

A Report
on
The Potential Impacts, Environmental Benefits and
Disbenefits
of
The Restoration of the Lichfield Canal

for
Lichfield and Hatherton Canals Restoration Trust

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by

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Restoration of the Lichfield Canal

Environmental Report

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1. Introduction

- 1.1 Ed Sharkey Associates has been commissioned by the Lichfield and Hatherton Canal Restoration Trust (The Trust) to prepare an environmental report outlining the potential impacts and environmental benefits and disbenefits of a restoration of the Lichfield Canal from Ogley Junction, near Brownhills to Huddlesford Junction, east of Lichfield.

2. Consultation

- 2.1 In preparing this report Ed Sharkey Associates had informal consultation meetings with the following organisations:
- 2.1.1 Environment Agency - Conservation, Flood Defence & Water Resources Officers
 - 2.1.2 Lichfield District Council - Conservation, Countryside Services & Local Plan Officers
 - 2.1.3 Staffordshire Wildlife Trust
- 2.2 Ed Sharkey Associates additionally had correspondence and telephone discussions with the following organisations:
- 2.2.1 British Waterways Hydrologists at Watford.
 - 2.2.2 English Nature at Attingham Park.
 - 2.2.3 the Forestry Authority Grants and Licenses Centre at Market Rasen.
 - 2.2.4 MAFF/FRCA at Crewe.

3. The Wyrley and Essington Canal

- 3.1 History:
- 3.1.1 In 1797 The Wyrley & Essington (W & E) Canal opened to the northern section of the Coventry Canal. This travelled across the northern edge of the Black Country, by-passing the monopolising Birmingham Canal company and opening up new routes to Cannock, Wolverhampton and the River Severn. The eastern end of the Wyrley & Essington Canal is the section referred to in this report as the 'Lichfield Canal'. The route of the canal is shown on location plan no. 9901.1
 - 3.1.2 The canal descended via 30 locks from the Wolverhampton Level (the top level of the Birmingham Canal Navigations -BCN) at approximately 142m AOD through a distance of approximately 7 miles north east to the Coventry Canal at approximately 65m AOD.
 - 3.1.3 In 1954 it was closed and drained, mainly due to loss of traffic and the high cost of maintaining the locks relative to the diminishing traffic.

3.2 Route Description:

- 3.2.1 The following route description is an edited version of an article by Peter Hardcastle - 'Canals: Roots and Routes - Wyrley and Essington Canal', a visual survey of the route, published on the UK Waterways Network (www.canals.org.uk). The route of the canal is shown on Plan No. 9901.1
- 3.2.2 "From Ogley Junction the main line is still navigable for a few yards and is used as marina moorings. Beyond the moorings was the first lock flight but locks 1 & 2 have been filled in and are now part of the gardens of 2 houses. These houses were formerly lock cottages and were in fact the highest numbered BCN cottages (270 & 271). Richard Chester-Browne (in "The Other Sixty Miles") says locks 3 & 4 were intact in 1980 but were in the gardens of private houses and therefore a polite knock at the door is needed to ascertain whether they still exist. Lock 5 still exists though it is completely hidden by dense undergrowth. It was situated just west of Warrenhouse Bridge on Barracks Lane. A sign posted path on the far side of the bridge may well be the former towpath but lock 6, which was just a few yards east, has gone without trace.
- 3.2.3 *[Note: In fact the lock has been infilled and is intact with the copings visible]*
- 3.2.4 The outline of the nearby side pond can be made out from the shape of garden fences and lock 7 can just about be recognised. The canal curved north to lock 8 which is still intact though there is no public right of way to it. The canal turned east before reaching Watling Street and its embankment can still be seen from the junction of the A5 and the B4155."
- 3.2.5 "The canal now winds away from public view in a south easterly direction. Its next traceable location is beside the Boat pub on Boat Lane (A461), now a busy dual-carriageway. Before the road was widened Boat Bridge used to stand close to the pub. The raised pavement in front of the pub indicates the original line of the road and a line of tall trees gives away the route of the canal."
- 3.2.6 "The canal bed runs parallel to the A461 in a north easterly direction but most of the route has been filled in. Watling Street (A5) crosses over the route about 50 yards east of the A461 roundabout (known as Muckley Corner). The parapet on the north side of the bridge still exists though the south side was removed when the road was widened. To the north of the bridge the canal bed has been taken over by a nursery and is now full of trees. Locks 9, 10 and 11 were on this 400 yard stretch but it is not known if they have been removed or simply filled in."
- 3.2.7 "Beyond the nursery the A461 crosses for a second time as the canal snakes north west and then north east. The bridge is a concrete structure built in the 1920's. If one is (very) lucky water can sometimes be seen in the canal below."
- 3.2.8 *[Note: Since this article was written in 1996 the section of cut north west of the A461 road bridge has now also been filled in]*

- 3.2.9 “A house called "Canal Cottage" stands close by. Sadly, the canal north of here up to Coppice Lane was filled in in recent years. Coppice Lane Bridge has now gone and Lock 12, which was just south of the bridge, has had the top partly demolished into the remainder. A straight north easterly section follows beyond Coppice Bridge and the canal holds water though it is very overgrown. The canal crosses an embankment past an old wharf which served a pumping station.”
- 3.2.10 “Today the canal turns sharp right where the railway (formerly a LNWR line) swings from west to east. The original canal used to go a few yards beyond the railway on a longer loop but it was re-routed when the railway was constructed. Immediately after the right turn the canal line is crossed for the third and last time by the A461. Pipehill Bridge, a Victorian blue brick structure, still stands.”
- 3.2.11 “East of the main road the canal twists around to the north east, its course could be followed if only the dense undergrowth could be cleared away. This stretch alternates between embankment and cutting until Wall Lane Bridge. This was the last surviving original road bridge on the abandoned stretch of the Wyrley & Essington Canal but it too has now been demolished.”
- 3.2.12 “North of Wall Lane were locks 13 to 17. Some of these were intact until recent years but all have now infilled and used as horse paddocks. Fosseway Lane crossed the canal directly below lock 17. Lock 18 was a little further north but had also vanished until recently. In 1996 it was re-excavated and found to be in good condition. Money was donated to restore it and the lengths of canal on either side. The lock cottage beside Fosseway Bridge has also survived.”
- 3.2.13 *{Note: LCRT raised funds to allow Lock 18 to be restored. The work was carried out by Trust members helped by other volunteer groups including work parties from as far away as the North East of England and Kent & East Sussex.}*
- 3.2.14 “Nearly a mile north east of Fosseway Bridge is lock 19, still intact but lock 20, a further 600 yards north east, has vanished. This lock was situated east of Chesterfield Road and immediately before Birmingham Road (A5127). Shires Industrial Estate now stands on the canal between the two roads. On the east side of Birmingham Road the canal was crossed by a railway, it then swung south under Shortbutts Lane. Lock 21 was immediately before Shortbutts Lane but it and all of this section has been built on.”
- 3.2.15 “South of Shortbutts Lane the canal swung around to head north east. This stretch is now a pleasant walk though the canal is infilled. Locks 22 & 23 were here, as was St. John's Wharf, but all have been infilled. The modern St. John's Bridge carries London Road over the former canal, the site of Gallows Wharf is on the far side. Until recent years some of the wharf buildings survived.”
- 3.2.16 “The next stretch can be seen from the road up to where the former canal runs through a garden. Locks 24, 25, & 26 were situated east of Cricket Lane. A lock cottage stands near the remains of lock 24, the site of lock 25 can be made out but lock 26 has been infilled. The A38 Lichfield bypass has blotted out the canal and lock 27.”
- 3.2.17 *[Note: Since this was written LHCRT have excavated and rebuilt Lock 25.]*

- 3.2.18 “After the dual-carriageway the canal turned left to head north under Freeford Bridge (A51). This section has disappeared under a transport yard. A road has been partly built on the canal from here to Darnford Bridge. Half way along this stretch was lock 28.”
- 3.2.19 “Darnford Lane, the minor road to Whittington, is the scene of the start of restoration but as you will have noticed from my description, it will take a lot of work before boats travel along this route to Ogleby Junction. It is just over a mile to Cappers Lane Bridge on another minor road to Whittington, lock 29 was on this section but it has been partly demolished. Lock 30 is situated a few yards above Cappers Lane, it is intact complete with the remains of gates, a lock cottage stands beside it. From the lock the canal has been dredged and is in water. Cappers Bridge has been flattened but the canal is navigable to the north of it. The waterway is currently used by Lichfield Cruising Club and is therefore not accessible but within 600 yards Huddlesford Junction is reached and the Wyrley & Essington Canal meets the Coventry Canal, the area around the junction has been fully restored. Huddlesford Junction can be found on the Coventry Canal to the north of Whittington.”

4. Scheme Proposals

4.1 Objective:

- 4.1.1 The Lichfield and Hatherton Canal Restoration Trust propose to restore the canal to allow navigation between Ogleby Junction and Huddlesford Junction and are actively engaged in the work.
- 4.1.2 At present restoration is being carried out in sections as land acquisition and funding for the work allows.
- 4.1.3 The Trust is actively seeking major funding to allow the restoration programme to be advanced significantly in the medium term.

4.2 The IWAAC Report:

- 4.2.1 The Report on Waterway Restoration Priorities by the Inland Waterways Amenity Advisory Council (IWAAC) in 1998 identified the restoration of the Lichfield Canal as one of twelve projects for main funding in the medium term, i.e within a 5-10 year timescale. Three projects in this group were identified as being of national significance. Another five, including the Lichfield Canal, were identified as being of regional significance.
- 4.2.2 The IWAAC assessed the Lichfield Canal restoration as:
- “A strategically important project for the creation of new cruising rings, the development of leisure cruising on the under-used northern part of the BW Birmingham Canal Navigations system and the revitalisation of this part of the West Midlands.”
- 4.2.3 Restoration costs at that time were put at approximately £9M plus land acquisition costs.

- 4.2.4 IWACC are currently reviewing waterway restoration priorities to take into account short term projects underway or approaching completion and material changes in the circumstances of other projects that affects their readiness to take major funding.

4.3 Overall Scheme of Work for Restoration:

- 4.3.1 Most of the restoration will be 'on-line' using the existing landtake. On these sections the work will involve re-excavation of filled sections, renovation of existing locks and ancillary structures, piling and re-lining where necessary.
- 4.3.2 The Trust estimate that 2.5 miles of existing cut will need clearing of vegetation and re-lining to hold water. A further 3 miles of the old route have been filled and will need re-excavating and re-lining.
- 4.3.3 The Trust estimate that 17 of the old locks that are derelict or filled in can be restored. An additional 13 new locks will need to be built on diversions or where the level must be lowered to pass under new roads.
- 4.3.4 The Trust estimate that 14 new crossings will need to be built under main and minor roads. Four of the original bridges survive and can be re-used.
- 4.3.5 Several culverts and pipe crossings will need to be re-instated as part of the works.
- 4.3.6 The towpath would be relaid along the whole of the route.
- 4.3.7 There are two main sections totalling about a mile in length where the Trust will need to build new sections 'off-line' due to road or building development on top of the old alignment:
- (1) A section from Sandfields (SK 109 083) to parallel the line of the proposed Lichfield Southern Bypass , under the A5127 Birmingham Road, to rejoin the old alignment at approximately 400m west of the London Road Bridge (SK 118 082).
 - (2) A section to go south of Freeford House (SK 132 083) then north under the A51, parallel to the A38 on its west side, then turning east under the A38 (at SK 134 085) and running north east to rejoin the old alignment near Darnford Bridge Farm (SK 137 085).
 - (3) Other minor diversions at Muckley Corner and near Ogley may be required. A further short diversion at Darnford Lane is partly complete.
- 4.3.8 The Trust are already carrying out restoration works on three sections of the canal in its lower reaches:
- (1) Darnford Lane Site (SK 142 089): Lift bridge replaced, siphon culvert replaced, new lift bridge completed and landscaped, new channel partly constructed, approximately 300m of sheet steel piling installed.
 - (2) Tamworth Road Lock (SK 131 083): Chamber of Lock 25 excavated, stonework and brickwork completed.

- (3) Fossey Lane Site (SK 102 080): Chamber of Lock 18 excavated and restored, lockside landscaped, 300m of towpath excavated and surfaced, picnic table installed.

4.3.9 The locations of the various sections of the route are shown on Plan 9901.1

5. Environmental Issues

5.1 Community:

5.1.1 Planning:

- (1) County Structure Plan: The Draft Staffordshire and Stoke on Trent Structure Plan supports canal restoration and development in its policies on Recreation, Leisure and Culture.. The contribution of canals to the heritage of Staffordshire is recognised as is their importance as a focus for recreation and tourism activities. The wildlife value of canals is to be conserved and enhanced.
- (2) Lichfield District Local Plan:
 - (a) The Lichfield District Local Plan (adopted in June 1998) contains many policies that accord with the aims of the project, in particular those on the development of Tourism and Recreation. However the introduction to the Local Plan, in discussing the framework for planning policy, makes explicit that the Council has an overarching aim in its intention to work for a more sustainable environment.
 - (b) To this end the Council intends to:
 - (i) maintain the quality of the countryside by controlling development within it
 - (ii) prevent damage to important wildlife habitats and natural features and to seek amelioration where this is to occur.
 - (iii) identify particularly fragile and important areas for special protection.
 - (iv) prevent developments which would cause unacceptable levels of pollution.
 - (c) The proposed section of canal between Birmingham Road and London Road falls within an Area of Development Restraint. Exceptions may be made for outdoor recreation that retains the character of the area (Policy E5A)

- (d) As well as containing policies that address the protection of statutorily designated nature conservation sites of national or international value (e.g. SACs or SSSIs [Policies E18 & E18A]) the Plan contains policies that address development on locally designated sites e.g. Local Nature Reserves or County Grade 1 Sites of Biological Importance.
- (e) In each case there is a presumption against development unless it can be shown that there are reasons why the proposal should outweigh the need to safeguard the intrinsic nature conservation value of the site (Policy E18B)
- (f) Similarly the Plan will only allow development on sites where it can be shown that harm to species protected by the Wildlife and Countryside Act 1981 can be avoided (Policy E19).
- (g) As regards architectural heritage the Plan contains policies that seek to prevent development that affects the structure or setting of listed buildings (Policy C1)
- (h) The Plan supports initiatives to develop tourism that are consistent with conservation aims (Policies Emp.6, L55). The Plan explicitly mentions the restoration of the Lichfield Canal under Policy Emp.11 and affirms the Council's intention to assist in its implementation through development control powers and land reclamation.
- (i) The Plan contains proposals to build the Walsall Road - Birmingham Road link (part of the Lichfield Southern Bypass) and to safeguard the line of the extension from Birmingham Road to London Road (Lichfield Area Policy L21) The proposal to include the canal diversion alongside the new road is not explicitly addressed within the Plan.

(3) Environment Agency LEAP:

- (a) The Environment Agency is a Non-Departmental Public Body (NDPB) and has a wide range of duties and powers relating to different aspects of environmental management, specifically with respect to safeguarding the water environment, controlling pollution and regulating waste disposal.
- (b) As part of its work the Agency has produced a number of Local Environment Agency Plans (LEAPs) which set out the main environmental issues identified in the subject area by the Agency.

- (c) A consultation draft of the Burton, Nuneaton and Tamworth LEAP was published in November 1999 and identifies the impact of canal restoration schemes as an issue (Issue 11), primarily in consideration of the potential sources of supply of water to a fully restored canal, the scarcity of surface and ground water resources in the area through which the canal passes, and the general environmental impact of the scheme.
- (4) Forest of Mercia:
 - (a) The sections of canal east of the A461 Walsall Road are within the boundary of the Forest of Mercia. Lichfield District Council supports the implementation of the Forest by negotiating provision of new planting schemes with developers and in establishing 'green corridors' along major routes (Policy E2)

5.1.2 Settlement:

- (1) The route of the restored canal takes it along the southern edge of Lichfield and there are a number of places where housing has been developed, or is proposed to be developed, immediately adjacent to the canal. There will inevitably be impacts on such properties, e.g. localised loss of privacy, during construction of the canal and possibly on-going in its operation. However these potential impacts are generally capable of mitigation.

5.1.3 Access and Leisure

- (1) Inland Waterways:
 - (a) British Waterways manages a network of some 2000 miles of canals and rivers which are visited by some 10 million people per year.
 - (b) The Government is encouraging British Waterways to develop partnerships with public and private sector organisations with the following objectives:
 - (i) urban regeneration
 - (ii) rural regeneration
 - (iii) community development
 - (iv) tourism
 - (v) sport & recreation
 - (vi) conservation
 - (c) The proposed restoration of the Lichfield Canal in partnership with British Waterways, and in close liaison with other parties such as Lichfield District Council and the Environment Agency, is therefore in accordance with Government policy on inland waterways.

(2) Tourism:

- (a) Lichfield District Council estimate that about 2000 persons are employed in the District directly in the Tourism business. Tourism makes an indirect contribution to the District's economy, particularly retailing within Lichfield City in the summer months.
- (b) An estimate for potential visitor spending on the restored canal was prepared by British Waterways for the Lichfield and Hatherton Canal Restoration Trust in 1992 using a computer model (the BW Standard Boat Model) produced by Liverpool University. The figures would require updating but the indications at that time were that the restored canal could contribute as much as £1.7M p.a. from all users including private boating, hire boats, angling and informal visitors (see Appendix 1)

5.2 Landownership and Landuse:

- 5.2.1 Landownership is one of the most significant issues in determining the feasibility of a full restoration of any canal. Through partnership arrangements with British Waterways, Lichfield District Council and Lichfield City Council the Trust can reasonably expect to secure rights to restore nearly 30% of the route in the short term.
- 5.2.2 The Trust have a land acquisitions committee who are in discussion with most of the major landowners along the route and who have a programme for establishing contact with the remainder which is being actively progressed. In instances, e.g. where filled sections are currently used as informal 'pony paddocks', it is sometimes quite difficult to establish who actually has rights over the land.
- 5.2.3 If the Trust can attract sufficient major funding then the hitherto piecemeal approach could possibly be accelerated since the downturn in the Agricultural industry might make landowners more amenable to selling land or agreeing easements to allow a full restoration to take place.

5.3 Landscape:

5.3.1 Designated Areas :

- (1) There are no nationally designated landscape areas along the route of the canal.
- (2) The section of canal from Fossey Lane to Cappers Lane lies within the area designated as Green Belt in the Lichfield District Local Plan on the south side of the city. Green Belt Policies E4 & E5 presume against development. Exceptions are allowed where development can be shown to preserve the openness of the Green Belt.

- (3) Much of the line of the canal goes through areas of medium to large scale agricultural landscape. Staffordshire County Council have been undertaking a landscape character assessment of the County which is shortly to be published as draft supplementary planning guidance. The intention is to move away from designations such as 'Special Landscape Areas' to a more considered approach of the local landscape's capacity to absorb change proposed by development.
- (4) Since for so much of its length the canal is being restored on-line the impact on the landscape will be relatively low. Exceptions are likely to be where tree cover is to be lost or where the location of moorings might conceivably lead to local visual intrusion. However in accordance with BW policy there are unlikely to allow any permanent moorings on the restored canal. On-line moorings are likely to be limited to 48hr duration.
- (5) Most impacts on the wider landscape are capable of mitigation.

5.4 Geology and Soils:

- 5.4.1 The line of the canal runs for much of its length over sandstone parent material laid down in the Triassic Period. These sandstones form the principal aquifer for the area and water is abstracted via boreholes for both Public Water Supply by South Staffordshire Water Company and a number of private users, mainly for agriculture.
- 5.4.2 In two areas the canal runs across alluvial deposits; in the valley of the Crane Brook to the west of Lichfield and in the valley of the Darnford Brook to the east of the city.
- 5.4.3 The porous nature of both the surface alluvial deposits and the underlying parent material have implications for the canal restoration and operation which are addressed late in this report under 'Water'

5.5 Ecology:

5.5.1 Ecological Survey:

- (1) A general NCC Phase 1 habitat survey of the line of the canal was carried out in May 1999 with the results shown on Dwg No.s 9901.1.1-3 in Appendix 2.
- (2) The survey shows that for most of its length the line of the canal runs through an agricultural landscape comprised of arable fields or improved grassland of low biodiversity.
- (3) The most interesting sections were those where the canal cut remained open and provided opportunities for the development of damp grassland, marshy and emergent vegetation and occasional areas of open water, mostly seasonal.

- (4) The survey identified 15 sites of ecological interest (see Appendix 2). It is recommended that the relevant sites be surveyed in more detail prior to any planning permission for additional restoration of corresponding sections of the canal.

5.5.2 Designated Areas:

- (1) Statutory: There are no statutory designated areas alongside or close to the proposed restored canal. However there are two SSSI's which could possibly be affected should the canal be connected to the BCN at Ogley junction:
 - (a) Chasewater SSSI: This is designated as a SSSI chiefly because of its aquatic habitats. The reservoir was originally constructed to supply water to the BCN via the Anglesey Arm. Should abstraction from Chasewater be increased to provide a supply to the Lichfield Canal then any additional draw-down might possibly have an adverse effect on the habitats in and around the reservoir.
 - (b) The Cannock Extension Canal SSSI: This is designated as a SSSI chiefly due the occurrence of a species of Floating Water-plantain, *Luronium natans*. This site hosts the most significant population in Staffordshire and is a candidate Special Area of Conservation for this reason. This species is susceptible to disturbance created by the passage of boats. At present this section of canal is a 'dead end', used for moorings and only visited occasionally by touring boats. Consultees have suggested that the restoration of the Lichfield Canal could lead to additional traffic which might adversely affect the SSSI.
- (2) Non-statutory:
 - (a) There are two Grade 1 County Sites of Biological Importance along the length of the canal: Pipehill Wharf (SCC Ref 00/87/76) and Pipehill Canal Corridor (SCC Ref 00/97/35) Both occur close to each other near Pipehill where the A461 Walsall Road crosses the canal, which runs in deep cut. The locations of these sites are shown on Plan 9901.4 with details of the listings given in Appendix 3.
 - (b) The sites were originally identified in a survey in 1979 and were briefly checked in 1989 and 1991. Pipehill Wharf was at the time of its original designation an area of marshy ground merging into relatively unimproved grassland. The Canal Corridor is in two sections: the first, from Wall Lane Bridge to approx SK 094 075, was in deep cutting with wooded sides. The second, from SK 094 075 to Pipehill Wharf consisted of emergent vegetation, carr and scattered scrub.

In the intervening period the sites have seen further colonisation by scrub species and part of the deep cutting has been used as a waste disposal site for inert materials.

- (c) Both sites require re-surveying to allow a better understanding of their current nature conservation value.

5.5.3 Flora and fauna:

- (1) Existing conditions: Beyond the general Phase 1 habitat survey recently carried out, and the older information on the SBI's, little detailed information exists on the fauna and flora present along the length of the canal corridor. The Phase 1 survey has pointed up some 15 sites on or immediately adjacent to the line of the canal which are recommended for further survey work. These are either sites which were known to have been of nature conservation interest in the past or, in particular, contain species that indicate that the area is habitat to be conserved under the provisions of the Staffordshire Biodiversity Action Plan.
- (2) Protected species: Before any additional areas are restored the relevant section should be surveyed for the presence of species protected by the provision of the Wildlife and Countryside Act 1981. Animal species include Badgers, Bats and Great Crested Newts. Where there are indications that the habitat comprises unimproved, semi-improved, acidic or wet grassland then there is the possibility that it will contain protected plant species or species that, whilst not subject to statutory protection, are the subject of a Species Action Plan as part of the Staffordshire Biodiversity Action Plan.
- (3) Habitat Loss: one of the most significant impacts associated with the proposed canal restoration is likely to be that of habitat loss. However this is also likely to be capable of mitigation to a degree by the opportunities for habitat creation along the line of the canal. The significance of the extent of this loss can only be judged in the light of further detailed survey work to determine precisely what habitat types are present and which may be impacted by the proposed works.

5.6 Water:

5.6.1 Water Supply:

- (1) Provision of a supply of water to a restored canal continues to be one of the contentious environmental issues under consideration, but not necessarily the most significant. Water could be supplied from one of three main sources: from ground water, from surface water supply, or from impoundments (existing or new).
- (2) The licencing of abstraction from groundwater and surface water sources is carried out in the UK by the Environment Agency by powers conferred under the Environmental Protection Act 1995 and the Water Resources Act 1981.
- (3) Under current legislation the Trust would need to either:
 - (a) obtain its own abstraction licences or

- (b) acquire water from someone else who has an abstraction licence that allows them to 'sell on' the water (e.g. a water supply company), or
 - (c) arrange for an existing licence holder to get a variation to an abstraction licence that allows water to be supplied to a third party or for a different purpose than originally abstracted.
- (4) This latter case may define the situation where the Trust is seeking to arrange for a water supply from British Waterways from the Wolverhampton Level of the BCN.
- (5) The restrictions on abstraction currently do not apply to any transfer of water from one area of inland waters to another by a navigation authority, which right has historically been used by British Waterways. However the Trust is not at present a navigation authority under the terms of the legislation and could not benefit from this device.
- (6) The position relative to any supply from the BCN is complicated by the fact that British Waterways are currently negotiating with the Environment Agency to agree an abstraction licence for the Bradley borehole with the purpose of increasing the volume of water extracted from the rising groundwater resource in the Birmingham area and transferring it south by the canal network into the Oxford Canal and thence into Thames Water's supply system.
- (7) Ed Sharkey Associates has requested information from BW in relation to the BW National Water Resource Strategy and the assessment carried out for the Bradley borehole abstraction license application. This information was not available at the time that this report was written.
- (8) From groundwater:
 - (a) Due to the continued depletion of the aquifer under the area in which the canal runs the Environment Agency are not issuing any new licences for groundwater abstraction and are in some instances negotiating reductions in existing abstraction rights.
 - (b) There is currently little or no possibility of the Trust securing a groundwater source within the local aquifer as a water supply to the canal. As such the direct impact on local groundwater resources from extraction is effectively nil.
- (9) From surface water:
 - (a) The Environment Agency is similarly prohibiting or curtailing summer abstractions from surface waters.

- (b) This does not preclude the Trust applying for a licence to abstract during winter flow conditions but any such licence is likely to be conditional upon the flow in the water course to which the licence relates. Whilst this may provide sufficient water to allow initial filling of certain pounds it is not sufficient to allow operation of the canal.
 - (c) A certain amount of water would enter the canal as a result of run-off from adjacent farmland or surface water drainage where levels permit. Indeed it might be feasible to arrange for surface water run off from adjacent highways to be diverted into the canal to improve the supply, e.g. in the Tamworth Road area. In such an instance there might be water quality issues that would need to be assessed.
- (10) From impoundments:
- (a) The canal could theoretically be supplied from the existing impoundment at Chasewater Reservoir. There is probably sufficient water to provide a supply to operate the canal. However, as has already been discussed, Chasewater is a SSSI, and any change in the draw-down regime is likely to have an effect on it. The magnitude and significance of this could only be determined once a water balance for the operation of the canal had been established.
 - (b) A further option would be for the Trust to acquire land and establish a new impoundment to supply the canal. However this in itself would have environmental impacts which would need to be assessed and the cost of such a scheme would have to be determined and assessed against the other options. It is likely that this is not going to be practicable relative to the other alternatives.

5.6.2 Surface Water:

- (1) Assuming the canal secured a supply of water there would be potential impacts as a result of overflow run off into surface water courses. The water in the canal is likely to be turbid and the potential impact on the water quality of receiving watercourses would need to be assessed.

5.6.3 BW National Water Strategy:

- (1) The Birmingham Canal Navigations supply water to several other canals, including the Birmingham and Fazeley Canal, the Stratford Canal and the Grand Union Canal. Water directed into all these canals ultimately flows south. The regional canal network is shown on Plan No. 9901.3
- (2) Any water supplied from the BCN to the Lichfield Canal would feed into the Coventry Canal and thence to the Trent and Mersey, i.e generally in a north easterly direction.

- (3) British Waterways have developed a National Water Resource Strategy which looks at the likely demand for water all over the canal network and then offers ways of meeting this demand by reducing waste, increasing storage and moving water from areas of surplus.
- (4) As part of this work BW have estimated figures for surplus and deficit for the different regions under conditions of 1 in 10, 1 in 50 and 1 in 200 year summer droughts. In the instances above the BCN maintains a net surplus of 7100, 6150 and 5300 megalitres per year respectively.
- (5) It is this surplus that has prompted investigation into the feasibility of moving water via the canal system to the South East region where it can be supplied to Thames Water for treatment and transfer to the drinking water supply. Additional water is to be abstracted from the Bradley borehole subject to the agreement by the Environment Agency to a variation to the existing abstraction licence. It is understood that this is agreed in principle, however the details are still to be confirmed and there are still some water quality issues, e.g. iron contamination from old mine workings, to be addressed.
- (6) BW's existing National Water Resource Strategy does not at present allow for the restoration of the Lichfield Canal. However on the figures produced by BW Water Resources Hydrologists at Watford there would seem to be no reason, in principle, why water could not be supplied to the Lichfield Canal, subject to BW securing a further variation to their abstraction licence for the Bradley borehole. Once again, the supply requirements for the restored canal would need to be determined before a variation to the licence could be agreed.

5.7 Air:

- 5.7.1 In general restoration of the canal is unlikely to give rise to any significant impacts on air quality.
- 5.7.2 Possible impacts may arise during construction from dust or fumes generated by construction traffic, both of which are capable of mitigation.
- 5.7.3 During operation of the canal impacts may arise from exhaust emissions from boat engines, which are mainly diesel. However the impact is capable of mitigation if engines are properly maintained. Problems are most likely to arise at permanent moorings where engines and/or solid fuel stoves are often run by boat owners to generate electricity or warmth.

5.8 Climate:

- 5.8.1 The direct effect of re-opening the Lichfield Canal will be to generate boat journeys that could not otherwise take place.

- 5.8.2 Operating boats uses fossil fuels, the decomposition of which contributes to global warming. However the magnitude and significance of this would depend on whether the canal generated additional traffic on the network or whether the 'short cut' established to the BCN actually reduced journey times and hence fuel consumption by some boaters.
- 5.8.3 Holiday makers who choose to stay in the UK and travel on the canals for a fortnight are probably having less effect on the climate than if they were travelling on a holiday jet to the Mediterranean which would put a larger amount of combustion by products into the upper atmosphere.
- 5.8.4 Which ever is the case the impact on climate nationally, regionally or locally is not likely to be measurable or significant, although the general point about cumulative effects on climate from emissions from all sources is recognised.

5.9 Material Assets:

- 5.9.1 The construction work associated with the canal will involve the use of new materials and involve the expenditure of non-renewable resources. However it may also provide opportunities for materials re-cycling within the development or the export of materials for use elsewhere.
- 5.9.2 The quantities of materials required to build all the various structures are not determined and the magnitude and significance of the impact on renewable and non-renewable resources cannot currently be estimated.
- 5.9.3 The construction and operation of the canal is also likely to have an effect on the values of material assets adjacent to the canal. For example, some properties may become more desirable and others less so depending on their location relative to the canal, the activity on it and the state of the market. Research carried out in 1993 by Newcastle University's Countryside Change Unit showed that new waterside properties can be up to 19% more valuable than similar nearby properties that do not have a waterside frontage. There is empirical evidence from recent residential development alongside many of the BCN canals that proximity to a working canal can be an attractive proposition for many house buyers.
- 5.9.4 Again whilst it is probable that the re-opening of the canal will have some effect it is not possible to predict the magnitude and significance of the impact. Extrapolation of information, if available, from other canal restoration projects might be possible but local area effects are likely to make this very difficult and the relevance questionable.

5.10 Cultural Heritage:

5.10.1 Scheduled Ancient Monuments:

- (1) There are no scheduled sites affected by the proposed canal restoration.

5.10.2 Listed Buildings:

- (1) Details of the listed buildings near to the route of the canal are given in Appendix 4 and their location shown on Plan 9901.4.

- (2) Most of the listed buildings are too far from canal to be affected by its restoration. However the proposal to build an off-line route under the A51 at Tamworth Road might possibly affect the setting of Freeford House, a Grade 2 listed building. Until engineering proposals are drawn up the magnitude and significance of any effects cannot be determined.
- (3) The Trust is discussing with Lichfield District Council the feasibility of providing a footpath link to the beam engine house at the old South Staffs Water Pumping Station at Sandfields to the south east of the city.

5.11 Other:

5.11.1 Waste Disposal:

- (1) The excavation of previously filled sections of the canal may give rise to the production of 'waste' as defined by the Waste Management Licensing Regulations 1994 which may only be disposed of at an approved waste disposal site.
- (2) Depending upon the type of material used to fill these sections re-excitation may in itself give rise to environmental impacts which would need to be assessed and issues of mitigation addressed.
- (3) Depending upon the precise operations being carried out the Trust might be able to claim exemptions from waste management licensing.
- (4) Currently no estimate has been made of the volume of material likely to be required to be disposed of as 'waste' and the magnitude and significance of the environmental effects of its disposal cannot therefore be assessed.
- (5) The Trust would need to carry out detailed ground investigation work in areas known to have been used for tipping to establish estimates of the type and amount of material used to fill sections.
- (6) From restoration work carried out so far it is becoming apparent that many of the locks were part demolished and the demolition material used to fill the lock. In other areas the canal cut was filled by a similar local 'cut-and-fill' arrangement whereby embankments were reduced and the arisings used to fill adjacent sections of cut; essentially the reverse of the method used to create the canal in the first place.

6. Summary of Probable Impacts, Environmental Benefits & Disbenefits

- 6.1 The main probable impacts and environmental benefits and disbenefits are set out in tabular form in Appendix 5.
- 6.2 As has been discussed above in part, the precise magnitude and significance of the effects cannot be properly determined without detailed design proposals for consideration.

6.3 However even at this stage it is possible to identify the issues and the type of impacts that are likely to be most significant in considering the overall environmental effects of the scheme. These are:

6.3.1 Temporary effects during construction:

- (1) These include: noise, dust, potential air and water pollution, construction site traffic operations and visual intrusion.
- (2) Most of these are capable of a reasonable degree of mitigation

6.3.2 Direct loss of habitat:

- (1) This would include loss of trees and shrubs, loss of various types of grassland habitat, loss of various types of wetland habitat. Some of this may result in protected species being affected.
- (2) Subject to further confirmatory site survey it is probable that this loss of habitat can be mitigated by the creation of new habitats along the length of the restored canal. Where direct habitat replacement is not feasible within the canal corridor it might be possible to provide compensatory areas away from the canal at suitable locations, subject to the agreement of adjacent landowners. Alternatively the Trust might itself acquire land 'off-line'.
- (3) The Trust has already sought advice from Lichfield District Council officers on habitat creation as part of the restoration work currently in progress.

6.3.3 Water resources:

- (1) As has already been discussed, from the known information about groundwater surpluses in the Birmingham area and the feasibility study already carried out by BW, the principle of supplying the restored canal from the BCN should be capable of being agreed with the Environment Agency and BW.
- (2) The magnitude and significance of any impacts as a result of this option, and the evaluation of other possible options, can only be determined once a water balance for the filling and operation of the canal has been established. The Trust should liaise closely with BW and EA hydrologists to establish this information within agreed tolerances given the current stage of preparation of the restoration proposals.

6.3.4 The potential environmental disbenefits of the scheme are set against the main potential benefits which are:

- (1) Enhanced recreational opportunities associated with the restored waterway e.g. angling, boating, canoeing, cycling, walking.
- (2) Economic benefits from increased visitor spend both in the local Lichfield area and elsewhere along the Midlands canal system.

- (3) Potential for habitat creation, especially aquatic and wetland habitat.
- (4) Restoration and conservation of historic structures.

7. Mitigation Measures Required

7.1 BW Environmental Code of Practice:

- 7.1.1 British Waterways have produced a comprehensive code of practice that addresses issues such as regeneration, waterway maintenance and water resource management.
- 7.1.2 This code of practice covers many of the conservation issues of concern to the Environment Agency, English Nature, Staffordshire Wildlife Trust and others.
- 7.1.3 British Waterways have recently become a partner with the Trust in the restoration project and are likely to be in a position to advise the Trust on the implementation of the code of practice in relation to the restoration project.

7.2 Environmental Action Plan

- 7.2.1 The nature of the project and the anticipated potential impacts, especially during the construction phase, would make it desirable that a comprehensive Environmental Action Plan (EAP) be drawn up for the canal restoration.
- 7.2.2 The EAP would set objectives for how the environmental issues identified in this report and as a result of subsequent further survey work and consultation are to be addressed in the detailed design of the scheme, during construction, and in the operation of the canal.
- 7.2.3 The EAP could be developed to address issues that arise in consideration of the restoration of the canal as a whole as well as those that arise if the scheme continues to develop on a sectional basis.
- 7.2.4 Where targets are agreed the EAP would need to address the issues of how these are achieved in practice and the degree of inspection or supervision necessary to do so.

8. Additional Enhancement Possibilities

8.1 Biodiversity Action Plans (BAPs)

8.1.1 Staffordshire BAP (SBAP):

- (1) The Staffordshire BAP was published in November 1998 and implements the advice of the UK Biodiversity Steering Group (set up as a response by the government to the Rio Earth Summit of 1992) that Local Biodiversity Action Plans are the best way to conserve priority habitats and species.
- (2) The SBAP identifies several habitats that could be created in association with a restoration of the canal including:
 - (a) lowland wet grassland

- (b) hedgerows
- (c) reedbed
- (d) wet woodland
- (e) canals, lakes and ponds

- (3) The EAP should identify opportunities in the design of the canal restoration to create and maintain these habitats.

8.2 Habitat creation:

- 8.2.1 Many other opportunities arise for habitat creation as part of the canal restoration. These might include the adaptation of built structures for use by bats or owls, retention of deadwood for invertebrates, specialist maintenance regimes, etc
- 8.2.2 Opportunities for habitat creation/enhancement should be identified as part of the ecological survey work proposed to be carried out before further sections are brought forward for planning consent.
- 8.2.3 Current restoration work is already providing opportunities for habitat creation, e.g. at Darnford Lane where re-alignment of the towpath has provided an area suitable for landscaping, probably seeding with a wet grassland mix.

9. Further Appraisal and Consultation

9.1 Further appraisal and consultation is required in the following areas:

9.1.1 Detailed ecological survey prior to construction

- (1) The initial ecological survey identified several sites that required more detailed examination. These should be surveyed at suitable time in advance of the preparation of any plans for restoration of the section in question.
- (2) The Trust should consult with English Nature, the Staffordshire Wildlife Trust, the Environment Agency and Lichfield District Council when the results of these surveys are known and before design proposals are drawn up.

9.1.2 Detailed water balance and hydrological assessment

- (1) The Trust should actively seek to establish a best estimate of the water balance required to fill and operate a fully restored canal by close liaison with BW and the EA.
- (2) The Trust should continue to liaise with BW and the EA in preparing options for supplying water to the canal and in arriving at a solution that has least impact on the available water resources.

9.2 Designs for individual sections proposed to be restored:

- 9.2.1 The general arrangement for the works will be:

(1) The cut:

- (a) excavation of filled sections or clearing the extant cut of vegetation
- (b) where banks are weak and there is a risk of a breach, carrying out suitable engineering works to reinforce them. At it's simplest this might involve placing additional bank reinforcement in the form of geotextiles. Other areas are likely to require sheet piling. Generally only the towpath side of the canal would be piled
- (c) preparation of the resultant formation to receive an impermeable lining
- (d) placement of liner and backfill
- (e) towpath restoration

(2) Structures:

- (a) Excavation of filled locks
- (b) Restoration of the lock chamber and equipment
- (c) Restoration of existing bridges to be retained
- (d) Construction of new locks and bridges on 'off-line' sections of the route where necessary to allow the canal to pass under roads or railways.
- (e) Replacement of culverts or siphons

9.2.2 Typical details:

- (1) The Trust should produce general arrangement drawings to indicate how typical structures will be designed as part of the restoration.
- (2) These might include a typical cross section through the cut, long and cross sections of lock chambers, typical details of bank re-enforcement, syphons, weirs and overflows to surface water courses, etc.

9.3 Method statements for construction and maintenance operations

9.3.1 The Trust should provide written confirmation to the planning authority and to statutory consultees that it is prepared to implement the BW Environmental Code of Practice on existing restoration areas and when drawing up proposals for further restoration.

9.3.2 Many of the areas of concern about Nature Conservation could be laid to rest if the statutory consultees could be assured that the Trust would be using best practice in carrying out the works. However the Trust would have to demonstrate how it proposed to implement the code of practice in terms of the preparation of method statements, induction training of volunteers, monitoring

of work practices, etc.

- 9.3.3 The Trust already use existing Inland Waterways Association publications to inform and establish good practice in its restoration work. These practical guides include chapters on topics such as wildlife conservation, green housekeeping, the choice of restoration materials, the correct use of tools, and safe working practices.

10. Summary

- 10.1 In preparing this report Ed Sharkey Associates was able to meet with representatives of the Local Planning Authority, statutory and non-statutory consultees such as Environment Agency and Staffordshire Wildlife Trust staff and consulted British Waterways as the Trust's project partners.
- 10.2 All parties were helpful in providing information, in identifying particular areas of concern and in providing advice on how these area of concern might be best addressed.
- 10.3 The summary positions of the various organisations consulted, subject to revision in the light of this report and the further assessment work proposed, are:

10.3.1 British Waterways:

- (1) BW have recently become project partners with the Trust and wish to work closely with Trust members to provide advice on the development of the restoration of the canal.
- (2) BW recognise that the restoration is a potentially important strategic link in the regional canal network.
- (3) BW have gone on record in the past as stating that they believe the restored canal can be supplied with water from the BCN without BW compromising other navigations or sources.
- (4) The BW's National Water Resource strategy does not currently provide for the restoration of the Lichfield Canal but it does support the principle of supply.

10.3.2 The Environment Agency:

- (1) The Agency agree, in principle, that the canal could be supplied with water from the BCN using water supplied to the Wolverhampton Level from the Bradley borehole.
- (2) The Agency confirm that such a supply would require a variation to the existing abstraction licence held by BW.
- (3) Before agreeing to such a variation the Agency would need to satisfy itself that increasing abstraction from this borehole did not compromise any other abstraction source, be that groundwater or surface water. To enable it to do this the Agency has requested that the Trust and/or BW supply information about the water balance proposed for the canal should it be restored.

- (4) The Agency would be prepared to consider on their merits applications by the Trust for temporary winter abstraction licences to fill particular pounds once they are restored.
- (5) The Agency, in fulfilling its duties to promote conservation of the amenity of inland waterways and the flora and fauna of the aquatic environment, has raised concerns about the impact of the restoration on the natural environment.
- (6) It is recognised that, on the available evidence and the balance of probabilities given the general knowledge of the area, there are not likely to be any insurmountable problems posed by loss of the existing habitats along the canal that cannot be mitigated by replacement habitat creation.
- (7) However the Agency's position on this is subject to the Trust's agreement to carry out detailed ecological surveys in advance of any further works and on the Trust's wholehearted commitment to implement the provisions of the British Waterways Environmental Code of Practice.
- (8) The Agency's Flood Defence and Drainage Consents Officer does not believe that there are any major issues that would prevent the Agency agreeing to a full restoration, subject to liaison and consultation with the Agency on the engineering details of the proposed works.
- (9) The Agency acknowledge that they also have a duty under the Environmental Protection Act 1995 to promote the use of inland waters and land associated with such waters for recreational purposes. A clearer understanding of the project by closer liaison between the Agency and the Trust would allow the Agency better opportunities to fulfill this duty.

10.3.3 **English Nature** have confirmed that:

- (1) the route of the canal does not pass through or by any Sites of Special Scientific Interest or ancient semi-natural woodland.
- (2) they recommend that surveys for protected species be carried out before any further applications for planning permission are made.

10.3.4 **The Forestry Authority** have confirmed that there are currently no sites that are the subject of FA grants or awards that would be affected by the scheme.

10.3.5 **Lichfield District Council:**

- (1) LDC support the scheme in principle as a potentially important contribution to local trade and tourism and provision of recreation opportunities.
- (2) LDC recognise the concerns expressed by the statutory consultees, particularly the Environment Agency and encourage the Trust to carry out further assessment work and to liaise more closely with the Agency.

- (3) LDC have indicated that they are willing to consider further planning applications for restoration of sections of the canal.

10.3.6 **MAFF/FRCA** have confirmed that there are currently no sites that are the subject of Countryside Stewardship agreements that would be affected by the scheme.

10.3.7 **Staffordshire Wildlife Trust (SWT):**

SWT have registered concerns about:

- (1) the impact on the Grade 1 Sites of Biological Importance in the Pipehill area. However SWT accept that the sites are likely to have changed significantly since they were first designated and will reserve their position on the matter subject to the Canal Trust commissioning up-to-date ecological surveys of these areas.
- (2) direct habitat loss, albeit that they recognise that opportunities will exist for new habitat creation, many in accordance with the Staffordshire Biodiversity Action Plan.
- (3) potential impact on protected species, albeit that most impacts are likely to be capable of mitigation.

11. Conclusions

11.1 From the work carried out so far it is apparent that the two main environmental issues associated with a full restoration of the Lichfield Canal are:

11.1.1 Direct habitat loss

11.1.2 Effects during construction

11.2 The magnitude and significance of these effects can only be currently determined in part due either to lack of available baseline information or to the design proposals being insufficiently well advanced.

11.3 Both are capable of mitigation provided the Trust adopts best practice and published guidance.

11.4 With regard to the issue of water resources, it seems probable that a solution involving supply from the BCN can be negotiated, subject to further work on estimating a water balance for the restored canal and an assessment of the impact that this additional demand would create on the groundwater resource that supplies the BW Bradley borehole.

11.1 Most of the issues to be addressed in determining any variation to BW's abstraction licence will already have been examined in relation to the BW proposal to supply water to the Oxford canal.

Appendix 1

Tourism

Projected Visitor Spend

Based on British Waterways Standard Boat Model

1992 prices

Appendix 2

Ecological Survey

Sites of Ecological Interest
proposed for more detailed survey

Appendix 3

Staffordshire County Council

Record

of

Sites of Biological Interest

December 1999

Lichfield and Hatherton Canal Restoration Trust

Sites of Biological Interest

Glossary of Common Names

Trees & Shrubs:

| | |
|----------------------------|-------------|
| <i>Acer pseudoplatanus</i> | Sycamore |
| <i>Alnus glutinosa</i> | Alder |
| <i>Betula pubescens</i> | Birch |
| <i>Crataegus mongyna</i> | Hawthorn |
| <i>Fraxinus excelsior</i> | Ash |
| <i>Ilex aquifolium</i> | Holly |
| <i>Prunus spinosa</i> | Blackthorn |
| <i>Rubus fruticosus</i> | Bramble |
| <i>Quercus ilex</i> | Holm Oak |
| <i>Quercus robur</i> | English Oak |
| <i>Salix caprea</i> | Goat Willow |
| <i>Sambucus nigra</i> | Elder |
| <i>Sorbus aucuparia</i> | Rowan |
| <i>Ulex europaeus</i> | Gorse |
| <i>Ulmus procera</i> | English Elm |

Herbaceous Plants:

| | |
|---------------------------------|-----------------------------|
| <i>Cardamine</i> spp | Bitter-cress |
| <i>Carex acutiformis</i> | Lesser Pond-sedge |
| <i>Carex hirta</i> | Hairy Sedge |
| <i>Centaurea nigra</i> | Common Knapweed |
| <i>Cirsium palustre</i> | Marsh Thistle |
| <i>Deschampsia caespitosa</i> | Tufted Hair-grass |
| <i>Digitalis purpurea</i> | Foxglove |
| <i>Dryopteris</i> | Fern |
| <i>Epilobium angustifolium</i> | Willowherb |
| <i>Filipendula ulmaria</i> | Meadowsweet |
| <i>Galium palustre</i> | Common Marsh-bedstraw |
| <i>Glyceria maxima</i> | Reed Sweet-grass |
| <i>Heracleum sphondylium</i> | Hogweed |
| <i>Impatiens glandulifera</i> | Himalayan Balsam |
| <i>Iris pseudacorus</i> | Yellow Flag |
| <i>Juncus articulatus</i> | Jointed Rush |
| <i>Juncus effusus</i> | Soft Rush |
| <i>Juncus inflexus</i> | Hard Rush |
| <i>Lotus pedunculatus</i> | Greater Bird's-foot Trefoil |
| <i>Lycopus europaeus</i> | Gipsywort |
| <i>Mentha aquatica</i> | Water Mint |
| <i>Pteridium aquilinum</i> | Bracken |
| <i>Scutellaria galericulata</i> | Skullcap |
| <i>Silene dioica</i> | Red Champion |
| <i>Solanum dulcamara</i> | Bittersweet |
| <i>Sonchus</i> | Sow Thistle |
| <i>Sparangium erectum</i> | Branched Burr-weed |
| <i>Stachys palustris</i> | Marsh Woundwort |
| <i>Stellaria palustris</i> | Marsh Stitchwort |
| <i>Typha latifolia</i> | Bulrush |
| <i>Urtica dioica</i> | Nettle |

Appendix 4

Listed Building Survey

November 1999

Appendix 5

Table

of

Scheme Benefits/Disbenefits

December 1999

Appendix 5: Scheme Benefits/Disbenefits

| Object | Construction | | Operation | |
|---------------|------------------------------|--|--|----------------------------------|
| | Benefits | Disbenefits | Benefits | Disbenefits |
| Humans | Reclamation of derelict land | Noise | Recreational opportunities | Noise |
| | Employment | Construction Traffic | Employment | Litter |
| | | Dust | Tourism | Trespass |
| | | Litter | Fisheries usage | Water hazards |
| | | Trespass | Creation of new permissive paths | Odour |
| | | Construction site hazards | Economic regeneration - local - elsewhere on canal network | Flood risk |
| | | Interruption of utilities service supplies | Sport & recreation | |
| | | Waste handling and disposal | | |
| | | Traffic delays at road works | | |
| Flora | Ephemeral habitat creation | Loss of habitat | Creation of habitat | Weed dispersal |
| | | Interruption of habitat | Achievement of BAP targets | Disturbance of sensitive species |
| | | Disturbance of sensitive spp. | | Maintenance operations |
| | | Weed dispersal | | |

Environmental Appraisal

December 1999

Appendix 5: Scheme Benefits/Disbenefits

| Object | Construction | | Operation | |
|--------------|----------------------------|---------------------------------------|---|------------------------------------|
| | Benefits | Disbenefits | Benefits | Disbenefits |
| Fauna | Ephemeral habitat creation | Loss of habitat | Creation of habitat | Spread of pest species |
| | | Interruption of habitat | Re-introduction of rare species | Breeding disturbance |
| | | Disturbance of sensitive species | Fisheries usage | Hazard to public and farm stock |
| | | | Maintenance operations | |
| | | | Achievement of BAP targets | |
| Soil | | Construction access and working areas | | |
| | | Topsoil requirements | | |
| Water | Potential new impoundments | Local hydrological effects | Water transfer | Area/Regional hydrological effects |
| | | Pollution of watercourses | Potential new abstraction opportunities | Pollution from boat operations |
| | | Loss of abstraction rights | | Pollution risk from overflows |
| | | Waste handling and disposal | | Loss of abstraction rights |
| | | | | Bankside erosion |
| | | | | Breaches |
| | | | | Leakage |

Appendix 5: Scheme Benefits/Disbenefits

| Object | Construction | | Operation | |
|------------------------|--|--|--|---|
| | Benefits | Disbenefits | Benefits | Disbenefits |
| Air | | Construction vehicle exhaust emissions | | Localised emissions at moorings |
| Landscape | Reclamation of derelict land | Visual intrusion of construction operations | On-going opportunities for local enhancement | Visual intrusion of boat operations |
| | | Loss of landscape features | | Visual intrusion of moorings |
| | | | | Pressure for canalside development |
| Material Assets | Re-cycling of materials | Use of new materials and non-renewable resources | | Use of non-renewable resources |
| | Change to asset values (site/properties) | Change to asset values (site/properties) | Change to asset values (site/properties) | Change to asset values (site/properties) |
| Heritage | Restoration of canalside features of historic interest | Disturbance to archaeological remains | Tourist access to Lichfield & Wall | Pressure on existing facilities |
| | | | Improved access to the BCN and Coventry Canals | Pressure for associated canalside development |
| | | | Maintenance of canalside features of historic interest | Increased pressure on other parts of the canal system |