

# Liquid Assets

Making the most of our Urban Watercourses

This report was initiated by the Urban Design Alliance, and compiled by a joint working group of members of the Institution of Civil Engineers and the Landscape Institute.

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# 1

**The problem:** the current state of many of our urban watercourses demonstrates the low value we have placed on them



*“In the past, ‘improving’ rivers often meant increasing their flow capacity. In future, it should refer to multi-purpose schemes designed to improve the capacity of each river valley to function as a visual amenity, a recreation area, a fishery, a nature reserve, a water supply, a storm detention area, a drainage network and a movement corridor for boats, walkers, cyclists and equestrians.”*

Tom Turner (Landscape Planning 1987)





*"Everything should be made as simple as possible, but not simpler."*

Albert Einstein



## 2

### Summary

Water is one of our most beautiful natural assets, yet in many towns and cities in Britain it is sadly neglected. Buried, culverted or constrained in a concrete straitjacket, it is so often hidden and fenced off from humanity as if it were something shameful. Yet towns and cities that have capitalised upon their watery assets often find themselves a magnet for tourists. Think of London, Paris or Köln, or on a more modest scale, Oxford, Lincoln High Wycombe and many other towns and cities in the UK. If we are to improve the quality of the urban environment and encourage successful individuals and businesses to want to remain in our cities, then we need to make the most of our watercourses.

Water and sewerage authorities in the UK are working under European and UK legislation to ensure that our rivers and streams are cleaner than at any time within living memory. They are no longer the open sewers of Victorian times.

Restoring an open watercourse from a buried culvert, or creating a reed-fringed pool enhances the environment. It provides an urban oasis and focal point for local residents and workers, and encourages wildlife habitats and biodiversity. Where a series of water features are linked with footpaths and cycleways to form a linear park, it offers an attractive means of access to offices, schools, shops and community centres. It also helps to achieve Local Agenda 21 and Habitats Directive targets.



All urban watercourses, no matter how small, should be considered for restoration to become a valued asset for all the community.

If we make urban living more attractive in this way, demand will increase for housing in urban areas, where public transport and other infrastructure already exist for sustainable development. Government targets for housing development in brownfield sites can then be met, while energy consumption and the need for private cars can be reduced. We can help to reverse the decline in urban areas, and save some of the countryside from further development.

This report is not intended to be a technical design guide but instead aims to stimulate decision makers to look again at some of the ways in which a largely forgotten resource can enhance the urban environment, provide recreational amenity in constricted areas, and bring a breath of nature back into our towns.

# 3

## The benefits of restoring urban watercourses include:

- Adding to the visual attractions of the town and complementing other urban regeneration initiatives
- Bringing commercial benefits such as enhanced image for properties and up to 20% increase in land values or rents
- (think of the number of up-market business parks which incorporate lakes into their masterplans)
- Providing valuable wetland/aquatic habitat
- Creating balancing ponds to help reduce flooding downstream
- Reducing maintenance and construction costs by using natural bioengineering techniques rather than concrete constructions
- Offering educational and play opportunities for children
- Enhancing pedestrian and cycle routes through the town
- Using water in motion to mask city noise and provide an atmosphere of quiet and calm
- Improving the quality of life for town dwellers and giving them a touch of the countryside and its seasons in the heart of the town
- Giving a place a sense of identity, because each combination of landform, waterway, bankside buildings and bridges is unique.





Lack of finance is often cited as the reason for ignoring our watercourses, yet there are many potential sources of funds available to help with such schemes. These include the Environment Agency, local authorities, MAFF, the DETR, developers, environment trusts, environmental bodies dispensing landfill tax funding, lottery funds, and the European Union – especially the EU LIFE programme. (Further details of potential funding are given on the website listed at the end of this report.) With a little research into the most appropriate source for the particular aims of a proposed scheme, and a partnership approach between public and private sector, funding should not be an insurmountable problem.

It is of course vital to remember to include provision for long term maintenance of the completed scheme when calculating the funding required. Where the restoration of a watercourse affects a number of landowners or different authority departments, the careful definition and sharing out of maintenance responsibilities at the earliest stages of planning will avoid future problems. The Environment Agency generally require an access strip beside main rivers for maintenance operations; it may be possible to liaise with the EA to make these strips multi-functional, providing footpaths and cycleways and attractive planting that camouflage but do not impede the maintenance function of the bankside area. Similar provisions should be considered for non-main rivers where possible.





**Flood control** is an important issue when considering the redesign of watercourses. The risk of flooding has actually been increased by the growth of towns. Rain, instead of falling onto absorbent fields or woods, now falls onto roofs and roads, draining swiftly into watercourses, increasing storm flows and creating new flooding problems where none existed before. The usual response to this has been to build up flood protection banks, straighten meanders to speed storm flows downstream, or to line the channels with concrete. None of this solves the root cause; it merely shifts the problem downstream. A better solution would be to incorporate natural drainage techniques into every new development so that runoff is slowed and reduced to avoid overloading the watercourse into which it flows.

Flooding is very unpredictable (especially under the current climate as the pendulum appears to swing violently between drought and flood conditions) and it can be very localised. Forecasting is improving in accuracy but still flooding can occur before warnings can be got to the public, especially in the very flashy watercourses of urban areas such as North London. More consideration could be given to designing houses near watercourses with 'stilts' e.g. Garage on the ground floor with living accommodation above.



**Safety** is obviously a major concern for all local authorities but appropriate design and detailing of the margins of the watercourse can help minimise risks. Culverts can be dangerous confined spaces, into which children sometimes venture unaware of the dangers, unless grids are fitted at both ends; these then become maintenance liabilities and can cause flooding if they become blocked. Obvious hazards should be avoided or warned against, but precautions should be related to context: sheer drops above deep or turbulent waters need to be protected, but shelving beaches and canal sides do not. The most dangerous water is that which is hidden away and uncared-for in societies where recreational water is not common; in Holland, children rarely drown. The best way of avoiding accidents is to educate children and adults about sensible behaviour in relation to our watercourses. Involving local schools in the design process when opening up watercourses for public access can pay dividends in terms of both safety and respect for riverside wildlife. Children are much less likely to vandalise what they have discovered to be interesting.

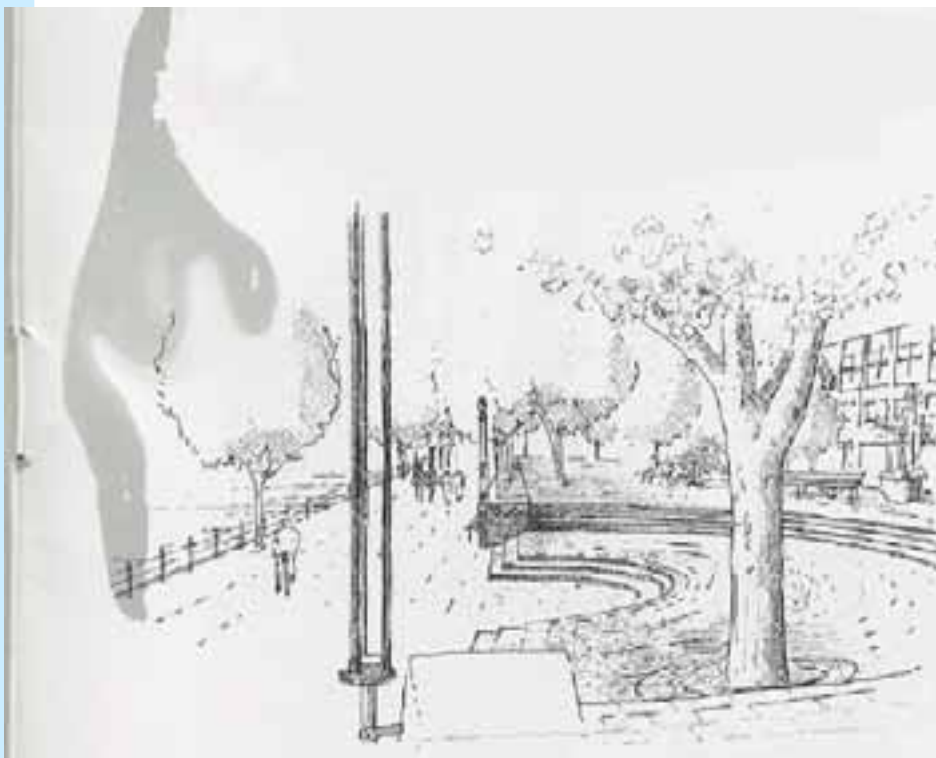


The main difference between urban watercourses and rivers in the countryside is the lack of space; land prices are at a premium, and ownership affecting the banks of a potential site for improvement is complex. However, since urban areas follow cycles of renewal as different industries thrive and decay, there are usually sections of the waterway which abut development sites where more expansive improvements can be considered. A mosaic of narrow fast-flowing stretches, interspersed with more open gentle sections, would after all reflect the natural topographic changes likely along a rural river's course.

**Access** to watercourses can be very variable – both along the banks and from the hinterland. Improving access would increase the public awareness of the river, and could increase the riverbank's potential as a wildlife corridor. However, retaining some relatively inaccessible areas of bank would provide a refuge for wildlife within the urban framework. Some towns, such as Ipswich, recognise the asset they have in their river and are compiling a River Strategy to maximise the benefits of the river for local residents and wildlife.

**Public consultation and involvement** in the design of schemes to bring their local rivers back to life is an important factor in creating a sense of ownership for the new landscape. To be successful, consultation needs careful organisation. Ideally this should be done at a very early stage of an initiative, through the local community groups recommended under Local Agenda 21. Such a forum should focus on what local people and businesses want, their impressions and perceptions of the possibilities, and what they think could and should be done. The final design will need to blend the differing viewpoints of local interests with the practical requirements of the numerous local authority departments likely to be involved in the implementation and long-term maintenance of the scheme. Surveys of public attitudes can be used to put a financial value on environmental improvements to feed into cost benefit analyses which are used to argue the case for funding schemes; there are several accepted methods for doing this.

The scale of these **environmental enhancement** schemes can range from the grand civic scale appropriate to cities and large town centres, down to more modest (but locally important) schemes to remove the concrete corsets imposed in the past and use more natural vegetated methods of bank stabilisation.





To ensure the maximum contribution towards such initiatives from developers and the private sector as a whole, it is crucial for local authorities to identify potential sites for improvement in their **strategic plans** so that all future developments focus on the possibilities. It must be made evident to developers that contributions towards such environmental enhancements, and the inclusion of best management practices and natural drainage techniques within their developments to ensure the highest quality water runoff from their sites, will enhance their chances of achieving planning permission. It may also be worth pointing out that a study by Newcastle University confirmed that homes with a waterfront view can be worth 20% more.

In **urban parks and open spaces** where there is room for a river to meander a little without threatening buildings or other expensive investments, we can remove much of the bank protection, toe-boarding and over-engineered concrete infills so beloved in the 1970's and 1980's that were intended to constrain the natural dynamics of the watercourse. In the USA, the current trend is towards allowing a corridor of land within the flood plain, called a streamway, in which the river can shift its course without danger to property. The surrounding flood plain of land also free of buildings provides further capacity for seasonal floodwaters.



Where space is too restricted to allow the watercourse room to wander, instream habitat structures can be used to increase biological diversity within channellised streams. Deflectors, gravel banks or riffles, fixed or anchored cover structures (such as interwoven willow branches, gabions, or granite rubble), or even randomly placed rocks in the channel bed, can produce small scour holes and areas of reduced flow velocities to provide shelters and niches for invertebrates and fish-fry.

Since flow levels in urban watercourses can vary dramatically through the year, well-designed two-stage channels are beneficial in that they offer a self-cleansing low-flow channel, but sufficient capacity for heavier flows within the extended channel width. The flood berm (or waterside shelf) offers good habitat for attractive marginal vegetation. It is also worth pointing out that the more natural-looking bioengineering techniques now available can often be cheaper to maintain than traditional drainage systems:

- There are no grills to unblock
- It is cheaper to mow a grassy swale than to clean a gully or clear blockages in conventional systems
- Backing up of floodwaters is less likely because there are no structures to trap debris and thus block the waterway
- Vegetation has inbuilt powers of rejuvenation after flooding and can adapt to changes in the water regime, unlike concrete or other man-made structures.

Many techniques need professional design – for example, meander spacings and design. It is important to work with the river's natural dynamics to avoid mistakes which could be costly.

Finally, any such watercourse improvements must be seen in the context of the whole catchment. Issues such as flood control, fluctuations in water levels and water quality, and biodiversity are obviously related to what is happening upstream and downstream, and cannot be treated in isolation. Reference to relevant Local Environment Agency Plans will help to set the scheme in its dynamic context, and allow designers to work with the hydrological imperatives of the flow patterns, rather than trying to fight against them. Environment Agency approval is of course required for works affecting the watercourse.





The condition of our watercourses today is the result of hundreds of years of history. Bringing watercourses back into positive use may take decades, so it is important to set long-term plans, and to make sure that day to day decisions work towards those long-term goals. When a bridge over a watercourse is rebuilt – then let it include facilities for wildlife. When a site is redeveloped, let the watercourse become a focus. Try to avoid placing roads next to watercourses as they tend to restrict the access to the waterside. Try to prevent actions that in the longer term could prevent a watercourse from being used for the benefit of the community as a whole.



For those interested in considering a scheme in their local area, the details of many such schemes already completed or underway are given in the Appendices to this report on Website: <http://www.udal.org.uk> together with the details of potential funding sources, and a full list of useful references.



## Further Reading:

### General

- *'Environmental Good Practice Guide for the Development of Urban, Industrial and Commercial Sites'*. Environment Agency/ Groundwork Birmingham/ Ove Arup & Partners/ Severn Trent Water plc July 1998
- *'Sustainable Urban Water Management'* Notes of a Construction Industry Environmental Forum (CIEF) Workshop, 8 July 1997 (Available from CIRIA)
- *'DETR - Sustainable Local Communities for the 21st Century. A Guide for local authorities to the implementation of Agenda 21 strategies'* HMSO 1998.
- *'Development and Flood Risk'* DOE Circular 30/92. HMSO 1992
- *'Guidance Notes for Local Planning Authorities on the Methods of Protecting the Water Environment through Development Plans'* NRA 1994.
- *'Policy and Practice for the Protection of Flood Plains'* Environment Agency.
- *'Conservation Guidelines for Drainage Authorities'* MAFF, DOE, Welsh Office. HMSO 1991.
- *'BREEAM 98 for Offices'* giving details of the Building Research Establishment's Environmental Assessment Method Tel: 01923.66.44.62; Fax 01923.66.41.03; email: [breeam@bre.co.uk](mailto:breeam@bre.co.uk)

### River Restoration and Management

- *'Design Imperatives for River Landscapes'* O D Manning. Landscape Research Vol 22, No 1. March 1997 pp67-94
- *'Taming the Flood - A History and Natural History of Rivers and Wetlands'* J Purseglove. OUP in association with Channel Four Television Company 1988
- *'Urban Rivers: Nature Conservation and the Use of Rivers for Recreation'* Eds: Hall & Smith. Riverbank Conservation, University of Hertfordshire. 1991.
- *'Nature Conservation and River Engineering'* C Newbold, J Purseglove, N Holmes. Nature Conservancy Council. Peterborough 1983
- *'Nature Conservation and the Management of Drainage Channels'* C Newbold, J Hannar & K Buckley. English Nature. 1989
- *'The New Rivers & Wildlife Handbook'* RSPB, NRA & RSNC 1994 ISBN 0 903138 70 0

### Source Control

- *'Protecting the Quality of Our Environment - A Guide to Sustainable Urban Drainage'* Scottish Environment Protection Agency (SEPA) & Environment Agency September 1997
- *Infiltration Drainage - Manual of Good Practice*. CIRIA Report 156. R. Bettes 1996
- *'Scope for Control of Urban Run-off'*. CIRIA Report 123/4: vols. 1-4. Ed. Marshall, Sherriff, Leonard.
- *'Urban Drainage - The Natural Way'* Hydro Research & Development Ltd. (Tel: 01275 878371) 1993
- *'Nature's Way'* (Video) International Association on Water Quality et al.

## **What action can you take?**

### **LOCAL AUTHORITIES:**

- Identify the current state of your watercourses and the opportunities for their restoration and enhancement; include these in your Local Plans
- Encourage developers to fully integrate watercourses into their developments
- Use planning authority powers to promote restoration and environmental enhancement of watercourses wherever possible
- Prohibit development within the natural flood plain of a watercourse
- Follow the advice of the Environment Agency and your own engineers
- Amend strategic plans to stipulate control of surface water runoff in all new developments
- Provide supplementary planning guidance to developers about sustainable drainage and watercourse enhancement techniques
- Consider the potential of watercourses and water features in public open spaces; allow for maintenance, particularly in housing development areas, using commuted sums to finance this
- Encourage a multi-disciplinary approach within your authority; town planners, engineers, architects, leisure services officers, landscape architects and conservationists should all be involved in producing guidelines and in planning control. Seek external advice if these disciplines are not available in-house
- Involve local communities – seek the views and aspirations of residents, workers and visitors, and consult local action and interest groups, educational establishments, and local businesses
- Use opportunities to promote local trade and industry employment and training
- Identify sources of funding; seek partnerships with developers and others

### **DEVELOPERS**

- Compare property values and returns of similar schemes with and without water features
- Check out how natural drainage techniques can save you capital outlay and future maintenance costs while enhancing the visual appeal of your development
- Contact BREEAM for details of award points which can help you promote a positive public image of your company
- Use the inclusion of natural drainage techniques and integration of the local watercourse into your scheme design as a positive factor when negotiating for planning approval
- Ensure that the appropriate management structure and adequate finance are made available for long-term maintenance
- Take professional advice on the design of water related issues (ensure that your drainage engineers are enlightened – not limited to traditional piped solutions only)
- Work in a partnership with local authorities, the Environment Agency and others to develop water features and minimise site runoff

## **MEMBERS OF THE COMMUNITY**

- Check out Ordnance Survey maps to see where rivers run through your own town (and check historical maps if you suspect some have been culverted)
- Walk beside the watercourse (wherever possible) to see if there is scope to improve the environment
- Get involved with Local Agenda 21 community action groups to see if there is scope to improve public access
- Raise awareness in local schools and colleges of the educational opportunities inherent in watercourses
- Help with fund-raising ventures to finance enhancement initiatives
- Ensure that your children and the wider public are educated about responsible and safe behaviour near watercourses
- Lobby your local authority to ensure that all new developments relate positively to adjacent watercourses (including visual enhancement, increased wildlife value, and public access where appropriate), and that they include best management practices to conserve water on site
- Maintain a rational approach to safety issues regarding public access to the water
- Lobby your local media sources if you feel not enough is happening to improve your river