

6. Ecology

- 6.1 As part of the commission for the overall feasibility study, an investigation into the current ecological condition of the route of the canal was undertaken to identify potential constraints and opportunities for ecological enhancement. The study targeted various locations of ecological interest, to provide information concerning potential impacts and constraints of the project on the existing flora, fauna and habitats within and adjacent to the proposed canal corridor. The proposed restoration will largely take place over its historical route, but with some alterations where the canal route has been permanently altered through, for example, development over the route of the canal. This chapter does not cover the proposed new sections of the canal.

METHODOLOGY

Consultation

- 6.2 A series of consultations were carried out in order to determine the known ecological interest within 500m of the canal route. Consultees were asked for any information on legally protected species and statutory and non-statutory designated sites of importance for nature conservation, as well as any views, concerns or aspirations in relation to the potential restoration of the canal. Details of the consultations and a summary of the responses received are given in the next section.
- 6.3 Following the consultation and data gathering exercise a review of all the information received was undertaken to identify all ecological issues associated with the canal, as well as potential constraints and opportunities.

Photographic Assessment

- 6.4 The Shrewsbury and Newport Canal Trust supplied a CD which contained a photographic survey of the historic route of the canal. This survey was analysed and locations likely to be of ecological interest, such as areas where the canal is still in water and wooded habitats, were highlighted and used to inform the subsequent field survey.

Field Survey

- 6.5 A walkover survey was undertaken between the 23 – 25 July 2003, on targeted sections of the canal route based on the information gathered during the consultation and photographic assessment of the canal. The targeted sites were visited and assessed on their present ecological interest. Records were made of the presence of invasive plant species (e.g. Japanese Knotweed (*Fallopia Japonica*) and the potential for habitats to support legally protected species, such as badger, bats, great crested newt and breeding bird populations.
- 6.6 Where habitats displayed significant floral communities, species lists were recorded. Woodlands (where possible) were initially assessed in order to determine the National Vegetation Classification (NVC) of the existing community as given in

(British Plant Communities, Volume 1, Woodland and Scrub, Rodwell, Cambridge University Press 1991).

- 6.7 Scientific names of floral species are given in accordance with '*The New Flora of the British Isles*', Stace, (Cambridge University Press 1995). The binomial system has been employed in this report, and the scientific names of flora and fauna have been given in italics when first mentioned in the text, but not thereafter.

CONSULTATION

- 6.8 Consultation focused on ecology was undertaken with a number of organisations and groups with an ecological interest in the canal. A summary of the consultee responses is given in Table 6.1 below:

Table 6.1 - – Summary Consultee Responses

Consultee	Information Received
English Nature	Held discussions regarding Newport Canal SSSI and Aqualate Mere Ramsar Site (Also a SSSI and NNR).
DEFRA MAGIC website	Location and citation for Newport Canal SSSI.
Staffordshire Ecological Records Centre	Provided information on Statutory and Non-statutory sites of conservation importance in Staffordshire, together with records of protected/Biodiversity Action Plan species in the vicinity of the canal.
Staffordshire County Council	Directed to Staffordshire Ecological Records Centre (see above).
Shropshire Wildlife Trust	Provided information on Statutory and Non-statutory sites in Shropshire, together with records of protected/BAP species in the vicinity of the canal.
Shropshire County Council	Meeting attended, awaiting information on data holding organisations.
Borough of Telford and Wrekin	Own a section of the canal, and are responsible for administering fishing licenses and maintenance of towpaths and litter collection.
Shrewsbury and Atcham Borough Council (website)	Details of a walk along the Old Shrewsbury Canal at Sundorne, which is managed as a Local Nature Reserve by the Borough.
Shropshire County Bird Recorder	Unable to provide data in the timescale of this project.
Shropshire Botanical Society	Awaiting Response.
Shropshire County Mammal Recorder	Awaiting Response.

EXISTING ENVIRONMENT

- 6.9 For ease of understanding the route of the canal has been split into 55 sites which are identified in Figures 1 to 5, in Appendix 2. The ecological interest of these sites is summarised below.

Section 1 (Woodland and wet lock)

- 6.10 This stretch of the canal meets the Shropshire Union Canal at Norbury Junction and enters a large wet dock covered by a building. The old lock is positioned directly behind the dock building and demonstrates a good assemblage of mosses and liverworts, male fern (*Dryopteris filix-mas*) and hartstongue (*Phyllitis scolopendrium*) prolific among the stonework.
- 6.11 The canal becomes dry after joining a ditch or brook within a small woodland area. This woodland demonstrates a NVC Community W8 characteristics dominated by ash (*Fraxinus excelsior*) with an understorey of bramble (*Rubus fruticosus*) and nettle (*Urtica dioica*). Also present was hawthorn (*Crataegus monogyna*), bracken (*Pteridium aquilinum*), great willowherb (*Epilobium hirsutum*), hedge woundwort (*Stachys sylvatica*), dog's mercury (*Mercurialis perennis*), dog violet (*Viola canina*), and hogweed (*Heracleum sphondylium*).
- 6.12 There is the potential in this section that the canal lock wall and trees may support bats and a population of small birds. Fast water movement through lock will reduce the potential for great crested newt (*Triturus cristatus*) to use for breeding.

Section 2

- 6.13 The canal is dry and in-filled, with current land use being pasture.

Section 3

- 6.14 The canal is evident but dry with tall ruderal vegetation.

Section 4 (Lock with bridge and woodland)

- 6.15 The canal bed is in water, with the existing lock and land adjacent to the site wooded. The lock walls and woods provide niches for fern colonisation with male fern, hartstongue and maidenhair spleenwort (*Asplenium trichomanes*).
- 6.16 The W8 woodland is dominated by ash with some elm (*Ulmus* sp.) and elder (*Sambucus nigra*). Ground flora includes hedge woundwort, ivy (*Hedera helix*), ground ivy (*Glechoma hederacea*), bluebell (*Hyacinthoides non-scripta*), nettle, herb Robert (*Geranium robertianum*) and greater stitchwort (*Stellaria holostea*).
- 6.17 The bridge provides some holes and crevices that have the potential to be used by bats whilst the wood provides good habitat for bird populations. Standing water may also provide some limited potential for great crested newt.

Section 5 (Woodland At Locks 6 To 7 With Wet bed)

- 6.18 Woodland; W8 (as above) with occasional foxglove (*Digitalis purpurea*). Adjacent land use at time of survey is agriculturally improved grass pasture with connected hedge network.

Section 6 (Bed in water, marshy vegetation near lock)

- 6.19 Some woodland (as in section 4) and scattered trees, those in adjacent pasture are large mature specimens with bat roost potential whilst the bridge also demonstrates some bat potential. The area will need to be assessed for great crested newt in areas of standing water. Marginal vegetation is dominated by lesser water-parsnip (*Berula erecta*).

Section 7

- 6.20 The canal is dry and in-filled, with current land use being pasture

Section 8 (Depression along canal corridor, Damp semi-improved grassland)

- 6.21 An area of semi-improved grassland with scattered shrubs including dog rose (*Rosa canina*), hawthorn and gorse (*Ulex europaeus*). Other species present include dominant hard rush (*Juncus inflexus*), creeping thistle and spear thistle (*Cirsium arvense* and *C. vulgare*) red and white clover (*Trifolium repens* and *T. pratense*), Timothy (*Phleum pratense*), sorrel (*Rumex acetosa*) and brooklime (*Veronica beccabunga*) in the wetter depressions.

Section 9

- 6.22 Pasture over corridor, canal dry and in-filled with some woodland.

Section 10 (Canal holding water, adjacent land includes pasture arable and scattered trees)

- 6.23 This description was unverified as the canal stretch holding water could not be located in the field. Adjacent ditches and watercourses may provide some potential to support water vole.

Section 11 (Wooded aqueduct)

- 6.24 Canal depression with semi-improved grassland and scrub. Trees include hawthorn and goat willow (*Salix caprea*). The River Meese is crossed by the aqueduct and sources through Aqualate Mere SSSI, NNR and Ramsar site. The river together with its meandering course, morphology and associated riparian habitat has the potential to support both otter (*Lutra lutra*) and water vole (*Arvicola terrestris*). This river may also be important for fisheries, invertebrates and macrophytes and is especially important due to its connection with the Aqualate Mere.

Section 12

- 6.25 Ponds, marshy and wooded areas offline from the canal corridor.
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Section 13

6.26 Canal evident, bed dry supporting thistles and scrub.

Section 14

6.27 Canal has a dry bed and scrub, with adjacent pasture.

Section 15

6.28 Canal in-filled through pasture and adjacent woodland and scrub.

Section 16

6.29 The canal is not evident in this section with tall herb and ruderal vegetation present.

Section 17 (Moss Pool)

6.30 Medium sized pond within improved pasture with closely cropped sward by farm and Canada geese (*Branta canadensis*). Pond has wooded banks and little marginal or aquatic vegetation and may support limited fish population. Due to these factors there is a low potential for great crested newt.

6.31 The surrounding woodlands, however, may support breeding bird populations. The bridge present at this location has limited potential for bat roosts in the crevices associated with the structure and brickwork of the bridge.

Section 18

6.32 Canal bed dry with trees and scrub.

6.33 Newport Canal SSSI is a length of disused canal designated for its macrophyte interest and recorded as one of the best localities for aquatic plants in Shropshire.

Section 19 Canal (Eastern Section)

6.34 This section of canal supports a proliferation of yellow water lily (*Nuphar lutea*) before entering a culvert under the road. Thereafter it passes through a narrow concrete channel and over a stepped weir before returning to its natural form.

Sections 20-23

6.35 Work had recently been undertaken on the canal bank (offside from path) in this section. This may have involved the treatment of vegetation by herbicide spraying and turf removal. There had been a large removal operation of filamentous algae from the canal. The marginal plant community forms a narrow strip and comprises common reed, reed canary grass, branched bur-reed, greater reedmace, with galingale (*Cyperus longus*) and flowering rush (*Butomus umbellatus*).

6.36 Aquatic macrophytes are rare with broadleaved pondweed (*Potamogeton natans*) and a pink water lily (*Nymphaea* sp.) Japanese knotweed is present but rare, in

small isolated stands. Fishing points also continue along the canal with access from the path.

Section 24 (Winding hole connected to canal SSSI)

6.37 Very little aquatic or marginal vegetation present.

Section 25 (Overflow/culverted into perpendicular ditch. Canal in-filled beyond, extending into pasture and scrub)

6.38 Perpendicular ditch with scrub and tall ruderals, occasional Himalayan balsam (*Impatiens glandulifera*) was also present. Large mature crack willows were the dominant feature of the area together with grey willow, hawthorn and some osier.

Section 26

6.39 Canal corridor passes through open pasture and arable farmland.

Section 27 (Scrub and Woodland)

6.40 Woodland dominated by large crack willow (*Salix fragilis*), alder (*Alnus glutinosa*) osier (*Salix viminalis*) sycamore (*Acer pseudoplatanus*). The wood demonstrates a few wet glades with reed sweet grass (*Glyceria maxima*) and other vegetation that includes burdock (*Arctium minus*), marsh thistle (*Cirsium palustre*), herb Robert, ivy and wood avens (*Geum urbanum*)

Section 28

6.41 A dry channel which is overgrown, with the unconfirmed presence of Japanese knotweed (*Fallopia japonica*), with trees and scrub and some adjacent arable land.

Section 29 (Arable farmland)

Section 30 (Woodland, adjacent land dominated by arable farmland and agriculture)

6.42 Canal structure evident with damp marshy habitat and some reed swamp (*Phragmites australis*). Wooded edges with some woodland, fenced and possibly managed for game birds. Woodland comprises osier, goat willow, and alder with scattered oak (*Quercus robur*) on field margins. Ground flora dominated by herbaceous species associated with agriculture and disturbance. Sow thistle (*Sonchus arvensis*), cleavers (*Galium aparine*), nipplewort (*Lapsana communis*), coltsfoot (*Tussilago farfara*), nettle and false oat grass (*Arrhenatherum elatius*) with meadowsweet (*Filipendula ulmaria*) prolific in wetter areas. The woodland area provides some suitability for bats.

Section 31

6.43 Scrub and scattered trees with tall herb vegetation. Adjacent land-use dominated by arable and pasture.

Section 32

- 6.44 Channel on embankment with tall herbaceous vegetation and some scattered scrub.

Section 33 (Woodland)

- 6.45 Woodland with willows (*Salix* sp.) ash, alder, elm, sycamore and elder. Ground flora comprises hedge woundwort, red campion (*Silene dioica*), hogweed, broadleaved plantain (*Plantago major*) and some tall grasses.
- 6.46 This area lies in close proximity to a pond that supports fish, with a low potential for the presence of great crested newts. The area may provide suitability for bats and bird populations due to the trees and associated potential roosts.

Section 34 (Trees and scrub along canal corridor)

- 6.47 Alder and ash with some elder and bramble scrub. Ground flora dominated by cleavers and agricultural weeds, creeping thistle, nettle, hogweed, common hemp nettle (*Galeopsis tetrahit*) and rosebay willowherb (*Chamerion angustifolium*).

Section 35

- 6.48 Tall ruderal and scattered trees and scrub.

Section 36

- 6.49 Corridor traverses arable farmland with scrub along route.

Section 37 (Dry canal bed along line of trees with some reedmace (*Typha latifolia*) west of Wappenshall Junction yard)

- 6.50 Trees include Norway maple (*Acer platanoides*), field maple (*Acer campestre*), white willow (*Salix alba*), crack willow and poplar (*Populus* sp.)

Section 38

- 6.51 The Trench Arm of the canal crosses arable farmland with occasional scrub along route.

Section 39 (Tall herbaceous vegetation and scrub. Adjacent land-use dominated by arable farmland)

- 6.52 Dry canal corridor (in-filled) runs alongside Hurley Brook. The brook is well vegetated prior to a large concrete weir before entering culvert under the road. Marginal plants include reed sweet grass (*Glyceria maxima*), ragwort (*Senecio jacobea*), common reed, water mint (*Mentha aquatica*), great willowherb, black knapweed (*Centaurea nigra*) and hedge bindweed (*Calystegia sepium*).
- 6.53 The brook may have some potential for water vole and the wide field margin provides some interest for invertebrates.
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Section 40 (Canal bed adapted as drainage watercourse from Wappenshall to east of lock 25)

- 6.54 The canal passes through Eyton Lock positioned by a residential property and then enters culvert beneath the road and garden of a second household. Hurley brook continues in parallel to the canal corridor with a thin strip of wooded habitat. This becomes more sporadic as it enters agricultural land. There is the potential for water voles to be present within this section.

Section 41 (Short stretch of canal with bed in water)

- 6.55 Section enclosed between sealed bridge and culvert under the road. The water appears to be polluted and discoloured. Area surrounded by hawthorn, ash, bramble and sycamore. The bridge demonstrates some bat potential.

Section 42

- 6.56 Stretch of canal with bed in water positioned between road and railway.

Section 43 (Embankment with tall herb vegetation, scattered trees and shrubs)

- 6.57 Tunnel through embankment demonstrates hollow cavities capable of supporting bats. The embankment is vegetated with elder, ash, bramble and hawthorn in accompaniment to tall ruderals including nettle, hogweed, creeping thistle, ivy and red dead nettle (*Lamium purpureum*). The canal bed demonstrates a swamp community dominated by reed sweet grass.

Section 44

- 6.58 Canal in-filled traversing arable farmland with parallel hedgerow.

Section 45

- 6.59 Tall herbaceous vegetation.

Section 46

- 6.60 Embankment evident. Tree and scrub adjacent to domestic garden.

Section 47 (Embankment with trees and scrub adjacent to arable farmland and pasture)

- 6.61 The embankment had been planted as a shelter belt and comprised a variety of trees including mature oaks, ash, hawthorn, Scot's pine (*Pinus sylvestris*), sweet chestnut, poplar species, rowan (*Sorbus aucuparia*), holly (*Ilex aquifolium*), birch, (*Betula pendula*), pin oak (*Quercus palustris*), aspen (*Populus tremulosa*), willows, dog rose and bramble.
- 6.62 Ground flora consisted of agricultural weeds with some climbing hop (*Humulus lupulus*), rosebay willowherb, great mullein (*Verbascum thapsus*) and reed canary grass.

Section 48 (Canal corridor with tree and scrub cover, bed in water.)

- 6.63 Vegetated canal corridor with some retained embankment structure surrounded by arable farmland and running parallel to road. The embankment vegetated with scattered trees and scrub including alder, ash, oak, sycamore, hawthorn, grey willow (*Salix cinerea*), blackthorn (*Prunus spinosa*) and elder with occasional bramble, black bryony (*Tamus communis*) and nettle.
- 6.64 The canal is bordered on one side by a laid hawthorn hedge next to the adjacent arable farmland.
- 6.65 The canal bed is marshy with some standing water and the ground flora is therefore a mixture of woodland and marginal species including ivy, cuckoo pint (*Arum maculatum*), ground ivy, red campion, hedge woundwort, garlic mustard (*Alliaria petiolata*), common figwort (*Scrophularia nodosa*), yellow flag iris (*Iris pseudacorus*), branched burreed (*Sparganium erectum*), skullcap (*Scutellaria galericulata*), reed canary grass, brooklime, lesser water parsnip and watermint. The woodland may provide potential habitat for bats and bird populations.

Section 49 (Canal re-profiled with bed in water)

- 6.66 A short stretch of re-profiled canal contained within steel piling and lawn banks. No marginal or aquatic vegetation present.

Section 50 (Large Tunnel in Woodland)

- 6.67 Stretch of canal in water entering long tunnel under wooded area. Tunnel in water (No access) with excellent potential to support bats. Woodland includes larch (*Larix decidua*), ash and blackthorn with an understorey of elder and bramble. The field layer comprises male and hartstongue fern whilst the ground flora is dominated by ivy, red campion, herb Robert and hedge woundwort. The woodland has the potential to support a diverse population of small birds. Brown Hare (*Lepus europaeus*) was also recorded on adjacent arable farmland.

Section 51 (Trees and scrub, corridor crossing pasture with bed in water)

- 6.68 The outbuilding and tunnel present high potential to support hibernating bats. Birds nest recorded in outbuilding. The water does not support aquatic or marginal plant species.

Section 52 (Tall herb vegetation and scrub adjacent land use dominated by arable farmland)

- 6.69 Woodland dominated by oak, hawthorn and grey willow. The field layer supports nettle and bramble whilst the ground flora comprises ivy, garlic mustard and ground elder (*Aegopodium podagraria*). The canal bed at this location is in water and dominated by duckweed (*Lemna* sp.) whilst the marginal habitat is dominated by yellow flag iris.

Section 53 (Tall herbaceous vegetation and scrub adjacent arable farmland)

- 6.70 Canal forms marshy wet habitat with lesser water parsnip, reedmace, reed canary grass, meadowsweet, great willowherb, and water cress (*Rorippa nasturtium aquaticum*). Willows dominate the canopy with both grey and goat willow present, tall herbs and ruderals present in adjacent field margins with tufted vetch (*Vicia cracca*) and common fleabane (*Pulicaria dysenterica*).

Section 54 (Canal bed in water)

- 6.71 Canal dominated with duckweeds (*Lemna minor* and other species), margins comprise branched bur reed and reed sweetgrass. Associated trees include ash, sycamore, hawthorn and Lombardy poplar (*Populus nigra*.) The area provides suitable habitat for water voles and should therefore be surveyed for this species.

Section 55 (Large stand of Japanese knotweed)

- 6.72 A stretch of canal in Shrewsbury, approximately 100m long and dominated by Japanese knotweed. The corridor is fully infested, with the stand extending laterally into adjacent land. The stand is seasonally fully grown at approximately 2m high and fills the canal bed with the main stand being 2m wide. A birds nest was present during survey (young heard).

Statutory Designated Sites*Aqualate Mere*

- 6.73 The majority of the canal route in Staffordshire lies within the statutory consultation area for Aqualate Mere RAMSAR/ Site of Special Scientific Interest (SSSI)/ National Nature Reserve (NNR). Refer to Appendix 2 for a citation.
- 6.74 Telephone consultations with English Nature (EN) yielded concerns about the water quality at Aqualate Mere if the restoration of the Shrewsbury and Newport Canal goes ahead. The water from Aqualate Mere comes from the Shropshire Union Canal and the boatyard at Norbury Junction. High phosphate and silt loading comes from these sources, with around 20% of total phosphate in the mere coming from the canal which can cause eutrophication.
- 6.75 While understanding English Natures concerns, the view expressed does not quite square with our understanding of the water supply to Aqualate Mere. The main input into the Mere is the Back Brook which rises near Stockton and flows northwards to Coley Mill, crossing under the A518 when it becomes the Coley Brook and thence into the Mere. There is a relatively insignificant stream called the Wood Brook which flows under the Shropshire Union Canal near to Norbury Junction and then on into the Mere. At Borbury Junction there is an overflow (which will only run when the Shropshire Union Canal has surplus water) into this brook). Water from the dry dock, at present utilising Lock No. 1 on the Newport Canal, is also understood to drain into a small tributary of the Wood Brook, but this is not drained frequently (certainly not daily) and the volume each time is insignificant compared to a stream flowing continuously. There is the possibility that the water drained off from the dry dock could be contaminated from the activities that are involved but these activities will cease when the Newport Canal is restored. There is evidence that the Mere, which
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is glacial in origin, has been silting up for centuries, probably for far longer than the existence of the canal.

- 6.76 EN are also concerned that if Shrewsbury and Newport Canal included spillways that directed water into the Mere, the two should remain hydrologically isolated. There may however be potential for improving water quality in the Mere by directing water from the Shropshire Union Canal into the Shrewsbury and Newport Canal instead of to the Mere. This can clearly be achieved. However, water from the restored Newport Canal should not enter the Mere as all the watercourses either flow the other way or enter the River Meece downstream from its exit from the Mere.
- 6.77 EN have also suggested contacting British Waterways for further information on resolving conflicts between nature conservation and navigation.

Newport Canal

- 6.78 Newport Canal SSSI comprises a length of about 2km of disused canal, designated for its plant communities including swamp and fen and is one of the best localities for aquatic plants in Shropshire (for the full citation refer to Appendix 2).

Attingham Park

- 6.79 Attingham Park SSSI is an ancient parkland immediately to the east of Shrewsbury. It is designated for its assemblage of invertebrates which depend upon the old trees (Refer to Appendix ? for further details).

Non Statutory Designated Sites

- 6.80 There are 4 Grade 1 Sites of Biological Importance (SBI's) in Staffordshire within 500m of the canal route (Refer to Figures 5-10 in Appendix 2 for locations).
- 6.81 There are 9 Wildlife Sites in Shropshire within 500m of the canal route (Refer to Figures 5-10 in Appendix 2 for locations). Two of the Wildlife Sites (Wrockwardine Wood and Central Hall) are to the east of the Trench Arm of the canal, and are therefore unlikely to be affected by the proposals. Details of these sites are not included in the Appendices.

CONSTRAINTS AND OPPORTUNITIES

- 6.82 In undertaking the restoration of the canal there is the potential for a number of adverse impacts upon the ecology and nature conservation value of the canal and its surroundings, as well as opportunities for ecological enhancement.

Constraints

Statutory and Non-Statutory Designated Sites

- 6.83 Adverse impacts on hydrological systems are complex and can be far reaching. The issues of water quality, movement and the effects of the canal restoration on the water table, ground water and watercourses within the catchment should be investigated thoroughly. Particular attention should be focused on potential impacts to Aqualate Mere SSSI, (also raised as a concern during initial consultation with
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English Nature). The impacts associated with regular use by canal boats; the associated fuel and oil pollutants, erosion, rubbish and disturbance during operation is also an important consideration.

Badgers

- 6.84 Badgers and their setts are protected under the Protection of Badgers Act 1992. This act consolidates all previous legislation and makes it illegal to deliberately kill, injure or take a badger; dig, ring or mark a badger; disturb one whilst in its sett, or damage, destroy or obstruct its sett. The current legislation does not directly protect foraging areas that are used by badgers.
- 6.85 Shropshire is believed to support an extensive badger population and this was demonstrated during the walkover survey. Badgers were present at three separate locations and much of the wooded habitat on the line of the canal was suitable for this species.
- 6.86 The presence of undisturbed earth embankments combined with broadleaved woodland, close proximity to water and interconnectivity (through the hedgerow system) to larger areas of woodland for forage and dispersal afford attractive habitats for badgers. The canal corridor provides many areas demonstrating these characteristics and is therefore likely to be exploited by badger populations.
- 6.87 Where badger setts will be disturbed or adversely affected a licence will be required from DEFRA. (Department of Environment, Fisheries and Rural Affairs) and it will be necessary to apply mitigation measures.
- 6.88 Further detailed badger surveys are necessary to establish the location and extent of the populations present along the canal corridor and surrounding areas. This information will be required to determine the scale of the impact of the canal restoration and design appropriate mitigation.

Bats

- 6.89 All bat species and their roosts (including transient roosts) are protected in the UK under Schedules 5 & 6 of the Wildlife and Countryside Act 1981 (as amended by the Countryside Rights of Way Act 2000 in England and Wales) and the Conservation (Natural Habitats &c.) Regulations 1994. These make it an offence to intentionally or recklessly damage or destroy any bat roost; intentionally or recklessly obstruct access to a bat roost; deliberately, intentionally or recklessly disturb a bat; or deliberately kill, injure or capture any bat.
- 6.90 The many remaining brick and stone structures (locks, tunnels, pound walls, and bridges) provide valuable roosting opportunities and hibernacula for various bat species. Although the presence of bats was unconfirmed throughout the survey the precautionary principle should be applied and all structures and mature trees capable of supporting bats either as winter, summer or transient roosts should be surveyed by a licensed bat worker. These surveys may involve intrusive roost identification, emergence surveys or the use of an endoscope for cavity searches. Much of the wooded habitat recorded provided excellent foraging habitat and the linear structure of the canal corridor provides flight paths for feeding and commuting and will also require survey for bat activity.
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- 6.91 Where bats are affected by the restoration project, mitigation measures will be required these may include translocation, provision of hibernacula or bat boxes/bricks. A licence will be required from DEFRA and all work will need to be undertaken under the supervision of a licensed bat worker.

Birds (general)

- 6.92 All birds are protected by the Wildlife and Countryside Act 1981, amended in England and Wales by the Countryside and Rights of Way (CROW) Act (2000).
- 6.93 Section 1 (1) of the Wildlife and Countryside Act 1981 creates the offences of intentionally killing, injuring or taking a wild bird; taking, damaging or destroying the nest of a wild bird; taking, damaging or destroying the eggs of a wild bird; or possessing a live or dead wild bird or the egg of a wild bird.
- 6.94 Section 1 (5)(a), as amended by the CROW Act 2000, creates the offences of intentionally or recklessly disturbing any wild bird included in Schedule 1, while it is building a nest or is in, on or near a nest containing eggs or young or disturbing dependent young of such a bird.
- 6.95 As the restoration project will conceivably involve the removal of large amounts of vegetation this may potentially affect a variety of different bird species. Depending on the type of habitat removed there may be impacts to Red Data Book listed and legally protected birds. For example the removal of improved grassland may directly affect ground nesting birds such as lapwing or skylark which are a priority UK Biodiversity Action Plan (BAP) species, whilst the removal of woodlands and reed swamp may affect a variety of different bird species.
- 6.96 Particular attention should be drawn to the bird populations present on Aqualate Mere SSSI and there should be close liaison with English Nature with regard to potential impacts.
- 6.97 Bird surveys are recommended along the length of the canal corridor and within the footprint of the potential embankments. Where structures are to be demolished surveys should be conducted to ascertain potential impacts to bird species (especially relevant to barn owl). Where protected species may be affected, mitigation will need to be applied in accompaniment with appropriate consultation (English Nature, RSPB).

Great crested newt

- 6.98 Great crested newt numbers are declining nationally due to loss and degradation of suitable breeding ponds and are therefore afforded protection under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended by the Countryside Rights of Way Act, 2000 in England and Wales) and under The Conservation (Natural Habitats etc.) Regulations 1994.
- 6.99 The defunct canal has preserved isolated pockets of still water, many within existing lock structures. Together with online and offline ponds these afford varying degrees of potential for breeding great crested newt. The associated scrub, woodland and tall ruderals, (often present where the canal bed is in water) also provide suitable terrestrial habitat for forage and hibernacula of the species.

Final Report

- 6.100 In addition to these features the linear structure of the habitats provides some suitability for dispersal of the species and may allow colonisation along the corridor where movement is not impeded by a fragmenting element such as roads or arable farmland.
- 6.101 The restoration of the canal will replace all of these small bodies of still water along the canal corridor and remove much of the existing terrestrial habitat. It will therefore be necessary to conduct great crested newt surveys of ponds and water bodies along the corridor and up to a distance of 500m from the canal footprint (EN Great Crested Newt Mitigation Guidelines, 2001).
- 6.102 Surveys should be conducted by a great crested newt license holder and will primarily identify the ponds potential to support the species and then may be followed by presence / absence surveys. Should great crested newts be present then further population surveys will be required. A licence will also be required from DEFRA in order for the works to commence. The granting of the licence will be dependant on adequate mitigation measures demonstrating that the favourable conservation status of the species will not be compromised and will only be granted with full planning permission or other legal permission.

Invertebrates

- 6.103 There are several areas of potential invertebrate interest including wide field margins, woodland rides, riparian strips and vegetated embankments. The transitional interface (ecotone) between wooded environments and the adjacent land often provided distinct invertebrate interest, this is especially relevant where the canal retains water and species such as damselflies and dragonflies were prolific.
- 6.104 Restoration of the canal will offer opportunities to enhance the route of the canal for invertebrates, particularly those associated with slow moving or standing water and bankside habitats.

Macrophytes

- 6.105 Where the canal bed was recorded to be in water there was little macrophyte interest, often due to the shaded position within lock structures. Aquatic plants, though frequently present were often restricted to the drier more marshy swamp habitat where wet sediments allowed a variety of marginal species to colonise.
- 6.106 Newport Canal SSSI represented the most diverse macrophyte interest as detailed in sections 19-25. The impacts associated with the canal restoration project are likely to be negative on these marginal and aquatic plant communities present in the channel.
- 6.107 A working canal has to be kept relatively clear of vegetation to allow the passage of boats, this obviously conflicts with maintaining the diverse plant community at Newport SSSI. In addition erosion from propeller wash, piling, canal maintenance, pollution and disturbance are all potential impacts in maintaining this diverse plant interest. There may be possible opportunities to neutralise these conflicts by the creation of a backwater system or widening of the canal at this location and the subsequent incorporation of a duel channel with the existing plant communities afforded protection from erosion/wash by central piling.

6.108 A detailed survey of the existing macrophyte interest on the SSSI should be undertaken to determine the full extent of the impacts associated with the proposed restoration. Liaison with English Nature and sensitive design are essential for maintaining the ecological significance and nature conservation interest at this section of the canal.

Water vole

6.109 This species has suffered considerable decline in number through the loss and fragmentation of its preferred habitat. It is protected, under Schedule 5 of the Wildlife and Countryside Act 1981 in respect of section 9(4), which affords limited legal protection. At present, this legislation protects the water voles habitat only making it an offence to damage, destroy or obstruct any structure or place which water voles use for shelter or protection. It is also an offence to disturb water voles whilst using such a place.

6.110 The survey revealed several areas capable of supporting water vole populations which are now vulnerable in England. Numbers of the species have been drastically reduced through predation (often by introduced mink) and habitat modification.

6.111 The canal restoration project may impinge on adjoining water courses and therefore disturb existing water vole habitat. However, the creation of a new water course and additional riparian habitat (If designed and constructed sensitively, possibly using soft engineering techniques) may provide additional colonisable habitat for the species. The restoration project could work towards local and UK BAP targets for the water vole.

Otter

6.112 The otter is afforded protection under the Wildlife and Countryside Act 1981, under Section 9.1 and 9.4, Schedule 5 (as amended as amended by the Countryside Rights of Way Act, 2000 in England and Wales) and under The Conservation (Natural Habitats etc.) Regulations 1994. This legislation makes it an offence to kill injure or take an otter from the wild without a licence; to damage or obstruct a holt; or disturb an otter in its resting place. A licence will be required from DEFRA if the project is found to impact on an existing otter population.

6.113 The otter has been given full legal protection throughout England and Wales since 1978 due to its drastic decline in numbers. Since then the otter has managed to survive in some localities that afford suitable riparian habitat and conditions. Recently, it has been much publicised that the otter has made a comeback with an increase in distribution in the English countryside. However, the population recovery is not complete and the species is far from being as widespread as once it was.

6.114 Instrumental in maintaining and enhancing the recovery of otter populations is water quality and the management of rivers following best practice; this includes issues such as connectivity, hydrology and the sensitive management of riparian habitat and vegetation.

6.115 Otters are present in the Severn catchment and the Otter Survey of England 2000-2002 (Environment Agency) has recorded an increase in otter range on the Middle Severn and the Tern systems. Some of the habitat recorded during the survey

(especially relevant to the area surrounding Aqualate mere and the River Meese) may be valuable to the existing otter population. Therefore otter surveys should be undertaken along the corridor to ascertain the likely impacts of the scheme on the existing population. Impacts on water quality that affect existing watercourses and local fisheries should be considered carefully.

- 6.116 However, the restoration project could feasibly enhance the environment for the existing otter population by providing connectivity (dispersal routes) between river systems and additional colonisable habitat. This may create potential to further the increase in otter distribution within the catchment and may work towards local and UK BAP targets for the species.

Woodlands

- 6.117 The woodlands recorded throughout the survey were mostly narrow linear habitats and often fragmented areas of semi-natural broadleaved or mixed plantation. Much of this woodland may require removal for construction of the canal and this will have associated impacts on the fauna present (especially relevant to protected species: badgers, bats and birds).
- 6.118 The canal corridor passes through some larger areas of woodland (for example section 33) and the impacts of the scheme in these areas are envisaged to be more substantial than on the smaller, more fragmented woodlands.
- 6.119 The woodlands will require further survey to establish the full diversity of ground flora in spring and provide community information that can be interpreted to provide a qualitative and quantitative assessment of the impacts associated with the canal construction.

Invasive species – Japanese Knotweed

- 6.120 Japanese knotweed is listed under Wildlife and Countryside Act 1981 schedule 9, Section 14. This legislation creates the offence to plant or otherwise cause this species to grow in the wild.
- 6.121 Japanese knotweed is a vigorously growing perennial plant native to Japan and Taiwan and is regarded as the most invasive plant in Britain. It is thought to produce no viable seed and the plant is chiefly propagated vegetatively through its underground rhizome system. This root system can extend up to 7 metres from the visible stand and small fragments of the plant, in particular the rhizomes, can produce new plants. Japanese knotweed has been known to emerge through tarmac and can cause damage to buildings and structures whilst also causing deleterious effects on native wildlife by out-competing the typical riparian plant species.
- 6.122 Japanese knotweed is present at several sites along the canal corridor and may represent a considerable constraint to the restoration project as it will be necessary to eradicate these stands prior to construction. This can be achieved by three methods, herbicidal treatment (potentially over a period of 3-5 years), deep burial on site, or removal for disposal to a licensed waste site. Japanese knotweed is also listed under The Environmental Protection Act 1990 (EPA), which classifies it as 'controlled waste' and as such must be disposed of safely at a licensed landfill site according to the EPA (Duty of Care Regulations 1991).

Final Report

- 6.123 The largest stand recorded is present in Shrewsbury Town centre, at the end of the canal (section 55).
- 6.124 It is recommended that the Japanese knotweed along the corridor is surveyed and mapped in order to ascertain the full extent of the infestation and design a successful and cost effective eradication programme.

Landscape integrity and habitat connectivity

- 6.125 The line of the canal corridor as it exists today is extremely fragmented and comprised of a variety of habitats including plantation and semi-natural woodland, semi-improved and improved grassland, swamp habitat, open water, arable farmland, amenity use and residential buildings.
- 6.126 These existing habitats form components within the landscape that constitutes a mosaic, thereby interlinking a variety of differing habitats. For example, the pockets of wooded and scrub habitat connect with hedgerows and other areas of woodland to form green corridors that enable the movement of wildlife throughout the area. These are important commuting and foraging routes for a wide range of species and are important in maintaining population dynamics and biodiversity.
- 6.127 The canal corridor covers approximately 25 miles and will form a large single corridor. It is therefore important to consider the scheme on a holistic level to interpret catchment based impacts on watercourses, and those associated with protected species and the fragmentation of existing habitats. This level of interpretation is invaluable in determining the type and severity of the potential impact and also in designing effective mitigations.
- 6.128 A Phase 1 habitat survey conducted in accordance with the Guidelines for Baseline Ecological Assessment (IEA 1995) is recommended in order to provide baseline conditions along the line of the corridor.
- 6.129 This survey will provide an overview of the habitats that will be affected and target further survey work required, whilst also providing information necessary in the process of determining the significance of the features affected and the ecological impacts of the restoration project.

Regulatory Constraints*Environmental Impact Assessment*

- 6.130 The need to undertake environmental impact assessments is governed by European and UK legislation.
- 6.131 The EC Directive on The assessment of the effects of certain public and private projects on the environment (85/337/EEC) came into effect in July 1988 and initiated a formal approach to environmental impact assessment throughout the European Community. The effect of the Directive was to require environmental impact assessment to be carried out, before development consent was granted, for certain types of major project which are judged likely to have significant impacts on the environment.

- 6.132 In March 1997, European Directive 85/337/EEC was amended by European Directive 97/11/EC. This extended the list of projects which are considered to have significant effects on the environment and which must be subjected to systematic assessment. The Directive provides selection criteria to determine whether projects for which assessment is not mandatory require environmental impact assessment and allows Member States to set their own criteria or thresholds for significance. The EU Directive is transposed into UK law by the Town and Country Planning Regulations 1999.
- 6.133 Proposed works constituting a project which falls within the Annex II of the European Council Directive will require an Environmental Assessment prior to the initiation of any works on-site.
- 6.134 If it is considered that the restoration works would require Environmental Impact Assessment under the Town and Country Planning Regulations 1999, a screening opinion obtained from the Local Planning Authority (LPA) will be required, and if a formal Environmental Statement is required this can be a lengthy process and must be included in the planned restoration programme, including a 16 week determination period by the LPA.

SSSI

- 6.135 Section 28, schedule 9 of the Countryside Rights of Way Act 2000, sets out the consultation process for work which may damage the special features of a SSSI, whether working within or outside of the SSSI boundary. The key requirements are that the authority (body applying to undertake the works) must give 28 days notice to English Nature of its intentions before commencing any operation likely to damage any flora, fauna or geological or physiological features for which the SSSI is designated.
- 6.136 If consent is withheld by English Nature or if the authority proposes to carry out the operation otherwise than in the accordance with the terms of English Nature consent, the authority is required to notify English Nature of the date on which it proposes to start the operations (which must be after the 28 day notification period) and how it has taken account of any written advice it received from English Nature.
- 6.137 If planning permission is required the authority shall take into account any advice received from English Nature in deciding whether or not to permit the proposed operations and if it does decide to do so, in deciding what conditions are to be attached to the permission.
- 6.138 If works are undertaken contrary to English Nature advice, all actions must be accountable. Failure to comply can result in a fine not exceeding £20k on summary conviction, or on conviction on indictment to a fine.

Non-Statutory Sites

- 6.139 In the single non-statutory site, potential enhancement opportunities do exist and there will be no significant legal constraints.

Other Opportunities

- 6.140 Although the canal restoration is likely to have some negative impacts on existing flora and fauna through temporary disturbance and permanent fragmentation and habitat loss, it also provides an opportunity to enhance the local environment by creating a green corridor and riparian habitat from the junction with the Shropshire Union canal at Norbury, through to the centre of Shrewsbury. This habitat offers opportunities that could be exploited by a variety of species of conservation importance.
- 6.141 The environmental potential of the project could be realised by a holistic approach and the use of sensitive design and construction techniques.
- 6.142 The design of the profile of the canal should incorporate a shallow area/shelf on the bank opposite the towpath. This should be planted with emergent vegetation to provide valuable marginal habitat for a range of wildlife which depend on shallower water to develop.
- 6.143 Soft engineering options (such as willow piling and revetments, coir rolls and matting) should be exploited wherever possible. The creation of online and offline features such as ponds, backwaters and associated woodlands should be considered as important incorporations to the linear canal design. In addition, a wide riparian strip would be beneficial in integrating the canal and embankments into the surrounding landscape and would also be capable of supporting a variety of species.
- 6.144 Detailed designs of habitat restoration/creation measures should be included at the design stage of the canal restoration project.

WAY FORWARD

- 6.145 The Shrewsbury to Newport Canal restoration project will be subject to a variety of ecological constraints as set out in this report. The project will require an in depth Environmental Impact Assessment necessitating further ecological surveys and the interpretation of impacts on protected species and habitats.
- 6.146 It is important that all designated sites are protected from any deleterious effects of the proposed restoration.
- 6.147 In conclusion, whilst the canal restoration is envisaged to impact on existing flora and fauna, it also provides an opportunity to enhance the local environment by creating a green corridor and riparian habitat that could be exploited by a variety of species. The environmental potential of the project could be realised by a holistic approach and the use of sensitive design and construction techniques.
- 6.148 Soft engineering options should be developed as part of the detailed design of the restoration scheme wherever possible and the creation of online and offline features such as ponds, backwaters and associated woodlands should be considered as important incorporations to the linear canal design.
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Recommendations

6.149 In summary it is recommended that the following surveys are undertaken as part of the future planning and development schemes leading to full and complete restoration of the canal route:

- ◆ Phase 1 survey as per *Nature Conservancy Council Handbook for Phase 1 Habitat Survey (1990)*;
- ◆ Bat;
- ◆ Great crested newts;
- ◆ Badger;
- ◆ Invertebrates;
- ◆ Macrophytes;
- ◆ Water voles.