vary quite distinctly between pounds, particularly noticeable in with emergent vegetation with dominant components of the community changing abruptly in each pound.				
Bankside vegetation summary (DAFOR): Dominated by species typical of disturbed ground and nutrient enrichment. <i>Epilobium hirsutum</i> dm, <i>Urtica dioica</i> (D). Other species: <i>Lolium perenne</i> (D), <i>Trifolium repens</i> (F), <i>Dactylis glomerata</i> (A), <i>Plantago lanceolata</i> (F), <i>Urtica dioica</i> (A), <i>Taraxacum officinale</i> agg. (A), <i>Rumex obtusifolius</i> (O), <i>Potentilla reptans</i> (O).				
Water vole summary: Good habitat throughout but no signs.				
Bat summary: 1 tree with potential near start of section.				
Birds: Coot, Moorhen dominating, with occasional farmland/hedge species; eg Yellowhammer. Also Swallow, Mute swan, Mallard, Sparrow hawk, Rook, Sedge warbler.				
Other notable species: N/A				
Notes: (1) Ash with hollow trunk rotting into upward branches, BRP. (2) Fallen and standing dead wood.				
Some areas within this section are heavily fished, though access to the channel for angling is restricted due to tall emergent vegetation fringes. Fish species noted were roach and perch, species typical of canal corridors.				

Date:	Surveyors:			
Section number: 4	Map numbers: 14/15/16			
Photograph taken: (Yes/No)				
% canal bed visible at 1m or deepest:				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
FGA (D) Cdem (O) Ppec (O)	FGA (D) Cdem (O) Ppec (O)	FGA (D) Cdem (O)	FGA (D) Cdem (O)	FGA (A) Cdem
6	7	8	9	10
Cdem (D) Lmin (R) Enut (R)	Cdem (D)	Cdem (D)	None	None
Lowered water table: Yes				
More than 5% channel shading: Yes – 10%				
Bank type: Soft				
20m grapnel sample: <i>Ceratophyllum demersum</i> (A), filamentous green algae (R)				
Aquatic vegetation summary (DAFOR): <i>Ceratophyllum demersum</i> (D), in open water where no carp. Filamentous green algae (D), in lower section.				
Marginal vegetation summary (DAFOR): <i>Phragmites australis</i> (D), in channel. <i>Typha latifolia</i> (O), <i>Sparganium erectum</i> (O). This section contains (A) significant stand of <i>Phragmites australis</i> .				
Bankside vegetation summary (DAFOR): <i>Lolium perenne</i> grassland dominated by – <i>Dactylis glomerata</i> (D), <i>Lamium album</i> (O), <i>Urtica dioica</i> (LA), <i>Heracleum sphondylium</i> (O), <i>Taraxacum officinale</i> agg. (O), <i>Trifolium repens</i> (O), <i>Plantago major</i> (O), <i>Plantago lanceolata</i> (O), <i>Anthriscus sylvestris</i> (F), <i>Torilis</i> sp. (O), <i>Prunella vulgaris</i> (O), <i>Artemisia vulgaris</i> (O).				
Water vole summary: All suitable habitat, no field signs.				
Bat summary: N/A				
Birds: Buzzard, Sedge warbler, green woodpecker.				
Other notable species: Common shrew.				
Notes: (1) Channel open, no macrophytes water very turbid and choked with algal mats in places. Large benthic cyprinids present. (2) Channel open and green with algae indicative of eutrophication due to high levels of stocking with benthic cyprinids.				

Date: 23/8/06	Surveyors: SS & FD			
Section number: 5	Map numbers: 16/17/18			
Photograph taken: (Yes/No)				
% canal bed visible at 1m or deepest:				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
None	None	n/a	n/a	n/a
6	7	8	9	10
n/a	n/a	n/a	n/a	n/a
Lowered water table: No				
More than 5% channel shading: Yes – 50%				
Bank type: Soft bank, tall vegetated.				
20m grapnel sample: Possible only on start of section where no aquatic plants were sampled.				
Aquatic vegetation summary (DAFOR): None. Heavy shading/ shallow water with large dry/ swamp sections.				
Marginal vegetation summary (DAFOR): <i>Glyceria maxima</i> , (LD-R); <i>Typha angustifolia</i> , (R); <i>Typha latifolia</i> , (LD-R); <i>Phragmites australis</i> (LD-A); <i>Sparganium erectum</i> , (R); <i>Carex riparia</i> , (LD-O)				
Bankside vegetation summary (DAFOR): Mainly tall ruderal and grassy. <i>Epilobium hirsutum</i> , <i>Urtica dioica</i> , <i>Dactylis glomerata</i> , <i>Rubus fruticosus</i> agg., <i>Rumex sanguineus</i> , <i>Trifolium pratense</i> , <i>Heracleum sphondylium</i> , <i>Carex</i> sp, <i>Lathyrus pratensis</i> , <i>Holcus lanatus</i> , <i>Solanum dulcamara</i> , <i>Lamium album</i> , <i>Anthriscus sylvestris</i> , <i>Convolvulus</i> sp, <i>Elytrigia repens</i> .				
Water vole summary: None seen, soft bank throughout, good vegetation cover. 1 small mammal burrow seen. Good habitat throughout although some sections dry.				
Bat summary: Off side willow stands may offer some degree of potential but inaccessible for detailed survey.				
Birds: Goldfinch, Wood pigeon, Heron, Starlings, Kingfisher, Sedge warbler, White-throat, Greenfinch, Robin, Blackbird, Wren, Blue tit, Moorhen				
Other notable species: Dragonflies throughout section				
Notes: Towpath mown and nearside hedge managed – flailed. (1) Standing deadwood on offside of potential interest to invertebrates.				

Date: 23/8/06	Surveyors: SS & FD			
Section number: 6	Map numbers: 18/19			
Photograph taken: (Yes/No)				
% canal bed visible at 1m or deepest: Section dry				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
n/a	n/a	n/a	n/a	n/a
6	7	8	9	10
n/a	n/a	n/a	n/a	n/a
Lowered water table: Section dry				
More than 5% channel shading: Section dry				
Bank type: Soft, gently sloping banks, tall vegetated.				
20m grapnel sample: Section dry				
Aquatic vegetation summary (DAFOR): None.				
Marginal vegetation summary (DAFOR): No defined marginal vegetation as section dry. Typical marginal species included: <i>Glyceria maxima</i> , (R); <i>Phragmites australis</i> , (R); <i>Iris pseudacorus</i> , (R).				
Bankside vegetation summary (DAFOR): Occupying sections of dry channel. Tall grassy ruderal. <i>Urtica dioica</i> , (D); <i>Epilobium hirsutum</i> , (O); <i>Dactylis glomerata</i> , (A); <i>Scrophularia nodosa</i> , (R); <i>Heracleum sphondylium</i> , (O); <i>Lamium album</i> , (R); <i>Arctium minus</i> , (R); <i>Chamerion angustifolium</i> , (LF-R); <i>Dipsacus fullonum</i> , (R), <i>Elytrigia repens</i> , (LA-O); <i>Centaurea nigra</i> , (R); <i>Convolvulus</i> sp, (LF-R); <i>Conium maculatum</i> , (LF-R).				
Water vole summary: n/a				
Bat summary: (1) Ash with bat potential towards end of section – anecdotal records of past bat use from BW staff when tree management works were undertaken due to wind damage in approx 2002 (Birkinshaw pers comms).				
Birds: wood pigeon, goldfinch, wren, long-tailed tit, blue tit, robin, blackbird				
Other notable species: (2) Grass snake.				
Notes: Channel dried out, completely in places. Managed hedge on off side - flailed.				

Date: 23/8/06	Surveyors: SS& FD			
Section number: 7	Map numbers: 19/20/21			
Photograph taken: (Yes/No)				
% canal bed visible at 1m or deepest: Section dry				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
n/a	n/a	n/a	n/a	n/a
6	7	8	9	10
n/a	n/a	n/a	n/a	n/a
Lowered water table: Section dry				
More than 5% channel shading: Section dry				
Bank type: soft bank				
20m grapnel sample: Section dry.				
Aquatic vegetation summary (DAFOR): Section dry				
Marginal vegetation summary (DAFOR): No defined marginal vegetation as section dry. Typical marginal species included: <i>Phragmites australis</i> , (LD-O); <i>Carex riparia</i> , (LD-O); <i>Glyceria maxima</i> , (LD-R); <i>Juncus inflexus</i> , (LD-O); <i>Carex otrubae</i> , (LF-O); <i>Mentha aquatica</i> , (R).				
Bankside vegetation summary (DAFOR): Typical tall ruderal throughout section with encroaching scrub: <i>Urtica dioica</i> (LD), <i>Convolvulus arvensis</i> (O), <i>Heracleum sphondylium</i> (O), <i>Rubus fruticosus</i> (LF).				
Water vole summary: n/a				
Bat summary: No potential				
Birds: greenfinch, swallow, magpie, yellowhammer, white-throat, blue tit, robin				
Other notable species: Ant hills occasional through section				
Notes: (1) Badger set on bank with dense scrub.				

Date:	Surveyors: FD/SS			
Section number: 8	Map numbers: 22/23/24			
Photograph taken: (Yes/No)				
% canal bed visible at 1m or deepest: Section dry.				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
n/a	n/a	n/a	n/a	n/a
6	7	8	9	10
n/a	n/a	n/a	n/a	n/a
Lowered water table: Yes				
More than 5% channel shading: (Yes/No)				
Bank type:				
20m grapnel sample: Section dry.				
Aquatic vegetation summary (DAFOR): Section dry.				
Marginal vegetation summary (DAFOR): <i>Phalaris arundinacea</i> , <i>Glyceria maxima</i> , <i>Phragmites australis</i> .				
Bankside vegetation summary (DAFOR): Ruderal vegetation in dry channel: <i>Urtica dioica</i> (LD), <i>Rubus fruticosus</i> (LD), <i>Heracleum sphondylium</i> (F), <i>Crataegus monogyna</i> (D), <i>Sambucus nigra</i> (O), <i>Tussilago farfara</i> (LA), <i>Rumex obtusifolius</i> (F), <i>Arctium</i> sp. (O), <i>Lamium album</i> (O), <i>Glyceria maxima</i> (O), <i>Phalaris arundinacea</i> (LA), <i>Deschampsia cespitosa</i> (O), <i>Dactylis glomerata</i> (F), <i>Arrhenatherum elatius</i> (A), <i>Elytrigia repens</i> (F), <i>Filipendula ulmaria</i> (O), <i>Phragmites australis</i> (LA), <i>Epilobium hirsutum</i> (LA), <i>Dipsacus fullonum</i> (O).				
Water vole summary: n/a				
Bat summary:				
Birds: Robin only species noted.				
Other notable species: Badger dung pits and many mammal paths crisscrossing canal and leading to adjacent habitats.				
Notes: (1) Occasional <i>Fraxinus excelsior</i> standards in scrub. (2) Mammal tracks and fresh dung pits across channel. (3) Fallen <i>Salix</i> sp of potential interest to invertebrates. (4) Pipe culvert. (5) Mammal paths leading in to wood.				

Date:	Surveyors:			
Section number: 9	Map numbers: 24/25/26/27			
Photograph taken: (Yes/No)				
% canal bed visible at 1m or deepest: Section dry.				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
n/a	n/a	n/a	n/a	n/a
6	7	8	9	10
n/a	n/a	n/a	n/a	n/a
Lowered water table: (Yes/No)				
More than 5% channel shading: (Yes/No)				
Bank type:				
20m grapnel sample: Section dry.				
Aquatic vegetation summary (DAFOR): Section dry.				
Marginal vegetation summary (DAFOR): <i>Phalaris arundinacea</i> , <i>Deschampsia cespitosa</i> , <i>Juncus inflexus</i> , <i>Apium nodiflorum</i> , <i>Mentha aquatica</i> (R), <i>Filipendula ulmaria</i> , <i>Iris pseudacorus</i> (LA).				
Bankside vegetation summary (DAFOR): <i>Filipendula ulmaria</i> (A), <i>Rubus fruticosus</i> (LA).				
Water vole summary: n/a				
Bat summary:				
Birds:				
Other notable species: (5) 6 hole badger sett. Area of isolated shallow water amongst reed swamp offers good amphibian breeding habitat.				
Notes: (1) <i>Glyceria maxima</i> and <i>Phalaris arundinacea</i> field layer of <i>Salix</i> scrub. (2) Standing dead wood of potential interest to invertebrates. (3) Open water with <i>Lemna</i> cover, around 30cm deep. (4) Bare ground due to recent tree felling.				

Date:	Surveyors:			
Section number: 10	Map numbers: 27/28			
Photograph taken: (Yes/No)				
% canal bed visible at 1m or deepest: Section dry.				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
n/a	n/a	n/a	n/a	n/a
6	7	8	9	10
n/a	n/a	n/a	n/a	n/a
Lowered water table: (Yes/No)				
More than 5% channel shading: (Yes/No)				
Bank type: Soft bank				
20m grapnel sample: Section dry.				
Aquatic vegetation summary (DAFOR): Section dry with occasional small open pool.				
Marginal vegetation summary (DAFOR): Section choked with emergent vegetation with limited small patches of open water. Emergent vegetation comprising <i>Glyceria maxima</i> (D), <i>Iris pseudacorus</i> (F) and <i>Typha latifolia</i> (R).				
Bankside vegetation summary (DAFOR): <i>Rubus fruticosus</i> agg. (LA), <i>Urtica Dioica</i> (F) <i>Filipendula ulmaria</i> (F), <i>Chamerion angustifolium</i> (O). Hedge/Scrub vegetation: <i>Salix</i> sp. (F), <i>Populus</i> sp, (O), <i>Populus tremula</i> (LD), <i>Crataegus monogyna</i> (LD), <i>Sambucus nigra</i> (LF)				
Water vole summary: Channel swamped with emergent vegetation with small patches of open water, suitable for water vole.				
Bat summary: No major trees for roosting, offers good foraging corridor.				
Birds: Foraging and nesting potential in hedgerows				
Other notable species: Areas of open water amongst emergent vegetation creating an area of shallow pools of potential interest to breeding amphibians. Adjacent woodland pond shallow, deep leaf litter layer and heavily shaded considered suboptimal for GCN.				
Notes: Filamentous green algae in open water around 10-30cm deep.				

Date: 23/8/06	Surveyors: NB			
Section number: 11	Map numbers: 29/30			
Photograph taken: Number 5				
% canal bed visible at 1m or deepest: 97%				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
Cdem (D) FGA (A)	Cdem (D) FGA (A) Ranunculus sp	Cdem (D) FGA (A) Enut (R)	Cdem (D) FGA (D)	Cdem (D) FGA (A)
6	7	8	9	10
Cdem (D) FGA (R)	Cdem (D) Ppec (O)	Cdem (D) FGA (A) Ltri (O) Lmin (O)	Cdem (D) Ppec (A) Ltri (O)	Cdem (D) Ppec (R) Ltri (R) Lmin (O)
Lowered water table: No				
More than 5% channel shading: No				
Bank type: Soft both banks				
20m grapnel sample: All <i>Ceratophyllum demersum</i> (D), <i>Elodea nuttallii</i> (R), filamentous green algae (F).				
Aquatic vegetation summary (DAFOR): <i>Ceratophyllum demersum</i> (D), <i>Elodea nuttallii</i> , <i>Potamogeton pectinatus</i> (LF), <i>Lemna trisulca</i> (LF), <i>Lemna minor</i> (LA), Filamentous green algae (LA), <i>Potamogeton natans</i> (R).				
Marginal vegetation summary (DAFOR): <i>Glyceria maxima</i> (A), <i>Sparganium erectum</i> (A-LD), <i>Phragmites australis</i> (LD), <i>Butomus umbellatus</i> (O), <i>Sagittaria sagittifolia</i> (LA), <i>Persicaria amphibia</i> (LF), <i>Mentha aquatica</i> (F), <i>Phragmites australis</i> (O), <i>Filipendula ulmaria</i> (O), <i>Iris pseudacorus</i> (R), <i>Berula erecta</i> (LA).				
Bankside vegetation summary (DAFOR): <i>Epilobium hirsutum</i> (F), <i>Urtica dioica</i> (LA), <i>Lolium perenne</i> (A), <i>Dactylis glomerata</i> (A), <i>Taraxacum officinale</i> agg. (F), <i>Lamium album</i> (LA), <i>Plantago major</i> (F), <i>Arrhenatherum elatius</i> (O), <i>Phalaris arundinacea</i> (F), <i>Heracleum sphondylium</i> (F), <i>Lycopus europaeus</i> (LA), <i>Convolvulus</i> sp (LD), <i>Anthriscus sylvestris</i> (F), <i>Fraxinus excelsior</i> (O), <i>Salix</i> sp (O), <i>Crataegus monogyna</i> (LD), <i>Sambucus nigra</i> (O), <i>Rosa canina</i> (O), <i>Rubus fruticosus</i> (O).				
Water vole summary: Good habitat, no field signs.				
Bat summary: No potential.				
Birds: coot, moorhen, mute swan, greenfinch, green woodpecker, house martin, pheasant				
Other notable species: None				
Notes: Poplar suckering through bank top. Towpath and towpath verge close mown.				

Date: 23/8/06	Surveyors: NB			
Section number: 12a	Map numbers: 30/31/32			
Photograph taken: Number 6				
% canal bed visible at 1m or deepest:				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
Cdem (D) Lmin (O)	Cdem (D) Lmin (O)	Cdem (D) Lmin (O)	Cdem (A) Lmin (A)	Cdem (A) Lmin (A)
6	7	8	9	10
Cdem (A) Lmin (A)	Cdem (A) Lmin (A)	n/a	n/a	n/a
Lowered water table: No				
More than 5% channel shading: No				
Bank type: Soft				
20m grapnel sample: <i>Ceratophyllum demersum</i> (D), <i>Lemna minor</i> (F), filamentous green algae (A).				
Aquatic vegetation summary (DAFOR): <i>Ceratophyllum demersum</i> (LD), <i>Lemna minor</i> (LA), filamentous green algae (A).				
Marginal vegetation summary (DAFOR): Channel dominated by <i>Typha latifolia</i> (LD). <i>Filipendula ulmaria</i> (F), <i>Iris pseudacorus</i> (O), <i>Glyceria maxima</i> (A), <i>Sparganium erectum</i> (A), <i>Berula erecta</i> (F), <i>Phalaris arundinacea</i> (O), <i>Glyceria fluitans</i> (R).				
Bankside vegetation summary (DAFOR): <i>Epilobium hirsutum</i> (A), <i>Urtica dioica</i> (A), <i>Prunus spinosa</i> (O), <i>Solanum dulcamara</i> (O), <i>Lycopus europaeus</i> (R), <i>Acer pseudoplatanus</i> (R).				
Water vole summary: Good habitat, no field signs				
Bat summary: No potential				
Birds: yellowhammer, sedge warbler				
Other notable species: None				
Notes: Towpath hedge flailed throughout. Semi improved grassland with relic ridge and furrow evident – indicative of little historic disturbance from agriculture.				

Date: 23/8/06	Surveyors: EK & TS			
Section number: 12b		Map numbers: 32		
Photograph taken: Yes				
% canal bed visible at 1m or deepest: deepest c. 0.4m				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
None	None	None	Cdem (O) FGA (F)	Cdem (O) FGA (F)
6	7	8	9	10
FGA (A)	Cdem (A) FGA (F)	Cdem (D) FGA (O)	Cdem (A) FGA (O)	Cdem (D) FGA (O)
Lowered water table: Yes				
More than 5% channel shading: No				
Bank type: stone wash walls				
20m grapnel sample: filamentous green algae (F), <i>Ceratophyllum demersum</i> (A).				
Aquatic vegetation summary (DAFOR): <i>Ceratophyllum demersum</i> (LA), <i>Lemna minor</i> (D), <i>Nymphaea alba</i> (R), Filamentous green algae (LD).				
Marginal vegetation summary (DAFOR): <i>Typha latifolia</i> (LD), <i>Glyceria maxima</i> (LD), <i>Phalaris arundinacea</i> (LF), <i>Butomus umbellatus</i> (R), <i>Alisma plantago-aquatica</i> (R), <i>Sparganium erectum</i> (LA), <i>Carex riparia</i> (LA), <i>Persicaria amphibia</i> (F), <i>Mentha aquatica</i> (O), <i>Solanum dulcamara</i> (O), <i>Rorippa amphibia</i> (O), <i>Berula erecta</i> (R), <i>Rubus fruticosus</i> (LF).				
Bankside vegetation summary (DAFOR): Tall grass and ruderal, including: <i>Persicaria amphibia</i> (A), <i>Phalaris arundinacea</i> (A), <i>Lathyrus pratensis</i> (R), <i>Carex riparia</i> (R), <i>Dactylis glomerata</i> (O), <i>Urtica dioica</i> (LA), <i>Cirsium palustre</i> (O), <i>Epilobium hirsutum</i> (LF), <i>Fraxinus excelsior</i> (O), <i>Sambucus nigra</i> (O), <i>Crataegus monogyna</i> (D).				
Water vole summary: Favourable habitat, no field signs.				
Bat summary: No obvious bat roost potential. Mature <i>Salix fragilis</i> on offside, no obvious cracks and crevices.				
Birds: mute swan, coot, moorhen, mallard, house sparrow, blackbird, wood pigeon				
Other notable species: None				
Notes:				

Date: 23/8/06	Surveyors: EK & TS			
Section number: 13	Map numbers: 32/33/34			
Photograph taken: Yes				
% canal bed visible at 1m or deepest: deepest c. 0.5m, 90% visible				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
Cdem (D) Lmin (O) FGA (F)	Cdem (D) Lmin (O) FGA (F)	Cdem (D) Lmin (O) FGA (F)	Cdem (D) Lmin (O) FGA (F)	Cdem (D) Lmin (O) FGA (F)
6	7	8	9	10
Cdem (D) Lmin (O) FGA (F)	Cdem (D) Lmin (O) FGA (F)	Cdem (D) Lmin (O) FGA (F)	Cdem (D) Lmin (O) FGA (F)	Cdem (D) Lmin (O) FGA (F)
Lowered water table: Yes				
More than 5% channel shading: No				
Bank type: soft				
20m grapnel sample: <i>Ceratophyllum demersum</i> (D), <i>Lemna minor</i> (D), filamentous green algae (A).				
Aquatic vegetation summary (DAFOR): <i>Ceratophyllum demersum</i> (D), <i>Lemna minor</i> (D).				
Marginal vegetation summary (DAFOR): <i>Typha latifolia</i> (LD), <i>Glyceria maxima</i> (LD), <i>Phalaris arundinacea</i> (LF), <i>Juncus inflexus</i> (O), <i>Sparganium erectum</i> (LF), <i>Lycopus europaeus</i> (LF), <i>Carex riparia</i> (A), <i>Butomus umbellatus</i> (O), <i>Filipendula ulmaria</i> (O), <i>Persicaria amphibia</i> (O), <i>Rorippa amphibia</i> (R), <i>Cirsium palustre</i> (O), <i>Equisetum fluitans</i> (R), <i>Caltha palustris</i> (O), <i>Berula erecta</i> (O).				
Bankside vegetation summary (DAFOR): <i>Epilobium hirsutum</i> (LF), <i>Phalaris arundinacea</i> (F), <i>Ranunculus repens</i> (O), <i>Lycopus europaeus</i> (O), <i>Solanum dulcamara</i> (LF), <i>Filipendula ulmaria</i> (O), <i>Agrostis stolonifera</i> (F), <i>Dactylis glomerata</i> (F), <i>Phleum pratense</i> (O), <i>Persicaria amphibia</i> (O), <i>Heracleum sphondylium</i> (O), <i>Fraxinus excelsior</i> (O), <i>Crataegus monogyna</i> (D), <i>Sambucus nigra</i> (O), <i>Convolvulus arvensis</i> (O).				
Water vole summary: Good habitat, no field signs.				
Bat summary: No roost potential.				
Birds: coot, moorhen, mute swan, house sparrow, magpie, swallow, mallard, woodpigeon				
Other notable species: None				
Notes: Cattle grazed to waters edge towards end of section, creating very eutrophic conditions. Filamentous green algae abundant throughout section. Sparse marginal fringe in much of section. Large mammal tracks through towpath-side hedge.				

Date:	Surveyors: NB			
Section number: 14	Map numbers: 35/36			
Photograph taken: Number7				
% canal bed visible at 1m or deepest: 0%				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
Cdem (D) Ltri (F) Lgib (F)	Cdem (F) Lmin (F)	Cdem (D) Enut (O) Ppec (O) Lmin (O)	Cdem (F) Enut (R) FGA (A)	Cdem (F) Enut (R) FGA (A)
6	7	8	9	10
Cdem (F) Enut (R) FGA (A)	Cdem (F) Lmin (F)	Cdem (D) Lmin (F)	Cdem (D) Lmin (F)	n/a
Lowered water table: c. 10 – 20 cm				
More than 5% channel shading: Yes				
Bank type: Soft				
20m grapnel sample: <i>Ceratophyllum demersum</i> (D), <i>Lemna minor</i> (F), <i>Elodea nuttallii</i> (R).				
Aquatic vegetation summary (DAFOR): <i>Ceratophyllum demersum</i> (D), <i>Lemna minor</i> (A), <i>Elodea nuttallii</i> (R), <i>Potamogeton pectinatus</i> (R)				
Marginal vegetation summary (DAFOR): <i>Sparganium erectum</i> (D), <i>Typha latifolia</i> (LD), <i>Sagittaria sagittifolia</i> (F), <i>Berula erecta</i> (LA), <i>Glyceria maxima</i> (F), <i>Lycopus europaeus</i> (LF), <i>Scrophularia aquatica</i> (O), <i>Iris pseudacorus</i> (O).				
Bankside vegetation summary (DAFOR): Surfaced path with short mown verges, species including: <i>Ranunculus repens</i> (O), <i>Lolium perenne</i> (A), <i>Dactylis glomerata</i> (A), <i>Taraxacum officinale</i> agg. (A), <i>Malus sylvestris</i> (R), <i>Trifolium repens</i> (LA), <i>Anthriscus sylvestris</i> (A), <i>Urtica dioica</i> (LA), <i>Lamium alba</i> (O), <i>Potentilla anserine</i> (LA), <i>Arrhenatherum elatius</i> (A), <i>Epilobium hirsutum</i> (O), <i>Trifolium pratense</i> (F), <i>Leontodon autumnalis</i> (O). Hedge, including species: <i>Prunus spinosa</i> (LA), <i>Rubus fruticosus</i> (O), <i>Crataegus monogyna</i> (O), <i>Sambucus nigra</i> (O), <i>Populus tremulous</i> (O), <i>Rosa canina</i> (O)				
Water vole summary: Favourable habitat, no signs recorded				
Bat summary: Limited potential, see T4				
Birds:				
Other notable species:				
Notes: (1) Sheet piles. (2) Brick built bank. (3) <i>Glyceria maxima</i> raft. (4) Standing dead wood with hollow limbs, bat roost potential. (5) Bat box in tree – not on map and target note pointing to tree wrongly labelled on map as T3.				

Date:	Surveyors:			
Section number: 15	Map numbers: 36/37/38			
Photograph taken: Number 8				
% canal bed visible at 1m or deepest:				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
Cdem (D) Enut (A) Lmin (R) Lgib (R)	Cdem (D) Enut (A) Lmin (R) Lgib (R)	Cdem (D) Enut (A) Lmin (R) Lgib (R)	Cdem (D) Enut (A) Lmin (R) Lgib (R)	Enut (D) Cdem (F) Lgib (F) Ltri (F)
6	7	8	9	10
Enut (D) Cdem (F) Lgib (F) Ltri (F)	Enut (D) Cdem (F) Lgib (F) Ltri (F)	Cdem (D) Enut (F) Lgib (O)	Cdem (D) Enut (F) Lgib (O)	Cdem (D) Enut (F) Lgib (O) Lmin (O)
Lowered water table: C. 20cm				
More than 5% channel shading: up to 5%				
Bank type: Soft				
20m grapnel sample: <i>Elodea nuttallii</i> (D), <i>Ceratophyllum demersum</i> (A), <i>Lemna gibba</i> (A), <i>Lemna trisulca</i> (F).				
Aquatic vegetation summary (DAFOR): <i>Elodea nuttallii</i> (LD), <i>Ceratophyllum demersum</i> (D), <i>Lemna gibba</i> (LA), <i>Lemna trisulca</i> (LF), <i>Lemna minor</i> (LF).				
Marginal vegetation summary (DAFOR): <i>Sparganium erectum</i> (D), <i>Sagittaria sagittifolia</i> (F), <i>Berula erecta</i> (LA), <i>Glyceria maxima</i> (F), <i>Lycopus europaeus</i> (LF), <i>Scrophularia aquatica</i> (O), <i>Iris pseudacorus</i> (R), <i>Carex riparia</i> (LF).				
Bankside vegetation summary (DAFOR): Surfaced path with short mown verges, species including: <i>Agrostis stolonifera</i> (LF), <i>Ranunculus repens</i> (O), <i>Lolium perenne</i> (A), <i>Dactylis glomerata</i> (A), <i>Epilobium hirsutum</i> (LA), <i>Taraxacum officinale</i> agg. (A), <i>Malus sylvestris</i> (R), <i>Trifolium repens</i> (LA), <i>Anthriscus sylvestris</i> (LF), <i>Urtica dioica</i> (LA), <i>Lamium alba</i> (O), <i>Potentilla anserine</i> (LA), <i>Arrhenatherum elatius</i> (A), <i>Trifolium pratense</i> (F), <i>Leontodon autumnalis</i> (O), <i>Arctium</i> sp. (R). Hedge, including species: <i>Prunus spinosa</i> (LA), <i>Rubus fruticosus</i> (O), <i>Crataegus monogyna</i> (D), <i>Sambucus nigra</i> (O), <i>Rosa canina</i> (R).				
Water vole summary: Good habitat, no signs				
Bat summary:				
Birds: yellowhammer, wren, moorhen, mallard.				
Other notable species: (1) Hare				
Notes: (2) Farm pond.				

Date:	Surveyors: NB			
Section number: 16	Map numbers: 38/39/40			
Photograph taken: Number 9				
% canal bed visible at 1m or deepest:				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
n/a	n/a	n/a	n/a	Cdem (D) Ltri (O) Lmin (F)
6	7	8	9	10
Cdem (D) Ltri (O) Lmin (F)	Cdem (D) Ltri (O) Lmin (F)	Cdem (D) Ltri (O) Lmin (F)	Cdem (D) Ltri (O) Lmin (F)	Cdem (D) Ltri (O) Lmin (F) Enut (R)
Lowered water table: (Yes/No) N				
More than 5% channel shading: (Yes/No) N				
Bank type: Soft bank				
20m grapnel sample: <i>Ceratophyllum demersum</i> (O), <i>Lemna gibba</i> (F), <i>Lemna trisulca</i> (F), <i>Lemna minor</i> (F), <i>Nuphar lutea</i> (R).				
Aquatic vegetation summary (DAFOR): <i>Ceratophyllum demersum</i> (A-LD), <i>Lemna minor</i> (A), <i>Lemna gibba</i> (A).				
Marginal vegetation summary (DAFOR): <i>Sparganium erectum</i> (LD), <i>Phragmites australis</i> (LD), <i>Glyceria maxima</i> (LA), <i>Alisma plantago-aquatica</i> (O), <i>Carex riparia</i> (LA), <i>Filipendula ulmaria</i> (O), <i>Juncus inflexus</i> (F), <i>Berula erecta</i> (LA), <i>Phalaris arundinacea</i> (LA), <i>Persicaria amphibia</i> (LF), <i>Mentha aquatica</i> (F), <i>Epilobium hirsutum</i> (LA), <i>Butomus umbellatus</i> (O), <i>Lycopus europaeus</i> (O), <i>Scrophularia aquatica</i> (R).				
Bankside vegetation summary (DAFOR): Verge: <i>Dactylis glomerata</i> (A), <i>Lolium perenne</i> (A), <i>Heracleum sphondylium</i> (F), <i>Plantago lanceolata</i> (F), <i>Plantago major</i> (A), <i>Lamium album</i> (O), <i>Urtica dioica</i> (LD), <i>Taraxacum officinale</i> agg. (LA), <i>Polygonum aviculare</i> (O), <i>Rumex obtusifolius</i> (F), <i>Anthriscus sylvestris</i> (F), <i>Trifolium repens</i> (A), <i>Arrhenatherum elatius</i> (A), <i>Ranunculus repens</i> (O), <i>Lathyrus pratensis</i> (LA), <i>Scrophularia aquatica</i> (F). Hedge: <i>Crataegus monogyna</i> (D), <i>Rubus fruticosus</i> (O), <i>Sambucus nigra</i> (O), <i>Prunus spinosa</i> (LD), Trees: <i>Fraxinus excelsior</i> (O), <i>Salix</i> sp. (O).				
Water vole summary: Suitable for water voles, cattle poached sections in some areas.				
Bat summary: Ash tree on section contains (A) smoothed hole, potential bat roost potential. Good foraging corridor.				
Birds: blue tit, mute swan, chaffinch.				
Other notable species:				
Notes: (1) Eroded bank from cattle poaching. (2) Surfaced path c. 7m. (3) Smoothed hole in trunk with bat roost potential.				

Date: 23/8/06	Surveyors: NB/CB			
Section number: 17	Map numbers: 40/41			
Photograph taken: Number 7				
% canal bed visible at 1m or deepest: mostly turbid				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
Cdem (D) Lmin (O)	Cdem (D) Lmin (A)	Cdem (D) Lmin (A) FGA (A)	Cdem (O) Lmin (D) FGA (A)	n/a
6	7	8	9	10
n/a	n/a	n/a	n/a	n/a
Lowered water table: No				
More than 5% channel shading: No				
Bank type: Soft				
20m grapnel sample: <i>Ceratophyllum demersum</i> (D), <i>Lemna minor</i> (D), filamentous green algae (F). (90% cover)				
Aquatic vegetation summary (DAFOR): <i>Ceratophyllum demersum</i> (D), <i>Lemna minor</i> (O), <i>Azolla filiculoides</i> (LD).				
Marginal vegetation summary (DAFOR): <i>Glyceria maxima</i> , (LD), <i>Phragmites australis</i> (LD), <i>Sparganium erectum</i> (LA), <i>Carex otrubae</i> (O), <i>Berula erecta</i> (LF), <i>Juncus effusus</i> (O), <i>Juncus inflexus</i> (R), <i>Carex riparia</i> (O), <i>Typha latifolia</i> (LA), <i>Lycopus europaeus</i> (O), <i>Iris pseudacorus</i> (O)				
Bankside vegetation summary (DAFOR): surfaced path with short mown verges, species including: <i>Ranunculus repens</i> (O), <i>Lolium perenne</i> (A), <i>Dactylis glomerata</i> (A), <i>Taraxacum officinale</i> agg. (LF), <i>Malus sylvestris</i> (R), <i>Trifolium repens</i> (LA), <i>Anthriscus sylvestris</i> (O), <i>Urtica dioica</i> (LA), <i>Lamium alba</i> (O), <i>Potentilla anserine</i> (LA), <i>Arrhenatherum elatius</i> (A), <i>Holcus lanatus</i> (F), <i>Galium aparine</i> (LF), <i>Plantago major</i> (LF), <i>Rubus fruticosus</i> (O), <i>Epilobium hirsutum</i> (LF). Hedge, including species: <i>Prunus spinosa</i> (LA), <i>Rubus fruticosus</i> (O), <i>Crataegus monogyna</i> (D), <i>Sambucus nigra</i> (O), <i>Phalaris arundinacea</i> (LF) Trees: <i>Ulmus</i> sp (R) <i>Fraxinus excelsior</i> (O).				
Water vole summary: Good habitat, no signs noted				
Bat summary:				
Birds: sedge warbler				
Other notable species: (1) Badger scrape adjacent to towpath, (2) Badger sett to west of Marriots' bridge.				
Notes: Open grazed bank. (3) Willow pollards of potential value to invertebrate taxa.				

Date:	Surveyors: EK/SS			
Section number: 18	Map numbers: 42/43/44			
Photograph taken:				
% canal bed visible at 1m or deepest: 0%				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
Lmin (D) Lgib (F)	Lmin (D) Cdem (LA)	Lmin (D) Cdem (LA)	Lmin (O) Cdem (O)	Lmin (D) Cdem (O)
6	7	8	9	10
Lmin (D) FGA (O)	FGA (D) Lmin (O)	FGA (D) Lmin (O)	FGA (D) Lmin (O)	Lmin (O)
Lowered water table: N				
More than 5% channel shading: N				
Bank type: Soft				
20m grapnel sample: <i>Ceratophyllum demersum</i> (O), <i>Lemna minor</i> (A) on all samples				
Aquatic vegetation summary (DAFOR): <i>Ceratophyllum demersum</i> (D), <i>Lemna minor</i> (D), filamentous green algae (LD), <i>Lemna trisulca</i> (O).				
Marginal vegetation summary (DAFOR): Areas dominated by emergent vegetation along length in places, <i>Glyceria maxima</i> (LD), <i>Berula erecta</i> (LF), <i>Iris pseudacorus</i> (O), <i>Juncus inflexus</i> (O), <i>Sparganium erectum</i> (LA), <i>Lycopus europaeus</i> (O), <i>Myosotis scorpioides</i> (O), <i>Butomus umbellatus</i> (LF), <i>Phalaris arundinacea</i> (LF), <i>Solanum dulcamara</i> (O).				
Bankside vegetation summary (DAFOR): <i>Urtica dioica</i> (A), <i>Epilobium hirsutum</i> (LA), <i>Persicaria amphibia</i> (F), <i>Phalaris arundinacea</i> (LF), <i>Chamerion angustifolium</i> (R), <i>Armoracia rusticana</i> (R), <i>Scutellaria galericulata</i> (O), <i>Cirsium arvense</i> (LF), <i>Solanum dulcamara</i> (O), <i>Heracleum sphondylium</i> (O), <i>Equisetum</i> sp. (LF), <i>Stachys sylvatica</i> (O), <i>Scutellaria galericulata</i> (O), <i>Rubus fruticosus</i> agg. (F), <i>Dactylis glomerata</i> (F), <i>Holcus lanatus</i> (F), <i>Arrhenatherum elatius</i> (F), <i>Elytrigia repens</i> (LF), <i>Lolium perenne</i> (LF), <i>Poa trivialis</i> (LF). Hedge species: <i>Crataegus monogyna</i> (LD), <i>Sambucus nigra</i> (O), <i>Salix</i> sp. (O), <i>Prunus spinosa</i> (O). Trees: <i>Fraxinus excelsior</i> (O), <i>Aesculus hippocastanum</i> (R), <i>Sambucus nigra</i> (O), <i>Rubus fruticosus</i> agg. (A), <i>Salix fragilis</i> (R).				
Water vole summary: Small mammal burrows on section possibly water vole, suitable habitat.				
Bat summary: Bat roost potential in adjacent buildings at end of section				
Birds: mute swan, mallard, swallow, heron				
Other notable species:				
Notes: (1) Fallen dead tree.				

Date:	Surveyors: EK/SS			
Section number: 19	Map numbers: 45/46			
Photograph taken:				
% canal bed visible at 1m or deepest: 80% visible to bed, c. 0.5m				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
Cdem (F) Lmin (O) FGA (F)	Cdem (O) Ltri (O) Lmin (O) FGA (F)	FGA (D) Cdem (F) Lmin (O) Ltri (R)	FGA (F) Cdem (A) Lmin (O) Ltri (R)	FGA (F) Cdem (A) Lmin (O) Ltri (R)
6	7	8	9	10
FGA (F) Cdem (A) Lmin (O) Ltri (R)	FGA (F) Cdem (A) Lmin (O) Ltri (R)	FGA (F) Cdem (A) Lmin (O) Ltri (R)	Cdem (A) Hmor (LF) Lmin (O) Ltri (R)	Cdem (A) Hmor (LF) Lmin (O) Ltri (R)
Lowered water table:				
More than 5% channel shading: no				
Bank type: stone bank, soft from water level				
20m grapnel sample: all <i>Ceratophyllum demersum</i> (F-A), <i>Lemna minor</i> (O-F), <i>Lemna trisulca</i> (R), filamentous green algae (F-A).				
Aquatic vegetation summary (DAFOR): <i>Ceratophyllum demersum</i> (D), <i>Lemna minor</i> (A), <i>Lemna trisulca</i> (O), <i>Hydrocharis morsus-ranae</i> (O).				
Marginal vegetation summary (DAFOR): <i>Glyceria maxima</i> (LD), <i>Sparganium erectum</i> (LA), <i>Phalaris arundinacea</i> (O-LF), <i>Typha latifolia</i> (LD), <i>Phragmites australis</i> (LD), <i>Berula erecta</i> (LF), <i>Scrophularia aquatica</i> (O), <i>Epilobium hirsutum</i> (LF), <i>Lycopus europaeus</i> (O), <i>Persicaria amphibia</i> (F), <i>Mentha aquatica</i> (R), <i>Butomus umbellatus</i> (O), <i>Juncus effusus</i> (O), <i>Juncus inflexus</i> (R), <i>Alisma plantago-aquatica</i> (R).				
Bankside vegetation summary (DAFOR): <i>Achillea millefolium</i> (O), <i>Plantago lanceolata</i> (O), <i>Urtica dioica</i> (LF), <i>Prunella vulgaris</i> (O), <i>Persicaria amphibia</i> (LF), <i>Leontodon autumnalis</i> (LF), <i>Trifolium pratense</i> (O), <i>Tussilago farfara</i> (R), <i>Equisetum</i> sp. (O), <i>Rumex obtusifolius</i> (O), <i>Plantago major</i> (O), <i>Vicia cracca</i> (R), <i>Stachys sylvatica</i> (O), <i>Heracleum sphondylium</i> (O), <i>Trifolium repens</i> (LF), <i>Chamerion angustifolium</i> (O), <i>Epilobium hirsutum</i> (LF), <i>Dactylis glomerata</i> (F), <i>Holcus lanatus</i> (F), <i>Poa trivialis</i> (F), <i>Phalaris arundinacea</i> (O-LF), <i>Lolium perenne</i> (F), <i>Arrhenatherum elatius</i> (F), <i>Scutellaria galericulata</i> (R), <i>Carex otrubae</i> (R), <i>Elytrigia repens</i> (O)-(LF), <i>Calystegia sepium</i> (F), <i>Vicia</i> sp (R), <i>Convolvulus arvensis</i> (O), <i>Taraxacum officinale</i> agg. (LF), <i>Equisetum telmateia</i> (O), <i>Phleum pratense</i> (O). Hedge <i>Crataegus monogyna</i> (D), <i>Sambucus nigra</i> (O), <i>Rosa canina</i> (R). Trees <i>Salix</i> sp. (LF), <i>Fraxinus excelsior</i> (R)				
Water vole summary: suitable habitat on both banks through much of section				
Bat summary: 1 tree with roost potential towards start of SSSI				
Birds: mute swan, kestrel, house martin, swallow, mistle thrush, mallard, wren, blackbird				
Other notable species: inverts recorded inc. common hawker, red admiral, speckled wood, emperor dragonfly				
Notes:				

Date:	Surveyors: EK/SS			
Section number: 20	Map numbers: 46/47			
Photograph taken:				
% canal bed visible at 1m or deepest: 100% 0.5 – 0.8m				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
Cdem (A) Lmin (O) Ltri (R)	Cdem (A) Lmin (O) Ltri (R)	Cdem (A) Lmin (O) Ltri (R)	Lmin (F) FGA (F) Cdem (O) Ltri (R)	Cdem (F) FGA (O) Lmin (O) Ltri (R)
6	7	8	9	10
Cdem (F) Lmin (O) Ltri (R)	Cdem (F) Lmin (O) Ltri (R)	Cdem (F) Lmin (O) Ltri (R)	Cdem (F) Lmin (O) Ltri (R)	Cdem (A) Lmin (O) Ltri (R)
Lowered water table: No				
More than 5% channel shading: No				
Bank type: stone – soft above water level				
20m grapnel sample: all <i>Ceratophyllum demersum</i> (LD), <i>Lemna minor</i> (O), <i>Lemna trisulca</i> (R), <i>Sagittaria sagittifolia</i> (R).				
Aquatic vegetation summary (DAFOR): <i>Ceratophyllum demersum</i> (D), <i>Hydrocharis morsus-ranae</i> (LF), <i>Nymphaea alba</i> (R), <i>Lemna minor</i> (F), <i>Lemna trisulca</i> (O).				
Marginal vegetation summary (DAFOR): <i>Sagittaria sagittifolia</i> (R), <i>Phragmites australis</i> (LD), <i>Phalaris arundinacea</i> (LF), <i>Sparganium erectum</i> (LA), <i>Glyceria maxima</i> (LA), <i>Typha latifolia</i> (LA), <i>Berula erecta</i> (O), <i>Butomus umbellatus</i> (O), <i>Persicaria amphibia</i> (O), <i>Scrophularia aquatica</i> (R), <i>Juncus inflexus</i> (R).				
Bankside vegetation summary (DAFOR): <i>Equisetum telmateia</i> (LA), <i>Epilobium hirsutum</i> (LF), <i>Persicaria amphibia</i> (LF), <i>Phalaris arundinacea</i> (LF), <i>Taraxacum officinale</i> agg. (F), <i>Lolium perenne</i> (A), <i>Juncus inflexus</i> (O), <i>Holcus lanatus</i> (LF), <i>Calystegia sepium</i> (LF), <i>Potentilla anserine</i> (O), <i>Ranunculus repens</i> (O), <i>Trifolium repens</i> (O), <i>Trifolium pratense</i> (O), <i>Sanguisorba minor</i> subsp. <i>minor</i> (O), <i>Lathyrus pratensis</i> (O), <i>Rumex obtusifolius</i> (O), <i>Vicia cracca</i> (O), <i>Phleum pratense</i> (O), <i>Scrophularia aquatica</i> , <i>Trifolium pratense</i> (O).				
Water vole summary: Good habitat both banks, no signs.				
Bat summary: (1) <i>Fraxinus excelsior</i> with bat roost potential on section.				
Birds: chaffinch, blue tit, long-tailed tit, reed warbler, moorhen, mallard				
Other notable species:				
Notes: Start of Harby to Redmile SSSI. Gappy grown out hedgerow on offside. Double hedgerow on towpath side.				

Date:	Surveyors: EK/SS			
Section number: 21	Map numbers: 47/48/49			
Photograph taken: yes				
% canal bed visible at 1m or deepest: 85%				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
Cdem (F) Ltri (R)	FGA (D) Cdem (R)	Cdem (F) Ltri (R)	Cdem (A) Ltri (R)	n/a
6	7	8	9	10
n/a	n/a	n/a	n/a	n/a
Lowered water table: no				
More than 5% channel shading: yes				
Bank type: soft above water level				
20m grapnel sample: Not taken – <i>Phragmites</i> swamp – section at bridge recorded: <i>Hydrocharis morsus-ranae</i> , <i>Ceratophyllum demersum</i> , <i>Potamogeton pectinatus</i> (VR).				
Aquatic vegetation summary (DAFOR): <i>Ceratophyllum demersum</i> (LD), <i>Hydrocharis morsus-ranae</i> (O), <i>Lemna trisulca</i> (R), <i>Lemna minor</i> (O), <i>Potamogeton pectinatus</i> (R), filamentous green algae (LA), <i>Nymphaea alba</i> (R).				
Marginal vegetation summary (DAFOR): <i>Phragmites australis</i> (D), <i>Glyceria maxima</i> (LA), <i>Sparganium erectum</i> (LA), <i>Typha latifolia</i> (LA), <i>Juncus inflexus</i> (R), <i>Berula erecta</i> (LF), <i>Phalaris arundinacea</i> (O), <i>Alisma plantago-aquatica</i> (R), <i>Butomus umbellatus</i> (R).				
Bankside vegetation summary (DAFOR): <i>Lolium perenne</i> (A), <i>Persicaria amphibia</i> (LF), <i>Phalaris arundinacea</i> (LF), <i>Filipendula ulmaria</i> (O), <i>Dactylis glomerata</i> (LA), <i>Holcus lanatus</i> (F), <i>Agrostis capillaris</i> (LF), <i>Plantago major</i> (F), <i>Vicia cracca</i> (O), <i>Poa trivialis</i> (LF), <i>Trifolium repens</i> (O), <i>Lathyrus pratensis</i> (R), <i>Centaurea nigra</i> (O), <i>Stachys sylvatica</i> (O), <i>Scrophularia aquatica</i> (O), <i>Filipendula ulmaria</i> (O). Hedge: <i>Crataegus monogyna</i> (D), <i>Rubus fruticosus</i> agg. (O), <i>Rosa canina</i> (R) Trees: <i>Salix</i> sp. (LF), <i>Crataegus monogyna</i> (LF).				
Water vole summary: Good habitat, no signs.				
Bat summary: None				
Birds: whitethroat, blue tit, house sparrow, swallow, wood pigeon, moorhen, sparrow hawk, house martin				
Other notable species: shrew (dead)				
Notes: within Harby – Redmile SSSI. 10 grapnel samples not undertaken due to dominance of <i>Phragmites australis</i> over much of section				

Date:	Surveyors: EK/SS			
Section number: 22	Map numbers: 50/51			
Photograph taken:				
% canal bed visible at 1m or deepest:				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
Cdem (D) Salo (A)	Cdem (D)	Salo (F)	Salo (F)	n/a
6	7	8	9	10
n/a	n/a	dead FGA (D)	dead FGA (D)	dead FGA (D)
Lowered water table: N				
More than 5% channel shading: N				
Bank type: Soft				
20m grapnel sample: <i>Ceratophyllum demersum</i> (D), <i>Stratiotes aloides</i> (F).				
Aquatic vegetation summary (DAFOR): <i>Ceratophyllum demersum</i> (LD), filamentous green algae (LD)				
Marginal vegetation summary (DAFOR): <i>Phragmites australis</i> (LD), <i>Sparganium erectum</i> (LF), <i>Lycopus europaeus</i> (O), <i>Glyceria maxima</i> (LD), <i>Typha latifolia</i> (F), <i>Phalaris arundinacea</i> (O), <i>Juncus inflexus</i> (LF), <i>Filipendula ulmaria</i> (O), <i>Scrophularia auriculata</i> (R), <i>Butomus umbellatus</i> (R), <i>Alisma plantago-aquatica</i> (O), <i>Stratiotes aloides</i> (LF), <i>Berula erecta</i> (LA), <i>Iris pseudacorus</i> (O), <i>Mentha aquatica</i> (O), <i>Butomus umbellatus</i> (O), <i>Alisma plantago-aquatica</i> (R), <i>Solanum dulcamara</i> (R).				
Bankside vegetation summary (DAFOR): <i>Dactylis glomerata</i> (LA), <i>Taraxacum officinale</i> agg. (LA), <i>Plantago lanceolata</i> (LF), <i>Juncus inflexus</i> (O), <i>Epilobium hirsutum</i> (LF), <i>Solanum dulcamara</i> (O), <i>Tussilago farfara</i> (O), <i>Cirsium arvense</i> (LF), <i>Agrostis stolonifera</i> (LF), <i>Holcus lanatus</i> (F), <i>Arrhenatherum elatius</i> (F). Hedge: <i>Crataegus monogyna</i> (LD), <i>Prunus spinosa</i> (LD), <i>Sambucus nigra</i> (R). Trees: <i>Crataegus monogyna</i> (O), <i>Sambucus nigra</i> (R), <i>Fraxinus excelsior</i> (R), <i>Salix</i> sp. (LF), <i>Salix fragilis</i> (R).				
Water vole summary: Good habitat with suitable banks, (2) 2 x small mammal burrows seen towards the end of section possibly water vole.				
Bat summary: Good general corridor for foraging bats.				
Birds: Good corridor for nesting/foraging birds				
Other notable species:				
Notes: Within Harby to Redmile SSSI. Good marshy fringe adjacent to winding hole, Potential interest to invertebrates. Dead algal mat from winding hole to west of Plungar to end of section. No aquatic macrophytes - possible water quality issues. Grown out gappy hedge to offside. Large shoal of Roach observed towards centre of the section.				

Date:	Surveyors: NB/CB			
Section number: 23	Map numbers: 51/52/53			
Photograph taken: (Yes/No)				
% canal bed visible at 1m or deepest:				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
Ltri (R) FGA (O)	Ltri (R) FGA (O)	Ltri (R) FGA (O) Salo (A)	Ltri (O) Lmin (F) FGA (A)	Ltri (O) Lmin (F) FGA (A) Salo (A)
6	7	8	9	10
Enut (F) FGA (O) Lmin (O)	Cdem (D) FGA (A) Lmin (A)	Cdem (D) FGA (A) Lmin (A)	FGA (D) Lmin (O) Cdem (LD) Ltri (O)	FGA (D) Lmin (O) Cdem (LD) Ltri (O)
Lowered water table: No				
More than 5% channel shading: (Yes/No)				
Bank type: Soft				
20m grapnel sample: <i>FGA</i> (D), <i>Lemna minor</i> (O), <i>Ceratophyllum demersum</i> (R)				
Aquatic vegetation summary (DAFOR): Section very changeable, species dominance changes throughout section. Species present: Filamentous green algae (LA-O), <i>Lemna minor</i> (O), <i>L. trisulca</i> (O), <i>Stratiotes aloides</i> (LD), <i>Ceratophyllum demersum</i> (LD), <i>Nuphar lutea</i> (LA), <i>Elodea nuttallii</i> (LA).				
Marginal vegetation summary (DAFOR): <i>Sparganium erectum</i> (A), <i>Glyceria maxima</i> (A), <i>Mentha aquatica</i> (F), <i>Berula erecta</i> (A), <i>Stratiotes aloides</i> (LD), <i>Juncus inflexus</i> (F), <i>Juncus effusus</i> (F), <i>Phragmites australis</i> (LA), <i>Butomus umbellatus</i> (O), and <i>Typha latifolia</i> (LD).				
Bankside vegetation summary (DAFOR): <i>Carex otrubae</i> (F), <i>Scutellaria galericulata</i> (O), <i>Mentha aquatica</i> (LA), <i>Equisetum fluviatile</i> (F), <i>Scrophularia auriculata</i> (O), <i>Vicia cracca</i> (LA), <i>Lathyrus pratensis</i> (LA), <i>Pulicaria dysenterica</i> (LA), <i>Convolvulus arvensis</i> (LA), <i>Heracleum sphondylium</i> (O), <i>Dactylis glomerata</i> (A), <i>Lolium perenne</i> (A), <i>Arrhenatherum elatius</i> (A), <i>Ranunculus repens</i> (O), <i>Plantago major</i> (F), <i>Rumex obtusifolius</i> (F), <i>Taraxacum officinale</i> agg. (F), <i>Lycopus europaeus</i> (LA), <i>Epilobium hirsutum</i> (LA) and <i>Filipendula ulmaria</i> (LA). Tree, hedge and shrub species recorded comprise <i>Salix</i> sp (O), <i>Prunus spinosa</i> (O), <i>Crataegus monogyna</i> (A-LD), <i>Rubus fruticosus</i> agg. (O), <i>Rosa canina</i> (O), and <i>Fraxinus excelsior</i> (O).				
Water vole summary: Good habitat, no signs noted				
Bat summary: Good corridor for foraging bats, low BRP in multi-stemmed willows at start of section with nearby willow with rotting heart wood again with low bat roost potential. Stag-head ash set back from canal to west of hill farm with high BRP and invertebrate potential. Probably not affected by works. No obvious gaps in pointing at Barkestone Bridge.				
Birds: reed bunting, blackbird, sedge warbler present along section.				
Other notable species: Speckled wood, holly blue, peacock, cabbage white, ruddy darter.				
Notes: Within Harby-Redmile SSSI. Standing deadwood (willow with rooting heart wood and stag-head ash) of potential interest to invertebrates and bats. Drying pond adjacent to canal to south of Barkestone Bridge.				

Date: 30/8/06	Surveyors: NB			
Section number: 24	Map numbers: 53/54			
Photograph taken: number 5				
% canal bed visible at 1m or deepest:				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
Cdem (A)	Nitella sp (A) FGA (A) Ppec (R)	Nitella sp (A) Cdem (A) FGA (A) Lmin (R) Ltri (R)	Nitella sp (A) Cdem (D) FGA (A) Lmin (R) Ltri (R) Enut (O)	Nitella sp (A) Cdem (D) FGA (A) Lmin (R) Ltri (R) Enut (O)
6	7	8	9	10
C dem (A) FGA (A) Ltri (O) Nitella sp (R)	C dem (A) FGA (A) Ltri (O) Nitella sp (R) Enut (O)	Cdem (A) Enut (O) Ltri (F)	Cdem (F) Enut (O) Pobt (F) Nitella sp (O)	Cdem (F) Enut (O) Pobt (F) Nitella sp (O)
Lowered water table: No				
More than 5% channel shading: No				
Bank type: Soft				
20m grapnel sample: <i>Ceratophyllum demersum</i> (A), <i>Elodea nuttallii</i> (O), <i>Lemna trisulca</i> (F), <i>Potamogeton obtusifolius</i> (F), <i>Nitella sp.</i>				
Aquatic vegetation summary (DAFOR): <i>Ceratophyllum demersum</i> (A), <i>Elodea nuttallii</i> (O), <i>Lemna trisulca</i> (F), <i>Potamogeton obtusifolius</i> (F), <i>Nitella sp.</i> , <i>Stratiotes aloides</i> (R), <i>Sagittaria sagittifolia</i> (O).				
Marginal vegetation summary (DAFOR): <i>Typha latifolia</i> (A), <i>Sparganium erectum</i> (O), <i>Butomus umbellatus</i> (R), <i>Berula erecta</i> (O), <i>Carex otrubae</i> (O), <i>Persicaria amphibia</i> (R).				
Bankside vegetation summary (DAFOR): bank verge: <i>Carex otrubae</i> (O), <i>Filipendula ulmaria</i> (F), <i>Phalaris arundinacea</i> (F), <i>Ranunculus repens</i> (F), <i>Persicaria maculosa</i> (F), <i>Vicia cracca</i> (LF), <i>Equisetum sp</i> (F), <i>Pulicaria dysenterica</i> (LF), <i>Epilobium hirsutum</i> (LA), <i>Scrophularia nodosa</i> (F), <i>Myosotis aquaticum</i> (O), <i>Carex nigra</i> (O), <i>Rubus fruticosus</i> (A), <i>Scutellaria galericulata</i> (R). Hedge: <i>Crataegus monogyna</i> (D), <i>Prunus spinosa</i> (F), <i>Salix sp</i> (R), <i>Fraxinus excelsior</i> (O), <i>Rosa canina</i> (O). Tow path: <i>Heracleum sphondylium</i> (O), <i>Dactylis glomerata</i> (A), <i>Lolium perenne</i> (A), <i>Arrhenatherum elatius</i> (A), <i>Ranunculus sp</i> (F), <i>Plantago major</i> (F), <i>Rumex obtusifolius</i> (F), <i>Taraxacum officinale</i> agg. (F), <i>Ranunculus plantago-aquatica</i> (LA).				
Water vole summary: Good habitat, no signs.				
Bat summary: Couple of likely trees.				
Birds: woodpigeon, sedge warbler.				
Other notable species: Good for dragonflies.				
Notes: (1) <i>Fraxinus excelsior</i> with cracks and has bat roost potential.				

Date: 30/8/06	Surveyors: nb cb rb			
Section number: 25	Map numbers: 54/55			
Photograph taken: number 6				
% canal bed visible at 1m or deepest:				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
Cdem (D) Ltri (O) FGA (O)	Cdem (O) Ltri (O)	Cdem (D) Lmin (R)	Cdem (D) Enut (F)	Cdem (D) Enut (O)
6	7	8	9	10
Cdem (D) Pobt (O) Ltri (O)	Cdem (D) Ltri (O)	Cdem (D) Lmin (O) Ppec (O)	Cdem (D) Lmin (O) Ppec (O)	Cdem (D) Lmin (F)
Lowered water table:				
More than 5% channel shading:				
Bank type:				
20m grapnel sample:				
Aquatic vegetation summary (DAFOR): <i>Stratiotes aloides</i> (LD), <i>Ceratophyllum demersum</i> (LD), <i>Lemna minor</i> (LD), <i>Nuphar lutea</i> (R).				
Marginal vegetation summary (DAFOR): <i>Typha latifolia</i> (LD), <i>Berula erecta</i> (O), <i>Butomus umbellatus</i> (O), <i>Sparganium erectum</i> (F), <i>Iris pseudacorus</i> (O), <i>Glyceria maxima</i> (O), <i>Lycopus europaeus</i> (R).				
Bankside vegetation summary (DAFOR): <i>Epilobium hirsutum</i> (LD), <i>Rubus fruticosus</i> (O), <i>Calystegia sepium</i> (O), <i>Urtica dioica</i> (LD). Tow path: <i>Heracleum sphondylium</i> (O), <i>Dactylis glomerata</i> (A), <i>Lolium perenne</i> (A), <i>Arrhenatherum elatius</i> (A), <i>Ranunculus</i> sp (F), <i>Plantago major</i> (F), <i>Rumex obtusifolius</i> (F), <i>Taraxacum officinale</i> agg. (F), <i>Ranunculus plantago-aquatica</i> l, <i>Potentilla anserine</i> (O). Bank verge: <i>Filipendula ulmaria</i> (A), <i>Carex nigra</i> (O), <i>Tussilago farfara</i> (LA), <i>Equisetum</i> sp (F), <i>Juncus inflexus</i> (F), <i>Prunus spinosa</i> (O), <i>Phalaris arundinacea</i> (F), <i>Sonchus asper</i> (O). Hedge: <i>Crataegus monogyna</i> (D), <i>Sambucus nigra</i> (R), <i>Fraxinus excelsior</i> (F), <i>Salix</i> sp (R), <i>Rosa canina</i> (R).				
Water vole summary:				
Bat summary:				
Birds: wren, swallow, bullfinch.				
Other notable species:				
Notes: (1) Sheet piling on off-side.				

Date:	Surveyors:			
Section number: 26	Map numbers: 56/57/58/59/60			
Photograph taken: (Yes/No)				
% canal bed visible at 1m or deepest: c. 0.5 m				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
6	7	8	9	10
Lowered water table: (Yes/No) No				
More than 5% channel shading: (Yes/No) No				
Bank type: Soft				
20m grapnel sample:				
Aquatic vegetation summary (DAFOR): 90% vegetation cover, with filamentous green algae over <i>Potamogeton pectinatus</i> (A), <i>Ceratophyllum demersum</i> (A), <i>Potamogeton crispus</i> (O), <i>Sagittaria sagittifolia</i> (LF), <i>Lemna minor</i> (LD).				
Marginal vegetation summary (DAFOR): <i>Alisma plantago-aquatica</i> (F), <i>Sparganium erectum</i> (A), <i>Typha latifolia</i> (A), <i>Glyceria maxima</i> (A), <i>Butomus umbellatus</i> (O-LF), <i>Iris pseudacorus</i> (O), <i>Carex riparia</i> (R), <i>Berula erecta</i> (F), <i>Phalaris arundinacea</i> (O), <i>Filipendula ulmaria</i> (LA).				
Bankside vegetation summary (DAFOR): <i>Epilobium hirsutum</i> (D), <i>Urtica dioica</i> (LD), <i>Rumex obtusifolius</i> (O), <i>Rubus fruticosus</i> (O), <i>Phalaris arundinacea</i> (O), <i>Berula erecta</i> (R). Tow path: <i>Dactylis glomerata</i> (A), <i>Lolium perenne</i> (A), <i>Arrhenatherum elatius</i> (A), <i>Potentilla anserine</i> (O), <i>Plantago major</i> , <i>Heracleum sphondylium</i> (O), <i>Anthriscus sylvestris</i> (O), <i>Taraxacum officinale</i> agg. (F). Hedge: <i>Crataegus monogyna</i> (D), <i>Prunus spinosa</i> , <i>Fraxinus excelsior</i> (O), <i>Acer pseudoplatanus</i> (O), <i>Sambucus nigra</i> (O), <i>Trifolium pratense</i> (O), <i>Ranunculus repens</i> . Bank verge: <i>Filipendula ulmaria</i> (A), <i>Phalaris arundinacea</i> (F), <i>Persicaria maculosa</i> (O), <i>Lycopus europaeus</i> (A), <i>Tussilago farfara</i> (O), <i>Lathyrus pratensis</i> (LA), <i>Vicia cracca</i> (LA), <i>Mentha aquatica</i> (O), <i>Persicaria amphibia</i> (F), <i>Carex nigra</i> (O), <i>Juncus effusus</i> (O), <i>Glyceria maxima</i> (F).				
Water vole summary:				
Bat summary:				
Birds: bullfinch, field fair, lapwing.				
Other notable species:				
Notes: (1) Scrub with <i>Fraxinus excelsior</i> standards. (2) Collapsed mammal burrow. Wide tow path, possible area for widening. (3) <i>Crataegus monogyna</i> hedge in front of scrub bank.				

Date:	Surveyors:			
Section number: 27	Map numbers: 60/61			
Photograph taken: (Yes/No)				
% canal bed visible at 1m or deepest:				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
6	7	8	9	10
Lowered water table: (Yes/No)				
More than 5% channel shading: (Yes/No)				
Bank type:				
20m grapnel sample: Poor access.				
Aquatic vegetation summary (DAFOR): <i>Potamogeton compressus</i> (O), <i>Elodea nuttallii</i> (O), <i>Filamentous green algae</i> (O), <i>Sagittaria sagittifolia</i> (O).				
Marginal vegetation summary (DAFOR): <i>Carex riparia</i> (LD), <i>Typha latifolia</i> (F), <i>Sparganium erectum</i> (LD), <i>Glyceria maxima</i> (A), <i>Berula erecta</i> (A), <i>Phalaris arundinacea</i> (A).				
Bankside vegetation summary (DAFOR): <i>Carex nigra</i> (O), <i>Cirsium arvense</i> (LA), <i>Senecio jacobaea</i> (O), <i>Rubus fruticosus</i> (F), <i>Fraxinus excelsior</i> (O), <i>Salix</i> sp (R), <i>Corylus avellana</i> (R), <i>Acer pseudoplatanus</i> (O). Tow path: <i>Rubus fruticosus</i> (O), <i>Epilobium hirsutum</i> (A), <i>Urtica dioica</i> (LD), <i>Lolium perenne</i> (A), <i>Plantago major</i> (F), <i>Plantago lanceolata</i> (F), <i>Heracleum sphondylium</i> (O), <i>Rumex obtusifolius</i> (O), <i>Taraxacum officinale</i> (F), <i>Anthriscus sylvestris</i> (F), <i>Persicaria amphibia</i> (A), <i>Lathyrus pratensis</i> (LA). Hedge: <i>Crataegus monogyna</i> (D). Bankside: <i>Lycopus europaeus</i> (F), <i>Juncus inflexus</i> (F), <i>Epilobium hirsutum</i> (A), <i>Carex riparia</i> (LD), <i>Filipendula ulmaria</i> (A), <i>Tussilago farfara</i> (O).				
Water vole summary:				
Bat summary:				
Birds:				
Other notable species: hedge brown butterflies.				
Notes: Poor access for grappling due to dense and tall marginal vegetation. (1) Dry pond. (2) Sheet piles with <i>Carex riparia</i> and <i>Sparganium erectum</i> between. (3) <i>Salix</i> sp with bat roost potential. (4) <i>Salix</i> sp over <i>Crataegus monogyna</i> hedge.				

Date: 11/9/06	Surveyors: NB			
Section number: 28	Map numbers: 61/62/63			
Photograph taken: number 3				
% canal bed visible at 1m or deepest: 100% where veg. permits				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
Cdem (D) Enut (O)	Cdem (co D) Enut (co D) FGA (F)	Enut (D) Cdem (O)	Enut (D) Cdem (O) Pcom (F) Lmin (O)	Enut (D) Cdem (O) Pcom (F) Lmin (O)
6	7	8	9	10
Enut (R) Lmin (F)	Cdem (R) Pcom (O)	Cdem (R) Pcom (O)	Enut (A) Pcom (O)	Enut (co D) Pcom (co D)
Lowered water table: No				
More than 5% channel shading: no 5%				
Bank type: soft				
20m grapnel sample: <i>Elodea nuttallii</i> (D), <i>Ceratophyllum demersum</i> (F), <i>Potamogeton compressus</i> (O), <i>Potamogeton pectinatus</i> (F), filamentous green algae (F).				
Aquatic vegetation summary (DAFOR): <i>Ceratophyllum demersum</i> (D) changing to <i>Elodea nuttallii</i> (D), <i>Potamogeton compressus</i> (A) in ecotone and second half.				
Marginal vegetation summary (DAFOR): <i>Sparganium erectum</i> (D), <i>Butomus umbellatus</i> (R), <i>Typha latifolia</i> (LA), <i>Sagittaria sagittifolia</i> (O).				
Bankside vegetation summary (DAFOR): Tow path: <i>Rubus fruticosus</i> (O), <i>Epilobium hirsutum</i> (A), <i>Urtica dioica</i> (LD), <i>Lolium perenne</i> (A), <i>Plantago major</i> (F), <i>Plantago lanceolata</i> (F), <i>Heracleum sphondylium</i> (O), <i>Rumex obtusifolius</i> (O), <i>Taraxacum officinale</i> (F), <i>Anthriscus sylvestris</i> (F), <i>Persicaria amphibia</i> (A), <i>Lathyrus pratensis</i> (LA), <i>Prunus spinosa</i> . Hedge: <i>Crataegus monogyna</i> (D), <i>Rosa canina</i> (O). Bankside: <i>Lycopus europaeus</i> (F), <i>Juncus inflexus</i> (F), <i>Epilobium hirsutum</i> (A), <i>Carex riparia</i> (LD), <i>Filipendula ulmaria</i> (A), <i>Tussilago farfara</i> (O), <i>Scrophularia nodosa</i> (O).				
Water vole summary: Good habitat, no signs.				
Bat summary: none				
Birds: linnet, house martin, sparrow hawk, crow, reed bunting.				
Other notable species: speckled wood.				
Notes: (1) Dragonflies, good habitat – larvae. (2) Mammal tracks. Channel, though aquatics kept open by swans, contains <i>Potamogeton compressus</i> .				

Date: 11/9/06	Surveyors: nb			
Section number: 29	Map numbers: 63/64/65			
Photograph taken:				
% canal bed visible at 1m or deepest:				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
Enut (A) Pcom (O)	Enut (A) Pcom (O) Cdem (R)	Enut (A) Pcom (A)	Enut (A) Pcom (A)	Pcom (A) Enut (R)
6	7	8	9	10
Enut (D) Pcom (R)	Enut (D)	Enut (D) Ppec (A)	Cdem (A) Enut (O) Lmin (F)	Enut (A) Ltri (F) Lgib (O) Lmin (F) FGA (A)
Lowered water table: no				
More than 5% channel shading: no				
Bank type: soft				
20m grapnel sample: <i>Elodea nuttallii</i> (D), <i>Ceratophyllum demersum</i> (O), <i>Ranunculus circinatus</i> (F), <i>Potamogeton pectinatus</i> (LA), <i>Potamogeton compressus</i> (O).				
Aquatic vegetation summary (DAFOR): <i>Potamogeton compressus</i> (O), <i>Potamogeton pectinatus</i> (R), <i>Filamentous green algae</i> (LA).				
Marginal vegetation summary (DAFOR): <i>Butomus umbellatus</i> (R), <i>Sparganium erectum</i> (A), <i>Glyceria maxima</i> (LA), <i>Berula erecta</i> (A), <i>Typha latifolia</i> (D), <i>Persicaria amphibia</i> (O), <i>Sagittaria sagittifolia</i> (A), <i>Mentha aquatica</i> (R), <i>Phalaris arundinacea</i> (F).				
Bankside vegetation summary (DAFOR): <i>Salix sp</i> (F), <i>Fraxinus excelsior</i> (O), <i>Quercus sp</i> (R), <i>Dipsacus fullonum</i> (R). Tow path: <i>Rubus fruticosus</i> (O), <i>Epilobium hirsutum</i> (A), <i>Urtica dioica</i> (LD), <i>Lolium perenne</i> (A), <i>Plantago major</i> (F), <i>Plantago lanceolata</i> (F), <i>Heracleum sphondylium</i> (O), <i>Rumex obtusifolius</i> (O), <i>Taraxacum officinale</i> agg. (F), <i>Anthriscus sylvestris</i> (F), <i>Persicaria amphibia</i> (A), <i>Lathyrus pratensis</i> (LA), <i>Prunus spinosa</i> , <i>Vicia cracca</i> (O). Hedge: <i>Crataegus monogyna</i> (D), <i>Prunus spinosa</i> (LD). Bankside: <i>Lycopus europaeus</i> (F), <i>Juncus inflexus</i> (F), <i>Epilobium hirsutum</i> (A), <i>Carex riparia</i> (LD), <i>Filipendula ulmaria</i> (A), <i>Tussilago farfara</i> (O), <i>Scrophularia nodosa</i> (O), <i>Lamium album</i> (O).				
Water vole summary: (2) Possible water vole.				
Bat summary: (3) Bridge with bat roost potential.				
Birds: kingfisher, chaffinch, mute swan.				
Other notable species:				
Notes: Water slightly cloudy. (1) Broken/pollarded willow – possible bat roost potential. Channel open, 10% Lemna cover.				

Date:	Surveyors: EK & SS			
Section number: 30	Map numbers: 65/66/67			
Photograph taken: Yes				
% canal bed visible at 1m or deepest: All, but Lemna 98% cover				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
Enut (O) Lmin (A) Ltri (R)	Ssag (R) Rcir (O) Bumb Enut (F)	Enut (D) Cdem (F) Pcom (O) FGA (F)	Ssag (O) Lmin (A) Eflu (LF) Ltri (O) Enut (F) Cdem (A)	Cdem (A) Enut (F) Eflu (LF) Lmin (A) Lgib (F)
6	7	8	9	10
Pper (LF) Ssag (O) Cdem (F) Lmin (F) Enut (F)	Enut (D) Cdem (F) Lmin (A) Lgib (F)	Cdem (D) Enut (O) Lmin (A) Lgib (F)	Lmin (A) Enut (O) FGA (O)	n/a
Lowered water table: No				
More than 5% channel shading: Yes				
Bank type: Soft				
20m grapnel sample: <i>Sagittaria sagittifolia</i> (O), <i>Equisetum fluviatile</i> (LF), <i>Elodea nuttallii</i> (F), <i>Ceratophyllum demersum</i> (A), <i>Lemna minor</i> (A), <i>Lemna trisulca</i> (O).				
Aquatic vegetation summary (DAFOR): <i>Ceratophyllum demersum</i> (LD), <i>Elodea nuttallii</i> (LA), <i>Ranunculus circinatus</i> (R), <i>Lemna minor</i> (A), <i>Lemna trisulca</i> (O), <i>Lemna gibba</i> (LF), <i>Potamogeton compressus</i> (O), <i>Potamogeton perfoliatus</i> (LF), Filamentous green algae (F)				
Marginal vegetation summary (DAFOR): <i>Phragmites australis</i> (LD), <i>Typha latifolia</i> (LA), <i>Sagittaria sagittifolia</i> (LF), <i>Glyceria maxima</i> (LA), <i>Butomus umbellatus</i> (R), <i>Sparganium erectum</i> (LD), <i>Lycopus europaeus</i> (O), <i>Carex</i> sp (O), <i>Carex riparia</i> (R), <i>Berula erecta</i> (LA), <i>Equisetum fluviatile</i> (O), <i>Juncus effusus</i> (O), <i>Scrophularia auriculata</i> (O).				
Bankside vegetation summary (DAFOR): <i>Epilobium hirsutum</i> (LA), <i>Scutellaria galericulata</i> (R), <i>Lamium alba</i> (O), <i>Filipendula ulmaria</i> (F), <i>Achillea millefolium</i> (F), <i>Cirsium arvensis</i> (O), <i>Centaurea nigra</i> (LF), <i>Lolium perenne</i> (A), <i>Vicia cracca</i> (O), <i>Vicia sativa</i> (O), <i>Ranunculus repens</i> (F), <i>Trifolium pratense</i> (LF), <i>Plantago lanceolata</i> (F), <i>Arrhenatherum elatius</i> (F), <i>Deschampsia cespitosa</i> (O), <i>Urtica dioica</i> (LA), , <i>Torilis japonica</i> , <i>Anthriscus sylvestris</i> . Hedge: <i>Crataegus monogyna</i> (D), <i>Prunus spinosa</i> (O), <i>Fraxinus excelsior</i> (O), <i>Salix fragilis</i> (O).				
Water vole summary: (4) Small mammal holes on towpath side				
Bat summary: none, except possibly large <i>Salix fragilis</i> on offside				
Birds: chaffinch, robin, wren, blue tit, wood pigeon, moorhen, mute swan, grey wagtail, bullfinch.				
Other notable species: grass snake recorded in channel margins, hornet recorded on bankside vegetation. Seasonal/ephemeral pond present beneath hawthorn thicket adjacent to towpath. <i>Lemna minor</i> dominated, no other aquatic vegetation, suboptimal for GCN.				
Notes: (1) Grass snake. (2) Seasonal pond. (3) Large carp. (4) Small mammal burrows in bank.				

Date:	Surveyors:			
Section number: 31	Map numbers: 67/68/69			
Photograph taken: Yes				
% canal bed visible at 1m or deepest: 50% - some turbidity.				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
Lmin (D) FGA (F)	Cdem (D) Enut (O) FGA (F)	Cdem (D) Pnat (O) Afil (F)	Cdem (D) Enut (O) Afil (F) FGA (F)	Cdem (A) Enut (O) Msp (F)
6	7	8	9	10
Cdem (F) Ssag (O) Afil (F)	Cdem (F) Ppec (O) Afil (F)	n/a	n/a	n/a
Lowered water table:				
More than 5% channel shading:				
Bank type: Soft.				
20m grapnel sample:				
Aquatic vegetation summary (DAFOR): <i>Ceratophyllum demersum</i> (D), <i>Elodea nuttallii</i> (F), <i>Azolla filiculoides</i> (F), <i>Potamogeton pectinatus</i> (O), <i>Potamogeton natans</i> (R), filamentous green algae (F)				
Marginal vegetation summary (DAFOR): <i>Sparganium erectum</i> (LD), <i>Glyceria maxima</i> (LD), <i>Phalaris arundinacea</i> (F), <i>Persicaria amphibia</i> (O), <i>Berula erecta</i> (LF), <i>Scrophularia auriculata</i> (O), <i>Solanum dulcamara</i> (R), <i>Lycopus europaeus</i> (O), <i>Sagittaria sagittifolia</i> (LF), <i>Equisetum fluviatile</i> (LA), <i>Oenanthe aquatica</i> (R)				
Bankside vegetation summary (DAFOR): <i>Achillea millefolium</i> (LF), <i>Heracleum sphondylium</i> (O), <i>Epilobium hirsutum</i> (LA), <i>Phalaris arundinacea</i> (LA), <i>Urtica dioica</i> (LA), <i>Vicia sativa</i> (O), <i>Persicaria amphibia</i> (LF), <i>Scrophularia auriculata</i> (O), <i>Scutellaria galericulata</i> (R), <i>Vicia cracca</i> (O), <i>Scrophularia nodosa</i> (R), <i>Filipendula ulmaria</i> (LF), <i>Ranunculus repens</i> (F), <i>Centaurea nigra</i> (O), <i>Lolium perenne</i> (LA), <i>Holcus lanatus</i> (F), <i>Dactylis glomerata</i> (F).				
Water vole summary: Small mammal holes in bank, probable water voles.				
Bat summary: none noted, may be potential in woodland fringe.				
Birds: chaffinch, robin, wren, blue tit, willow warbler.				
Other notable species:				
Notes: Short section, only seven formal samples taken.				

Date:	Surveyors: EK/SS			
Section number: 32	Map numbers: 69/70			
Photograph taken: (Yes/No)				
% canal bed visible at 1m or deepest:				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
Lmin (A) Cdem (A) FGA (A) Rnas (R)	Cdem (A) FGA (A)	Cdem (D) FGA (A) Afil (O) Ltri (R)	Cdem (D) FGA (A) Afil (O)	Cdem (D) FGA (F)
6	7	8	9	10
Cdem (A) FGA (A)	Cdem (A) FGA (A) Msp (O)	Lmin (D) FGA (F)		
Lowered water table: No				
More than 5% channel shading: No				
Bank type:				
20m grapnel sample: <i>Ceratophyllum demersum</i> (D), FGA (F)				
Aquatic vegetation summary (DAFOR): <i>Rorippa nasturtium-aquaticum</i> , <i>Ceratophyllum demersum</i> (D), <i>Lemna trisulca</i> (R), <i>Myriophyllum spicatum</i> (LF) Filamentous green algae <i>Azolla filiculoides</i> (F).				
Marginal vegetation summary (DAFOR): <i>Juncus effusus</i> (O), <i>Juncus inflexus</i> (O), <i>Sparganium erectum</i> (LD), <i>Glyceria maxima</i> (LD), <i>Phalaris arundinacea</i> (LD), <i>Persicaria amphibia</i> (F), <i>Berula erecta</i> (LA), <i>Mentha aquatica</i> (O), <i>Sagittaria sagittifolia</i> (O), <i>Iris pseudacorus</i> (R).				
Bankside vegetation summary (DAFOR): <i>Juncus inflexus</i> (LF), <i>Phalaris arundinacea</i> (LA), <i>Lathyrus pratensis</i> (O), <i>Vicia cracca</i> (O), <i>Calystegia sepium</i> (LA), <i>Persicaria amphibia</i> (LF), <i>Urtica dioica</i> (LA), <i>Trifolium pratense</i> (O), <i>Geranium pratense</i> (O), <i>Mentha aquatica</i> (F), <i>Plantago lanceolata</i> (F), <i>Epilobium hirsutum</i> (LA), <i>Filipendula ulmaria</i> (F), <i>Deschampsia cespitosa</i> (O), <i>Tussilago farfara</i> (O), <i>Arrhenatherum elatius</i> (LA), <i>Lolium perenne</i> (F), <i>Holcus lanatus</i> (LA), <i>Poa trivialis</i> (LF), <i>Dactylis glomerata</i> (F). Hedge and trees: <i>Crataegus monogyna</i> (D), <i>Salix</i> sp. (F), <i>Fraxinus excelsior</i> (F)				
Water vole summary: Suitable habitat, no signs.				
Bat summary: (2) <i>Salix fragilis</i> with broken limbs, dead wood and cracks on offside bank, some bat roost potential.				
Birds: Robin, chaffinch, moorhen, wren and blue tit.				
Other notable species:				
Notes: (1) Standing dead tree, potential value for invertebrates.				

Date:	Surveyors: EK/SS			
Section number: 33	Map numbers: 70/71			
Photograph taken: (Yes/No)				
% canal bed visible at 1m or deepest: visible to 0.6 m only				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
Cdem (D) FGA (A) Enut (O) Lmin (F)	Cdem (D) Enut (O) FGA (F) Lmin (F)	Cdem (D) Afil (O) Lmin (F) FGA (F)	Cdem (D) Enut (O) Lmin (F) FGA (A)	Cdem (D) Lmin (F) FGA (F)
6	7	8	9	10
Cdem (D) Lmin (F) FGA (F)	Cdem (D) Lmin (F) FGA (F)	Cdem (D) Lmin (F) FGA (F) Ppec (O)	Cdem (D) Lmin (F) FGA (F) Afil (O)	Cdem (D) Lmin (F) FGA (F) Ppec (O) Afil (F)
Lowered water table: No				
More than 5% channel shading: No				
Bank type: Soft				
20m grapnel sample: <i>Ceratophyllum demersum</i> (D), <i>Lemna minor</i> (F), FGA (F)				
Aquatic vegetation summary (DAFOR): <i>Ceratophyllum demersum</i> (D), <i>Elodea nuttallii</i> (F), <i>Azolla filiculoides</i> (O), filamentous green algae (LA), <i>Lemna minor</i> (LD), <i>Potamogeton pectinatus</i> (O), <i>Eichhornia crassipes</i> (O)				
Marginal vegetation summary (DAFOR): <i>Sparganium erectum</i> (D), <i>Carex riparia</i> (LD), <i>Glyceria maxima</i> (LD), <i>Berula erecta</i> (F), <i>Iris pseudacorus</i> (R), <i>Juncus effusus</i> (O), <i>Juncus inflexus</i> (O), <i>Typha latifolia</i> (R), <i>Mentha aquatica</i> (O), <i>Carex riparia</i> (LD), <i>Phalaris arundinacea</i> (F), <i>Persicaria amphibia</i> (LF), <i>Lycopus europaeus</i> (O), <i>Equisetum fluviale</i> (O), <i>Scrophularia auriculata</i> (O), <i>Phalaris arundinacea</i> (F), <i>Berula erecta</i> (O).				
Bankside vegetation summary (DAFOR): <i>Calystegia sepium</i> (LA), <i>Urtica dioica</i> (LA), <i>Equisetum</i> sp (O), <i>Persicaria amphibia</i> (LF), <i>Epilobium hirsutum</i> (LA), <i>Juncus inflexus</i> (O), <i>Trifolium pratense</i> (O), <i>Filipendula ulmaria</i> (F), <i>Rumex sanguineus</i> (O), <i>Lolium perenne</i> (LA), <i>Dactylis glomerata</i> (F), <i>Rubus fruticosus</i> (LA), <i>Heracleum sphondylium</i> (O), <i>Equisetum</i> sp (O), <i>Lathyrus pratensis</i> (O), <i>Holcus lanatus</i> (F), <i>Arrhenatherum elatius</i> (F). Hedge and trees: <i>Crataegus monogyna</i> (D), <i>Rosa canina</i> agg. (O), <i>Sambucus nigra</i> (O), <i>Fraxinus excelsior</i> (O) <i>Salix</i> sp. (LD), <i>Rumex obtusifolius</i> (O).				
Water vole summary: Suitable habitat no signs noted				
Bat summary: (1) Longmoor Bridge at the start of the section has some patches of missing mortar, although all holes cobwebbed and therefore unlikely to be used by bats at time of survey. (2) Stag-head oak with low bat roost potential.				
Birds: greenfinch, great tit, willow warbler, robin, chaffinch, coot, mute swan, long-tailed tit.				
Other notable species:				
Notes: Invasive plant species <i>Azolla filiculoides</i> and water hyacinth present in this section.				

Date: 12/9/06	Surveyors: nb			
Section number: 34	Map numbers: 72/73			
Photograph taken: number 5				
% canal bed visible at 1m or deepest: 90% where open but slight greyness				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
Cdem (D) Lmin (F)	Cdem (D) Lmin (F) Lgib (O)	Cdem (R)	Cdem (F)	Cdem (F)
6	7	8	9	10
Cdem (A)	Cdem (A) Enut (A) FGA (A)	Cdem (A) Enut (A) FGA (A)	Cdem (A) Lmin (F)	Cdem (A) Lmin (F) FGA (A)
Lowered water table: no				
More than 5% channel shading: no				
Bank type: 99% soft				
20m grapnel sample: Lots of leaf litter, <i>Ceratophyllum demersum</i> (A), <i>Lemna minor</i> (F).				
Aquatic vegetation summary (DAFOR): <i>Ceratophyllum demersum</i> (D), <i>Elodea nuttallii</i> (O), <i>Lemna minor</i> (A), <i>Lemna gibba</i> (LA), filamentous green algae (LA) <i>Eichhornia crassipes</i> (O).				
Marginal vegetation summary (DAFOR): <i>Sparganium erectum</i> (D), <i>Berula erecta</i> (A), <i>Typha latifolia</i> (LA), <i>Juncus inflexus</i> (F), <i>Epilobium hirsutum</i> (A), <i>Glyceria maxima</i> (A), <i>Filipendula ulmaria</i> (A), <i>Juncus effusus</i> (F), <i>Scrophularia auriculata</i> (F), <i>Persicaria amphibia</i> (O), <i>Lycopus europaeus</i> (LA), <i>Phalaris arundinacea</i> (LF)				
Bankside vegetation summary (DAFOR): Tow path, surfaced with mown grass verge: <i>Artemisia vulgaris</i> (O), <i>Lolium perenne</i> (A), <i>Urtica dioica</i> (F), <i>Dactylis glomerata</i> (A), <i>Lamium alba</i> (F), <i>Anthriscus sylvestris</i> (F), <i>Cirsium arvense</i> (LF), <i>Ranunculus repens</i> (F), <i>Rumex obtusifolius</i> (O). Hedge, grown out in sections: <i>Crataegus monogyna</i> (D), <i>Sambucus nigra</i> (O), <i>Prunus spinosa</i> (O), <i>Rubus fruticosus</i> (F), <i>Urtica dioica</i> (F), <i>Lamium alba</i> (F), <i>Malva sylvestris</i> (O) <i>Acer campestre</i> (O).				
Water vole summary:				
Bat summary:				
Birds:				
Other notable species:				
Notes: Greyish water in some of stretches. Towpath hedge recently gap planted. (1) Bridge with low BRP. (2) Grown out hedge with <i>Fraxinus excelsior</i> standards. (3) Very wide possible reserve area.				

Date: 12/9/06	Surveyors: NB/CB			
Section number: 35	Map numbers: 73/74			
Photograph taken: number 6				
% canal bed visible at 1m or deepest: 0%				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
Cdem (D) Lmin (F)	Cdem (D) Lmin (F)	Cdem (D) Lmin (F)	Cdem (D) Lmin (F)	Cdem (D) Lmin (F)
6	7	8	9	10
Cdem (D) Lmin (F) FGA (A) Ppec (O)	None	None	Lmin (F)	Lmin (F)
Lowered water table: no				
More than 5% channel shading: yes				
Bank type: soft				
20m grapnel sample: <i>Ceratophyllum demersum</i> (D), <i>Potamogeton pectinatus</i> (O), <i>Lemna minor</i> (F).				
Aquatic vegetation summary (DAFOR): <i>Ceratophyllum demersum</i> (D), <i>Potamogeton pectinatus</i> (O), <i>Lemna minor</i> (A), Filamentous green algae				
Marginal vegetation summary (DAFOR): <i>Sparganium erectum</i> dominates in open areas. <i>Typha latifolia</i> (O), <i>Persicaria amphibia</i> (LF), <i>Glyceria maxima</i> (LD), <i>Iris pseudacorus</i> (O), <i>Phragmites australis</i> (LD).				
Bankside vegetation summary (DAFOR): Tow path, surfaced with mown grass verge: <i>Epilobium hirsutum</i> (LA), <i>Artemisia vulgaris</i> (O), <i>Lolium perenne</i> (A), <i>Urtica dioica</i> (F), <i>Dactylis glomerata</i> (A), <i>Lamium alba</i> (F), <i>Anthriscus sylvestris</i> (F), <i>Cirsium arvense</i> (O), , <i>Ranunculus repens</i> (F), <i>Rumex obtusifolius</i> (O). Hedge, grown out but side flailed: <i>Crataegus monogyna</i> (D), <i>Sambucus nigra</i> (O), <i>Prunus spinosa</i> (O), <i>Rubus fruticosus</i> (F), <i>Urtica dioica</i> (F), <i>Lamium album</i> (F), <i>Malva sylvestris</i> (O). <i>Acer campestre</i> (O)				
Water vole summary: Good habitat except woodland where shading limits emergent growth.				
Bat summary: Possible roost in one offside tree.				
Birds: Robin, blue tit, great tit, blackbird, tawny owl, moorhen, mute swan, heron, peregrine falcon				
Other notable species:				
Notes: Canal in slight cutting, overhanging wood on off side. (1) Dry pond. (2) Oak with high BRP, hole and staining visible. (3) Sheet pile.				

Date: 12/9/06		Surveyors: NB/CB		
Section number: 36		Map numbers: 75/76		
Photograph taken: number 3				
% canal bed visible at 1m or deepest:				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
Lmin (A)	Lmin (A)	Lmin (A)	Lmin (A)	Lmin (A) FGA (O)
6	7	8	9	10
Lmin (A) FGA (O)	Lmin (A) FGA (O)	Lmin (A)	Lmin (A)	Lmin (A) FGA (O)
Lowered water table: yes c.30cm				
More than 5% channel shading: yes				
Bank type: soft cutting				
20m grapnel sample: <i>Lemna minor</i> (A) all samples.				
Aquatic vegetation summary (DAFOR): <i>Lemna minor</i> (A), filamentous green algae (F).				
Marginal vegetation summary (DAFOR): Sparse vegetation of: <i>Phragmites australis</i> (R), <i>Glyceria maxima</i> (O), <i>Phalaris arundinacea</i> (O).				
Bankside vegetation summary (DAFOR): Tow path, surfaced and recently mown verge: <i>Lamium alba</i> (F), <i>Urtica dioica</i> (A), <i>Plantago major</i> (A), <i>Plantago lanceolata</i> (A), <i>Rumex obtusifolius</i> (A), <i>Taraxacum officinale</i> (A), <i>Polygonum aviculare</i> (O), <i>Dactylis glomerata</i> (A), <i>Ranunculus repens</i> (LA), <i>Arctium minus</i> (R), <i>Sonchus arvensis</i> (LA), <i>Heracleum sphondylium</i> (F), <i>Chamerion angustifolium</i> (O), <i>Geranium pyrenaicum</i> (R), <i>Trifolium repens</i> (F). Hedge/scrub/woodland embankment: <i>Acer pseudoplatanus</i> (A), <i>Aesculus hippocastanum</i> (R), <i>Crataegus monogyna</i> (A), <i>Sambucus nigra</i> (O), <i>Urtica dioica</i> (A), <i>Lamium alba</i> (F), <i>Heracleum sphondylium</i> (F), <i>Artemisia vulgaris</i> (O), <i>Sonchus</i> sp (O), <i>Rubus fruticosus</i> (LF).				
Water vole summary: Too shaded.				
Bat summary: Trees with dead limbs but look poor.				
Birds: Robin, blue tit, great tit, blackbird, tawny owl, moorhen, mute swan, magpie.				
Other notable species:				
Notes: Will need trimming for navigation. Overhanging vegetation/trees on off side. Canal heavily shaded and in cutting. (1) Fallen <i>Aesculus hippocastanum</i> . (2) <i>Aesculus hippocastanum</i> with rotting limbs one in channel. (3) Badger sett. (4) Possible badger sett.				

Date: 12/9/06	Surveyors: NB/CB			
Section number: 37	Map numbers: 76/77			
Photograph taken: number 4				
% canal bed visible at 1m or deepest:				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
FGA (D) Enut (O) Lmin (A)	FGA (D) Enut (O) Lmin (A)	FGA (D) Zpal (F) Pcri (O) Lmin (A)	FGA (D) Zpal (O) Lmin (A) Pcri (R)	FGA (D) Zpal (O) Lmin (A) Pcri (R)
6	7	8	9	10
FGA (D) Lmin (A) Zpal (O) Pcri (R)	Lmin (A)	Lmin (A)	Lmin (A)	Lmin (A)
Lowered water table: yes 30 – 40cm				
More than 5% channel shading: yes				
Bank type: Soft cutting.				
20m grapnel sample: Filamentous green algae (D), <i>Potamogeton crispus</i> (O), <i>Zannichellia palustris</i> (F), <i>Lemna minor</i> (A),				
Aquatic vegetation summary (DAFOR): <i>Lemna minor</i> (LD), <i>Filamentous green algae</i> (LD), <i>Elodea nuttallii</i> (O), <i>Zannichellia palustris</i> (LF), <i>Potamogeton crispus</i> (O).				
Marginal vegetation summary (DAFOR): <i>Glyceria maxima</i> (LA), <i>Sparganium erectum</i> (LF), <i>Phalaris arundinacea</i> (LF), <i>Iris pseudacorus</i> (R).				
Bankside vegetation summary (DAFOR): <i>Epilobium hirsutum</i> (LA), <i>Petasites hybridus</i> (O), <i>Urtica dioica</i> (LA), <i>Phalaris arundinacea</i> (LF), <i>Silene latifolia</i> (O), <i>Arctium lappa</i> (O), <i>Malva sylvestris</i> (O), <i>Lamium purpureum</i> (LA). Trees/Hedge: <i>Sambucus nigra</i> (O), <i>Crataegus monogyna</i> (LA), <i>Symphoricarpos albus</i> (O), <i>Aesculus hippocastanum</i> (R), <i>Acer pseudoplatanus</i> (O), <i>Fraxinus excelsior</i> (F), <i>Prunus spinosa</i> (F), <i>Acer campestre</i> (LA).				
Water vole summary: Ok towards end but isolated.				
Bat summary: Possible old tree but overall low bat roost potential.				
Birds: robin, magpie, mallard, blue tit				
Other notable species:				
Notes: Trees overhanging on both sides. (1) Veteran ash with low BRP. (2) Fallen ash. (3) Dead wood. (4) Horse chestnut with holes (low BRP). (5) Extensive rabbit warren. (6) Mammal burrows in sandy substrate, possibly badger or rabbit.				

Date: 15/9/06		Surveyors: NB		
Section number: 38		Map numbers: 77/78/79		
Photograph taken: (Yes/No)				
% canal bed visible at 1m or deepest:				
Aquatic vegetation sampled (DAFOR):				
1	2	3	4	5
Cdem (D) Lmin (A)	Cdem (D) Lmin (A)	Cdem (A) FGA (A) Cstag (R) Lmin (A) Enteromorpha sp (O)	Cdem (A) FGA (A) Cstag (R) Lmin (A) Enteromorpha sp (O)	Cdem (A) FGA (A) Cstag (R) Lmin (A) Enteromorpha sp (O)
6	7	8	9	10
Cdem (A) FGA (A) Cstag (R) Lmin (A) Enteromorpha sp (O)	Cstag (D) Enteromorpha sp (A)	Cdem (D) Lmin (O)	Cdem (D) Lmin (O)	Cdem (D) Lmin (O)
Lowered water table: (Yes/No)				
More than 5% channel shading: (Yes/No)				
Bank type:				
20m grapnel sample: <i>Ceratophyllum demersum</i> (LD), filamentous green algae (A), <i>Enteromorpha</i> sp (O), <i>Lemna minor</i> (F) <i>Callitriche stagnalis</i> (D).				
Aquatic vegetation summary (DAFOR): <i>Ceratophyllum demersum</i> (LD), filamentous green algae (A), <i>Enteromorpha</i> sp (LF), <i>Lemna minor</i> (F), <i>Callitriche stagnalis</i> (LD), <i>Potamogeton crispus</i> (R).				
Marginal vegetation summary (DAFOR): <i>Sparganium erectum</i> (LD), <i>Carex riparia</i> (O), <i>Glyceria maxima</i> (LD), <i>Iris pseudacorus</i> (R), <i>Typha latifolia</i> (R).				
Bankside vegetation summary (DAFOR): Tow path, surfaced with amenity grassland verge: <i>Lolium perenne</i> (A), <i>Dactylis glomerata</i> (A), <i>Epilobium hirsutum</i> (LA), <i>Urtica dioica</i> (LD), <i>Rubus fruticosus</i> (O), <i>Lamium alba</i> (O), <i>Anthriscus sylvestris</i> (F), <i>Phalaris arundinacea</i> (F), <i>Artemisia vulgaris</i> (O), <i>Cirsium arvense</i> (LD), <i>Taraxacum officinale</i> (LD), , <i>Lamium purpureum</i> (LA), <i>Salix</i> sp. (LA), <i>Crataegus monogyna</i> (LA), <i>Rubus fruticosus</i> agg. (O), <i>Acer pseudoplatanus</i> (O).				
Water vole summary: Some suitable soft bank with areas of stone rudiment.				
Bat summary:				
Birds: Mute swan, moorhen, coot, mallard.				
Other notable species:				
Notes: 0.75m sechi measurement. Tow path surfaced. (1) Tench. (2) Mature hedge of ornamental species. (3) <i>Salix</i> pollard.				



Sub-appendix 3: Summary of Plant Records



Sub-appendix 4: Summary of bird records



Sub-appendix 5: Aquatic macrophyte intensive survey results