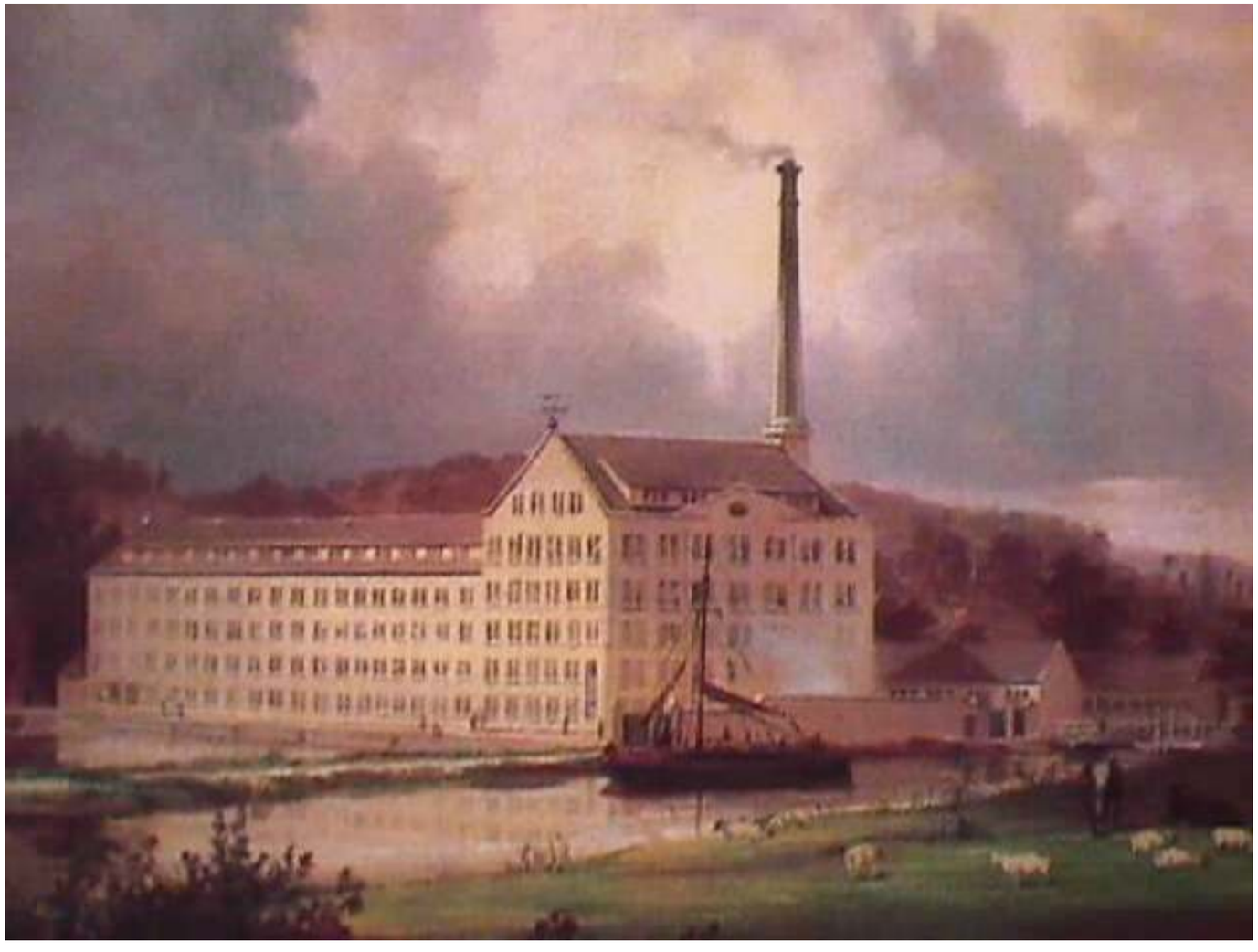
The Cotswold Canals
LINKING THE THAMES AND SEVERN
Partnership

Cotswold Canals Restoration Phase 1
Conservation Management Plan



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Partnership

Consultation Draft
January 2007

Contents

A Group of local children pose on board a severn trow at brimscombe basin.

Appendices

Extent of the current Cotswold Canal Restoration

1. Introduction

1.1 The Cotswold Canals Restoration Project is an ambitious plan to restore to full navigation two historic inland waterways, the Stroudwater Navigation and the Thames & Severn Canal (now collectively known as the Cotswold Canals). The Project is being promoted by the Cotswold Canals Partnership (hereafter CCP), a body formed in 2001 to bring together a wide range of statutory, voluntary and private interests. The management of the project is being led by British Waterways (hereafter BW).

1.2 This Conservation Management Plan (hereafter CMP) has been prepared on behalf of the CCP, and has been endorsed by all partners. It will be used to guide decisions concerning Phase 1 of the restoration programme, and will also be used as a basis for decision making in the future management and continuing maintenance of the Cotswold Canals after restoration is completed. The CMP was commissioned by BW in June 2006 on behalf of the CCP, and has been prepared by RPS Planning. It draws extensively on draft material previously prepared in house by BW, and follows a Conservation Statement (Appendix A3.1) prepared in June 2003 by BW on behalf of the CCP.

1.3 The preparation of the CMP has been informed by internationally developed approaches to conservation management planning, and the specific guidance of the Heritage Lottery Fund. It also draws on good practice previously established elsewhere on the canal network. It should be noted that the CMP has been prepared at the development stage of the Cotswold Canals Restoration Project, and therefore, although extensive survey work has been available to support the preparation of the document, at the time of writing further detailed technical investigations and public consultations were in progress.

Project vision

1.4 The overall vision for the Cotswold Canals Restoration Project, as expressed in the CCP statement of aims, is to:

Restore the Cotswold Canals to full navigation in the interests of conservation, biodiversity and local quality of life, and to use the restoration as a catalyst for wider social, economic and environmental regeneration in areas neighbouring the canals.

1.5 A fundamental aim of the Restoration Project is to balance the need for restoration with the need to conserve the historic environment and protect biodiversity. The CCP is determined to carry out the restoration of the canals in an exemplary manner, according to principles of sustainability. The project will thus demonstrate good practice in waterway regeneration, protecting and enhancing both the built heritage and the natural environment, and this conservation-led approach will underpin all aspects of the work.

1.6 In addition to the conservation of the waterway heritage and ecology, the restoration of the canals is intended to deliver significant social and economic regeneration. The intention is that it will make a substantial contribution to local community development and quality of life by increasing opportunities for recreational and amenity use of the canals and their immediate environs. A vitally important aspect of this will be improved access for all, including people with disabilities.

1.7 The CCP recognises that, in order to realise the vision for the Cotswold Canals Restoration Project, significant change to the current condition of the canals and their immediate environs is both inevitable and desirable. However, it is important that such change is carefully managed and informed by principles of sustainable development.

Geographical extent and phasing of the project

1.8 The restoration of the Cotswold Canals to full navigable condition will be an extremely challenging enterprise presenting complex technical and environmental problems. For this reason, and in view of obvious financial considerations, the proposed restoration is to be undertaken in three distinct phases. The first of these phases extends from Saul Junction to Brimscombe Port, near Stroud, and is the subject of this CMP. The second phase will extend from the River Thames at Inglesham through to the Cotswold Water Park, near Cirencester, and the third phase will link the two sections of the canal together between the Cotswold Water Park and Brimscombe Port.

1.9 For Phase 1, a substantial amount of preparatory work has been completed, including heritage and biodiversity surveys, and engineering design. The restoration work is to be divided into two sub-phases: Phase 1a covers the stretch of canal from Stonehouse to Brimscombe Port for which funding is in place, and Phase 1b covers Saul Junction to Stonehouse for which funding is in progress. Works for Phase 1a are scheduled to start in 2006, and Phase 1b in 2009 subject to funding.

1.10 The considerable technical challenges that will have to be faced in implementing Phases 2 and 3 (involving tunnel restoration and reinstatement of extensive infilled sections of canal) and the consequently high costs mean that these parts of the overall restoration programme are likely to follow some time later. They will therefore be the subject of a separate CMP. This CMP deals only with Phase 1 of the restoration project (Saul Junction to Brimscombe Port), although the policies it outlines will be generally applicable to all sections.

Purpose of the CMP and intended readership

1.11 The Cotswold Canals constitute a particularly large, complex and vulnerable heritage asset. Before undertaking any restoration work, it is essential to understand the nature of the asset, so that the restoration and subsequent day-to-day management are carried out in an informed manner that does not damage the asset. The preparation of a CMP that recognises all aspects of the special significance of the canals, and puts into place a clear set of management principles, is therefore a prerequisite of a successful restoration project.

1.12 The purpose of this CMP is to guide decisions concerning the restoration, future management and continuing maintenance of the canals, and in so doing to reconcile potentially competing values and interests.

1.13 The CMP has been written with a diverse readership in mind. In general, the intended readership of the CMP is anyone who has an interest in the restoration of the Cotswold Canals. In practice, the key users of the plan will be the CCP, including BW's operational managers, supervisors and restoration project managers, other project managers outside the Partnership, stakeholders, third parties, and

Brimscombe Port Mill - east face overlooking the Port

Nutshell House & Bridge - looking from the east

Blunder Lock - restored by volunteers

grant-giving and statutory bodies. In particular, the document will be used as a reference point by those responsible for implementing the restoration project, and for the continuing management and maintenance of the waterway after restoration.

Scope and content of the CMP

1.14 The scope and content of the CMP is informed by an understanding of the specific issues arising from the restoration and management of the Cotswold Canals, and the needs of those who will use the document.

1.15 The structure of the CMP complies with the specific guidance of the Heritage Lottery Fund (hereafter HLF), whose funding conditions require the preparation of a CMP.

1.16 The CMP addresses most aspects of managing the large, complex and vulnerable heritage asset of the Cotswold Canals, including built heritage, archaeology, ecology and biodiversity, engineering, community, recreation and amenity. These issues are explored in greater detail in Section 5.

1.17 Contamination, water quality and water resources are largely outside the remit of this plan. However, these issues are relevant in the context of sustaining and enhancing the biodiversity of the canals, and are therefore referred to in the relevant sections of the CMP.

1.17 The aim of the CMP is to provide clear and practical guidance across a wide range of topics, while remaining a focused strategic document. The CMP is therefore arranged as a succinct 'front end' document supported by and referring to appendices that contain comprehensive and detailed technical information. For example, Appendix A5.1 (*Project Atlas*) divides the restoration project on a length-by-length basis in order to show how individual engineering structures will be restored, and how the requirements of navigation will be reconciled with those of biodiversity and other potentially competing factors.

1.19 A benefit of this approach is that the main body of the adopted CMP, setting out the broad policies and principles, will remain unchanged until major review, while the technical appendices will be augmented and revised as new information becomes available. As overall project managers BW will be responsible for updating the technical appendices in response to new information from regular monitoring. After five years the CMP will be reviewed by the CCP to ensure that it continues to address all relevant aspects of the restoration project, and it will be updated as necessary to reflect current best practice.

Relationship of CMP to other documents and plans

1.20 This CMP has an important relationship with other plans pertaining to the regeneration and conservation of the Cotswold Canals and surrounding area. In particular, it will have a close relationship with statutory planning framework for the area through the emerging Cotswold Canals Area Action Plan (hereafter AAP) which will form part of the Local Development Framework (hereafter LDF), the statutory Development Plan for Stroud District. The AAP will be the key planning policy document guiding the development and regeneration of the canal corridor. It will address a range of issues, including housing, open space, employment, built heritage and wildlife. It will, in turn, be supported by a Supplementary Planning Document (SPD) in the form of a Design Framework that will set standards for the quality of new development along the canal corridor. The CMP will also have an important relationship with the Stroud Industrial Heritage Conservation Area Statement (Appendix A3.6). This document will set the framework for the preservation and enhancement of the linear conservation area that covers the corridor of the Cotswold Canals. The Statement, which has the status of SPD, draws on the same sources of information as the CMP. It has been produced in close liaison with the authors of this CMP and the two documents have mutually compatible objectives.

1.21 Of particular relevance to the CMP is the prospective preparation of an Environmental Impact Assessment (EIA) for the Cotswold Canals restoration which is due to be completed in Spring 2007 (forthcoming Appendix 3.8). As the restoration project is a major development with significant environmental impacts, there will be a statutory requirement for the preparation of an EIA to support applications for planning permission for the various stages of the Restoration Project. The EIA will draw on the survey work undertaken in the preparation of the CMP, and therefore the two documents will have a close relationship. The EIA will be added to the Appendices.

Bagpath Bridge - Thames & Severn section

Ryeford Swing Bridge - restored by CCT volunteers

2. Partnership, community consultation and engagement

Introduction

2.1 This section of the CMP identifies the groups, within the CCP and outside it, that play key roles in the project. It describes the methods used to engage stakeholders, and explains how the process of community engagement will continue through the life of the project and beyond.

2.2 The involvement of many different stakeholders is fundamental to the success of the restoration project, and to the continued vitality of the waterway after restoration. Identification of key stakeholders and their interests, and the establishment of a wide-ranging partnership, have therefore been essential parts of preparing the project, and stakeholders have played an important part in the production of this CMP.

2.3 A key aim of the project is to:

Encourage greater and more varied community involvement in the restoration, maintenance and use of the canals.

Consultation with local residents and other potential users of the canal before and during the restoration work is a particularly important element in the success of the project. The long-term future of the restored waterway depends on its continuing to be valued and used by local communities. Maintaining good communications will remain an important aspect of the project's sustainability.

A community-led project

2.4 The Cotswold Canals restoration project originated in the activities of members of the local community who, in the 1970s, formed the Stroudwater Canal Society (later to become the Cotswold Canals Trust). For more than 30 years this group has worked towards the goal of the eventual restoration of the canals. It has undertaken substantial practical conservation work, commissioned a number of important surveys and reports, and been tireless in campaigning for and promoting the restoration of the canals. The Cotswold Canals restoration project is thus an outstanding example of a community-led project that is rooted in the work of the voluntary sector.

Key stakeholders and the Cotswold Canals Partnership

2.5 Many different statutory, voluntary and private groups have an interest in the future of the canals and their immediate environs. There are also innumerable individuals who value the canals for different reasons. From an early stage in the restoration project, considerable effort went into establishing a dynamic partnership of key stakeholders from statutory and other bodies. The result is the CCP, which has become the principal vehicle for promoting and securing funding for the restoration project.

2.6 The Partnership already includes the main statutory bodies and key stakeholder groups, and it has the potential to expand as new partnership opportunities arise. At present, it consists of the following bodies:

- The Waterways Trust (Chair)
- British Waterways (Project Manager)
- The Cotswold Canals Trust (hereafter CCT)
- The South West of England Regional Development Agency (hereafter SWRDA)
- Stroud District Council
- Gloucestershire County Council
- Wiltshire County Council
- Cotswold District Council
- North Wiltshire District Council
- The Company of Proprietors of the Stroudwater Navigation
- Cotswold Water Park
- The Environment Agency (hereafter EA)
- The Inland Waterways Association
- South West Tourism
- The Cotswold AONB Partnership
- The Learning and Skills Council
- Gloucestershire First
- Gloucestershire Rural Community Council

2.7 The Partnership is advised by the Country Landowners Association (CLA) and the Gloucestershire Wildlife Trust (GWT) as well as by a number of other specialist groups. These have specific remits covering matters such as built heritage and archaeology, access and amenity, wildlife, learning and skills development, interpretation and business.

2.8 The Partnership is also advised by groups representing local communities along the canal, notably the Western and Eastern Consultative Groups, which represent parishes adjoining the canals.

Wider engagement with stakeholders

2.9 Past experience of other restoration projects by BW has shown that genuine inclusion of a wide range of people with an interest or potential interest in a project is essential if the project is to be appreciated and valued by the community. The main statutory bodies and key stakeholder groups are already formally represented in the CCP, but a fundamental aim of the Partnership is also to engage the widest possible range of stakeholders and community groups outside the Partnership itself. In order to achieve this, a Community Participation Strategy (Appendix A4.10) has been prepared in consultation with local voluntary groups across the project area.

2.10 Part of the research for the Community Participation Strategy was an investigation into local groups' level of interest in the Restoration Project and their capacity to become involved in it. This revealed that local groups were very interested in the project, but lack of knowledge and resources reduced their capacity to become involved. In accordance with the Strategy, therefore, two new posts have been created (community links involvement co-ordinator and volunteer programme co-ordinator) and further work (a Volunteer Strategy is in preparation) has been carried out to establish how best to involve local groups.

2.11 This work has led to further development within the project to engage the local community in the next phases of the Restoration Project. The result is a Stakeholder Management Plan (Appendix A3.5), which draws on the community participation work described above to plan community involvement in the restoration between Saul Junction and Stonehouse. Along this length, more focused methods of engagement, including a Citizen's Jury, will be used to bring together a wide range of local and national interest groups and make it possible for them to influence and monitor the restoration work.

Current and continuing programme of community engagement

2.12 Whilst it enjoys the benefits of more than 30 years of popular support for restoration of the canals, the CCP recognises the need for continuing community engagement and consultation in order to bring the project to fruition. For this reason extensive consultation has been undertaken along the entire route of Phase 1, with groups that represent local communities, such as parish councils.

2.13 In addition to the extensive community engagement that has already taken place and that will continue throughout the life of the restoration project, the CCP, through BW, proposes a continuing programme of community engagement and consultation. Whilst the views of many of the larger community groups are generally known, the views of private users are less well understood.

2.14 A key area of communication within the project will be explaining the apparent compromises that may be necessary in order to reconcile the potentially conflicting requirements of restoration, conservation and development.

Community engagement at 'challenge sites'

2.15 Some parts of the canal corridor present particularly complex and challenging problems for restoration. This is particularly so in locations where multiple layers of significance coincide with major technical challenges and the need for extensive physical interventions to secure the wider objective of restoring the waterway to full navigation. This in turn may make it difficult to secure public understanding and support. For the purposes of this CMP, and the restoration programme as a whole, these locations have been termed 'Challenge Sites'. Two such sites exist in the Phase 1 restoration area, namely Capel Mill and Brimscombe Port. At present, members of the local community use and value these sites in many different ways, and concerns have been expressed about the potential impacts of restoration.

2.16 At these 'Challenge Sites' it is therefore particularly important to ensure that members of the public have sufficient reliable evidence to enable them to express their views in an informed and balanced way. For this reason it is necessary to focus particular attention on informing members of the local community, explaining the impacts of differing restoration and management options, and to elicit the considered views of the public. This consultation has already begun, and will continue throughout the restoration programme.

Waterway Training - Hedgelaying

Whitminster Lock - volunteers at work on the new top gates

Saul Festival - at Saul Junction

Volunteering

2.17 One of the most obvious and tangible ways in which people can become involved in a project is through volunteering. There is already a thriving, well-established community of volunteers actively participating in the restoration of the Cotswold Canals through the CCT. These volunteers are engaged in practical and other work, ranging from lock and bridge restoration to organisation of events such as the highly successful Saul Festival.

2.18 Research has suggested that the volunteer community can develop its capacity to become more involved in the canals. One of the key project aims, therefore, is to:

Encourage greater and more varied community involvement in the restoration, maintenance and use of the canals. This will be achieved by both protecting and exploiting the strengths of existing community involvement in the canals whilst creating enjoyable opportunities for participation by those not already involved, for the benefit of both canals and local people.

2.19 The project will seek to reflect people's different reasons for becoming involved, and the skills and time they can offer. For example, people with teaching skills can lead schools groups or work with young people.

Education, training and skills development

2.20 The restoration and future management of the Cotswold Canals has the potential to provide an invaluable local resource for people of all ages who are involved in teaching and learning. The themes that are addressed in the restoration (such as science and history) have a direct link with the national curriculum and are also relevant to lifelong learning.

2.21 The project also has the potential to stimulate skills development, not only in the conservation and traditional rural sectors but also in engineering, building and construction services, landscape design, community development, and leisure and tourism.

2.22 There is an acknowledged shortage in traditional craft skills at national, regional and local levels, and the Cotswold Canals Restoration project has the potential to contribute to training and skills development to help to address this shortage by providing many training opportunities in stonemasonry and other conservation. The canals will become a venue for training providers working within the CCP towards the restoration of the canals, and also for those who offer training in complementary subjects. Thus the canal project will be a catalyst for wider learning.

2.23 A Training Plan has been produced in order to identify the skills and training needed for the restoration project (Appendix A4.11). This analyses existing training provision, identifies training opportunities created by the project, and describes the incentives available for trainees and employers. It suggests actions that the CCP can take in order to stimulate learning and skills development in and around the canal corridor.

2.24 The Training Plan aims to ensure that high standards of work are achieved during both the restoration and the long-term management of the canals, and that the restoration project contributes to local regional and national training objectives. In particular, the plan sets out how the restoration can be used to develop traditional conservation skills and methods of maintenance and management of the built and natural heritage.

2.25 The CCP has links with local training providers in the region, including the Royal Agricultural College, Stroud College, Woodchester Mansion and Cirencester College. The restoration project already forms a key component of the Cotswolds Heritage Academy, an informal partnership of local colleges and training providers that aims to provide training development opportunities in traditional skills throughout Gloucestershire and the surrounding region. The training programme is also expected to have a positive impact on community development, offering opportunities for local people to learn, both professionally and as volunteers, new skills that will build capacity in the community.

Interpretation

2.26 The Cotswold Canals have significance for many different people and for many different reasons. The restoration project aims to enhance their significance by:

- Increasing understanding and appreciation of the Cotswold Canals' cultural importance (heritage, environmental, community and regeneration)
- Raising awareness of the challenges and benefits of waterway restoration
- Raising awareness of the CCP.

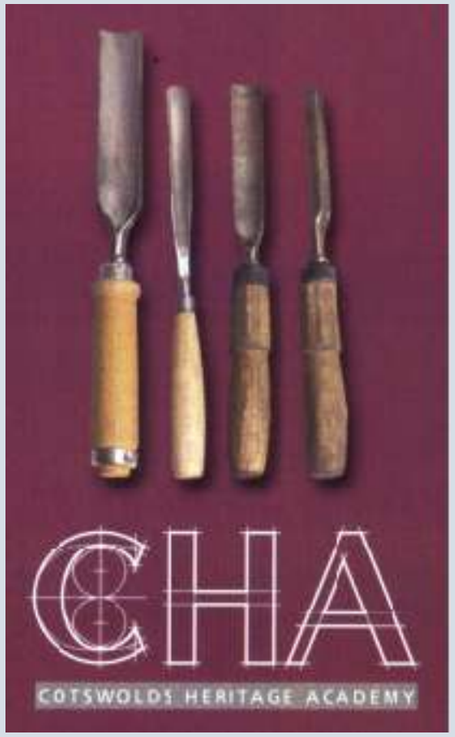
2.27 An Interpretation Strategy has been prepared (Appendix A4.8), in which the interweaving of landscape, heritage and communities is the main interpretative theme. The following sub-themes have also been identified:

- Local people
- The distinctive design of the canals
- The natural environment of the canals
- The restoration work
- The landscape of the canals and the canal corridor.

2.28 Local Interpretation Plans will be planned by local people. Focusing on specific lengths of the canals, these interpretative projects will identify areas and subjects of significance and plan appropriate interpretative provision which might be in the form of an information panel, a leaflet or a training event, or one of the other methods described in a 'tool kit' in the Interpretation Strategy. The CCP will facilitate the projects by helping local communities to find funding and assisting with the management and implementation of projects. All interpretation will be linked closely to the physical restoration of the canals.

Interpretive Signage - on the Kennet & Avon

Masonry Training - fitting an arch keystone



Cotswold Heritage Academy - distinctive new logo

Multi-faceted Interpretive Signage - on the Stratford Canal

Cotswold Stroudwater Landscape

3. Historical background

3.1 The Cotswold Canals comprise two separate waterways, each having its origins in the eighteenth century.

3.2 The Stroudwater Navigation, drawn up by Thomas Yeoman, opened in 1779. The Thames and Severn, engineered by Josiah Clowes, came 10 years later, in 1789. The Stroudwater was linked to the River Severn at Framilode, and the Thames and Severn was linked to the River Thames at Inglesham.

3.3 Although run by two separate companies, the two canals joined up at Wallbridge near Stroud and together formed the first navigable waterway link between the River Thames and the River Severn. The Thames & Severn was always the 'senior partner' but was never entirely successful, owing to competition from the Kennet & Avon Canal, which offered a quicker route between Bristol and London.

3.4 Both canals incorporated innovative design and experimental technology. Boats on the Stroudwater were originally intended to change levels by means of cranes, and the Thames & Severn had a wind pump to back-pump water from the Thames. These experiments were soon abandoned, however, for more reliable technology in the form of locks and a steam-powered pump. Another innovation occurred in the 1820s, when the Gloucester & Sharpness Canal crossed the Stroudwater, forming a unique level crossing at Saul Junction.

3.5 The Stroudwater was designed to take Severn trows, which had to be bow-hauled until a towpath was constructed in 1827. In 1859 the Stroudwater locks were enlarged to take steam barges up to Ryeford Mill. The main cargo on the Stroudwater was coal, which was transported from South Wales to the steam-powered mills in the Stroud Valley.

3.6 The Thames & Severn Canal was proposed as a convenient means of transporting coal from South Staffordshire to the Thames. Cargoes carried on the Thames & Severn tended to be local, mainly serving the woollen mills of Stroud and the Golden Valley. The Thames & Severn Co built and operated its own boats, a business venture that enjoyed modest success.

3.7 Brimscombe Port was the transhipment point for cargoes between Severn trows and Thames barges, and the locks in the canal on either side of this point reflect the different dimensions of the vessels plying the two canals. Locks between Brimscombe and Wallbridge (the junction with the Stroudwater) were shorter and wider (68'-69' x 16'1"-16'2") than those between Brimscombe and the junction with the Thames at Inglesham (90'-93' x 12'9" or 13'). The one exception was Bourne Lock immediately above Brimscombe which could accommodate both types of vessel and allowed the trows to reach Bourne boat repair yard.

3.8 From the 1840s, the increasing dominance of the railways led to a steady decline in the economic fortunes of the two canals. In the 1860s and the 1880s there were even plans to convert the Thames & Severn into a railway line. The GWR became a majority shareholder in the Thames and Severn in 1882, but in 1895 ownership was transferred to a trust, with the canal passing to Gloucestershire County Council in 1900. During the early twentieth century receipts continued to dwindle. The last cargo traffic was in 1911 and the Council closed the section east of Chalford in 1927, followed by the remainder of the canal in 1933. After closure a few canal-side industries continued to operate, including the boat-builders' yard at Brimscombe, which used road transport to export its wares until it closed, in about 1939.The Stroudwater struggled on for another 20 years, and was formally abandoned by Act of Parliament in 1954.

3.9 The canals subsequently became derelict and un-navigable. Some sections were infilled and canal-side sites were converted to alternative uses, with the inevitable loss of important features. Remarkably, however, most of the original canal channel, locks, bridges and other structures survive despite years of neglect. This is largely due to the efforts of the local community and the Stroudwater Canal Society (forerunner of the CCT). Now an important member of the CCP, the Trust has been a vital catalyst for the current restoration proposals.

Brimscombe Halfpenny - the canal company's 1795 tender

Skeleton vessel - boat building at Saul Junction

Unique level crossing - at Saul Junction

Historic View of Brimscombe Port - looking north west with boat weighing station in centre

Model of the Brimscombe boat weighing machine - made in 1843 to demonstrate proposed mechanism

Introduction

4.1 The Cotswold Canals present a diverse, mixed environment that is rich in industrial heritage, archaeology, historic landscapes and biodiversity. The various man-made and natural elements that contribute to the heritage interest of the Cotswold Canals must be identified before they can be properly understood and thus managed appropriately. This section of the CMP therefore contains a summary of those elements. Because of the richness and complexity of the canals as a heritage asset, this section can only describe the key heritage components in broad terms. More detailed description and analysis of individual elements is provided within the relevant surveys (Appendices A2.2, A4.20).

4.2 The summary is structured under the following headings:

- Research resources
- Built heritage and archaeology
- Biodiversity
- Landscape
- Historical water supply
- Gaps in our knowledge.

Research resources

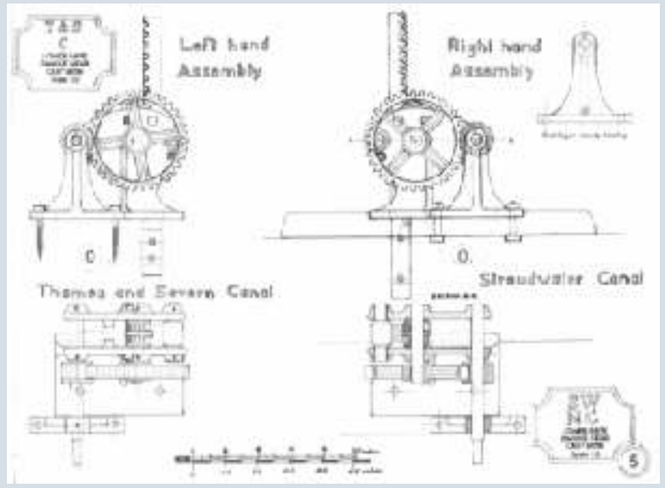
4.3 The Cotswold Canals have been the subject of several published and unpublished works (a select list is given in Section 10).

4.4 Some features on the canals have been recorded by the Gloucestershire Society for Industrial Archaeology. Additionally, Gloucestershire County Council's archaeological unit has carried out broad-brush historic landscape characterisation work, and subsequent heritage surveys have extended this characterisation along the line of the canal into Wiltshire.

Cotswold Archaeology heritage survey

4.5 These sources have provided useful and authoritative starting-points for understanding the canals as a heritage resource, but more detailed information was required to inform the restoration proposals and as background to the CMP. The CCP therefore commissioned Cotswold Archaeology to carry out a heritage survey of the full 57km of the Cotswold Canals (Appendix A2.2). This work, comprising documentary, built heritage, archaeological and historic landscape research, was completed in June 2003 and has been used to develop baseline information for this CMP.

4.6 The data contained in the heritage survey consist of existing records from the Sites and Monuments Record (hereafter SMR) for Gloucestershire and Wiltshire, and new surveys of features highlighted in the earlier surveys. In total, the survey identified more than 540 individual canal features along the line of both canals. More than 180 of these lie within Phase 1 of the restoration project. Roughly half of these are easily recognisable above ground; the remainder (including several new discoveries) were identified from study of early maps, the archives of the two canal companies, published secondary sources, the SMR and National Monuments Record, and the unpublished knowledge of local people. The data have been incorporated into the historic environment database for Gloucestershire, along with the documentary and archive sources, where practical.



Drawings - of Historic Lock Gearing

Land documentation - from British Waterways archives

Hedgerow invoice - from archives

4.7 In order to better understand the original design of the lock gates and associated paddle gear a separate detailed study was commissioned by BW on behalf of the CCP. This report, prepared by David McDougal in October 2006, researched the original lock designs and analysed the surviving features. It demonstrated that, although much of the original lock gear has been successively renewed, some original features survive. The detailed understanding of these features derived from this study will inform the approach to restoration and future maintenance of the locks and associated mechanisms.

Archives

4.8 The archive associated with both canals is perhaps the best historical record of any canal in the country. Archive collections are held by:

- Gloucestershire Records Office
- The Company of Proprietors of the Stroudwater Navigation
- Gloucestershire Local History Collection
- The Waterways Trust Archives & Records Division at Gloucester
- The National Waterways Museum at Gloucester
- The Public Record Office
- The CCT
- Private owners.

4.9 The content and potential of these collections is well understood, following many years of research by canal historians. Notable are David McDougall and Linda Viner, for their reports covering Phase 1A of the restoration: Archive Searches for Thames and Severn Canal and Archive Searches for the Stroudwater Canal (April 2005). The reports assemble in one place all the published bibliographic sources as well as tithe, enclosure, parish and estate maps, along with plans, drawings, sections and models referred to while the canal was being built, and estimates, surveys and reports by engineers along both canals. In addition, the authors carried out a brief inspection of the documents held by the Company of Proprietors of the Stroudwater Navigation. These previously unrecorded data could usefully be integrated into the Gloucestershire historic environment database.

4.10 The working life of the Cotswold Canals system is recorded in the surviving tonnage books, wharfage books, ledgers etc. Only a fraction of this material has been studied in detail. The management records of the Cotswold Canals are equally well preserved (although incomplete), and have provided source material for various studies. The record of the involvement of Gloucestershire County Council from *c*.1895 in the management of the Thames & Severn is complete and comprehensive. Apart from committee minutes etc., there are associated records of the struggle to keep the system open. The same archive contains valuable data on the post-closure phase of the Thames & Severn, including land ownership. These aspects of the archive present considerable research opportunities.

4.11 A detailed record is also available for the restoration activity in the period 1972-2002, which is now assuming historical significance in its own right: the archives of the CCT include a photographic collection and issues of *The Trow*, the Trust's magazine, which reached issue number 135 in Winter 2006.

Published sources

4.12 Several books about the canals have been published (Section 10). These are largely based on material in the archives, and include some selections from photographic collections.

The wider corridor

4.13 There is a large archive for the wider canal corridor, particularly the industrial sites, mills etc. bordering the canals. Sources for these include the Record Offices and the research and publications of the Stroudwater Textile Trust, the Gloucestershire Society for Industrial Archaeology etc. Parish archives may also include useful information; indications of these can be found in the National Archive catalogue.

Photographs

4.14 Another significant source for social history since the mid-nineteenth century is photography. Although there is no formal photographic archive, there are several collections of historic postcards of the canals, which contain many views of canal workers and the general public using the canals. Photographs may have a particular role in helping understand post-war social history, particularly the decline of the canal structures and environment.

Built heritage and archaeology

Refer to detail maps in section 4.110 following

4.15 The key elements that comprise the historic built environment and archaeology of the canals are summarised below (in categories broadly similar to those used for the national canal architectural heritage survey undertaken by BW in the 1980s and 1990s):

- Channel
- Towpath
- Locks and other level-changing structures
- Other water management features
- Bridges
- Aqueducts
- Tunnels
- Pumping stations
- Maintenance, wharf and boatyard buildings
- Accommodation buildings
- Trim
- Vessels

4.16 Few of the structures surveyed retain precisely the same form, fabric and function as they had when they were originally constructed, and most have undergone a considerable degree of change.

Ryeford Double Lock - Historic gate replacement work

Unloading Coal - at Gough's Orchard Lock

1904 Postcard - with towpath gate & St Cyr's Church

Bowbridge Lock - Historic view from bridge

Channel

4.17 In order to accommodate sea-going vessels from their respective river estuaries, Severn trows on the Stroudwater and Thames barges on the Thames & Severn, both canals were built to similarly large dimensions: about 12m wide, 1.5m deep, and with side slopes of about 3:4.

4.18 The canals were lined with a thick layer of puddle clay, which is thought to survive on most of the length; the recent works at Ebley found good puddle clay, 400-600mm thick, to the sides and bed. Only minor repairs were needed here, and water levels appear to be stable.

4.19 The canal channel today is barely recognisable on several sections along Phase 1. Much is silted up, shallow and overgrown, some has been infilled, and some built over. Some of the sections that do retain water are significantly reduced in width, particularly the 'main river' section between Wallbridge and Ebley, where the wide 'towpath' strip includes much of the channel. Only the volunteer-restored navigable sections between Newtown and Pike Locks resemble their original appearance. Recent initiatives at Ebley have re-opened some of the infilled channel, but these are currently compromised by a lack of water supply.

Towpath

4.20 The Act of 1776 required the construction of a 'towing path [to] be separated from the adjoining lands by either fencing or ditching to prevent cattle from straying along the canal banks' along the Stroudwater Navigation. Towpath gates, an unusual feature of the Stroudwater, survive at several locations. Whereas the Thames & Severn was constructed from the outset with a towpath contained by a boundary of walling, hedging or fences, no similar canalside path was established on the Stroudwater until 1827, 48 years after it had first opened.

4.21 Towpaths are now very rarely used for their original purpose of providing a walkway for the horses pulling vessels along the canal, but they continue to provide public access to the canals and their environs. People using the towpath, walkers, joggers and cyclists, considerably outnumber those travelling on the water. The Cotswold Canals towpath is a right of way for most of the Phase 1 length with permissive rights for access to be extended to the remainder as part of the first stage of restoration.

4.22 The towpath verges provide extra habitat: wide wildflower verges can be particularly valuable for biodiversity, and even narrow verges can support a significant range of invertebrates and plants.

Historic View of Brimscombe Port - looking south west showing island, wharves and Port Mill.

Locks and other level-changing structures

4.23 The locks downstream of Brimscombe were built to handle Severn trows, and those between Brimscombe and the Thames were designed for Thames barges. The discontinuation of barge traffic and increasing use of narrowboats led to the shortening of many of the Thames barge locks in the 1840s; these shortened structures are characteristic of the locks upstream of Brimscombe.

4.24 The restoration project only involves the locks downstream of Brimscombe. These are all of similar dimensions, capable of accommodating craft up to 16' wide and 68' long, with falls that range from 2m to 3m.

4.25 The Stroudwater locks to be restored in Phase 1a are Ryeford Double, and Dudbridge Lower and Upper. In Phase 1b the locks to be restored, either partially or fully, are Whitminster, Westfield, Dock, Pike, Blunder and Newtown. Bristol Road Lock was demolished during improvements to the A38 road in the 1960s and will need to be replaced.

4.26 The Thames & Severn Locks to be restored in Phase 1 are Wallbridge Lower and Upper, Bowbridge, Ham Mill, Griffin's, Hope Mill and Gough's Orchard.

4.27 Bourne Lock, immediately upstream of Brimscombe, will be stabilised and made safe as part of Phase 1, but not restored to working condition.

Other water management features

4.28 Much of the value of the Cotswold Canals as a heritage asset resides in the structures and devices designed to supply water, control excess flows, and drain the channels for maintenance purposes.

4.29 The most striking water management structures on the Stroudwater date from the period 1774-99. These are the eight surviving spill weirs, five of which are associated with the Eastington lock flight. All but one (Dock House spill weir) are situated on the towpath side of the canal. Three of the eight are circular weirs of the 'well-fall' type. The weirs near Oil Mills Bridge are well preserved and comprise a circular trough with a central cylinder down which water drops to a culvert. Culverts under the towpath connect the weirs to the canal.

4.30 The spill weirs associated with Pike, Blunder and Newtown Locks share a number of apparently original features: a culvert beneath the towpath protected by a small stone 'bridge', an open trough into which the overspill flowed, and culverts leading away from the canal that comprise shallow brick arches, stone jambs and chamfered mullions. Only a few of the associated railings are original, although what is there today might replace earlier guards. Meadow Mill also has the open trough and presumably once had the bridge, but otherwise it empties directly into a cylinder rather than arched culverts.

4.31 The spill weir at Ebley has the well-crafted, chamfered stone mullions of the Eastington weirs but, because of the close proximity of the canal and the River Frome at this point, the overspill carried under the towpath empties not into a trough but directly into the adjacent river channel. The ashlar wall on the river side has stop plank grooves for regulating the flow of water.

4.32 In addition to the spill weirs along the canal, several other structures - probably sluice-regulated culverts - are known to have fed and drained the Stroudwater. The distribution of these was plotted on a map of the canal in 2003, and some have been investigated by the CCT. Several are known from early Ordnance Survey and other maps but have not been located in recent times; they can be considered archaeological features of the canal.

4.33 A pair of stop gates, used to drain sections of the canal, was installed at the Ocean swing bridge, where the recesses into which the gates folded survive in both the north and south abutments. Elsewhere, vertical grooves testify to the use of plank stops.

4.34 Several water management features were built between Saul Junction and Whitminster when this section of the canal was modified in the 1820s to accommodate the crossing with the Gloucester & Berkeley Canal. Most are known only from documentary evidence. However, the stop gate recesses built into the north and south abutments of the swing bridge at the Junction remain visible above the waterline. The paired gates are a later addition but the iron handle on the south bank probably operated the original sluice that drained the Stroudwater pound. Documentary evidence testifies to at least four other culverts between the Junction and Whitminster Lock.

4.35 Many of these structures do not survive above ground, or are not easily visible. One aspect of water management in the earlier phases of the canal's existence, described in the Company archive but not recorded archaeologically, is the use of timber-lined culverts.

4.36 Water was supplied to the Thames & Severn from several local rivers, streams and springs, some of which were diverted beneath the canal via culverts under embanked sections of canal. The Company also straightened the natural course of adjacent rivers and streams in places, lining sections of the river channel with stone, and adding culverts. Most of this work dates to the late 1780s. The Thames & Severn Canal had two reservoirs, but neither of these is located within the scope of the project.

4.37 Most of the locks between Wallbridge and the eastern limits of the project area were probably furnished with spill weirs. Not all weirs, however, were associated with locks. The 18 weirs (excluding paddle weirs) that have been surveyed probably represent only a proportion of the total number that were built in the stretch of canal covered by the Phase 1 restoration project. Several others can be identified from documentary and/or anecdotal evidence, but are now impossible or difficult to see. Preliminary examinations of the accessible weirs suggest that two principle forms were built: circular weirs and apron weirs.

Bowbridge Circular Spill Weir

Newton Lock Spill Weir

Meadow's Mill Spill Weir

4.38 Adjacent to Bowbridge Lock a culvert under the towpath carries excess water from the channel to a circular spill weir of the 'well-fall' style, as described above. The central cylinder is brick-lined with an ashlar coping, and the whole is protected by a modern metal grill. A second circular weir is known to have existed at Wallbridge Upper Lock but has now been lost beneath modern development.

4.39 An apron weir survives at Ham Mill Lock and has been heavily restored.

4.40 The simplest method of draining stretches of the canal for maintenance was to use stop planks. Vertical grooves, into which planks could be dropped, were incorporated into the walls of lock approaches, bridge narrows and other pinch points. Many are undoubtedly primary features of the canal and well-preserved examples can be seen at numerous sites.

4.41 None of the water management features on the Thames & Severn has been conclusively dated to the first half of the twentieth century, though clearly the works undertaken by Gloucestershire County Council in the first decade of the century would fall into this category. The most notable later twentieth-century additions are the dams built across the tops of locks by the CCT from the 1970s onwards, which retain water in the pounds above.

Bridges

4.42 There are three types of bridges on the canals: fixed bridges - mostly brick-built humpbacks - carrying footways or roadways, swingbridges carrying roadways, and railway bridges.

Stroudwater: fixed bridges

4.43 Five early hump-backed bridges survive above ground on the Stroudwater: Occupation Bridge, Westfield Bridge, Newtown Roving Bridge, Nutshell Bridge and Ryeford Bridge. Occupation, Westfield, and Nutshell were accommodation bridges, designed to give local landowners access to properties on both sides of the waterway; Ryeford served as a road bridge. All were built to a basic company design of red brick elliptical arch and stone detailing that is still recognisable, despite later alterations. All the bridges show evidence of later repair and alterations, which include rebuilt parapets and widening. One example, Ryeford, has a new stone arch on the western side replacing the brick original.

4.44 Six other hump-backed bridges were built across the canal between 1775 and 1779 but no longer survive, although in some cases at least there are remains below ground. The brick abutments of Pike have been incorporated into a new road bridge. Oilmills, another brick structure, is largely intact below ground level, having lost only the parapets and the centre of its crown. Evidence of footings at Dudbridge below the modern road bridge suggests this differed from the others in being stone-built.

Stroudwater: swing bridges

4.45 Swing bridges were a particular feature of the Stroudwater, which was originally furnished with 10 examples: Whitminster, Bonds Mill, the Ocean, Upper Mills, Ryeford, Ebley, Hilly Orchard, Downfield Road (later known as Gasworks Bridge), and Lodgemoor Mill (Framilode is not included in the restoration project). Originally of timber construction, all the swing bridges were later rebuilt with metal girder decks. Most of them were rebuilt in the 1920s by Daniels Ltd, of Stroud. They were relatively lightweight in appearance, balanced by A-frame tie-rods mounted on a vertical metal channel. The 1920s bridges all had slender parapets on the outside of the deck beams, maximising the available carriageway width. Some 1920s fabric remains at Lodgemore and Upper Mills Bridges, with makers' nameplates on riveted steel girders, and some 1920s handrail and curved brickwork on the abutments. Remains of swing mechanisms may survive beneath the decks. All the sites still have their original narrows, but only one of the bridges remains in operating condition: Ryeford footbridge, restored by CCT in the 1980s.

Ham Mill - by weir

Occupation Bridge - Stroudwater

Lodgemore Swing Bridge - 1928 Steel Replacement

4.46 Bonds Mill was converted into a modern lift bridge in 1994. Hilly Orchard was rebuilt as a high-level footbridge at the end of the nineteenth century (reinstated 2003), and the rest were converted into fixed deck bridges.

4.47 Saul Junction footbridge, the most complete surviving example of a swing bridge over the Stroudwater, was built by the Gloucester & Berkeley Canal directors in the 1820s and is still in use for the Stroudwater moorings.

Stroudwater: railway bridges

4.48 The Bristol to Gloucester railway line crosses at the Ocean, where the bridge was replaced with a solid embankment in the 1960s. The Midland Railway crossing at Stonehouse survives as the iron Skew Bridge, now carrying a cycleway.

Thames & Severn: fixed bridges

4.49 On the Stroud section of the Thames & Severn, most bridges were fixed humpbacks, often located adjacent to locks. Six eighteenth-century bridges survive on the Phase 1 section of the canal: Wallbridge, Bowbridge, Stanton's, Ham Mill, Bagpath and Gough's Orchard. A standard company design was applied, though with more variations than were permitted on the Stroudwater: at Wallbridge, for instance, the bridge has a stone keystone and rusticated stone voussoirs, while Stanton's Bridge has stone rubbing strips formed from extended springers.

4.50 The condition of the surviving bridges varies according to previous restoration and current use. Only two, Wallbridge and Bowbridge, remain as road bridges and both of these have been repeatedly widened. The most recent extension at Bowbridge has blocked the navigation and towpath, leaving just a culvert for the canal flow.

4.51 Other bridges on the Thames & Severn include Jubilee Bridge, a high-level lattice-girder footbridge of the late nineteenth century.

Thames & Severn: swing bridges

4.52 The only Thames & Severn swing bridges on the current project length were the three within Brimscombe Port. All of these have been lost and their sites have been infilled, though there is photographic evidence for their existence. Preliminary archaeological investigations have proved the survival of at least one set of abutments.

Thames & Severn: railway bridges

4.53 Only the Capel Mill railway crossing of the Thames & Severn is included in the current project. The viaduct skew arch over the canal here survives intact, but is now used by the Stroud bypass rather than the canal.

Aqueducts

4.54 The Stroudwater Navigation only had one aqueduct - the former Lockham or Latham Aqueduct, which carried the canal over the River Frome near Whitminster. This was removed as part of flood defence works in the 1970s when the canal and river were combined.

4.55 There were originally two aqueducts on the stretch of the Thames and Severn Canal covered by Phase 1 of the currently proposed restoration. At the entrance to Brimscombe Port was an aqueduct, now infilled. The Arundel Aqueduct at Capel Mill, which carries the canal over the River Frome, is the only true aqueduct that survives to any great degree on the two canals. It is however, little more than a sophisticated culvert, comprising two low arches of brick and stone.

Tunnels

4.56 There are no tunnels within the stretch of the Cotswold Canals covered by the Phase 1 restoration project. The Sapperton Tunnel is to the east of the Phase 1 area.

Pumping stations

4.57 There are no pumping stations in the part of the Cotswold Canals covered by the Phase 1 restoration project.

Maintenance, wharf and boatyard buildings

4.58 This category includes slipways, wet and dry docks, workshops, forges, stores, warehouses, cranes, yard and toll offices, lobbies and 'hovels'.

Stroudwater

4.59 The key sites along the canal (some of which were built as temporary heads of navigation as the canal was being constructed from west to east) are: Framilode basin (which falls outside the scope of the project), Bristol Road Wharf, Chippenham's Platt, Stonehouse Wharf, Ryeford Wharf, Dudbridge Wharf, and Wallbridge Basin.

4.60 Little survives of the wharf built on the offside of the canal adjacent to the west wall of Ryeford Bridge *c*.1780. The wharf at Dudbridge has been almost entirely obscured by severe encroachment onto the line of the canal by adjacent properties, and only the nineteenth-century crane still stands.

Capel Mill Rail Viaduct - before (1986) construction of bypass

Sapperton Tunnel - Daneway Portal

Stroudwater Navigation Company Headquarters

4.61 Rather more survives of Bristol Road Wharf, Chippenham's Platt and Wallbridge Basin. Bristol Road Wharf (also known as Whitminster Wharf) was a modest outfit that catered mainly for domestic supplies of coal. Two brick-built structures survive on site: Wharf House was constructed in 1776 for the Company clerk, and later extended, and Wharf Cottage was evidently constructed *c*. 1799 as a warehouse but was later converted into a dwelling. Further investigation would be required to determine whether other contemporary structures - including a solid landing - survive.

4.62 Chippenham's Platt was a multi-purpose site - maintenance yard, dry dock and coal wharf - on the offside of the canal, adjacent to the second lowest lock in the Eastington flight. Directly to the east of the upper gates of Dock Lock is the dry dock itself. It has been in-filled, though the stone-edged entrance survives above water level. Thirty metres to the north is a large gabled building built from brick and weatherboard, which once served as a maintenance building. Its date of (re)construction is not known. To the east is Dock House, a two-and-a-half storey brick-built structure of *c*.1788 built to house the company's chief engineer. Between Dock House and the maintenance building are the footings of several brick structures which appear to be the remains of the forge and carpenter's workshop erected on site in the late eighteenth century.

4.63 The wharf at Chippenham's Platt was situated between the dry dock and Pike Bridge to the east. The offside bank at this point (now overgrown) was stone-edged; behind it survives the wharf cottage. Though later extended, this clearly originated as a simple, brick-built, two-bay, two-storey dwelling positioned gable end-on to the canal, with a single storey lean-to on its south side.

4.64 The most commercially active site along the Stroudwater was Wallbridge Basin, built at the terminus of the Stroudwater in 1779. It included the most important wharf on the canal and clearly had a complicated history of development. Unfortunately, like the other Stroudwater wharves, this site has suffered: the basin is infilled. The manner in which this was done at Wallbridge has not been explored. However, it is possible that materials were merely dumped in the basin, leaving the wharf walls substantially intact.

4.65 Only three features of note appear to survive above ground. A stone ashlar gateway across the towpath was the western entrance to the wharf and is all that survives of the basin's perimeter wall, constructed *c*.1784. To its east is a warehouse that sat on the north side of the wharf, facing the basin. Built in 1779, this two-storey, five-bay structure is of hand-made red brick with stone surrounds to the original openings. A full-height opening (now blocked) on the basin façade allowed loading and unloading of goods. Finally, to the east of the basin, stands the Company office, constructed 1795-1797 of stone rubble and brick, with a five-bay, pedimented, ashlar façade onto the dock basin.

4.66 Documentary evidence shows that the Stroudwater wharves and yards were at various times occupied by many different structures, including perimeter walls and internal partitions, warehouses, workshops, cranes, coal pens, sheds and brewhouses. Where these were in stone or brick, their footings, as well as yard surfaces and other features, may survive below ground. However, an archaeological evaluation of the wharf at Stonehouse (before redevelopment) revealed that the site had been heavily truncated and no evidence for the eighteenth-century canal wharf was found, though the stone-capped landing that fronted the north bank of the canal was exposed and preserved.

4.67 The wharves, basins and yards along the Stroudwater Navigation continued to develop through the nineteenth century and several key features from this phase survive substantially intact.

4.68 The boathouse to the east of Upper Mill Bridge in Stonehouse was constructed by Wycliffe College, perhaps at the end of the nineteenth century. A corrugated iron, timber and brick structure, it is built gable end-on to the canal with a water-gate at its base. The structure is now derelict and redundant.

4.69 The commercial capacity of Ryeford was expanded in the nineteenth century with the addition of two private wharves. On the towpath side of the canal to the west of Ryeford Bridge, opposite the wharf constructed by the Company in the 1770s, survives a coal pen built in 1864 by the Marling family to serve local mills. Separated from the canal by the towpath, it comprises a stone ashlar frontage pierced by a pair of coal chutes. The stone wall also encloses the rear of the pen, and entrance is provided through an iron-gated portal. In The Stroudwater Navigation, Tucker also makes reference to 'Ford's Wharf' just to the east of Ryeford Bridge. This is likely to be a nineteenth-century addition to the canal and may relate to the solid landing along the towpath between the road bridge and the swing bridge, which consists of a wall of hand-made brick capped with stone copings.

4.70 At Dudbridge Wharf a crane was added to the canal frontage, probably in the 1820s. The crane that survives at Dudbridge today is probably the replacement of 1854. It comprises a hand-operated timber jib 7.3m long on a cast- and wrought-iron base and frame (the base is no longer visible). It bears the maker's plate of John Stevenson, Canal Foundry, Preston.

4.71 There are no extant wharves, maintenance yard or basin structures known to date to the first half of the twentieth century. Given that commercial tolls were still being paid on the Stroudwater as late as 1941, it is conceivable that earlier wharves continued to be adapted during the first half of the twentieth century, and that these alterations are reflected in the archaeological record.

4.72 The concrete slipway between Pike and Blunder Locks was added to the canal by the CCT in 1991.

Thames & Severn

4.73 Very little survives above ground of the pivotal site of Brimscombe Port: principally two warehouses at East Wharf Cottage and the Salt Warehouse and a length of the perimeter wall, The warehouses probably date to the late eighteenth century. Common features include a simple rectangular, two-storey design, rubblestone construction with dressed quoins, gabled roofs with slate tiles, and full-length loading openings facing the basin. Salt was stored in the warehouse on the western wharf of the port; its side walls are consequently pierced by ventilation loops.

4.74 Port Mill, although it dominates the port, cannot be directly counted as part of the Thames & Severn, as the original mill building pre-dates the arrival of the canal. Today, however, the Salt Warehouse is considered for statutory purposes to be within the curtilage of the mill.

4.75 A stretch of about 150m of boundary wall, built from roughly dressed stone and over 2m high, survives in the south-east corner of the Brimscombe Port complex. The towpath towards Bourne Bridge passes through an intact recessed opening with iron hangers for a gate. Remnants of a second gateway have been traced on the offside of the canal, and a substantial square gatepost marks the entrance to the adjacent port foundry.

4.76 After Brimscombe, Wallbridge was the busiest wharf on the Thames & Severn Canal. Surviving features of the wharf include a stone-capped edge to both the towpath and offside of the channel above Wallbridge Upper Lock; a stone wall built to revet the steep sloping bank to the north of the wharf; and a warehouse, also on the offside. Also of note are several openings (now blocked) in the surviving towpath wall, through which freight delivered to the wharf could be passed to adjacent buildings.

4.77 The more rural sections of the canal were provided with more modest wharves. These may once have been furnished with warehouses, coal pens, accommodation buildings and outbuildings but these features rarely survive. Many wharves including those at Bowbridge, Stanton's Bridge, Griffin's Mill, are now characterised by just a slight widening of the channel and a stone-capped edge to the towpath.

4.78 The canal company constructed a boat building and maintenance yard at Bourne.

4.79 In 1878 a private boat-building company, Edwin Clark & Co, was established beside the canal opposite Hope Mill. From 1899 the yard was owned and operated by Abdela & Mitchell Ltd. Boat building continued on this site until 1934, and the canal was used to transfer vessels to the River Severn until 1933. However, the site was levelled and rebuilt as a small industrial estate (Canal Ironworks, Brimscombe) in the second half of the twentieth century, with the exception of Edwin Clarke's house, which survives.

Wycliffe College Boathouse

Salt Warehouse - a remnant of the Brimscombe Port Buidings

Dudbridge Crane - the only surviving crane on the canals

The 'Humaytha' - at Hope Mill Boatyard built in 1903 by Abdela & Mitchell Ltd.

Accommodation buildings

Stroudwater

4.80 Apart from housing for company workers that were directly associated with wharves, yards and basins (described above), accommodation buildings known to date to the late eighteenth century are comparatively rare along the stretch of the Stroudwater covered by the Phase 1 restoration project.

4.81 A terrace of three two-storey cottages beside the canal between Stonehouse and Ryeford, appear to be of late eighteenth-century date, and likely to have been built to house company employees. Later extensions have been added to the rear of these properties and a modern boundary wall installed beside the towpath. A cottage added to the eastern end of the adjacent warehouse (now called Jacob's Cottage see above) appears to be contemporary with the terrace.

4.82 Ryeford Double Lock has the only surviving eighteenth-century lock keeper's cottage on the Stroudwater a three-bay red brick structure erected in 1784, with a slightly later, single-storey brick-built extension on its east side. A free-standing brick-built structure just to the south of the cottage appears to be the surviving sentinel box, originally erected by the Company on site in 1779.

4.83 The most pretentious accommodation building of the nineteenth century is the decorative three-storey house attached to Nutshell Bridge, constructed of brick with ashlar stone dressings. The western end bonds with Nutshell Bridge. West of the bridge are two-storey, brick-built outhouses, formerly the cottages that are known from the archive to have been built on site by 1803.

Thames & Severn

4.84 Lengthmen's cottages on the Thames & Severn are concentrated at the eastern end of the canal; none is within the stretch of canal included in the Phase 1 restoration project.

4.85 Another surviving structure worthy of note is the Ship Inn, beside the Thames & Severn. This may have been a public house for Brimscombe Port from the outset.

Trim

4.86 This category includes mileposts, distance markers, boundary posts, standing signs, attached plates, fence posts, bollards, and mooring posts and rings.

Stroudwater

4.87 The Stroudwater Navigation appears to lack mileposts or other distance markers along its towpath, although these features are common across the rest of the canal network. This may be because the Company negotiated an individual toll for each commodity carried, rather than charging according to the distance travelled.

4.88 Free-standing boundary markers, probably of the late eighteenth century, are known at three locations along the Stroudwater: two pairs of markers are positioned at Blunder and Newtown Locks, and there is a boundary marker at Ryeford Double Lock.

4.89 Late-nineteenth and early-twentieth century photographs testify to the provision of gates across the towpath to prevent cattle from straying. These gates were presumably replacements for original features of the canal from before the towpath was enclosed, but their relationship to any boundary structures has not been determined.

4.90 No examples of mooring posts survive, suggesting that if they existed at all they were likely to have been made from timber. Several metal mooring rings are embedded in the stone-edged bank between the road and swing bridges at Ryeford. They cannot at present be dated with any precision.

4.91 Several artefacts have been found in the garden of Ryeford Lock Cottage, including a sign specifying the rules for boats passing the locks. It is likely that other portable artefacts survive.

Thames & Severn

4.92 The Thames & Severn Canal was furnished with a boundary wall beside its towpath for much of its length. Parts of this original feature, dating from the late 1780s, survive. The surviving parts now stand to various heights, but in places the wall has been demolished altogether (though the buried footings undoubtedly survive). It is free-standing for much of its line, but where appropriate it has been used to revet cuttings or embankments. It comprises undressed blocks of limestone built into a drystone wall up to 2m high with a coping of limestone rubble banked vertically. Though it closely parallels the towpath line for most of its length, in places it diverges where the canal company's ownership extended outwards. It is conceivable that the company planted a hedgerow along some lengths of the canal; further characterisation of the form, distribution and survival of boundaries requires additional survey work.

4.93 Milestones were provided at half-mile intervals along the whole length of the Thames & Severn Canal (with the exception of the tunnel length and the Cirencester Arm, which is outside the scope of the current restoration proposals). Of the 52 that were probably added at the very end of the 1780s, 20 survive *in situ*. They are carved from what is said to be local stone, with either a square or round head, and each has a rectilinear recess on its front face, into which would have been set a cast-iron plate recording the distances to Wallbridge and Inglesham. Two plates formerly attached to milestones have been retained beside the canal - one at Brimscombe and one at Chalford. Several unattached milestone plates are cared for by county museums, and one is in the possession of the CCT. The Corinium Museum in Cirencester holds the complete milestone from near Cowground Bridge, with the plate still attached.

4.94 An intact Thames & Severn stone boundary marker was recovered from a waste site above Wallbridge Upper Lock in 2006 and is now in the care of Stroud's Museum in the Park

4.95 Metal railings survive at several points along the canal, but have yet to be formally surveyed.

4.96 On the evidence of late-nineteenth and early twentieth-century photographs, boats were tied up to timber posts at locks and wharves along the Thames & Severn. The posts at the locks may well have been the stop posts positioned on the lockside to prevent the balance beams from over-swinging and not primarily intended as bollards. Archaeological investigation carried out as part of the restoration works may reveal evidence of these features, although this will depend in part upon the materials from which they were constructed. Nevertheless, even though timber mooring posts may have decayed, post holes relating to these may survive.

4.97 Just outside Phase 1 of the project above Bourne Lock, there are two boundary posts embedded beside the towpath to define the land ownership relating to the adjacent railway. Each comprises a cast-iron cylindrical head attached to a section of broad-gauge bridge rail; the tops of these markers read 'GREAT WESTERN RAILWAY CO BOUNDARY'. Certainly no earlier than the 1840s, these are more likely to date to the late 1890s.

Archaeological potential

4.98 There is significant potential for buried archaeological features to be revealed as a result of restoration. The heritage survey undertaken as background to this CMP identified by means of map regression many canal related sites or structures that no longer exist. Typical sites include lock cottages, warehouses, wharves and water control features such as sluices, feeders and weirs, traces of which may survive as 'buried archaeology' and may reveal important historic and engineering evidence related to the functioning of the canal.

4.99 One of the largest and most important sites is likely to be Brimscombe Port, where the original basin walls, and maybe sunken boats, could potentially survive below the modern surface. The archaeological potential of this and other sites will need to be recognised in the context of the restoration works.

T&S Boundary Markers - at Bourne Railway Viaduct & Wallbridge Wharf

Mile stone - at Bowbridge

and Chalford with replica plate

Biodiversity

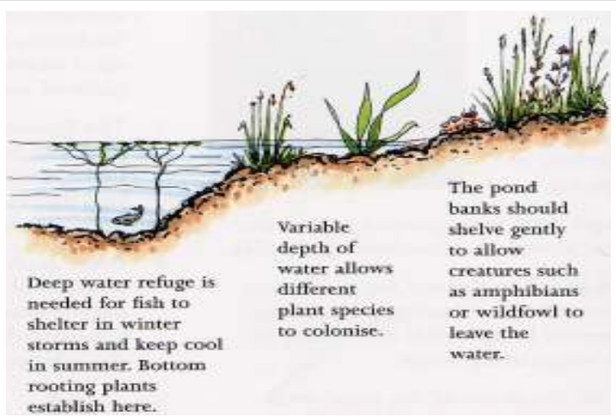
4.100 The canals provide diverse natural environments, including the canal channel, banks, towpaths, hedgerows, verges, and structures such as walls, locks, bridges and canalside buildings. These provide habitat for the many plant and animal species that constitute the biodiversity of the waterway.

4.101 Planning for biodiversity is undertaken at national and local levels in the UK in the form of Biodiversity Action Plans (BAPs) designed to conserve and enhance biodiversity. These are informed by an understanding of the resource in question, and based on established conservation principles. The CCP benefits from the expertise that the lead partner has already acquired in this area: BW, in partnership with many environmental organisations, has produced both a national waterways BAP (Appendix A1.4) and several BAPs for individual waterways, and it is the intention of the CCP to prepare a BAP for the Cotswold Canals, to be used in tandem with this CMP.

4.102 The natural environment of the Cotswold Canals has the potential to make a major contribution to biodiversity. The biodiversity has been measured by ecological surveys conducted between 2003 and 2006 (Appendices A4.3, A4.4, A4.13, A4.14 and A4.16). These assessed and reviewed the biodiversity value of the canals using various methods including habitat mapping, breeding bird surveys, aquatic assessments, amphibian surveys and reptile surveys. These show that the canals provide habitats for all the species identified in BW's national biodiversity strategy, and many that are included in national, regional and local BAPs.

4.103 The principal habitats in the Phase 1 area are:

- The water channel
- Waterway banks
- Towpath verges
- Hedgerows and walls
- Cuttings and embankments
- Built structures (bridges, tunnels, locks)
- Reservoirs, lakes and ponds
- Dredging tips (old and new)
- Feeders and streams
- Reedbeds
- Adjoining land/field margins, woodlands and scrub



4.104 The available habitat and consequent ecological interest and resource of the canals varies greatly from length to length. In the arable lowland of the Severn Vale (west of Stonehouse) the Stroudwater is largely dry or infilled, with a few sections in water. In these sections the biodiversity is minimal, based mainly on remnant hedgerow. In the Frome valley between Stonehouse and Brimscombe the canal, river, road and railway together form a distinctive, narrow habitat corridor. The channel is mostly recognisable, and is either silted with just a stream-like flow, or in full water with wide emergent fringes. A few sections are infilled. In this section the biodiversity increases and in some places is protected by regionally important nature conservation designations.

4.105 Survey work carried out as part of the preparation for this CMP has identified a wide variety of flora and fauna within the Cotswold Canals Phase 1 corridor, including a number of protected and nationally scarce species. The significance of all those occurring in the Phase 1 length is fully covered in Section 5. The surveys also identified a number of non-native species (discussed in detail in Section 6 which deals with Vulnerabilities).

4.106 The canal corridor between Saul and Brimscombe Port clearly provides a range of potential habitats for mammals, although the survey work undertaken as background to this CMP focused only on protected species of mammals. The detailed findings can be found by reference to the survey itself (Appendix A4.16) but the broad findings can be summarised as follows. Substantial evidence was found of badger activity, including numerous setts. Despite potentially good conditions for bat commuting and foraging habitat in Phase 1 canal route, surveys did not reveal evidence of bat roosts in either bridges or trees. Although more evidence of otter activity was found elsewhere on the canal, only one spraint was identified in the Phase 1 area. There are no records of dormice between Saul Junction and Brimscombe Port, although they do occur in woodland further to the east.

4.107 The canal corridor supports a range of habitats that are capable of supporting reptiles. Red-eared terrapin, common lizard, slow-worm and grass snake were recorded within the Phase 1 restoration area. Detailed reptile 'tinning' surveys were conducted at three sites along the canal that were identified to have high potential to support reptiles. The survey at Ebley Tip determined that there was at least a medium sized slow-worm population, although this was probably an underestimate because there is an extensive amount of suitable habitat that was not surveyed. Slow-worm was the most abundant species of reptile at Capel Mill Tip, with fewer recorded common lizard and grass snake. Small populations of common lizard and slow-worm were recorded from Brimscombe Port Tip. Each of these sites is considered to support important reptile meta-populations, with individuals that can disperse to adjoining habitats.

4.108 Surveys of amphibians recorded both common frogs and common toads breeding at a number of locations The largest numbers were recorded in the sections between Wallbridge and Bowbridge. No evidence of great crested newts was found within Phase 1 restoration area of the canals, nor in adjacent water-bodies that were considered potentially suitable for this species. The only exception is Stonehouse Newt Pond Key Wildlife Site (KWS), which supports a large population of great crested newts. However, this site is isolated from the Canals by the busy A417 road. There are historical records of great crested newts from Packthorne Farm (approximately 1km north-east of Saul Junction). However, the adjacent section of canal supports large numbers of predatory fish, including pike and stickleback, which limit the potential for this habitat to support great crested newts. Smooth and palmate newts were recorded from the canal immediately west of the A38 and Gannicox Toad Pond KWS. The latter site also supports breeding common frogs and common toads.

4.109 A total of 56 species of bird were recorded within the canal corridor between Saul and Brimscombe in surveys during 2005. Of these, 28 species were recorded as probably breeding and a further 12 species were recorded as possibly breeding. The survey revealed the presence of a wide range of species that are associated with different habitats. Tables summarising the various species of bird recorded and their locations are given in Appendix A4.4


Bankside Reinforcement


Coir Bank Protection


Vegetated Towpath


Reed Fringe

Landscape

4.110 Canals, though man-made, are now seen as essential landscape elements, or successions of linear landscapes, that complement the wider landscape through which they pass. Each canal has its own identity and local distinctiveness, the materials and form of construction giving a common character to the waterway as it crosses the sequence of surrounding landscapes.

4.111 The Cotswold Canals pass through many types of landscape, including the Severn Vale, the steep Stroud valleys and the Cotswolds, before sloping down towards the Thames. These areas are highly valued landscapes in their own right, and many initiatives have been taken to conserve and protect them.

4.112 The Cotswold Canals now form an integral part of the urban and rural scene, but when they were first built they had a significant impact, adding many distinctive landscape features. Besides the canal earthworks themselves (shallow embankments and cuttings, locks and bridges) they introduced vegetation and boundary features such as reed fringes to reduce erosion, towpath hedges on the Stroudwater, and dry-stone walls on the Thames & Severn. Since the canals were abandoned, their landscape setting has continued to change, particularly in response to continuing development of industrial sites alongside the canals in Stroud.

4.113 The route of the canals in the Phase 1 area passes through the following Landscape Character Areas (from west to east):

A Rural Frome Vale: generally open, rural character with expansive views across pasture fields with dense hedgerows. South of Walk Bridge, the canal is winding and enclosed, with soft edges of dense vegetation. Beyond Whitminster Bridge it shares its course with the River Frome for approximately 500m, then runs in a straight line across open fields. Landmarks on this section include Whitminster church tower, and a sequence of three brick arch bridges near the A38/A419.

B A38/M5 Rural transport corridor: between the A38 and Westfield Bridge, the canal has been infilled and its course obliterated, making it difficult to detect in the ground. The original route crosses small and medium-sized rectangular fields of pasture, affording wide, open rural views. Character is strongly affected by the intrusive noise and traffic of the M5, A38 and A419. The M5 runs along an embankment that obliterates the line of the canal .

C Newtown Locks: a well-enclosed stretch of canal with soft grass and dense vegetation along the towpath boundary, and dense sycamore woodland on the opposite bank. The proximity of the busy A419 creates noise intrusion. Newtown and Blunder Locks are highly prominent features. At Newtown the canal shares its boundary with the back gardens of the eighteenth-century cottages.

D Bonds Mill: The canal runs in a graceful curve between two bridges, with the landmark of Bonds Mill in a picturesque setting of open country composed of small and medium-sized pasture fields. An undefined grassy edge and rows of pollard willows give the canal a river-like quality, and the northern bank has a varied profile, in places trampled by cattle and with pockets of dense vegetation, particularly reeds. There is intrusive noise, although at some distance, from the A419 and nearby large industrial units.

E Ocean Rural Village: the graceful curve of the canal east of Ocean Bridge affords panoramic views over pasture to the south. An idyllically picturesque rural scene occurs where the canal forms part of the setting of St Cyr's Church, and is in turn framed by Nutshell Bridge to the south. The 'Ocean' has wide expanses of waterlilies, while the edges of the canal are softened by marginal vegetation and reeds.

F Stonehouse Residential and Upper Mills: a built-up canal corridor with soft green edges. Residential developments of the 1960s and industrial premises alike present poor-quality frontages to the canal. The built character is predominantly domestic, broken by short stretches of scrub and overhanging trees, by Nutshell Bridge to the west, and by the factories to the east.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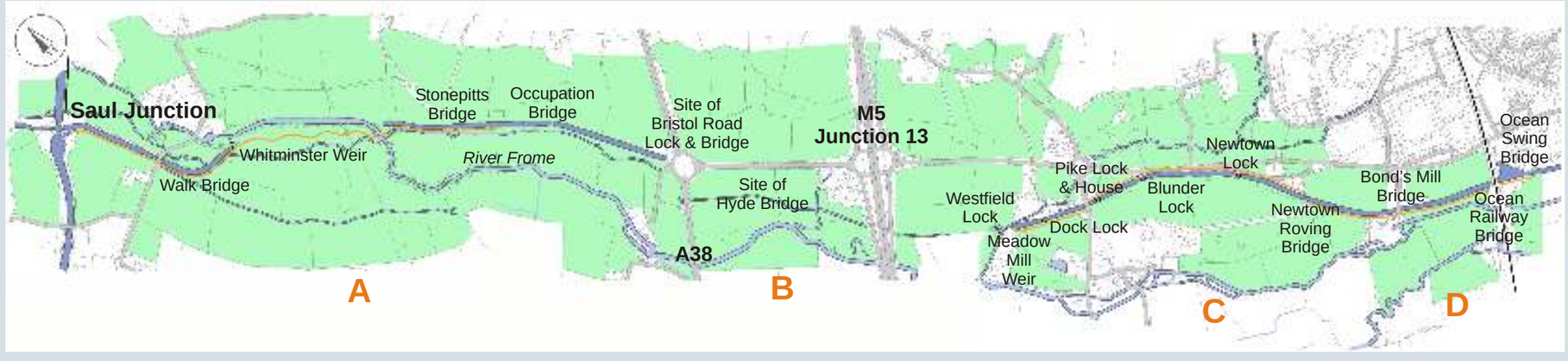
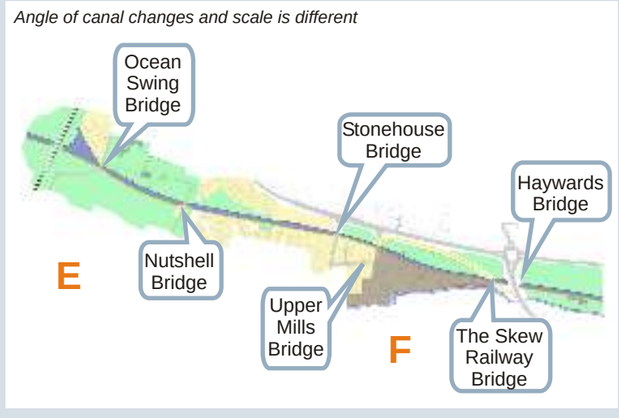


Angle of canal changes and scale is different



G Ryeford rural village and industry: a harmonious, intimate character, with nineteenth-century housing and industrial buildings balanced with more open rural character to the west. The towpath is softened with herbaceous vegetation and overhanging trees that create a dense and enclosed woodland corridor. Focal points include Ryeford swing bridge and the line of the towpath between the canal and the river. Back garden clutter and poor-quality industrial boundaries along the river are intrusive.

H Ryeford Ebley rural gap: a 'green gap' between more built-up areas to the east and west, with the Double Lock forming a key event along the canal, with views out to the surrounding valley. Cluttered back garden and industrial edges affect the offside canal boundary to the north, and at the Ebley infill the route of the canal is scrubby and overgrown.

I Ebley Mill: the canal corridor becomes part of the wide-open valley landscape, with the massive form of Ebley Mill a key landmark event on the canal. The offside (northern) edge of the canal is marked by continuous residential development, and the towpath side is partially bordered by river meadows.

J Cainscross green canal corridor: a heavily vegetated stretch of the canal corridor, particularly overgrown in the eastern section in Wallbridge. An overall strong sense of enclosure, yet with important glimpsed views out, especially to the west, where the canal is bordered by large playing fields. Generally, there is the sense of moving through a calm 'backwater'.

K Wallbridge historic centre: a highly built-up section of canal, characterised by mill and factory buildings and the proximity of Stroud town centre, with some fine townscape elements. Wallbridge marks the historic centre of the Cotswold Canals, the meeting place of the Stroudwater with the Thames and Severn. Negative canal boundary marked by backs of factories, warehouses and the more recent DIY store. Wallbridge basin is now infilled although a warehouse and the Stroudwater Company headquarters remain.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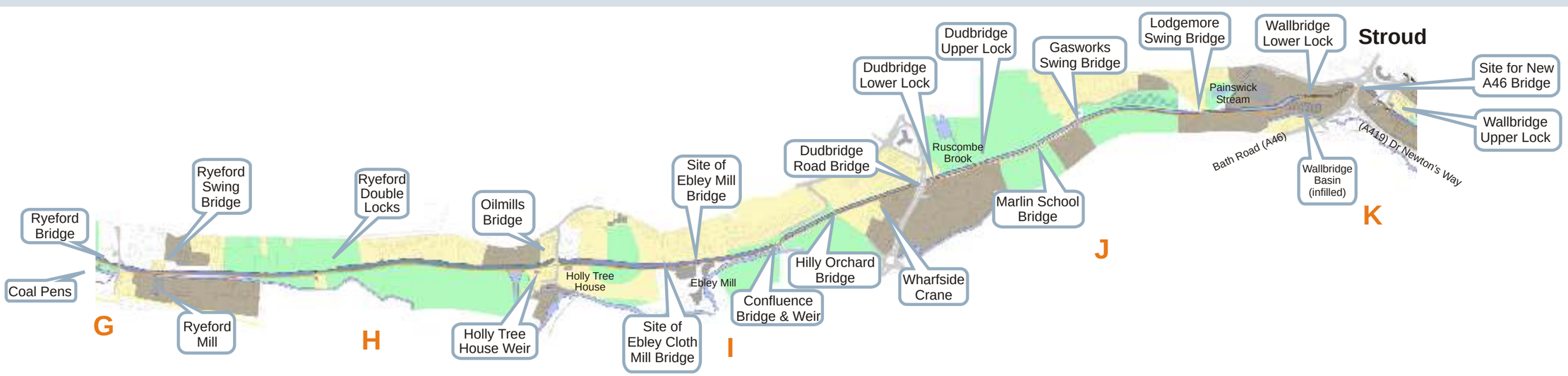


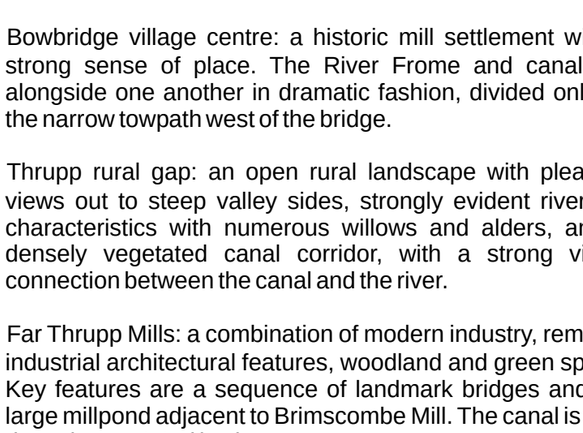
L Stroud riverside corridor: a stretch with a soft, wooded character, where the canal is intimately associated with the River Frome and shares the same corridor space. At the western end, the canal is blocked by the modern alignment of Dr Newton's Way, and a restored landfill site. The canal edges are heavily vegetated, with grassy edges and overhanging willows and alders. The Capel Mill railway viaduct, with its high brick arches, is a key landscape feature.

M Bowbridge village centre: a historic mill settlement with a strong sense of place. The River Frome and canal run alongside one another in dramatic fashion, divided only by the narrow towpath west of the bridge.

N Thrupp rural gap: an open rural landscape with pleasant views out to steep valley sides, strongly evident riverside characteristics with numerous willows and alders, and a densely vegetated canal corridor, with a strong visual connection between the canal and the river.

O Far Thrupp Mills: a combination of modern industry, remnant industrial architectural features, woodland and green space. Key features are a sequence of landmark bridges and the large millpond adjacent to Brimscombe Mill. The canal is very densely vegetated in places.

P Brimscombe historic centre: south of Port Mill, the canal has been infilled, the site of the historic basin of Brimscombe Port now occupied by a bland car park surrounded by an industrial estate. Current character is a varied pattern of modern industrial units and original features including stone boundary walls and bridges, a fine imposing stone mill building and a row of eighteenth-century cottages. The port is enclosed by the village of Brimscombe, clinging to the steep valley sides to create a natural amphitheatre.



Brimscombe Port Mill - water feeder

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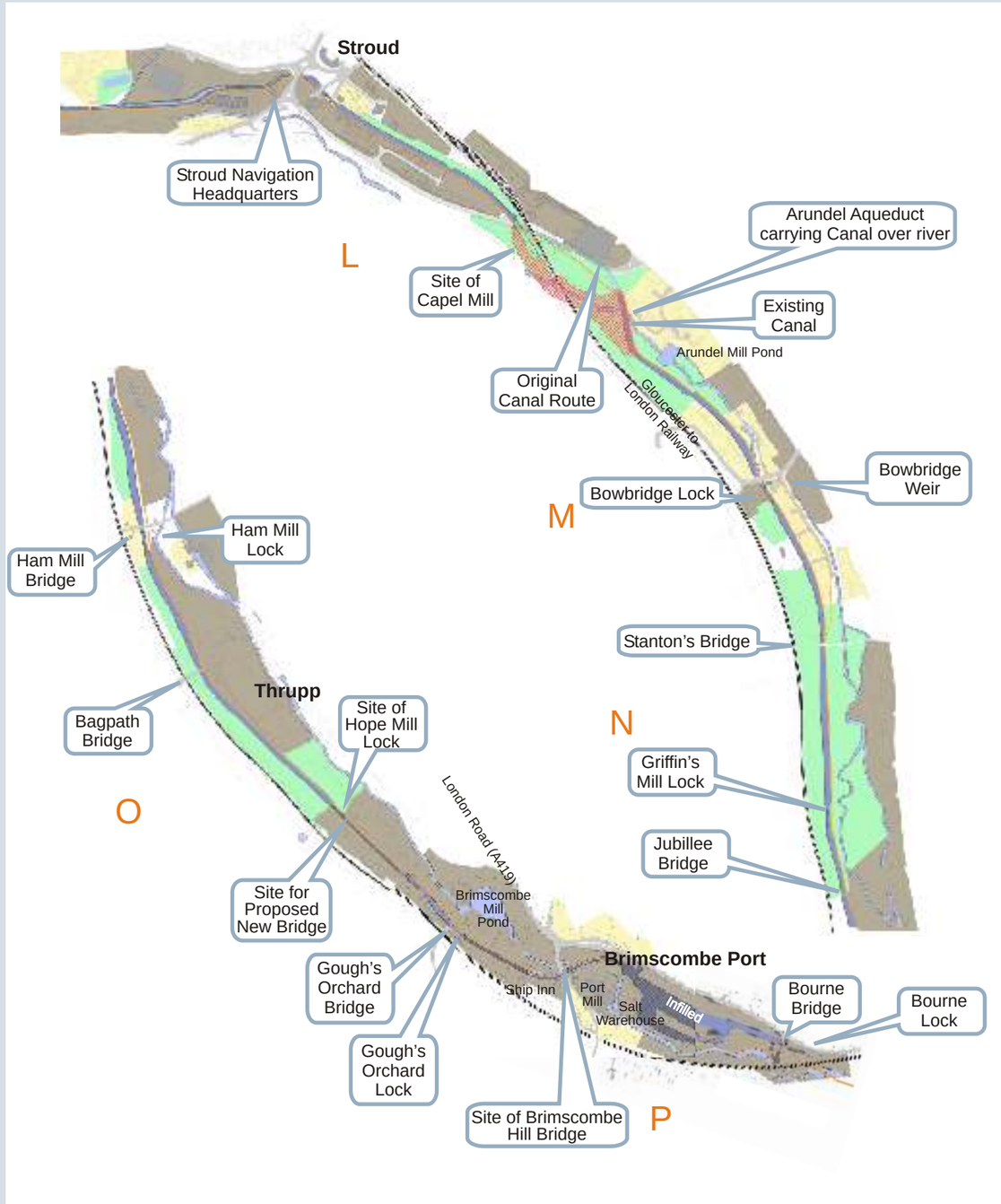
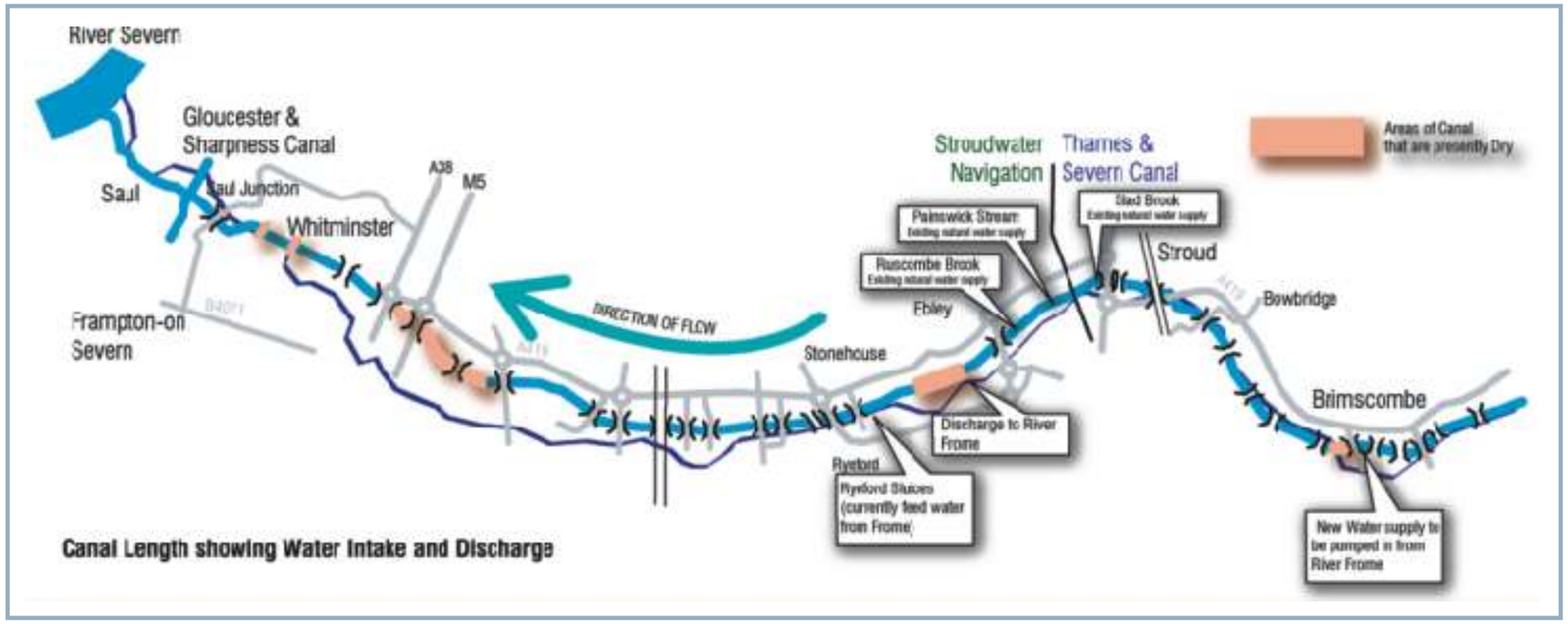


Historical water supply

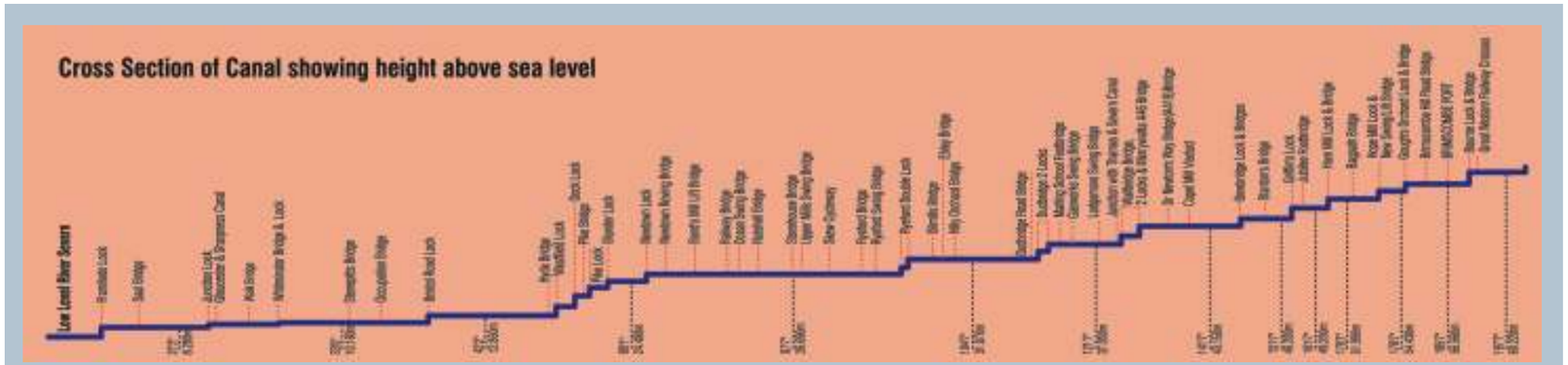
4.114 The Stroudwater, supplied largely by tributaries of the adjoining River Frome, was always relatively self-sufficient for water. The Thames & Severn Canal, on the other hand, relied on pumped supplies to the summit pound (not part of the Phase 1 area) to feed the canal in both directions. This was never satisfactory: supplies were intermittent and the canal bed leaked constantly. Although the western (Stroud) side also had links with the Frome and its tributaries, the right to use this was disputed with local mill-owners.

4.115 In the post-war period the flow regime changed, most notably in the mid-1950s when the Wallbridge to Ryeford section was 'converted' to part of the river system as part of a flood alleviation scheme. Three feeder streams were diverted into the canal, which was deliberately narrowed to give it fast, river flow characteristics. The combined three streams exited the canal channel at Confluence Weir at Ebley. The legacy of this arrangement is the narrow channel and wide 'towpath' of this section today. Infilling between Ebley and Ryeford Locks required additional supplies to be secured for the Stonehouse section, especially after the 1970s, when restoration began in earnest. After dredging the Ryeford to Newtown Lock pound in the 1980s, CCT introduced a new water supply at Ryeford Mill by installing a culvert under the towpath. This arrangement is still in place, and relies on manual intervention to control the flow from the Frome at Ryeford Sluices.

4.116 Management of water resources and water quality during and after restoration is dealt with in the Engineering Appraisal (Appendix A3.4).



Canal Length showing Water Intake and Discharge




Confluence Bridge & Weir


Water Control - at Ryeford

Gaps in our knowledge

4.117 Informed decision-making, which is the key to the sensitive management of the Cotswold Canals, depends on having a complete picture of the heritage resource, including areas where there is a lack of knowledge. This section highlights the remaining gaps in our understanding of the canals and their wider corridor.

Built heritage, archaeology and archives

4.118 Whilst a large amount of data has been gathered in respect of the surviving features and the historic infrastructure of the canals, there are some gaps in our understanding. In particular, further detailed survey work must be undertaken in advance of interventions in order to definitively distinguish original fabric from later phases of repair and rebuilding. In this respect the nature and provenance of building materials has had only partial examination.

4.119 The complicated network of water management features, particularly those associated with the Thames & Severn Canal, has been identified primarily through map regression and is not fully understood.

4.120 One aspect of water management in the earlier phases of the canal's existence, described in the Company archive but not recorded archaeologically, is the use of timber-lined culverts.

4.121 The archives of the two canal companies contain much information on the construction and development of the Stroudwater and the Thames & Severn. The nature of the restoration makes it likely that these will be consulted on a structure-by-structure basis.

Portable artefacts

4.122 As part of the restoration programme more detailed investigation will be needed into portable artefacts (metal fittings) associated with particular structures on the canal. Some lie abandoned beside the canal, some have been removed to museums and archives, and many more may form part of the archaeological record.

Vessels

4.123 It would be helpful to have a better understanding of the design, construction and use of the vessels that once plied the Cotswold Canals, and particularly to trace any that still exist.

Social history

4.124 The social history of the canals is not only significant for the restoration project, but also has the potential to increase community involvement and engagement in the project by providing material for interpretative projects along the canal, or information that can help maintain local skills and traditions through training projects. The canals were once a key part of the social fabric: they provided direct employment for some and indirect employment for many more particularly in the Stroud area, where they served innumerable mills and factories. Employment was also created much further afield, as raw materials and products were brought via the canals from all over the country.

4.125 The canals also promoted the growth of canalside communities through informal usage, such as the use of the towpath as a thoroughfare.

4.126 Some key aspects of the social history that could be developed further are:

- Documentation
- Photographs
- Oral history
- Continuity and change
- Community development and growth
- Post-war history

Oral history

4.127 Oral history initiatives would be an excellent way to gather more information and involve the community in the implementation of the project. They can inform engineering works, education projects and interpretation projects. They can help create a sense of shared experience.

4.128 Local Interpretation Plans will aim to tell the stories of sections of the canal by linking them to people and characters that modern visitors and local communities can identify with.

Biodiversity and nature conservation

4.129 Detailed ecological surveys have been conducted (Appendices A4.3, A4.4, A4.13, A4.14 and A4.16). However, the 'shelf-life' of ecological surveys for informing management planning and assessments is normally two years. A survey update programme will be required to keep the ecological record up to date. During restoration specific detailed studies of certain features will be required in order to support development licence applications.

Contamination

4.130 Issues relating to land and sediment contamination and associated waste management issues are dealt with in a Waste Management Plan within the Engineering Appraisal (Appendix A3.4). Further information about land contamination and analysis of canal sediments and infill will be obtained and fed into the Canal Land Condition Plan as the project progresses.

Amenity and access

4.131 Notable gaps in our understanding of the amenity use of the canals are the extent and nature of activities such as cycling on the canal towpath and the use and management of the canals where they are privately owned with no public access.

Remains of softwood balance beam at Ryeford Double Lock - with the only surviving handhold staple which spiked into the top of the beam.

Examining Swing Bridge abutments at Ebley

5. Statement of significance

Introduction

5.1 This section assesses the particular significance of the canals as a heritage asset, encompassing built and archaeological heritage, biodiversity, landscape and other values. Understanding these values is fundamental to the successful management of the canals, and will influence every decision that is made about their future.

5.2 The CMP highlights those elements in the Phase 1 area of the restoration programme that are of special significance, including those recognised by statutory and other forms of designation. The CMP also recognises other elements that are not formally designated, but nevertheless have value, particularly in the local context. The Cotswold Canals' significance as a heritage asset (see Section 3, above) is assessed in various ways, including:

- Historical significance
- Built heritage and archaeological significance
- Ecological/biodiversity significance
- Landscape significance
- Statutory and non-statutory designations
- Other values and significance of the canals
- 'Challenge sites'
- Negative features currently detracting from significance of the canals

5.3 More detailed information about the significance of particular features is given in the gazetteer (Appendix A2.2).

5.4 A complex asset such as the Cotswold Canals has significance for different people, and for different reasons, and competition between different values has the potential to create many management problems. An important reason for engaging a wide range of stakeholders to help develop this CMP was to ensure that all relevant views and values were acknowledged, and as far as practicable reconciled, within the final document.

Historical significance

5.5 The Cotswold Canals occupy a special place in canal history, having distinctive characters and features not found elsewhere on the canal network in Britain. There are few canals in Southern England, and the Kennet & Avon is at present the only east-west route open to navigation. Restoration of the Cotswold Canals will re-open another east-west route.

5.6 The Stroudwater Navigation passes through a flat landscape and its most significant feature is the astonishing 'level crossing' at Saul Junction, where it was bisected by the later Gloucester & Berkeley Canal, now termed the Gloucester & Sharpness. For a long time the Stroudwater had no towpath, and barges were hauled by men who crossed the fields along its banks by means of stiles or gates.

5.7 The Thames & Severn has an almost legendary quality, memorably described by Temple Thurston in *The Flower of Gloster* (1911). Thurston, one of the last to use the canal, noted the great Sapperton Tunnel, the fanciful stone round-houses (built for lock-keepers) and the lyrical landscapes of the Golden Valley. Like the Cotswolds region through which it passes, the Thames & Severn has distinctive vernacular stone buildings and details of its own. These exhibit the Georgian craftsman's touch, their local style enlivened by polite classical touches.

5.8 The distinctive 'artisan classical' style of the architecture on both canals finds echoes in the sculpted weirs, sluices and water control structures that line the canal. There are engineering rarities here in the form of circular weirs, side valves and 'mini reservoirs' that date from the pioneering period of canal construction.

Built heritage and archaeological significance

5.9 The overall significance of the built heritage and archaeology of the Cotswold Canals is assessed according to seven principal criteria (derived from those adopted for conservation management planning by the National Parks & Wildlife Services of New South Wales in Australia, and by UNESCO cultural criteria). These assess the importance of the canals in the following contexts:

- The history of the Stroud Valleys, the South-west of England, or Britain
- Associations with the life or work of an individual or group of individuals
- Aesthetic quality and/or a high degree of creative and/or technical achievement
- Strong or special associations with a particular community or cultural group
- Potential contribution to local, regional or national history
- Uncommon, rare or endangered aspects of local, regional or national waterway heritage
- Capacity to demonstrate the principal characteristics of British inland waterways.

The Golden Valley

Holly Tree House - circular weir

Aerial Photograph showing Ebley Tip adjacent to canal - now an important wildlife area

Brimscombe Port - perimeter wall

The history of the Stroud Valleys, the South-west of England, or Britain

5.10 The canals are significant for their antiquity; they pre-date the 'canal-mania' of the 1790s. The Stroudwater is a prime example of a local canal built to suit local ambition; the Thames & Severn manifests an Elizabethan (or earlier) vision of a link between the Severn and the Thames.

5.11 The canals have a close association with the industrialisation of the nationally-important textile industry that developed in the Stroud Valley in the seventeenth and eighteenth centuries.

5.12 The canals demonstrate the evolution of transport infrastructure through Gloucestershire and Wiltshire in the eighteenth and nineteenth centuries. The juxtaposition of road, rail and canal in a narrow 'corridor' is significant in this respect.

5.13 The Thames & Severn Canal has close associations with boat-building in the late nineteenth and early eighteenth centuries.

Associations with the life or work of an individual or group of individuals

5.14 The Company of Proprietors of the Stroudwater Navigation, a private company formed in 1774, remains a going concern; it is believed to be the oldest surviving private canal company in Britain.

5.15 The so-called King's Reach section of the Thames & Severn Canal is associated with King George III, who visited it in 1788. The Canal is also significant for the role played by the newly-created district and county councils in its management in the late nineteenth and early twentieth centuries.

Aesthetic quality and/or a high degree of creative and/or technical achievement

5.16 Notable examples of technical achievement (albeit outside the Phase 1 area), include: roundhouses on the Thames & Severn Canal, which are novel forms of workers' housing, and the Sapperton Tunnel, one of the most ambitious engineering projects of its age. For several years it was the longest tunnel in the world (it remains the third longest canal tunnel in Britain), and thus demonstrates a high degree of technical acumen and ambition.

Strong or special associations with a particular community or cultural group

5.17 Both canals are closely associated with the CCT, a community-led charitable organisation founded in the 1970s and now the largest canal trust in the country with over 5000 members. The Trust reflects the renewed interest in canals that developed in the second half of the twentieth century.

5.18 The canals have sentimental significance for the local people who have lived, worked and played beside them, and particularly for those who recall them still in operation in the early twentieth century.

Potential contribution to local, regional or national cultural history

5.19 The archaeology of the canals could make important contributions to our understanding of late eighteenth-century waterways. Many 'lost' features may survive below ground, and it may also be possible to retrieve information from the fabric of standing structures. In this respect it should be noted that detailed research and analysis already undertaken in relation to locks and associated gear has revealed useful information about the original construction that will inform the restoration proposals and future maintenance.

5.20 Standing structures, remains of building and their settings (including wharf areas, gardens, paddocks, etc) may yield evidence for changing working practices and conditions on the canals, and changes in local industry.

5.21 The use of specific building materials is likely to provide insights into contemporary procurement and the local building industry.

5.22 The documentary archives of both canal companies are particularly extensive and an invaluable resource for local and regional history. There is also an impressive body of photographic material, which is likely to shed light on the nature and use of the canals in the late nineteenth and twentieth centuries. This could be of great value in learning more about the social history of the communities in the Stroud valleys and the role the canals played in the lives of the local inhabitants.

CCT Members - promoting and fundraising

Lodgemore Mills - as they are today, the only surviving cloth mill still in production

Lodgemore Mills - production of cloth for billiard tables

Uncommon, rare or endangered aspects of local, regional or national waterway heritage

5.23 Both canals are regionally significant as being the two earliest entirely artificial navigable waterways in Gloucestershire and Wiltshire. Although depleted by later repairs and alterations, the surviving and archaeological structures of the Stroudwater are the only remnants of a canal designed to accommodate Severn trows. The Thames & Severn Canal is a similarly rare example of a waterway designed principally to accommodate Thames barges. Additionally it may be a unique instance of a single canal which was intended to cater separately for two types of vessel.

5.24 Brimscombe Port is arguably the earliest example of a small number of inland transhipment ports serving the junction of two canals.

5.25 The Cotswold Canals as a whole incorporate some structures that are rare in the national context: the Sapperton Tunnel, the circular spill weirs, the swing bridges, the early example of a double lock at Ryeford, the coal pen at Ryeford, and the roundhouses.

5.26 They also accommodate several structures that are regionally rare or uncommon: locks, warehouses, wharfinger's houses, spill weirs, the wharf crane at Dudbridge, and milestones.

5.27 There are other structural characteristics that are locally distinctive, such as the carpentry traditions behind the lock gate construction, the nature of the lock gearing and anchor furniture and the trim on the lockside.

Capacity to demonstrate the principal characteristics of British inland waterways

5.28 Both canals incorporate late eighteenth-century design solutions and construction techniques for the creation and management of an inland waterway. In particular, eighteenth and nineteenth-century approaches to managing water supplies to a canal are very well represented in the weirs, sluices, culverts, feeders and lock adaptations on the Thames & Severn.

5.29 Wharves, basins, wharf cottages and other structures demonstrate the commercial characteristics of inland waterways, and their close association with historic industry.

Ecological/biodiversity significance

5.30 Though built for industrial and agricultural freight, waterway channels were colonised by many plants and animals soon after construction and are now a significant wildlife habitat. Despite their artificial origins, many are designated as important wildlife sites at local, national and international level. Their slow flows and managed water levels provide a unique environment that has become internationally important for nature conservation.

5.31 The canal corridor forms a linear mosaic of habitats including woodland and scrub-edges, hedgerows, flower-rich towpath verges and diverse emergent 'reed' fringes. The corridor helps link habitats fragmented by urbanisation or intense agricultural use and often forms a wetland link between river catchments. When canals share a close and parallel connection with riparian corridors, they effectively widen the wetland corridor and its associated habitats.

5.32 The biodiversity significance of any canal is derived from its management and history. The initial construction work would have had a significant impact on the existing environment, as the canals would have severed linked habitats and scarred the land. They would have imported many new features, such as hedgerows, where none previously existed. Once the canals were in use, the cargoes they carried produced environmental impacts. In some cases they continue to do so through a legacy of, for example, contaminated silts and pollution sources.

5.33 Canals were subsequently recolonised by plants and animals from the wider countryside, some of them carried by water from the abstraction and feeder sources. Recolonisation will have taken place by natural spread and also by direct intervention through the deliberate introduction of plants (for bank stabilisation) and animals (particularly fish). The specific history of any canal in relation to its geographic setting, its transport history, ownership and management history and intensity of usage will have shaped the exact nature of this recolonisation.

5.34 The commercial decline of the Cotswold Canals has been accompanied by less active management of the canal structures and environment or even, in some cases, complete abandonment. Neglect in various degrees has shaped the current biodiversity status of the canals.

5.35 The remnant canal network has to a large extent escaped the intense land management that has transformed the wider countryside in the post-war period. For this reason, many canal corridors have preserved biodiversity features that would have otherwise been lost.

5.36 The renaissance of the Cotswold Canals as a heritage and recreational asset (and now increasingly as a sustainable transport asset) has again altered the biodiversity value of the corridor, and although it presents immediate challenges, it may represent the best opportunity to achieve a position of strength for biodiversity overall.

5.37 The canal corridor provides a valuable biodiversity link between the protected habitats in the Cotswolds and Stroud valleys and those found alongside the River Severn to the west.







Biodiversity significance of the Cotswold Canals

5.38 The concept of the national waterway network as being a huge (approximately 3,000 miles) linear national park is a useful notion for defining the biodiversity significance.

5.39 The most significant influences on biodiversity in Phase 1 of the Cotswold Canals restoration project are:

- Managing the canals has potential to change their biodiversity in a positive way
- Intervention; much of the canal system is not managed at present. When this changes, so will their biodiversity.
- The biodiversity value of the canal varies greatly from place to place. In areas of infill, for example, the biodiversity value is negligible whereas in others it is relatively high, particularly in relation to the surrounding land
- The absence of modern engineering features such as steel piling and gabion armouring makes the canal a relatively 'soft' environment.
- Some sections of the canals are strongly associated with riparian corridors
- The Cotswold Canals are blighted by problems arising from the presence of non-native invasive species.

The heritage value of the biodiversity aspect

5.40 An appreciation of the biodiversity aspects of the network is a major draw: each year, more than 300 million visits are made to waterways owned by BW, most of the visitors walkers, cyclists, anglers and day trippers use the towpath, and only a small proportion are in boats on the water. A common feature throughout the canals is their 'unspoilt' nature. They are relatively untouched by modern modular engineering features such as steel piling, gabion baskets and concrete edging.

5.41 This section examines the biodiversity significance of the canals for Phases 1a (Stonehouse to Brimscombe) and 1b (Saul to Stonehouse) of the restoration programme. It deals mainly with the immediate canal corridor, i.e. the channel, banks, towpath, towpath verges and canal boundaries.

Saul Junction to Brimscombe Port

5.42 The canal corridor has not been recognised by national or international nature conservation designations although some sections have received non-statutory regional designations. However, as a corridor it connects internationally and nationally designated sites such as the Upper Severn Estuary, Frampton Pools and Rodborough Common.

5.43 The adjacent figure shows the international and national nature conservation designations within a 2km buffer of the Phase 1 corridor.

5.44 The Phase 1 section of the restoration contains sections of infilled canal (such as those resulting from the construction of the M5) that have almost no current biodiversity value. In the remaining wetted areas the biodiversity value is generally now in decline because of successional change.

Significance of species and habitats present

5.45 The ecological surveys conducted between 2003 and 2006 have confirmed the presence of a number of nationally and internationally important protected species and habitats. There are also regionally important species and habitats, which are important in the context of the Local Biodiversity Action Plans. Several problematic species have also been identified.

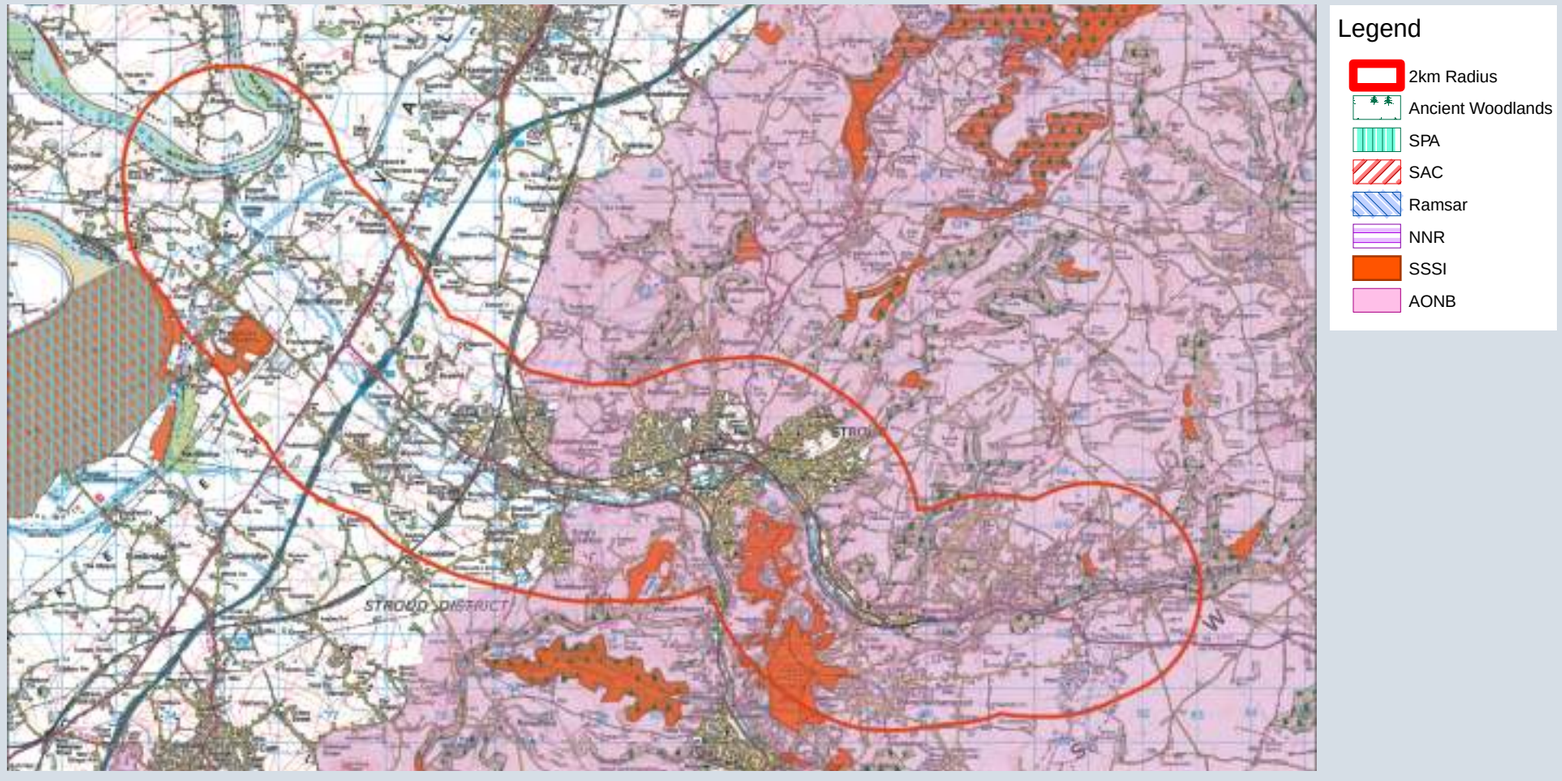
5.46 The canal corridor between Saul Junction and Brimscombe Port supports a range of different habitats. Priority habitats listed in the UK and Gloucestershire Biodiversity Action Plans that occur within the canal corridor include:

- Mesotrophic standing open water
- Canals
- Rivers
- Reed bed
- Woodland
- Urban
- Lowland calcareous grassland
- Ancient and/or species-rich hedgerows
- Cereal field margins
- Old orchards

5.47 Specially protected animals that have been recorded within the canal corridor between Saul Junction and Brimscombe Port include:

- Common lizard
- Slow-worm
- Grass snake
- Kingfisher
- Daubenton's bat
- Noctule bat
- Common pipistrelle bat
- Soprano pipistrelle bat
- Badger
- Otter

There have also been recent reports of water vole within the canal corridor but these have not yet been confirmed. Further survey work is required to establish the size of any colonies.



National & International Biodiversity Landscape Designations within 2 km of the Cotswold Canals

5.48 Current surveys have found numerous badger setts, either in adjoining sites or, where the canal is largely dry, on the canal earthworks themselves.

5.49 Surveys within the Phase 1 restoration area have not identified any roosting sites for bats along the canal but confirm that there is potential for them to use some of the trees, canal bridges and other structures. Bat survey work is planned to continue through the restoration period.

5.50 Another protected species that has been reported in the upper reaches of the River Frome above the Phase 1 area, although not in the canal itself, is native crayfish. This has not been confirmed yet by an official survey.

5.51 In addition to protected species, several other nationally and locally scarce species occur. These are being assessed as part of the current survey work but are known to include both plants and invertebrates. Plants of particular note include some unusual aquatic macrophytes in the watered sections of the canal, as well as terrestrial species such as common clary on the canal embankment at Stonehouse.

5.52 Nationally scarce vascular plants that have been recorded within the canal corridor between Saul Junction and Brimscombe Port include:

- Green-flowered helleborine
- Dittander
- Whorled water-milfoil
- Grass-wrack pondweed

5.53 In addition to the above the canal corridor supports a range of priority species that are included on the UK and Gloucestershire Biodiversity Action Plans.

5.54 Bird species whose breeding or non-breeding population declined, or whose range contracted rapidly (by more than 50%) or moderately (by between 25% and 49%) over the last 25 years, are placed on the RSPB red and amber lists respectively. Red and amber list breeding birds that have been recorded in the canal corridor between Saul Junction and Brimscombe Port include:

- Skylark (red list)
- Grey wagtail (amber list)
- Song thrush (red list)
- Starling (red list)
- House sparrow (red list)
- Linnet (red list)
- Bullfinch (red list)
- Yellowhammer (red list)

5.55 Most of the canal channel sections that are not infilled are in a marshy successional state, which reflects the absence of management. They are becoming increasingly dominated by 'reedy' species such as common reed and reed sweet-grass. Open water is often dominated by duckweed species and to a lesser extent the invasive non-native water fern. Continued decline could be expected to lead to a further decrease in biodiversity value through successional change towards dry habitat. Several noteworthy species of flora are identified within the channel.

5.56 The canal corridor possesses a significant proportion of woodland and scrub dominated by mature ash and field maple. The treescape is predominantly made up of native deciduous species. The dominant grassland is mesotrophic grassland one (MG1) *Arrhenattherum elatius* grassland. In areas of infill the corridor has generally reverted to agriculture and is primarily improved grassland of minimal biodiversity significance.

5.57 The hedgerows are largely an introduced feature in the landscape. They were planted as the towpath was introduced alongside the waterway. They are not ancient and are not particularly species-rich. In general they are reasonably intact.

5.58 The canals and their associated lands have ecological value not only because they provide habitats for species but also because they act as a wildlife corridor that links a number of otherwise isolated areas.

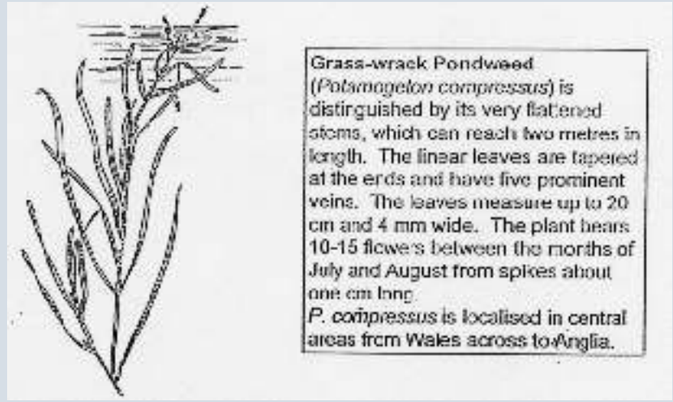
Landscape significance

5.59 The BW *Cotswold Canals Corridor Study* (1996) enabled the canals to be viewed against the national perspective of the canal system. The identification of 113 Landscape Character Zones along with the various Types and Geographic Bands showed the canals to be unusually diverse.

5.60 Taking this diversity into account alongside 'visual envelope', views, vegetation and important features and the overall perceptual quality, the canals were rated very highly compared to other canals. The secluded character of the canal corridor, the historic relationship between the canal and its surroundings, attractive views and the rich industrial heritage were deemed particularly significant.

5.61 The wider countryside is also of exceptionally high quality, with much of the canals bordering closely the Cotswolds Area of Outstanding Natural Beauty (hereafter AONB), although not in the Phase 1B area.

5.62 The main significance of the stretch of canal covered by the Phase 1 restoration is its distinctive character as a post-industrial landscape in a rural setting, containing a juxtaposition of early industrial features associated with the textile manufacturing, such as mills, workers housing, and the canal itself. Except in specific locations the immediate countryside is not outstanding, but is a visual manifestation of the earlier industrial nature of the area.



BW Archive - of nationally scarce vascular plant

Kingfisher

Former Midland Railway Viaduct - now used as a cycleway

Statutory and non-statutory designations

Conservation areas

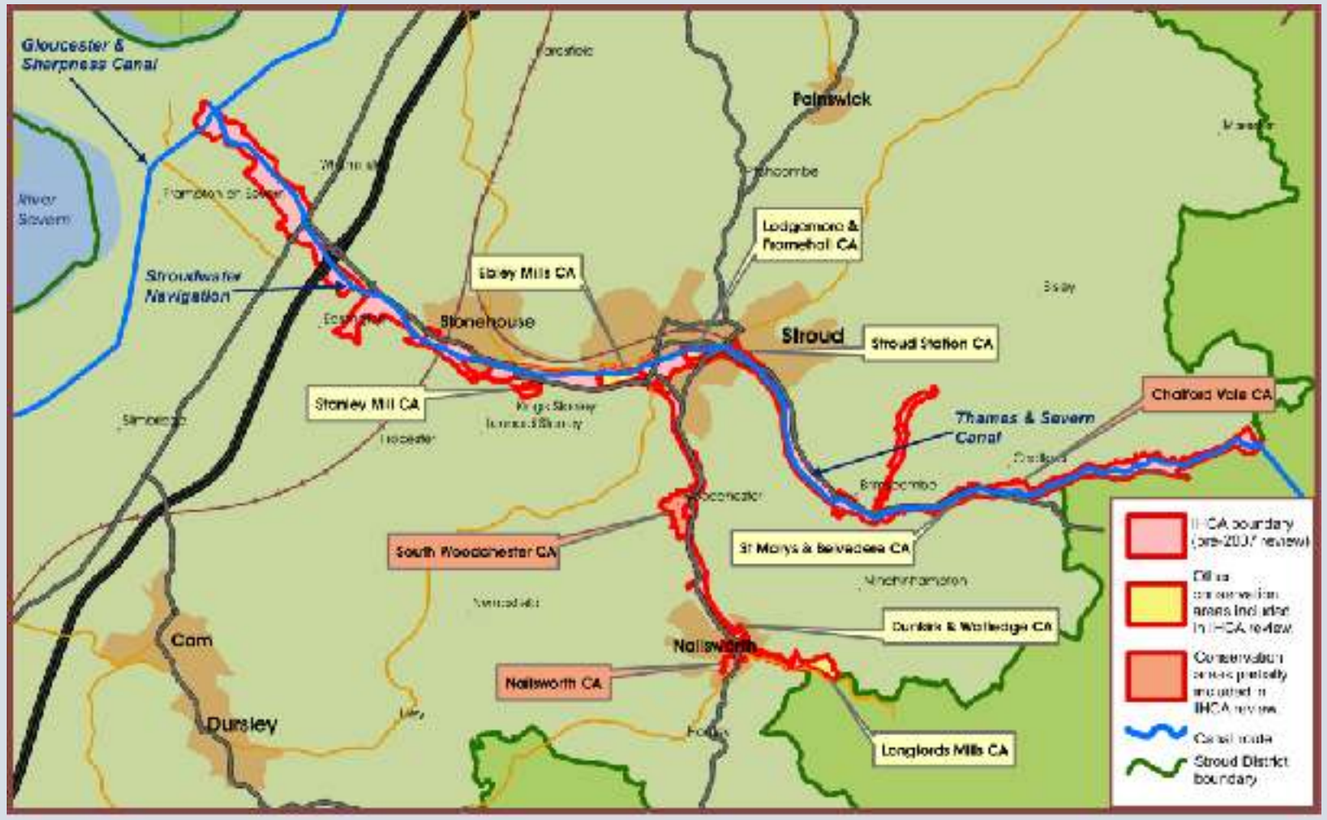
5.63 There is a single conservation area covering the whole of the Phase 1 restoration area. From Saul Junction to Chalford the canals form part of the Stroud Industrial Heritage Conservation Area (hereafter IHCA), designated in 1987 for the architectural and historic quality, character and coherence of the buildings along the Stroud valleys. This linear conservation area embraces not only the most striking built elements of the Stroud Valley's industrial legacy but also the various transport systems (road, railway and canal) that developed over the eighteenth and nineteenth centuries. The line of the Cotswold Canals is an integral feature of the entire conservation area.

5.64 The IHCA is unusually large: it stretches almost 23km from Saul Junction, where the Stroudwater Navigation meets the Gloucester & Sharpness Canal, to the Daneway Portal of the Sapperton Tunnel. Although in places it is extremely narrow, it embraces the whole line of the Cotswold Canals between these points.

5.65 The IHCA and the land immediately adjacent to it are currently undergoing a parish-by-parish review by Stroud District Council to examine whether the boundaries should be amended and the level of statutory protection afforded to the structures within increased. The resultant Conservation Area Statement will become Supplementary Planning Guidance for the District.

Listed buildings

5.66 Many individual structures within the wider corridor are listed, and a number of these are directly associated with the Cotswold Canals. Excluding a dense urban area in Stroud, 142 listed buildings lie within the 1km-wide area investigated by the architectural heritage and archaeological surveys. At least 35 of these relate directly to the canals, including the Grade II* Coates Portal of the Sapperton Tunnel. However, only 15 of the listed buildings are within the Phase 1 of the restoration project, and these are all Grade II.



Stroud Industrial Heritage Conservation Area (IHCA): Existing conservation area boundaries, prior to 2007 review

Aerial View of Length

5.67 The listed buildings which will be directly affected by Phase 1a of the restoration project are:

- Nutshell Bridge
- Ryeford Bridge
- Ryeford Double Lock
- Ham Mill Lock & Bridge
- Brimscombe Port Mill
- Bourne Bridge.

5.68 The listed building affected by Phase 1b of the restoration project is:

- Junction Lock.

Scheduled Ancient Monuments

5.69 Nine Scheduled Ancient Monuments (hereafter SAMs) lie within 500m of the canals. There are no SAMs within the Phase 1 area.

County Sites & Monuments Record (SMR) sites

5.70 The recent heritage survey has identified about 1,000 archaeological sites from the SMR and a further 600 from the NMR that lie within 500m on either side of the canals. It has added a further 200 sites that are unrecorded by the SMR and NMR.

Historic Parks and Gardens and Historic Battlefields

5.71 There are no designations on the English Heritage Register of Historic Parks and Gardens and Register of Historic Battlefields within the Phase 1 restoration area.

Archives and collections

5.72 Several local and national institutions hold relevant archival collections (see Section 4.8).

Areas of Outstanding Natural Beauty

5.73 Much of the canal line (from Stonehouse to Thames Head, near Kemble) is within or close to the Cotswolds AONB (the Canals lie just outside the AONB, downstream of Chalford). None of the Phase 1 area falls directly within the AONB, but one of the route options for realignment at Capel Mill may involve crossing the boundary.

Countryside Character Areas

5.74 The Canals pass through three different Countryside Character Areas each with a distinctive landscape character and features. They are:

- Severn & Avon Vales
- Cotswolds
- Upper Thames Clay Vales

Special Landscape Areas

5.75 Several Special Landscape Areas are identified in Structure and Local Plans. These designations, which include the SDC Secluded Valleys Landscape type, are being fully reviewed in the context of the CMP.

5.76 The canals pass through three English Nature Natural Areas, each with distinctive assemblages of habitat and species. These are:

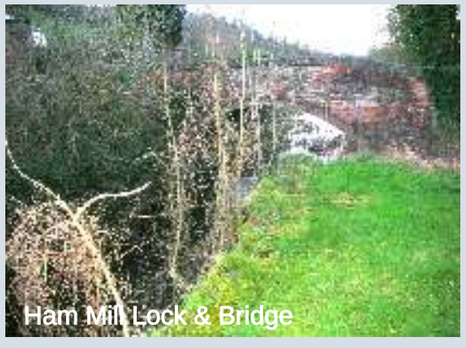
- Severn & Avon Vales
- Cotswolds
- Thames & Avon Vales


Junction Lock


Nutshell Bridge


Ryeford Bridge


Ryeford Double Lock


Ham Mill Lock & Bridge


Brimscombe Port Mill


Bourne Bridge

Statutory nature conservation sites (SSSIs, SACs, SPAs, Ramsar sites)

5.77 No sections of the canals are designated statutory nature conservation sites, but several such sites lie within the wider corridor.

5.78 The Stroudwater Canal's original terminus on the River Severn is now close to the Severn Estuary SSSI/SPA/Ramsar site. The restoration scheme, stopping at Saul Junction, will not directly affect this site, though there are indirect links, including water resources.

5.79 The Phase 1 length is not covered by any Sites of Special Scientific Interest, although there are several nearby. The wetland SSSI, Frampton Pools, is approximately 1km from the 1b section and the calcareous grassland SSSIs at Selsley, Rodborough and Minchinhampton Commons all lie within 1km of the 1a section.

Nature reserves

5.80 Several Wildlife Trust and Woodland Trust reserves cover lengths along the Cotswold Canals, but only one lies within Phase 1. This site, at Frome Banks, has woodland and river interest but excludes the existing canal lengths, and is managed by Gloucestershire Wildlife Trust (GWT).

5.81 Non-statutory Wildlife Sites designated at county level are called Key Wildlife Sites (hereafter KWSs). In Gloucestershire, the sites at River Frome, Ebley Tip, Gannicox Toad Ponds, Rodborough Fields and Frome Banks are adjacent to sections of the canal within Phase 1a.

5.82 The English Nature Habitat Inventory lists several areas alongside the Canals and within the wider canal corridor. These include lowland grazing marsh in the Severn Vale area, and several grassland and ancient woodland sites in the Stroud valleys sections.

5.83 The canals as a whole fall into two Local Environment Agency Plan areas (hereafter LEAP areas): Severn Vale LEAP and Cotswolds LEAP (which includes the former Upper Thames LEAP). There are two new Catchment Abstraction Management Strategies (hereafter CAMS). The EA is preparing two CAMS (due for completion summer 2007) to cover the same areas.

Biodiversity Action Plan species and habitats

5.84 Many of the species and habitats already mentioned are also designated under the various biodiversity initiatives relevant to the Cotswold Canals. The Phase 1 restoration area is affected by BAPS at national level (UK and England) and county level (Gloucestershire). At a local level the relevant documents are: BW's Biodiversity Framework (Appendix A1.4) and the EA's Biodiversity Strategies for the Thames and Midland Regions.

5.85 The species involved include aquatic plants, water voles, otter, bats, crayfish and farmland birds. Habitats include standing open water, field margins, reedbeds and various grassland types.

5.86 The Gloucestershire BAP has a specific Habitat Action Plan (hereafter HAP) for canals, in which the Cotswolds Canals are a key element. BW, EA and others in the Partnership have also developed their own biodiversity planning approach. The BW Biodiversity Framework describes generic habitats and species considered important at a national level for canals, and which occur on the Cotswold Canals.

Geological, aquatic and other designations

5.87 There are no known geological SSSIs on the line of the canals; and none close to the canals in the Phase 1 area. The current status of non-statutory geological sites (RIGS) on and adjoining the canals will be reviewed as part of the CMP process.

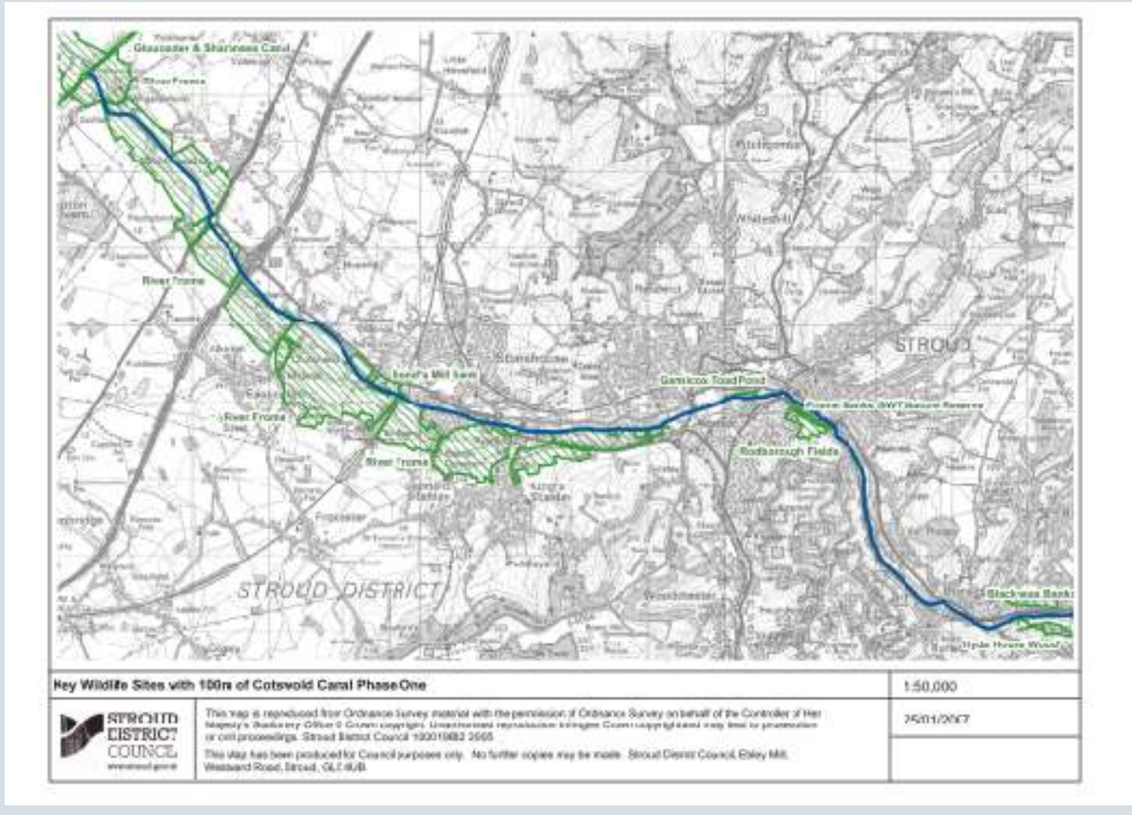
5.88 The current status of the canals and adjoining watercourses in relation to EU designations relating to water and fisheries, and forthcoming legislation such as the Water Framework Directive, will be reviewed as part of the CMP process.

5.89 As far as local designations are concerned, the canals have Main River status on some sections, for example, between Ebley and Wallbridge and in the Severn Vale at Whitminster.

Other values and significance of the canals

5.90 The waterway has other value besides its heritage significance. Amenity uses, such as walking, cycling and angling, are immensely important to local people. Another important dimension of local value of the canals is reflected in the active engagement of small volunteer groups in the restoration. It is important that the restoration and future management of the canals recognises these values and supports the continued use of the canals for these purposes. More importantly, the restoration has the potential to increase leisure use of the canals.

5.91 Leisure use of the canals has a long history, with records of a leisure barge on an early version of the Stroudwater Navigation in the 1740s. Though leisure boating was never a major feature of the canals, some adjoining landowners kept boats, and there are also records of several special event boat trips, particularly from late nineteenth-century photographs. Today the CCT's trip boats operate on the restored section at Saul Junction and on the River Thames at Lechlade. The Wycliffe College boathouse at Stonehouse was the base for the school's rowing teams from 1887; it now stands disused and derelict, the school having switched allegiance to the Gloucester & Sharpness Canal at Saul in 1936. The school still owns the old site, however, and could revert to using the Stroudwater once it has been restored to navigation.



School Trip - emphasising multi-user needs

Cyclists - using gateway on towpath

5.92 General use of the towpath as a footpath dates back to the nineteenth century, when the canal operators felt obliged to close sections annually to demonstrate that they were in private ownership. Most of the remaining towpath is now a Public Right of Way, and though many of the privately-owned eastern sections are inaccessible, a few lengths are again open as 'permissive paths'. Use of the open paths is a strong tradition in the canalside community: many people use the path as a route to work or to town, for walking the dog or just for pleasure. This is probably the longest-standing social use of the canals.

5.93 Angling is another continuing social use, although many lengths are now dry. There are also changes in angling habits: the modern coarse fisherman participates in a sport and throws his catch back, but his forbears caught fish to eat. Particular areas of the Cotswold Canals are popular and well-managed fisheries.

5.94 Family continuity is another interesting aspect of the value of the canals, though difficult to assess. Many families with long histories in the canal area will have some links to the canals, perhaps simply a family tradition to walk the towpath on a Sunday afternoon, or perhaps a more complex history, with some family members working on or alongside the canals over several generations. The key element of the social significance of the canal is that it means something different to everyone in society. Each person will have his or her own ideas and feelings about it. Few other local features will attract such a variety of people for so many different reasons.

'Challenge sites'

5.95 Capel Mill and Brimscombe Port have been identified as 'challenge sites', which pose particularly complex and challenging problems for restoration due to a combination of difficult technical problems and layering of significance. In both cases the line of the canal has been infilled and will require reinstatement as part of the restoration. These sites will require careful treatment based on a thorough understanding of their significance in historical, environmental and amenity terms.

Capel Mill

5.96 Capel Mill is a complex site that contains extensive archaeological interest. It was the location of an historic mill, which was altered by the advent of the canal in the late eighteenth century and was again changed with the arrival of the railway in the nineteenth century with the construction of an impressive railway viaduct. The GWR company constructed a warehouse within one of the arches, as compensation for these changes to the mill, and this is still visible. The viaduct is not listed.

5.97 The site also has significance in ecological and landscape terms and falls within the GWT site of Frome Banks. Capel Mill is valued by many local people as a site of amenity value, because it is aesthetically attractive due to the distinctive cascade and pool feature in the river Frome, and being located at a point of interest on a well-trodden footpath between the town and the local beauty spot of Rodborough Common. The specific risks and vulnerabilities relating to the potential impact of restoration options for this site are dealt with in more detail in paras. 6.33 and 6.34 of this CMP, but it is clear that any significant intervention here will have considerable impact on both the built and natural environments.

Brimscombe Port

5.98 This site has national significance as one of the first examples of a small number of trans-shipment ports serving the junction of two canals. Brimscombe Port was the obligatory terminus for the Severn trows travelling up the Stroudwater Navigation and the Thames barges coming down the Thames & Severn Canal. The different sized locks prevented either type of boat from making a through journey and ensured that all goods had to be off-loaded at the port. Overlooking the site is the Grade II listed Port Mill, which includes a curtilage building directly associated with the canal known as the Salt Warehouse. The mill is a substantial and significant nineteenth-century building, which replaced an earlier mill dating from before the canal's construction.

5.99 The port was progressively infilled following the abandonment of the Thames and Severn Canal in 1933, and is now partially covered by modern buildings. Only a few standing structures survive from the original port function, but archaeological investigation has revealed that there are significant buried remains of the former basins. Excavation of the 1.6-hectare port represents a major intervention, and the subsequent development will require very careful handling.

Negative features currently detracting from significance of the canals

5.100 Several negative or intrusive features detract from the significance of the canals as a heritage asset. In certain locations these seriously diminish the appreciation and potential use of the asset by local residents and others, and undermine the potential use and enjoyment of the canal as a cultural and amenity resource. Identification of these negative attributes offers scope for significant improvement of the canals and their immediate surroundings.

5.101 Negative elements include:

- Invasive species
- Major roads
- Dereliction and neglected canalside sites
- Infilled elements of the canal
- Inappropriate past repairs to historic features
- Obstructions to the navigation (e.g. low bridges, culverts)
- Inappropriate canalside development
- Contamination.

Low Bridge - and obstruction to line of canal

Infilled canal channel

6. Vulnerability and potential management problems

Introduction

6.1 This section of the CMP sets out the potential management problems facing the Cotswold Canals. In particular it highlights how the special qualities of the canals might be at risk or vulnerable, either from neglect or as a result of restoration or future management and maintenance. It highlights the problems that need to be solved in order to secure a long-term sustainable future for the canals, and identifies opportunities for improving the heritage asset. Dealing with these vulnerabilities represents a challenge both for the restoration programme and in the subsequent management of the asset. This section therefore forms the basis for the policies and principles designed to conserve and enhance the significance of the canals, set out in Section 7 of the CMP.

6.2 There are many ways in which the heritage significance of the canals is already under threat. At a general level the most obvious factor is the fact that much of the line of the canals is currently unmanaged and, as a consequence, both the built heritage and biodiversity value is at risk of deterioration through neglect. Surviving heritage features such as locks and bridges, representing the industrial archaeological heritage of the canals, are very visibly in a process of decay. Similarly the biodiversity value is diminishing as a result of an absence of management, through the progressive re-colonisation of the channel by plant growth, and the progress of invasive non-native plant and animal species which, if left unchecked, will tend to predominate over native species.

6.3 Without an overall management scheme, erosion of the heritage value of the canals is likely to continue, since decisions about parts of the canal are likely to be made without a wider understanding of their impacts on the special significance. Furthermore, lack of overall strategic management of the canals by a single body, and the fragmented ownership of the canal corridor makes it difficult to promote good heritage management: some landowners may be uninterested, or unwilling to address heritage management. Coupled with a lack of resources for regular maintenance, this is currently the most significant single cause of vulnerability of the built and natural heritage. There are, however, many other, less obvious ways in which the heritage significance of the canals may be vulnerable.

6.4 Taking a longer-term view, and keeping in mind the aim of restoring the canals for navigation, a distinction needs to be made between vulnerabilities that arise from the current state of neglect, and those that may occur as a result of restoration and subsequent management of the waterway. There is an inherent risk that returning the waterway to full navigation may in itself threaten the preservation of both the natural and built heritage, and damage other values currently ascribed to the canals. The restoration therefore needs to be handled with extreme care, and in the context of a strategic management framework.

6.5 Where canal restoration occurs as a result of adjacent development through a Section 106 condition in the planning permission, there are particular risks for the heritage value of the canals. Without robust guidance it is likely that the canal vernacular and soft bank canal edges will tend to be lost in favour of structures and hard landscaping that serve only the new development and not the special significance of the whole canal.

Wallbridge lower lock - unrestored

Hilly Orchard Bridge - shows narrowed canal and need for ramped access

Upper Mills Swing Bridge - remains of the 1928 structure

6.6 Key vulnerabilities and opportunities, relating to both the current state of neglect and to restoration, are discussed below under the following headings:

- Built heritage and archaeology
- Biodiversity vulnerability
- Landscape
- Access and amenity
- 'Challenge sites'

Built heritage and archaeology vulnerability

6.7 There is a risk that, however well intentioned, restoration or maintenance work to the canals will be undertaken without full regard to their heritage significance, and thereby diminish the value of the canals as a heritage asset. In the past works have sometimes proceeded without a thorough understanding of the historical/archaeological significance of the feature to be restored, and some restoration and repair work has not been carried out to appropriate standards. Where changes have been made to structures, these have not always been adequately recorded. This applies equally to work undertaken by volunteers and by contractors, and to work carried out as part of planning gain agreements with Local Authorities. The risk of damage applies equally to the built heritage and to buried archaeology. There is a risk that this situation could continue unless policies are put in place and rigorously observed by those responsible for the restoration or long-term maintenance of the canals.

6.8 Without substantial public funding through the National Lottery and other grant giving sources, there are currently insufficient resources, whether financial or human, to stabilise the condition of the canal or protect its heritage. The existing workforce on the canals (mainly CCT and Waterway Recovery Group volunteers) have limited formal training in heritage management and the use of traditional craft skills. Successful restoration of the canals will secure continued and informed management, but the built heritage and archaeology may be vulnerable in establishing re-use.

6.9 Whether the canals are restored or not, there is potential for some conflict between the conservation of the historic environment and other requirements, such as for Access for All or Health and Safety. Appropriate decisions that balance the various considerations can only be made within the framework of a CMP.

6.10 As noted in Section 5, there are some structures including the circular spill weirs and former swing bridges that are considered to be rare in the national context. These are vulnerable to poor management of the canal asset. Current restoration plans will not necessarily ensure protection of the weirs, as most of them will remain in private ownership.

6.11 Piecemeal restoration of the canals may place certain other distinctive features at risk. In the case of the swing bridges, for example, the interests of some user groups may be at odds with conservation aims, i.e. the retention or reinstatement of historic swing bridges may be seen as an obstacle to convenient navigation or access, which may lead to pressure for them to be replaced with overhead bridges.

Biodiversity vulnerability

6.12 The biodiversity value of the Cotswold Canals is currently in decline. Where there is a noteworthy value, it is largely due to the relative intensification of land use beyond the corridor compared with the neglected state of the canal. To that extent the biodiversity value is accidental and is not necessarily sustainable. Continued lack of management leaves the biodiversity in the canal corridor vulnerable to loss of habitat and inappropriate intervention. Successional change tends towards a drying-out of habitats that will result in a reduced flora and fauna. Neglect tends to increase as the aesthetic value of the canal corridor becomes less and less appreciated. This leads in turn to the increased likelihood of vandalism, contamination and encroachment by adjacent landowners.

6.13 A restored and managed canal represents the only realistic chance of maximising the biodiversity value of the corridor. The restoration will affect the biodiversity aspect throughout the corridor, in some cases profoundly, but construction work must be conducted so as to preserve the important features now present. Once the canals have been returned to full navigational use, the management regime must be one that maximises the biodiversity value.

6.14 The principal changes will come through the recreation or re-widening of the canal channel. Much of the marshy habitat will disappear and, conversely, open-water habitat will significantly increase. This will benefit some species and disadvantage others. The flow regime of the canal will alter: still backwaters will become smooth, slow laminar flows. The canal corridor habitat will change: hedges can be maintained using traditional laying methods, and woodland and scrub can be managed through intervention. The result will be that both the wetland and associated habitat types can be 'held' at a certain successional position. The challenge is to strike a balance between management that allows the waterway to function successfully while maximising biodiversity value.

6.15 Certain points on the canal where major construction works are planned (such as Capel Mill) present particular challenges in terms of protecting biodiversity.

Construction impacts

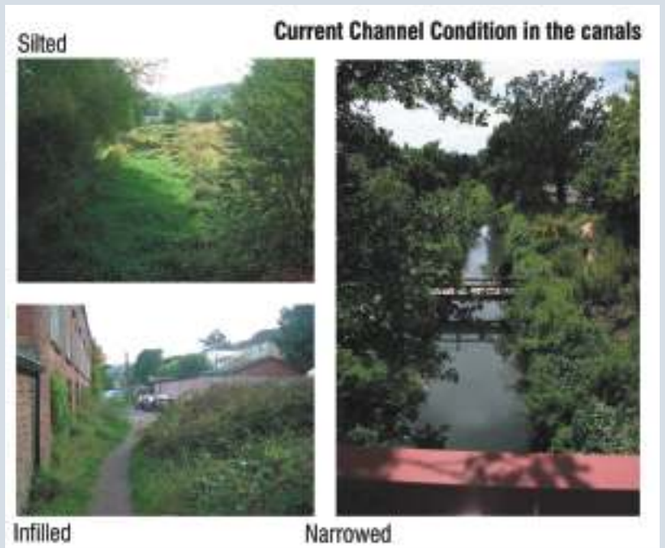
6.16 The restoration process begins with a period of disruptive construction. There is a risk that construction activities and the services associated with them (e.g. access routes) may destroy, damage or disturb features of biodiversity value. In the most serious cases legally protected species may be endangered unless a comprehensive programme of evaluation and mitigation is undertaken before detailed design work commences.

Planting/landscaping

6.17 The planting schedule and landscaping works conducted immediately after construction are intimately linked to the eventual biodiversity value of the corridor. They have the potential either to compromise biodiversity through bad design or implementation, or to enhance it. The CMP seeks to achieve the latter.

Unmanaged canal length

Neglect and lack of management



6.18 The range and number of wildflower species are probably at their highest at some point on the management spectrum between full commercial use (when boat traffic and navigation management may restrict species) and total dereliction (when a small number of the more competitive species will tend to dominate). The presence of vegetation and root systems in unmanaged low-flow waters encourages the deposition of silt and dead plant material, and the plant species will typically shift towards increasingly drier habitat types in a process referred to as succession.

Non-native and problem species

6.19 Various non-native plant species occur along the canal, including riparian plants such as Himalayan balsam, Japanese knotweed and giant hogweed that are highly invasive. Aquatic species such as water fern are also present but do not pose a threat of the same scale. Japanese knotweed and giant hogweed infestations are particularly difficult because these species are covered by the Wildlife and Countryside Act (as amended) 1981, which makes it a criminal offence to cause them to spread in the wild.

6.20 Non-native animals within the canal corridor and water catchments include fish such as zander (Severn catchment but not Thames) signal crayfish (largely Thames catchment and not currently identified in the Cotswold Canals below Sapperton Tunnel) and mink. Although not positively identified within the Phase I length in the 2003 Mammal Survey (Appendix A4.16), mink are widely distributed in the Severn catchment and are likely to increase their range in the future unless controls are instigated. These species represent a threat to native animals either through competition for habitat or by predatory behaviour. Non-native reptiles (terrapins) have also been identified but are not seen as a serious risk as they are unable to reproduce in this climatic zone.

6.21 In the case of the American mink it is considered that only an active and co-ordinated programme of trapping can remove them successfully. It is important therefore that this is pursued in conjunction with the local and statutory authorities and rural landowners in the area. The removal of mink would encourage water vole recolonisation. To some extent measures to encourage otters will also help to displace mink, but these alone will not be enough to preserve the water vole.

New invasive species

6.22 The restoration of the Cotswold Canals may make the system more vulnerable to invasive and other problematic species issues. Many of these will not arise until the final restoration of a continuous waterway linking the Severn and Thames catchments. The restored link will provide a new pathway for the spread of problematic species such as signal crayfish (considered to be in the upper Thames but not the lower Severn) and zander (in the lower Severn but not in the upper Thames). Other spreading species such as floating pennywort will require vigilance. Contaminated boat hulls are a significant vector for this type of problematic species.

Water resources and quality

6.23 The restoration will create or modify several culverts and aqueducts. This has implications for biodiversity, particularly for more terrestrial/bankside species. Lack of provision for the passage of vulnerable species in the design of new structures will have a negative effect on their distribution and wellbeing.

6.24 A new discharge weir will be created below Oil Mills Bridge, with potential to directly affect water quality in the River Frome. Water management is addressed in the Engineering Technical Appraisal (Appendix A3.4).

Contamination

6.25 Dredgings and infill materials have been assessed and information is provided in the Engineering Technical Appraisal (Appendix A3.4). The removal of contaminated infill is directly associated with the restoration or protection of identified heritage structures at a number of locations, such as Capel Mill and Brimscombe. For example, the presence of asbestos could present particular difficulties for archaeological investigation, and contamination from waste oils could require specialist cleaning techniques. These risks will need to be identified, assessed and mitigated before any restoration works can commence.

6.26 It will be necessary to fully understand the type, volume and properties of all the waste materials likely to be produced during the life of the Cotswold Canals project. Waste costs will increase as a result of a rise in Landfill Tax unless exemptions can be obtained, but also due to the requirement to pre-treat material prior to disposal to landfill.

Landscape

6.27 Unmanaged piecemeal restoration is likely to lead to loss of local distinctiveness. Inappropriate wider development may also erode local distinctiveness and character. The overall management scheme must take into account the conservation area and listed building status of some sections of the canal. The distinctive 'sense of place' of some sections of the Canals (e.g. The Ocean at Stonehouse) is very vulnerable to erosion or loss unless it is managed and insensitive restoration is prevented.

6.28 Without a canal-wide management scheme and vision, there is a risk of loss of general character. Examples include loss of greenfield sites, 'over-restoration' and rehabilitation of some brownfield sites, which might lead to a an erosion of the distinctiveness of the canal. The potential for such deterioration largely relates to the wider canal corridor and needs to be controlled through appropriate planning guidance and control. However, the problem must be addressed in a concerted manner so that the CMP is fully complemented by local authority documents such as the Stroud Industrial Heritage Conservation Area (IHCA) Statement (Appendix A3.6).

6.29 Restoration will inevitably bring increased visitor numbers and associated pressures. New infrastructure - improved access, car parking and additional leisure facilities such as picnic areas - may be needed. This could erode the landscape value in a number of ways, changing not only the canalside character but also the 'sense of place' it engenders, unless an appropriate balance is achieved. Sensitivity is critical to avoiding damaging alterations. This must be addressed in a concerted manner and requires guidance and control through the Stroud District Council Area Action Plan.

6.30 The landscape relationship between the canal and the wider corridor is not always maintained at present. This cannot be resolved without an overall plan to co-ordinate restoration within the context of the wider corridor.

Access and amenity

6.31 A key requirement for the success of the restoration project will be to satisfy the different needs and demands of all the groups with an interest in the canals, and the individuals who visit and use the canals. This applies equally to the planning of the project and to the long-term management of the restored waterway. Although a broad basis of agreement will be sought in the planning for each project, this in turn creates the challenge of reconciling each group's interests and the demands that they make on the canals.

6.32 The rise in visitor numbers as a result of restoration will put pressure on the sustainability of canal biodiversity and increase the risk of conflict between competing interests. The nature, scale and level of risk will vary along the length of the canal. Some sections will be more capable of accommodating multiple users than others, but in the most vulnerable areas, such as those adjacent to Key Wildlife Sites, the impact will need to be controlled through careful design and subsequent management.

6.33 There are potentially competing demands on the canal's footpath network, for example between cyclists and anglers. Little of the network currently meets BT Countryside for All standards, and therefore may need to be upgraded. Upgrading to provide access for people with disabilities may, unless carefully planned, compromise the historic significance. Increased public access to the canals is also likely to create health and safety risks that will need to be addressed. For example, it may be necessary to provide safety barriers in certain locations.

Contaminated Infill - at Brimscombe Port blocks the line of canal

Ebley Road Bridge - constructed without reference to a CMP

Development - significant change in landscape character

'Challenge sites'

6.34 In addition to the vulnerabilities that apply generally throughout the Phase 1 restoration area, there is particular concern at Capel Mill and Brimscombe Port. The vulnerabilities for these two 'challenge sites' are summarised below.

Capel Mill

6.35 In the 1980s the line of the canal was lost through the construction of Dr Newton's Way, a bypass road to the south of Stroud town centre, a change that forces any subsequent restoration of the canal to utilise one of the two other skew arches through the viaduct. It will be necessary to re-introduce a navigable route within a physically constrained area containing a number of vulnerable elements. Each of the options for realignment has a considerable impact on the archaeology, natural environment and amenity of the site. The complexity is compounded by the fact that for many years part of the site was used as a household waste dump; this now presents a potential environmental hazard, heightened if the landfill must be disturbed in order to re-establish the canal route. However, selecting a route that avoids the contaminated landfill has a greater impact on the current amenity value of the site. Nevertheless, there are significant opportunities at Capel Mill to enhance habitat quality, by selecting an appropriate design for the reinstated canal line. There is the potential for the creation of new habitats for species such as otters, water voles and bats through a design that establishes a beneficial interaction between the River Frome, the canal and the viaduct.

6.36 Because Capel Mill is a vulnerable site, restoration proposals will have to be extremely sensitively conceived in order to avoid damage to significance. Restoration options have already been the subject of considerable public consultation, and it is plain that there are no simple solutions. The eventual restoration proposal will have to take into account all the ecological, heritage and landscape considerations, and balance them in a way that has public support. The approach for finding an acceptable compromise for this sensitive location is covered in more detail in Section 7 dealing with Policy.

Brimscombe Port

6.37 Like Capel Mill, Brimscombe Port is a complex and challenging site with a wide variety of potentially competing interests. A key issue of vulnerability at Brimscombe is that there is significant archaeological potential, confirmed by a trial excavation that revealed the existence of industrial remains below ground. Restoration and development works will therefore inevitably have a significant impact on the archaeological record, and must be designed to protect this as far as practicable. At the same time there are challenging technical problems relating to re-excavation of the basins and the removal of contaminated infill (foundry waste and asbestos). More particularly, the restoration can only be achieved as part of an overall package entailing canalside development that will help fund the necessary works. Initial consultation with the local community has highlighted an aspiration for the former port area to become the new focal point for the village of Thrupp, and accordingly there are particular sensitivities about the nature and scale of potential development. This is a site that will be vulnerable at a number of levels, and considerable care will be needed to ensure that its significance is safeguarded in any future development of the area. Careful consultation on this issue is being undertaken. The approach for finding an acceptable compromise for this sensitive location is covered in more detail in Section 7 dealing with Policy.

Capel Mill - construction of the by-pass on the line of the canal

Capel Mill - canal terminated by the waste tip

Brimscombe Port - the infilled basin

Approach channel - from Brimscombe Port Bridge

Approach channel today - forming access road

7. Policy aims and standards to be applied in managing the canals

Introduction

7.1 Previous sections of the CMP have outlined the nature, significance and vulnerability of the Cotswold Canals as a heritage asset. This section sets out the policies and standards that will be applied in order to safeguard the significance of the canals, bearing in mind the particular vulnerabilities that have been identified in Section 6 above.

7.2 The CCP is committed to securing the highest practicable standards of conservation and management in delivering the restoration project, and in the subsequent management of the canals. In order to ensure this, a set of rigorous policies and standards has been established, informed by BW's policies and other recognised standards and sources of good practice. It is essential that all those involved in the project properly understand the policy aims and standards that are to be applied. This applies to project managers, partners, stakeholders and funding bodies alike. As well as establishing the broad principles that are generally applicable to the restoration as a whole, this section sets out detailed policies and standards under various topic areas, based on the particular problems and vulnerabilities identified in Section 6 above. The section is structured under the following broad headings:

- Broad policy aims
- Built heritage and archaeology policies and standards
- Biodiversity policies and standards
- Landscape policies and standards
- Access policies and standards
- Training, education and interpretation
- 'Challenge sites'.

Broad policy aims

7.3 The overarching policy aims for the Cotswold Canals restoration project are enshrined in the project vision, which states that the CCP aims to:

'Restore the Cotswold Canals to full navigation in the interests of conservation, biodiversity and local quality of life, and to use the restoration as a catalyst for wider social, economic and environmental regeneration in areas neighbouring the canals'.

7.4 This conservation-led vision for the regeneration of the waterway accords with the funding principles of the HLF, and is the basis of this CMP. It is also in line with the stated policy aims of the key members of the CCP. Specifically, it accords with BW general policy aims and those of the Waterways Trust.

7.5 With the above overarching principle in mind, the following general policies will be applied in the context of the restoration of the canals and their future maintenance and management:

Kennet & Avon Canal - sympathetic repair of wharf wall with new stone

Chesterfield Canal - sympathetic repair of a historic lock

Chesterfield Canal - sympathetic restoration of an historic bridge

- The CMP shall be used as the primary policy document to guide the restoration, maintenance and future management of the Cotswold Canals
- All works of restoration and subsequent management of the canals must be based on a thorough understanding of the significance of the asset in question, and of the impact of the proposal on the built heritage, biodiversity and other values
- All works of conservation, restoration, repair and maintenance must aim to conserve and enhance the built heritage, biodiversity, landscape and other significant values of the canals
- All major elements of restoration must be preceded and informed by consultation with user groups, local communities and statutory bodies.

Built heritage and archaeology policies and standards

7.6 Good intentions alone will not produce sensitive and appropriate conservation work. It is essential that all parties involved in the restoration project, including engineers, contractors, volunteers and funding bodies, understand the philosophy and approach to conservation works related to the built heritage. Effective communication of conservation principles is also essential, in order to prevent well-meant but misguided interventions, and to safeguard the historic value and distinctiveness of the canals in the long term.

7.7 An important distinction to be made in the case of any successful canal restoration is that it will be returned to operational use; in effect, it becomes a working monument. While the engineering requirements to achieve safe operation must respect all aspects of the canal's heritage, there will inevitably be certain constraints that would not apply in the management of an un-navigable waterway.

7.8 The restoration works, and the future management of the built heritage of the Cotswold Canals, will be guided by BW's Heritage Policy and Principles (Appendix A1.1). These principles are founded on international conservation best practice, as defined by ICOMOS, and national standards as defined in BS 7913 and English Heritage Principles of Repair. They are entirely in accord with CMP principles. An overarching principle, applying equally to the built and natural elements of the canal environment, is that waterways are to be treasured and valued as a national asset, and careful protection and management is an essential part of this. A vital component of the BW Heritage Policy and Principles is that where balance and judgements have to be made between competing resources and activities, there should be a presumption in favour of preserving the waterway heritage.

7.9 Built heritage

The surviving built heritage of the Cotswold Canals is a fragile resource, and it is vitally important that its value is not diminished as a result of works of restoration and subsequent management and maintenance. The specific ways in which the built heritage of the canals is vulnerable has been set out in Section 6 above.

7.10 Bearing these risks in mind the following policies and principles will be adopted in relation to all work likely to have an impact on the built heritage of the canals, whether in the form of practical repair, restoration or maintenance.

- Repairs must be preceded by archaeological and historical research so that the significance of the feature in question is properly understood prior to the commencement of works affecting historic fabric.
- Recording of the existing feature shall be undertaken before, during and after any significant intervention (whether repair or replacement/restoration).
- Repairs and restoration must be based on the principle of 'minimum intervention' and retention of as much original fabric as practicable.
- Where practicable, repairs should be reversible.
- Re-instatement of features such as lock paddle gear must be based closely on original designs (adapted as necessary to meet modern health and safety requirements). The presumption will be that the original design is replicated. All drawings and specifications are to be based on careful research of original features.
- There should be a presumption that refurbishment or replacement of features will be undertaken using traditional materials such as cast iron, locally occurring natural stone (or best possible match) and native hardwoods from sustainable sources.
- Different periods of work within a historic structure or site shall be respected.
- The 'patina of age' should be recognised as part of the value, but restoration work should aim to avoid artificial ageing.
- Harmful or poor-quality previous repairs should be removed and replaced with appropriate repairs using sympathetic materials, correct techniques and an appropriate standard of workmanship.
- New work should be distinguished from old when restoration and repairs are carried out by discreet date-marking of new material.
- All personnel involved in the restoration and maintenance of the canals, whether BW staff, contractors or volunteers, shall receive appropriate training in the conservation, repair and maintenance of historic structures.

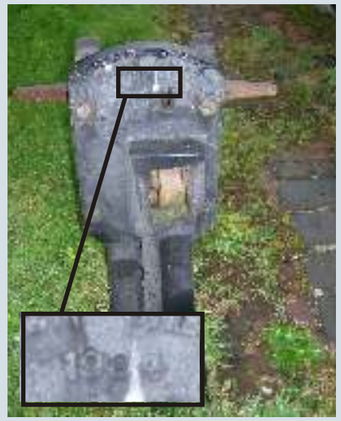
7.11 Archaeology

Much of the construction history of the canal is traceable through a near-complete set of company records. Restoration will recover physical evidence that is expected to be highly significant in terms of civil engineering and canal archaeology. The Cotswold Canals Restoration Archaeological Strategy sets out detailed policy aims that will guide the approach to dealing with archaeologically sensitive remains. The strategy outlines the appropriate response for dealing with different types of canal feature, i.e bridges, locks, other built heritage features, towpaths and dredging dumps.

7.12 The following policies summarise the key principles to be applied to all aspects of canal archaeology:

- Before works of restoration or development are commenced an assessment must be made of the potential impact that such works will have on the archaeological resource. This should be done with reference to existing archaeological baseline information (Cotswold Archaeology Heritage Survey, Sites and Monuments Record and any desk based assessments, as set out in the Archaeological Strategy (Appendix A 4.19).
- Where there is potential for known sites to be affected by works of restoration, or there is potential for previously undiscovered archaeological remains, a programme of archaeological works must be devised and approved by the County Archaeologist in order to: a) provide further information as to the nature of the resource; b) enable appropriate mitigation measures to be put in place if necessary.
- Where applicable archaeological recording of historic structures, as identified by reference to the local Sites and Monuments Record and the Cotswold Archaeology Heritage Survey will be undertaken to a minimum Level 2 standard as set out in the recent English Heritage Guidelines (EH 2006), which are a revised and expanded version of the RCHME guidelines (1996)
- Adequate planning and timescales must be built into the restoration programme to allow for archaeological recording.
- Once the restoration project has been completed, recording will continue to be required before any significant repairs are undertaken as part of the maintenance of the canal.
- Reporting and archiving of the results of Archaeological works will be to the standards set out in the Archaeological Strategy.

Research - into lock gates and gear



Cast Iron Paddle Stand on Droitwich Barge Canal - with date stamp

New Lock Ladder on the BCN.- carefully introduced

Brimscombe Port - trial pit showing edge of narrowboat dock

Biodiversity policies and standards

7.13 The restoration of the whole Cotswold Canals corridor provides an opportunity to increase the wildlife population of the lower Severn and Upper Thames by linking several otherwise disparate biodiversity initiatives. However, it could also bring some negative impacts by facilitating the spread of invasive or non-native species. The restoration works and future management of the natural environment and biodiversity of the Cotswold Canals will be guided by the principles set out in BW's Environmental Policy (Appendix A1.2). As an overarching principle this policy recognises that:

It is the quality and sustainability of the waterway environment that will attract people to [the canals] and ensure they become increasingly valued as a national asset.

7.14 The BW Environmental Policy further recognises that waterways are used for both navigation and recreation and that their operation as working heritage makes certain demands on the natural environment. It therefore seeks to integrate the needs of those who visit and use the network with the actions needed to conserve wildlife that contributes to the waterways. In addition to BW policy the biodiversity policies for the Cotswold Canals restoration are informed by best practice principles set out in Planning Policy Statement 9 'Biodiversity and Geological Conservation' (ODPM, 2005) and the associated Government Circular 'Biodiversity and Geological Conservation Statutory Obligations and their Impact within the Planning System' (ODPM 06/2005 and DEFRA 01/2005).

7.15 BW's 'Environmental Code of Practice' provides a framework for local biodiversity planning. Its 'Biodiversity Manual' describes more specific management advice that can be applied at a local level, including technical and management specifications that take account of biodiversity aspects. Further and more widely applicable guidance,

such as the Environment Agency's Pollution Prevention Guidelines, state good practice that will directly or indirectly protect biodiversity assets. Future best practice is likely to emerge and shall be adopted. The Association of Inland Navigation Authorities in a report of their Working Group on the environmental impacts of waterway uses ('Safeguarding the Waterway Environment: Priorities for Research', AINA 2003) calls for a universal manual of waterway ecology for navigation managers.

7.16 Informed management of the biodiversity is required to conserve and enhance the present habitats and species on the canals. Conservation-led restoration, in line with CMP principles, will both conserve the existing biodiversity, and enhance it in those sections that currently have less value. The biodiversity approach can be applied to both the canals themselves and the wider corridor. As with the built environment, it is necessary to identify the elements that make up the biodiversity value.

7.17 Phase 1 of the Cotswold Canals does not pass through any designated nature conservation sites although there are several examples within a 2km radius (see figure 5.43). It is possible that sections of the restored canal will be designated in the future. The protection for nationally designated SSSIs is afforded via Section 28 of the Wildlife and Countryside Act 1981 as inserted by section 75 and schedule 9 of the Countryside and Rights of way Act 2000. In effect these measures produce a general duty to conserve and enhance the interest features of protected sites. The UK is also bound by the terms of the EC Birds and Habitats Directives.

7.18 Several species of flora and fauna are protected by law. Principally this is achieved either through Part I of the Wildlife and Countryside Act (as amended) 1981: nationally protected species, or through the Habitats Regulations: European Protected Species. Furthermore some species receive protection under specific legislation, such as the Protection of Badgers Act 1992. Also of consideration are hedgerows that qualify as important under the terms of the Hedgerow Regulations 1997 (SI 1997/1160) as made under section 97 of the Environment Act 1985; Trees protected by Tree Preservation Orders (TPOs) and Ancient Woodlands.

7.19 The potential effects of the restoration on habitats and species listed as priorities under the UK Biodiversity Action Plan (UKBAP), by Local Biodiversity Plans (LBAPs), and by policies in the Biodiversity Strategy for England (DEFRA 2002), can be material decisions in the making of planning decisions. Section 74 of the Countryside and Rights of Way Act 2000 places a duty on Ministers and Government Departments with respect to the conservation of biodiversity. The First Secretary of State has issued Planning Policy Statement (PPS) 9 as an instruction to local authorities to use their planning functions as a principal conduit for the conservation of habitats and species of principal importance.

7.20 The restoration project aims to achieve the greatest practicable biodiversity gain within the context of restored navigation.

7.21 The following policies and principles will be adopted when carrying out works affecting elements of the biodiversity of the canals:

- Negative impacts on biodiversity will be avoided wherever possible. When negative impacts are unavoidable they must be adequately mitigated or compensated for.
- In cases where construction and related activities impact on legally protected species, an application for a Development Licence must be submitted, which must contain a robust justification for the actions and provide specific information on how impacts will be mitigated and compensated for. The same discipline must be extended to non-protected noteworthy species.
- Opportunities to enhance biodiversity should be sought throughout the restoration and subsequent operation of the canals.
- All works affecting biodiversity will be carried out following established and emerging best practice.
- Works will aim to conserve and enhance all internationally or nationally designated sites (of all types) where directly affected by the restoration project.
- All protected species (species protected by law) that occur on the canals or within the wider canal corridor, or that are directly affected by the restoration project, will be conserved. The presence of these species must be established prior to restoration so that the effect of the operation upon them can be determined. The measures necessary to protect such species must be put in place prior to commencement of works.
- Other species and habitats that enjoy local protection or contribute to national and local biodiversity will be conserved and enhanced, in accordance with UK, local and corporate BAPs.
- Protected trees and hedgerows will be safeguarded.
- Opportunities will be sought to link adjoining habitats and enhance the wider canal corridor in accordance with biodiversity and Natural Area objectives (as defined by English Nature/Natural England).
- The 'catch and return' requirement of all angling on the canals will be enforced.

Creating Bat Habitat - introducing a batbrick into a bridge arch

Vole Pipe Laying

Bank Protection - Coir Roll / Hazelfaggot

Planting

7.22 The general principle for restoration planting and landscaping will be to encourage native biodiversity through the use of indigenous species and to minimise the amount of non-native ornamental planting. With this principle in mind the following policies shall be adopted in planting and landscaping schemes:

- There will be a presumption in favour of planting regionally appropriate native species.
- Planting will utilise local genetic stock material wherever available.
- Planting schedules will mimic local conditions.
- Wherever possible existing native vegetation will be preserved and protected during construction, through measures such as barrier fencing with root-protective buffer zones. Where desirable vegetation has to be removed to facilitate construction it should be set aside, if possible, for reinstatement later. Where possible, seeds will be harvested to establish a seed bank for use after construction.
- The use of ornamental species will be restricted to urban focus points and will make use of species that are likely to be of some biodiversity value. In Phase 1 it is considered that ornamental planting might be used at suitable urban points such as at Brimscombe.

7.23 Planting schedules will take account of operational management cycles that are likely to be low-intervention and rely upon traditional methods such as hedge laying and coppicing. These practices will be informed by best practice developed by BW and others.

7.24 In cases where ornamental planting is deployed for visual effect the planting will still be respectful of biodiversity principles making use, for example, of flower and fruit-rich species. The design of ornamental planting will also take account of the availability of longer-term management. Opportunities will be sought throughout the restoration project to conserve, set aside, translocate and harvest existing native plant resources to ensure that as much local stock as possible is preserved or re-used in the restoration. This is a sustainable approach to planting that reduces the need to bring in new material from elsewhere.

Invasive species

7.25 Material contaminated with Japanese knotweed or giant hogweed must be dealt with under an appropriate waste management stream if removed from site. Specific procedures will be developed for dealing with these species. Basic principles will be to isolate infestations from construction activity and to apply strict controls over access to infested areas. Isolated areas will then be dealt with through longer-term herbicidal control. Where isolation is not possible, contaminated material and an appropriate buffer will be excavated and transferred under licence to an approved landfill site.

7.26 Himalayan balsam is not yet under the same control regime as Japanese knotweed and giant hogweed, although this position is likely to change in the near future. However, its level of infestation is the greatest of the three species and therefore it poses the greatest threat to biodiversity.

7.27 This plan acknowledges that it is impossible and unrealistic to talk about eradication of these three species. Management effort can only be applied to the land under its control. High levels of infestation on third-party landholdings will not be controllable and these will provide reservoirs for continuous re-infection of the canal corridor. It is considered that long-term herbicidal control will be the only management option available to control or minimise infestations in the corridor. Mechanical measures such as cutting may also be used selectively, but wide-scale cutting may compromise other biodiversity features.

7.28 Water fern is a floating invasive species. The habitat survey of 2003 judged its infection level to be lower than had been reported in the past. Eventually, navigation will help to keep this species under control. In the meantime herbicidal and physical measures will be employed to reduce it. All herbicides must have EA consent before they are used on or near watercourses. Only herbicides approved for use in or near water can be used in the canal channel corridor.

Landscape policies and standards

7.29 Section 6 above outlined the various ways in which the locally distinctive landscape qualities of the Cotswold Canals might be vulnerable to damage, whether as a result of neglect, lack of strategic management, or piecemeal restoration and development. It is therefore essential to establish broad agreement about how the landscape (both rural and urban) should be managed in the longer term. Fundamentally such management must take into account of the industrial archaeological landscape that has been recognised through the designation of the Stroud Industrial Heritage Conservation Area, a linear conservation area that follows the route of the waterway. Specifically, any works of restoration, and future development undertaken alongside the canal must respect the character and appearance of the conservation area, as defined in the IHCA Conservation Area Statement (Appendix A3.6) and comply with the guidance set out in the Design Framework SPD, prepared for the conservation area by Stroud District Council.

Access policies and standards

7.30 Access for All is a stated objective of the canal restoration. The Disability Discrimination Act (1995) (DDA) now makes it mandatory for service providers to ensure that disabled people are offered the same quality of goods, services and facilities as anyone else, where reasonably practicable. The Act will affect information and interpretation services and access to public sites. The BT Countryside for All Standards and Guidelines have been widely endorsed by countryside and disability organisations and are a useful guide to the standards of access which should be aspired to in different landscape types. Good design should aim to create access for everybody, and not make distinctions between types of access for people with differing abilities.

7.31 The Cotswold Canals restoration project will be guided and informed by the BW Policy Statement on Access for People with Disabilities. This policy emphasises that BW seeks to encourage the use of the waterway network by people with disabilities, and recognises its responsibilities under the Disabilities Discrimination Act. While the policy acknowledges that it will never be possible to provide perfect access everywhere on the waterway system (see para. 6.17 of the policy statement in Appendix A1.3, which sets out the principle of least restrictive access), it nevertheless seeks to secure improvements to access.

7.32 The Policy seeks to ensure that the needs of people with disabilities are built into policies and plans, and into major programmes of restoration, regeneration and refurbishment (including those implemented with external partners). The Policy also states that it will consult people with disabilities to ensure that local needs are taken into account in the management of the waterways, and that it intends to be guided by current best practice.

7.33 The full BW Policy Statement on Access for People with Disabilities is included within Appendix A1.3 of this CMP. An Access Audit has been carried out along the length of the canals to establish present conditions (Appendix A4.12), and an Access Plan has been formulated, which sets out how access will be improved. Ongoing consultation through an Access Forum is essential to achieving successful implementation.

7.34 As a general principle throughout the canal restoration best practice will be followed in the provision of access and facilities for as many and as wide a range of people as practicable, including those with disabilities. Some places will lend themselves to exemplar Access for All projects. However, it is recognised that in other places and for various reasons access for all disabled people will be limited for example, where a sufficient margin of safety cannot be provided, or where the canal heritage would be significantly compromised.

Giant Hogweed

Himalayan Balsam

Japanese Knotweed

Fradley Reservoir - disabled buggy access

7.35 In such cases the principle of Least Restrictive Access should be applied, i.e. it may be necessary to apply lower standards, such as narrower path widths or steeper inclines. In locations where access for disabled people is severely restricted alternative routes should be provided as far as is practicable. In the few cases where this will not be possible, intellectual access should be provided through interpretative means.

7.36 The following access and amenity policies and principles will be adopted when carrying out works on the canals:

- BT Countryside for All standards and guidelines will be used as a basis for all new access works in relation to the canals.
- The Access Audit, linked to the Sustainable Access and Tourism Strategy, will be used to plan access in a strategic manner.
- Provision will be made for the widest range of visitors and activities compatible with protecting the significance of the canals an optimum level rather than a maximum level.
- The Leisure Development Plan (currently in preparation) will be used to help people of all abilities and backgrounds undertake a variety of positive leisure activities, including walking, cycling, angling, boating, and other active pursuits.
- Encouragement to access and use the canals will be given to people who have previously been excluded from them - including disabled people, the elderly, others of low mobility, those on low incomes and ethnic minority communities.
- The design of new signage and furniture will be simple, robust and appropriate to the functional tradition of the canals.
- The CCP will support ways to reduce the use of private cars to reach, and travel along, the canal corridor; these might include rail connections, bus services and development of green networks such as seasonal leisure bus provision, 'green point car parks', water buses etc.
- Towpath management will reflect the local character of the canals, and take into account that not all activities will be appropriate for the entire route.
- Opportunities will be sought to improve access to the wider corridor, by integrating access to the canals into the network of existing local footpaths, lanes etc.

Training, education and interpretation

7.37 The Training Plan (Appendix A4.11) addresses the link between the skills needed to complete the conservation project to the appropriate standard and the skills that are available locally. It reflects the findings of the skills needs analysis of the built heritage sector in England carried out in 2005 by the National Heritage Training Group and published in their report, *Traditional Building Skills. Assessing the Need, Meeting the Challenge*.

7.38 The CCP will deliver the education element of the project in partnership with the Cotswold Heritage Academy (key partners within the Academy are: the Royal Agricultural Society, Stroud College, Cirencester College, Gloscat and Woodchester Mansion). The CCP will work with the Academy to train people working on the restoration project in the skills that they need to carry out the work to the appropriate standard.

7.39 To promote the use of local labour for the restoration project, the CCP and its educational partners will work with local volunteers and businesses to provide training in conservation building skills.

Waterway Training - metalwork

Waterway Training - stonewalling

Waterway Training - bricklaying

Waterway Training - stonemasonry

Interpretation

Cycle Access

Access - anglers & walkers

Volunteers have already contributed a great deal of knowledge, enthusiasm and practical help to the project. This valuable contribution will continue, and opportunities will be sought to develop volunteers' skills through training.

7.40 Training will also aid the long-term sustainable restoration and management of the canals after the Phase 1 restoration is complete, because it improves understanding of the problems that arise from working within historic buildings and potentially vulnerable environments, and provides the skills to solve those problems.

7.41 The Training Plan (Appendix A4.11 recognises that not all the skills needed to restore a canal are physical and practical. Organising events and facilitating interpretation help to promote the project and ensure greater community involvement and understanding of its aims. These 'softer' skills are not traditionally seen as key to a restoration project, although they can often have the greatest effect on it.

7.42 The Training Plan, Interpretation Strategy and Community Participation Strategy (Appendices A4.11, A4.8 and A4.10) support local Lifelong Learning, as they encourage working with people of all ages.

7.43 The Education Strategy (Appendix A4.17) identifies opportunities within the project to provide education resources for schools. A range of on and off-site educational resources will be developed in partnership with local schools and parents. The themes and subject areas will be linked to the interpretative themes, focusing around the areas of significance identified through the CMP. Although the strategy concentrates on Key Stage Two of the National Curriculum, it also addresses the need to work with older groups in formal education, specifically with those groups who are close to the canals and can have a direct impact (negative or positive) on it.

7.44 The community-led process of developing Local Interpretation Plans (see para 2.28) aims to increase understanding of the Cotswold Canals' cultural significance in heritage, environmental, community and regeneration terms, and to raise awareness of the benefits and challenges of the restoration project. The process will also highlight areas and features of local significance that lie beyond the canal corridor but are affected by the restoration work.

7.45 This provision may take a variety of forms identified in the 'tool kit' within the Interpretation Strategy (Appendix A4.8). This could be an event, an interpretative panel or installation, a leaflet or a training event. The CCP will facilitate the projects by helping local communities to find funding and by assisting with the management and implementation of projects.

7.46 A Volunteering Policy (in preparation) linked to the Training Plan (Appendix A4.11) will encourage the use of volunteers in a wide range of activities, according to local demand and need. It is the aim of CCT to be skilled in organising volunteers, and this expertise will be developed to enable a broader range of people to be engaged and a wider variety of tasks to be performed. The policy will encourage the recruitment of volunteers from sections of the local population who have not hitherto been involved in the project, including young people, women, people with disabilities and older people. It will provide the widest possible range of opportunities for volunteers to contribute to the project: running an education project, for example, requires different skills from those needed to rebuild a lock, but the impulse to volunteer for either may spring from identical motives and inspiration.

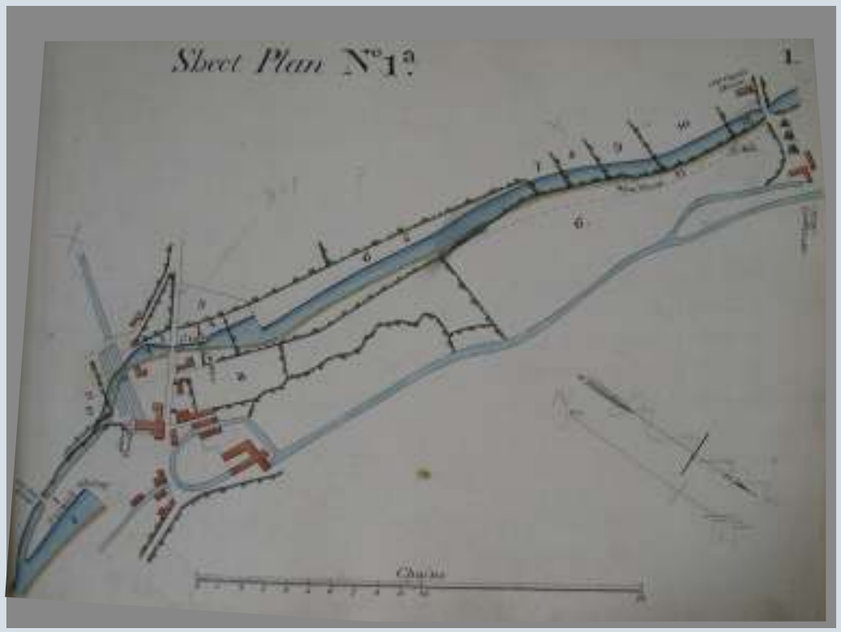
'Challenge sites'

7.47 As described in Sections 5 and 6 above the 'challenge sites' of Capel Mill and Brimscombe Port have a complex layering of significance, and are likely to be particularly vulnerable to change. For this reason a specific policy response is required to ensure that their special value is properly understood and respected in any programme of restoration. Although the two sites are quite different in terms of their significance, and present different challenges, the overall approach to dealing with them, and to other such sites in later phases of restoration, should be similar. The objective should be to achieve the optimum balance between competing interests based on a thorough understanding of the particular historic, environmental, amenity and community value of the sites in question. As such the decisions on the most appropriate long-term treatment of the sites should be informed by:

- Provision of objective evidence on the technical, environmental and other characteristics of the site, based on detailed professional reports and surveys
- Thorough understanding of the historical, environmental and amenity value of the sites based on comprehensive historical research and input from local people
- Rigorous appraisal of options including an objective evaluation of costs and benefits
- Full assessment of the impacts and opportunities for mitigation with each option
- Extensive community consultation and engagement
- Formulation of detailed proposals informed by the above stages.

Aerial View of Brimscombe Port - overlay showing shape of original port

Hope Mill Lock - trial pit exposing former lock wall



Historic Map of New Canal - from Wallbridge to Capel Mill

Capel Mill - consultation meeting

Capel Mill - discussing the options

8. Plan implementation

Introduction

8.1 This section of the CMP sets out the management mechanisms that need to be put into place to ensure successful implementation of the policies and objectives that have been established for Phase 1 of the Cotswold Canals restoration. It also outlines the specific actions that will be needed to restore, conserve and enhance the asset in the short and the medium term, and to safeguard the significance of the canals as a heritage asset in the long term. Accordingly this section of the CMP is structured as follows:

- Use of the Communications Action Plan to guide consultation with stakeholders and the local communities
- Use of the CMP to guide restoration and future maintenance
- Management and reporting structures and responsibilities
- Outline of specific works proposed in Phase 1 restoration
- Long-term maintenance needs and future maintenance strategy.

Use of the Communications Action Plan to guide consultation with stakeholders and the local communities

8.2 The Communications Action Plan, which is being prepared by BW on behalf of the CCP, identifies a range of different stakeholder, special interest and community groups involved in or affected by the restoration project. The Action Plan is led by the Communications Sub-group, which meets on a monthly basis. It identifies the key messages to be communicated throughout the restoration project, and an outline timeline showing when consultation should take place and when information should be provided. Within the timeline there is more detail, breaking down each month into key actions, messages and target audiences.

8.3 At every point of the process the local community and wider public should be kept informed and consulted through the appropriate means which will range from, for example, newsletters, guided walks, events and exhibitions to public meetings and formal exercises feeding into the design process.

8.4 This consultation process is continuous, and the Communications Action Plan will be revised and updated to take account of new information as it emerges.

8.5 A number of other stakeholder and specialist groups have been established or involved in the restoration and will continue to play an active and important role as it continues. Sub-groups such as those for Heritage, Environment and Access will be regularly consulted on the design and implementation of the construction works. The long term role of these groups will be developed during the restoration process.

Use of the CMP to guide restoration and future maintenance

8.6 This CMP draws together the conclusions and recommendations of the various policies and strategies discussed in Section 7. The CMP is the main management guidance document for the restoration of the Cotswold Canals and their future management and maintenance. The supporting studies and plans (provided as appendices) contain details, or explanations for particular approaches, that will inform this restoration. The CMP must be used in conjunction with the relevant appendices for each aspect of the programme.

8.7 A conservation led restoration can only be fully implemented and successfully maintained if the CMP is endorsed and adopted by all the partners within the CCP at Board level.

8.8 It is essential that a consistent approach is applied to the canal as a linear asset. The Stroud District Council Area Action Plan and accompanying supplementary planning documents, namely the IHCA Statement and the Cotswold Canals Design Framework, when they are issued, will provide the framework and guidance for the way in which the development of the canal corridor is managed. The CMP should complement these documents..

8.9 The authorities outside Phase 1 will be encouraged to provide similar statutory protection for the canal and its corridor.

Management and reporting structures and responsibilities

8.10 The overall direction and policy of the CCP is set by the Project Board, which includes representatives of the key stakeholders - among them elected members and senior officers from the Local Authorities. The Board meets quarterly. The action plan for the canal restoration will be reviewed at each Board meeting and updated as required. The plan will include the development of skills and knowledge necessary within the various restoration teams and will aim to exert influence as far as it can over other third party works adjacent to the canals.

8.11 The Board has decided that overall management for Phase 1 of the restoration will be by BW. The restoration project manager will have overall responsibility for the restoration process, aided by a multi-disciplinary team, including engineering, natural and built heritage specialists and community and volunteer co-ordinators. It is anticipated that BW will continue to have responsibility for operation and management of the Cotswold Canals when the restoration is complete.

8.12 BW has extensive experience of managing complex canal restoration projects, and has established sophisticated integrated management systems that take into account the many potentially competing technical and environmental issues that need to be faced on a day-to-day basis. These management systems will be used as a model for the Cotswold Canals, but tailored to meet the specific needs and policies identified in this CMP.

8.13 The main BW system that is relevant in this context is the CMP appraisal, which is analogous to the Environmental Code of Practice (hereafter ECP) currently in use by BW for the management of their canal network. This provides an assessment procedure similar to the Heritage Impact Assessment suggested by the HLF in its CMP guidance. The CMP appraisal is an in-house environmental appraisal system covering the natural and built environments, as well as wider impacts on society, and extends the ECP process, which is mandatory for all projects managed by BW.

8.14 The CMP Appraisal highlights the need to assess environmental impacts but does not suggest standards of work. Therefore it needs to be used in tandem with the CMP, in order that the impact of each element within the restoration project can be fully considered, and actions decided accordingly.

8.15 The CMP will continue to provide the basis for ongoing management of the canals after restoration is complete, whether this is the responsibility of BW, as anticipated, or any other member of the CCP.

IHCA Statement - example of typical Stroudwater lock cottage. Courtesy of Stroud District Council Conservation Team.

IHCA Statement - example of typical Thames & Severn lock cottage. Courtesy of Stroud District Council Conservation Team.

Outline of specific works proposed in Phase 1 restoration

8.16 The Phase 1 proposals consist of restoring the canals to full navigation between Saul Junction and Brimscombe Port. Substantial engineering and conservation works are required to restore the canal to full navigational capacity. This will involve the restoration of locks, bridges, towpath and accesses, creation of new habitats and the linking of fragmented habitats, removal of infill, dredging of the canal channel and a realignment in order to cross the M5 embankment.

8.17 All the detailed proposals for the restoration work will be subject to consultation within sub-groups for Heritage, Environment and Access. Members for these groups must represent all the relevant stakeholder interests and have the relevant specialist knowledge. The proposals must also be considered by the Consultative Group representing parishes along the line of the canal.

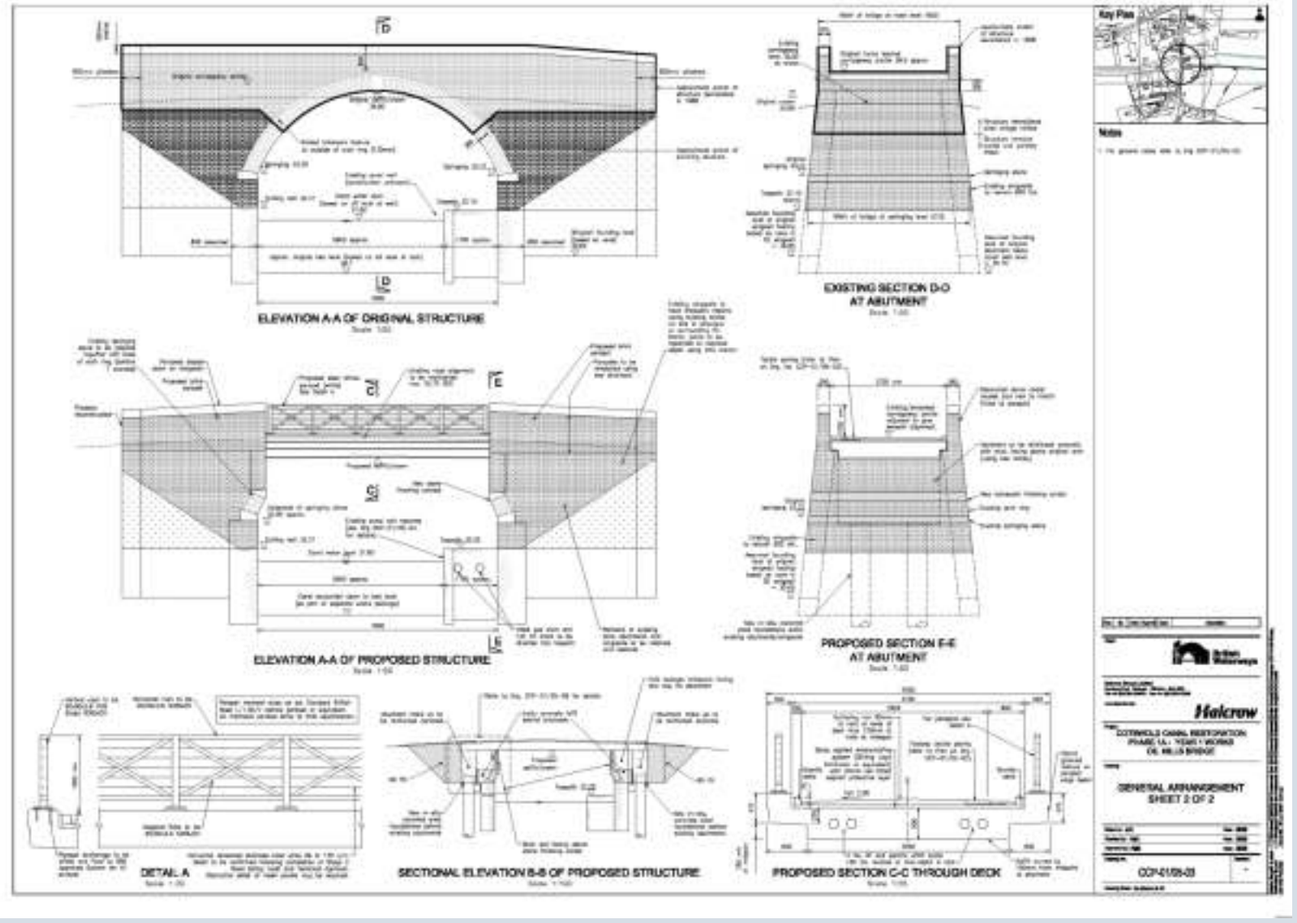
8.18 The main components of the Phase 1 restoration works are listed below. A full description of the works is included in the Engineering Reports for both these phases (Appendix A3.3 and A3.4).

8.19 The main components in Phase 1a are:

- Locks: 1 restored; 3 part restored; 6 unrestored
- Swing bridges: 4 replacing existing fixed bridges; 1 entirely new
- Fixed bridges: 3 new; 5 are unaffected by works
- Accommodation bridges: 6 possibly requiring repairs below waterline; 1 requiring restoration
- Footbridges: 1 new over River Frome; 1 over towpath to be refurbished; 1 private to be removed
- Aqueducts: 1, possibly 2, depending on route option at Capel Mill
- Channel works: dredging to previously excavated open or heavily-reeded canal channel (7.8km); excavation to infilled canal channel (1.3km); reconstruction of lost stretch of canal (660m); re-canalisation of the 'main river' stretch between Ryeford and Wallbridge (1,7km)
- Weirs: 2 new large by-weirs and 2 new discharge weirs at 'main river' section; 1 new waste weir; 6 new by-weirs
- Towpath works: a new multi-user path from Saul Junction to The Ocean and a restored towpath for multi-use from Ocean to Brimscombe Basin (total of 16km)

8.20 The main components in Phase 1b are:

- Locks: 1 unrestored; 2 restored; 3 partly restored; 1 replacement
- Road bridges: 1 new structure; I restored; 1 modified
- Accommodation bridges: 1 new structure; I modified; 2 restored; 1 partially restored; I replacement
- Major crossings: 3 new (A38 road crossing, M5 road crossing and Bristol to Birmingham railway crossing)
- Channel works: dredging to existing canal and river channel (3.6km)
- Realignment: new channel (1.4km)
- Towpath works: restored towpath for multi-use (5.8 km)



Engineering Proposals for Oillmills Bridge

Architects Impression of the restored Oillmills Bridge

Locks

8.21 The locks will be restored using materials and methods matched to the originals wherever practicable. Critical heritage features include the detailing of the lock furniture, and distinctive differences between the Stroudwater and Thames & Severn Canals. Other details, such as quadrants and bollards, are less straightforward and design decisions must be fully debated through the sub-groups.

8.22 Key engineering features vary from lock to lock but generally include:

- The invert (base of the lock) and the chamber walls: repairs required
- The lock quoins: may require repairs
- Cill aprons: many require reinforced concrete slabs to enable fitting of new timber cills and gate pintle cups
- Lock gates, balance beams, paddle gearing and walkways: replacements required
- Boat landings below and above the locks: lower landings mostly intact; new timber platforms required
- Stop-plank guides: refurbishment and/or fitting required
- Safety ladders: two required in each lock chamber.

8.23 Operation of the lock gates and paddle gearing needs to be designed to comply with modern expectations for ease of use as set out in the emerging BW Standards and the principles of Access for All. Inevitably this could mean that the historic designs will have to be modified, but such alterations must be carefully considered in accordance with the CMP Heritage Policies described in Section 7.10 and through consultation with the Heritage sub-group.

Swing bridges

8.24 The existing bridges are in a fixed position, are no longer operational and will all require replacement. Mounting new mechanisms on the site of the original abutments will require additional support that is likely to impact on the historic masonry. Treatment of the archaeology must always be in accordance with the CMP Archaeological Strategy (Appendix A4.19) and CMP Policies described in Section 7.12.

8.25 The new swing bridges will be fabricated in steel and, where appropriate, designed to be mechanically operated, although generally manual operation equipment will be installed. A barrier system will be employed to close the road to traffic and on busier bridges warning lights will also be required. Changes required to accommodate modern vehicles, satisfy current safety regulations and provide additional strength and stability will require modifications to the original appearance of the bridges. However new designs should aim to reflect in some way the distinctiveness of the historic Stroudwater swing bridges.

Fixed bridges

8.26 Replacement or restoration of the road and accommodation bridges will require a case by case approach. Design options should contribute to the character of the canal corridor in a distinctive way. While it is important to retain historic material wherever practicable a good contemporary design is preferable to an attempt to replicate traditional patterns. All proposals must be properly debated through the Heritage sub-group and Western Consultative Group before decisions are made.

8.27 The bridges requiring major work in the Phase 1a section are:

- Oilmills Bridge: a reinstatement involving part restoration and part new design where a number of options have already been fully debated with the final design receiving planning permission in 2006 (see illustrations on page 43)
- A46 crossing: an entirely new bridge is required
- Bowbridge: options include either a partial restoration or a new build
- Brimscombe Hill crossing: a new structure on or close to the site of the original bridge

Biodiversity

8.28 The canal restoration will provide biodiversity gain, particularly by linking fragmented sections of the canal to create a 15.8 km wildlife corridor. Creating continuity will benefit fish, water voles, otters, birds and bats. Increased connections between the River Frome and the canal will benefit fish and the restoration will create a sustainable fishery by guaranteeing flows, improving dissolved oxygen and reducing likelihood of excessive duckweed growth.

8.29 In Phase 1A, 1.3 km of new channel will be created by removing sections of infilled channel. In doing so, an area of new open water between 21,000 m^2 to 22,500 m^2 (depending on option created at Brimscombe Port) will be created. Where new channel is created, soft banks will be used where possible with an emergent reed fringe. A reedbed will also be created at the Lawns pond, adjacent to the canal at Dudbridge. New planting will be a diverse mix of locally prevalent species. Reed fringes will benefit invertebrates, birds, bats, water voles, otters, crayfish, fish and amphibians.

8.30 3 bat roosts will be created in new bridge structures including Oil Mills Bridge. 20 bat boxes and 30 bird boxes will be erected in trees where appropriate and 3 amphibian/reptile hibernacula will be built at Ebley, Capel Mill and Brimscombe. In addition, 3 log pile otter holts will be built on the River Frome.

8.31 Where several partners are responsible for habitat strips formed by canal, road, railway and river, or for larger habitat areas, joint efforts should be made to ensure that land in the canal corridor is managed in sympathy with the aims and policy objectives of both the CMP and Stroud District Council's IHCA Statement. Where sites are already being actively managed for biodiversity, the CMP can link canal management to these to ensure mutual biodiversity advantage.

Kennet & Avon Restoration

Maintenance

Water supply

8.32 The Stroudwater canal will continue to receive surface water from the three existing sources between Dudbridge and Wallbridge: Ruscombe Brook, Slad Brook and Painswick Stream. All excess water from the canal will return to the Frome, with the major outfall via a new construction under the towpath near Ebley. Water will also return to the Frome by existing and new waste weirs.

8.33 The reinstatement of the channel between Ryeford and Ebley will allow normal canal flow to be resumed below Ryeford Double Lock. The supply from the River Frome at Ryeford Sluices will be closed.

8.34 The Environment Agency has in principle agreed an abstraction from the River Frome at Brimscombe Port which will provide a new, reliable, supply for the Thames & Severn Canal from Brimscombe down to Wallbridge.

Contamination

8.35 Agreement on disposal of waste, particularly the contaminated waste at Brimscombe and potentially at Capel Mill as well, will be an essential part of the restoration. All re-use options must be fully considered in the interests of sustainability.

8.36 The disposal options for all sites are as follows:

- Domestic waste: likely to be to designated landfill
- Contaminated waste: likely to be to designated landfill
- Stone/construction material: either to landfill, for re-use in engineering works or for use under a waste management licensing exemption

Disposal options for material dredged from channels in water:

- Deposit on the banks/adjacent land
- Spread to agricultural land
- Landfill
- Other re-use/disposal options which are available as waste management licensing exemptions

Training and competence

8.37 All staff involved in the capital works programme, whether they are contractors, volunteers or BW staff, will be either assessed as suitably competent to participate in works, or incorporated into a programme of training on the job as part of the learning and skills strategy. Training records of all works will be an integral part of the project procedures.

8.38 It is important that all partners involved in the restoration recognise the importance of ensuring that the heritage and biodiversity objectives of the CMP are met, whoever is responsible for carrying out particular works. Much of the work will be undertaken by people with relevant training and skills, but there may be times when this is not the case. Therefore, where necessary, training provision for heritage and environmental skills must be built into the restoration and management programme, in accordance with the principles set out in the Training Plan. Volunteers in particular may need appropriate supervision and guidance in these areas.

Interpretation

8.39 In order to implement the strategy, the waterway will be broken up into distinct lengths, each of which will be approached using a series of plans designed with and for local communities. These individual Local Interpretation Plans (LIPs) will be based around a community and its neighbouring or adopted canal stretch, but each will be interlinked to ensure a seamless flow of interpretation along the entire length of the restored canal.

8.40 The first project (funded by the Local Heritage Initiative) designed to deliver up to six interpretive installations, a self guided trail leaflet and a DVD of locally sourced oral history, serving to encourage visitors from the canal into local communities and vice versa, will act as a pilot project for ensuing LIPs.

Conflict Resolution

8.41 Inevitably there will be cases in which there are competing interests where the optimum balance will have to be struck between social, conservation and economic factors. The allocation of often scarce resources across the project and across the partners own competing objectives will add a further layer of debate requiring resolution. These debates and decisions will be undertaken in as transparent and open a way as practicable. Consultation should involve a full description of the perceived constraints and issues with inclusion of key stakeholders in the decision making process as described in the Communication Plan (Appendix A4.15). Where appropriate this should also include public consultation.

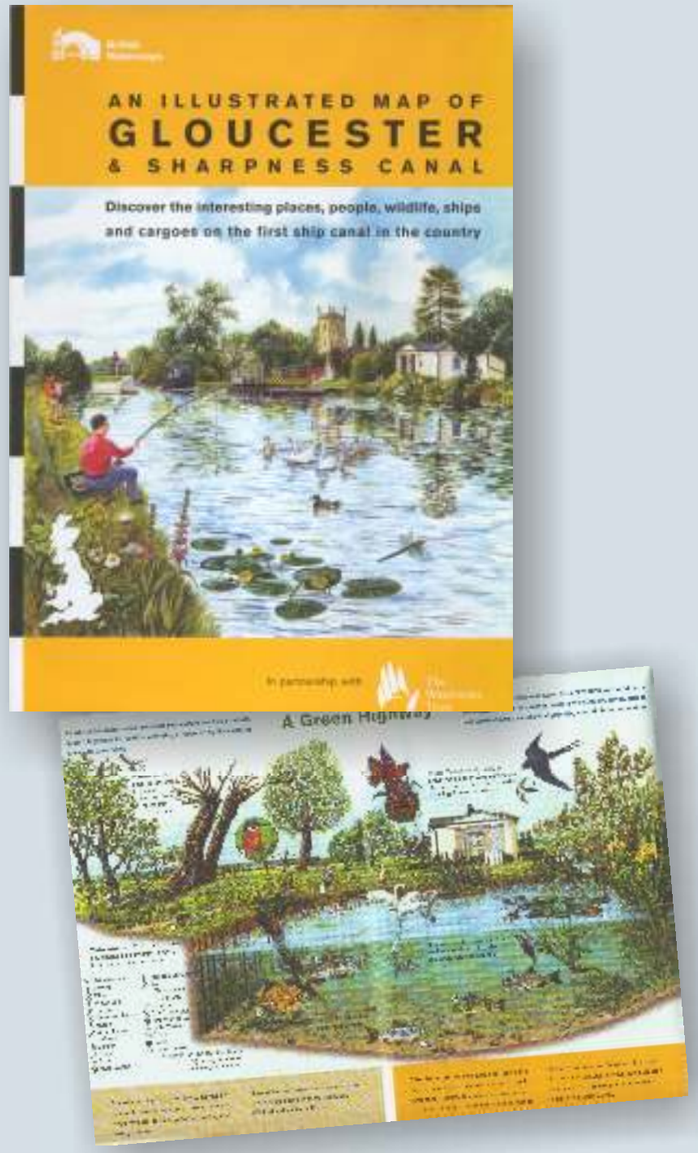
Long-term maintenance needs and future maintenance strategy

8.42 Long-term regeneration of the Cotswold Canals does not end once the restoration works are complete. Thereafter, regular and sustained maintenance is the only way to ensure that the natural and built heritage is sustained, the canals remain in a navigable condition and that their regeneration continues. All works of maintenance will be carried out in accordance with the policies and standards set out in this CMP.

8.43 In order to ensure that maintenance work is undertaken in a timely manner and to the required standard, a detailed maintenance programme will be designed for the Cotswold Canals, based on BW general waterway standards. These are currently in preparation. For the purposes of the Cotswold Canals restoration, these will be tailored to BW South West Regional requirements and will also take into account existing partner responsibilities, such as for highways and public rights of way.

8.44 The partners in the CCP should consider the impacts of future demands for access to the canal upon the wider corridor. They should make adequate provision for predicted changes within the context of their normal wider, rural and urban, spatial and transport planning, such as for example the braiding of foot and cycle routes and additional shared car parking.

8.45 Where development by third parties takes place alongside the canals contributions will be sought from the developer for maintenance of the waterway “open space”.



Interpretive material - as produced for the Gloucester & Sharpness Canal

9. Monitoring and review

Introduction

9.1 The CCP must be able to assess how well the programme delivers the intended physical outcomes of the project. It must be able to ensure that the policies set out in this CMP are followed, and that the specified standards are met. It is therefore essential to have in place effective systems of monitoring and evaluation, as well as a strategy for updating and reviewing the CMP. This section sets out how the CCP will monitor progress against the objectives in the plan, and ensure that the plan is being used to inform decision-making. It also sets out how the wider environmental, community and economic impacts of restoration will be evaluated over time. The section is structured under the following headings:

- Monitoring performance against the objectives of the CMP
- Evaluating the impacts of restoration
- Strategy for updating and review.

Monitoring performance against the objectives of the CMP

9.2 Section 7 of this CMP sets out the policy aims and standards for the restoration programme and subsequent maintenance and management of the waterway. These policies and standards will therefore be used as the benchmark for monitoring the effectiveness of the restoration project.

9.3 Restoration of the canals will be a long-term project, and in order to be useful in informing the process, monitoring needs to be conducted on a regular basis. Monitoring of progress will be assessed against the baseline information established in the various studies and strategies undertaken to develop the CMP. Monitoring topics will include built heritage and archaeology, biodiversity, landscape, access, training and education. An appropriate structure will be developed to enable monitoring reports to be delivered to the Quarterly Project Board meetings.

Evaluating the impacts of restoration

9.4 Measuring the outcomes of the programme is not only good practice; it is also a specific requirement of the major funding bodies, and so the particular measures stipulated by these bodies will be used as a basis for monitoring in the first instance. Experience of a number of canal restoration projects that have received major public grants (e.g. the Kennet and Avon Canal) has enabled BW to develop a 'benefits-led' approach, in which a set of 'sustainability indicators' has been identified in order to measure community, economic and environmental outcomes. The framework of indicators has been developed from the UK Government's Sustainable Development Strategy, adapting the set of indicators found in Annex A of Quality of Life Counts. The BW methodology has now been published by the Association of Inland Navigation Authorities (AINA) as best practice for the appraisal of waterway regeneration and restoration projects, and will be used to appraise, and subsequently monitor, manage and evaluate the Cotswold Canals restoration project. The full list of indicators, and an outline of target impacts is contained in Appendix A3.2. In summary, the following impacts will be measured under three key headings:

<u>Environment</u>

- Investment in waterway assets
- Improvements to walking and cycling routes
- Improvements to boating facilities
- Investment in land
- New housing
- New commercial space
- Investment in physical infrastructure
- Improved management of waterway landscape/sense of place
- Management of waterway wildlife (biodiversity habitats and species)
- Improved management of waterway heritage
- Removal of contaminated waste

<u>Community</u>

- Improvements to value of waterway to residents
- Improvements to image/profile of canals within wider community
- Increased recreational use
- Enhanced visitor experience
- Access to recreational opportunities/recreational resource
- Opportunities for local involvement/local ties
- Opportunities for volunteer involvement
- Community events
- Development of canal as an educational resource
- Development of alternative local transport routes

<u>Economy</u>

- Economically efficient use of land and property
- Income generation through waterway-based tourism and leisure
- Creation of jobs in waterway management
- Creation of employment in new canal based tourism
- Creation of jobs through property regeneration
- Creation of jobs through canal restoration
- Development related employment
- Training and skills development
- Opportunities for local businesses during restoration
- Opportunities for new business development
- Transport impacts of tourism and leisure

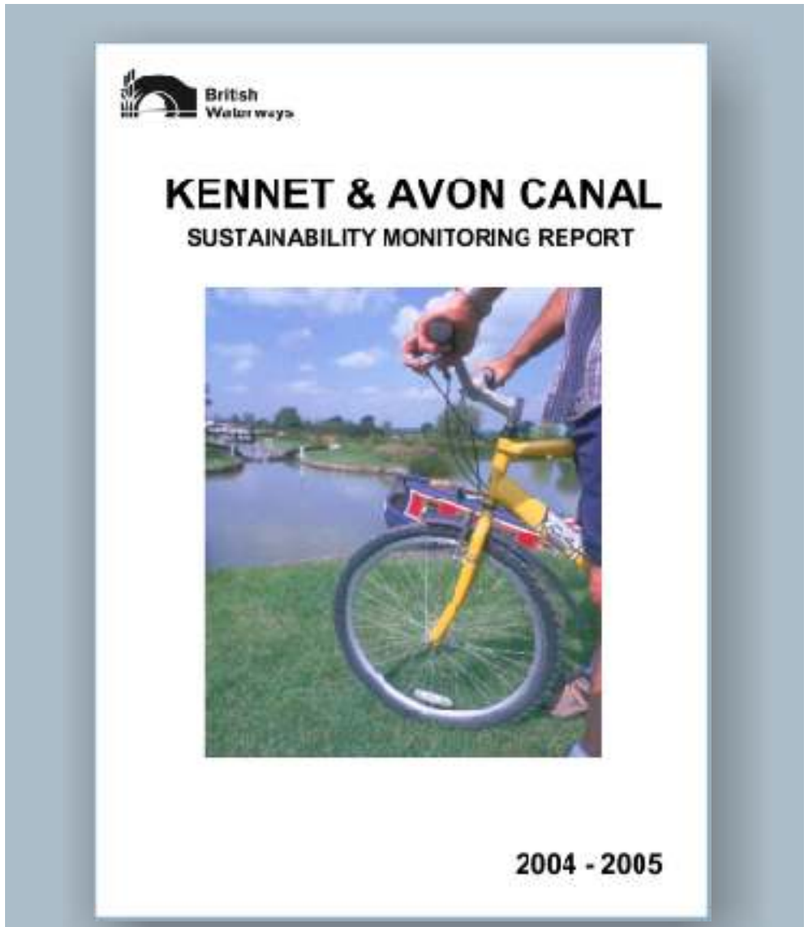
9.5 The gazetteer of heritage assets (Appendix A2) will be used as a basis for auditing the changing condition of the canal built environment, and will be regularly updated as the project progresses. Three yearly monitoring reports will be produced for specific outputs, identifying whether or not intended targets are being met and what actions will be needed in future.

9.6 Within the community participation elements of the project, monitoring will be carried out to gauge levels of awareness and ownership. These differ from local community surveys in that the participants are the people who are playing an active role in the restoration project, assisting with planning, decision-making and implementation. Throughout these elements, there will be both qualitative and quantitative monitoring.

9.7 The Environment Agency, as a member of CCP, will be asked to annually monitor the full suite of determinants necessary to decide whether there is any change in water quality that could be attributed to the canal restoration.

Strategy for updating and review of the CMP

9.8 It is anticipated that this CMP, once adopted, will remain in place as the key guiding policy document throughout the life of the Cotswold Canals restoration project. Inevitably, however, circumstances change, and our understanding of the canals as a natural and built heritage asset will evolve and expand as new information comes to light. It will therefore be necessary for the CMP to be reviewed and updated periodically. It is anticipated that the main policy document will be reviewed every 5 years. The content of the technical appendices will be updated as new data becomes available. The review of the CMP will be informed by the monitoring reports outlined above.



Monitoring the Kennet & Avon Restoration

Cotswold Canals

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Cotswold Canals Restoration Vision is to:

Restore the Cotswold Canals to full navigation in the interests of conservation, biodiversity and local quality of life, and to use the restoration as a catalyst for wider social, economic and environmental regeneration in areas neighbouring the canals.