

Policy Position Statement

De-culverting of watercourses

Purpose

This Policy Position Statement sets out the position of the Chartered Institution of Water and Environmental Management (CIWEM) on de-culverting (or 'daylighting') of watercourses.

CIWEM calls for:

1. Active promotion of de-culverting in national and regional Government planning guidance, and by public bodies and local planning authorities.
2. Active identification and promotion of opportunities to restore urban watercourses, no matter how small, to realise benefits for the local community and environment. This particularly applies where watercourses now run below ground in fully-enclosed culverts.
3. Better integration and enhancement of natural watercourses in development proposals as part of a sympathetic design process aimed at protecting and enhancing the overall quality of the watercourse and the provision of recreational opportunities.
4. Active identification of opportunities for de-culverting in developing Programmes of Measures to enhance Heavily Modified Water Bodies (HMWBs) under the Water Framework Directive. For example, through: development and regeneration proposals, particularly for "brownfield" sites; Environmental Impact Assessments; Local Authority flood maintenance planning; Local Biodiversity Action Plans; and Catchment Flood Management Plans.

CIWEM is the leading independent Chartered professional body for water and environmental professionals, promoting excellence within the sector.

Context

Culverts are artificial water channels. They vary considerably from narrow pipes through to large, square-sided channels which encase watercourses underground. This PPS focuses on the de-culverting of watercourses which run within fully-enclosed channels, with or without artificial bases.

Culverts are generally constructed in order to enable development above watercourses (houses, factories, roads etc) or manage flood flows where a natural channel is felt to be inadequate. However, culverts can themselves restrict flood flows and contribute to flood risk, by causing ponding of water near the entrance to the culvert. Screens designed to prevent debris entering a culvert, unless well-designed and maintained, can also cause blockages

which heighten flood risk. Flood risk issues associated with culverts may become more pronounced if under climate change we see more extreme rainfall events, and de-culverting may constitute an effective adaptation measure.

Since the mid-1990s the negative impacts of culverting watercourses on flood risk, ecology and amenity have been acknowledged. Both the Environment Agency and SEPA now discourage culverting, particularly where this fully encloses a watercourse. Some culverts have been opened up and the watercourses restored. The River Restoration Centre has played a significant role in facilitating this process in the UK, and the practice is widely observed elsewhere. In England, local authorities can control the culverting of watercourses under section 263 of the Public Health Act 1936.

Many watercourses have been buried below ground for a long time (even centuries in major conurbations) with the result that the local population may be unaware of the existence of a river or stream running beneath streets, buildings or open spaces. Often, the nature of the development above such culverted watercourses is prohibitive to their restoration. The restoration of navigation on some canals has involved the removal of culverted lengths.

Under the Water Framework Directive (WFD), culverted watercourses will be termed 'Heavily Modified Water Bodies (HMWB)' because they have been significantly altered by human activity, substantially changed in character, and designated under Annex II (Article 4(3)). The Directive aspires for HMWBs to meet the (lower) standard of 'Good Ecological Potential' rather than the (higher) standard, for other water bodies, of 'Good Ecological Status'.

Key Issues

Problems associated with culverting can include:

- ◆ Increasing upstream flood risk due to blockages (of culverts or screens) by waterborne debris and/or constricted flood flows in the culvert itself.
- ◆ Increased downstream flood risk flows due to shortened response times and reduced flood retention in artificial channels, compared with natural watercourse floodplains.
- ◆ Reduced ecological value within concrete channels and with reduced light.
- ◆ Loss of and adverse effects on environmental features and wildlife habitat including disruption of the linear habitat of a watercourse, stopping species from spreading naturally.
- ◆ Increased concerns in relation to maintenance and health and safety both for drainage operatives and unauthorised trespassers due to poor access.
- ◆ Detrimental effects on passage for recreational users – whether on foot or waterborne.

Many culverted watercourses have been restored, encouraging access, improving the local quality of life and attracting opportunities for regeneration. Specific benefits includeiii:

- ◆ Providing valuable wetland / aquatic habitat, aiding fish passage and significantly adding to the visual attractions of an area.
- ◆ Offering educational and play opportunities for children, enhancing pedestrian and cycle routes and giving people a touch of the countryside and its seasons in the town.
- ◆ Restoring historic canals for amenity or for navigation by powered and unpowered boats.

- Using water in motion to mask city noise and provide an atmosphere of quiet and calm.
- Complementing other urban regeneration initiatives and bringing commercial benefits such as enhanced image for properties and up to 20% increase in land values or rents.
- Reducing maintenance and construction costs by using natural bioengineering techniques rather than concrete constructions.
- Reducing flood risk, and creating balancing ponds to help reduce flooding downstream.
- Giving a place a sense of identity, because each combination of landform, waterway, bankside buildings and bridges is unique.

Challenges to successful de-culverting include:

- It is generally an expensive process and assured funding for projects must be secured beforehand. As a result de-culverting may be more likely in regeneration areas.
- Removing a culvert which previously constrained flows could increase downstream flood risk. Modelling should therefore be employed to ensure no adverse flood risks.
- Securing support for projects may be a lengthy process, especially in urban areas where people are simply not aware of the existence of a watercourse.
- Once covered, the land above culverted watercourses may become heavily developed to the extent that de-culverting is not a realistic option.
- New watercourses may attract fly tipping and vandalism, with increased deposition of urban trash following floods where re-engineered channels become wide and shallow. Local communities and authorities need to be fully engaged and involved in maintenance.
- Some culverts may be formally listed or scheduled for their historic importance. Very careful consideration is needed in these cases, and formal consents must be secured beforehand.

Discussion

1. CIWEM considers that there should be active promotion of de-culverting in national and regional Government planning guidance, and by public bodies and local planning authorities.

There is little official guidance on the use of culverts to enclose watercourses or on their removal. Policymakers should recognise that burying watercourses below ground is rarely the optimal solution.

De-culverting projects will generally require the cooperation of many different parties. This includes professionals involved in initial environmental assessment, planning, landscape architecture, river hydrology/ hydromorphology, conservation and biodiversity and recreation and social dimensions. Local authorities and any private landowners will also play a key role, together with consultants and contractors and a range of stakeholder / user and community groups.

Future guidance should encourage competent authorities to consider de-culverting when any of the following criteria are met, and to actively encourage it when several of these criteria are met:

- Removing a culvert is physically possible within the context of the local physical and built landscape, and would not damage ecological or historical interests.
- Flood risk may be reduced by removing a section of culvert and re-establishing a more natural flow regime and watercourse profile, taking account of any impacts on flood risk downstream.
- The local environment would be enhanced significantly by re-establishing a more natural channel profile.
- Removing a culvert would enhance local biodiversity through recolonisation by local species, especially protected species and priority species under Biodiversity Action Plans.

For large culverts with no adjacent development, the aim should be to return the watercourse to a more naturally functioning form. For channel/box culverts with adjacent development, the culvert should be opened and the bed returned to a natural state. Where this is not possible, enhancement or mitigation work should be implemented elsewhere on the reach.

2. CIWEM considers that there should be active identification and promotion of opportunities to restore urban watercourses, no matter how small, to realise benefits for the local community and environment. This particularly applies where watercourses now run below ground in fully-enclosed culverts.

Creating a national database of buried watercourses with potential for de-culverting would help inform this work. Relevant information is held by diverse authorities and could usefully be collated and shared. Key interests include environment and heritage agencies, highway and planning authorities, rail network operators and other landowners. There should also be wider implementation of initiatives to promote awareness amongst the public of buried watercourses in urban areas, the reasons why they are buried and the benefits of restoring them where possible, possibly as part of the river basin planning process under the Water Framework Directive.

3. CIWEM considers that there should be better integration and enhancement of natural watercourses in development proposals as part of a sympathetic design process aimed at protecting and enhancing the overall quality of the watercourse and the provision of recreational opportunities.

This may include creating buffer zones to separate watercourses from developments (including gardens). Professionals working with developers have an important role to play here.

4. CIWEM considers that there should be active identification of opportunities for de-culverting in developing Programmes of Measures to enhance Heavily Modified Water Bodies (HMWBs) under the Water Framework Directive.

For example, through: development and regeneration proposals, particularly for "brownfield" sites; Environmental Impact Assessments; Local Authority flood maintenance planning; Local Biodiversity Action Plans; and Catchment Flood Management Plans. It is important that sufficient financial resources are provided to the Environment Agency and SEPA to improve the ecological potential of HMWBs, not least by remediating or mitigating the damaging impacts of existing culverts, especially on fully-enclosed watercourses.

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Note: CIWEM Policy Position Statements (PPS) represents the Institution's views on issues at a particular point in time. It is accepted that situations change as research provides new evidence. It should be understood, therefore, that CIWEM PPS's are under constant review and that previously held views may alter and lead to revised PPS's. PPSs are produced as a consensus report and do not represent the view of individual members of CIWEM.

Appendix - Case Studies

River Alt, Merseyside

1994-96 rehabilitation included the re-opening of 200 metres of 1.5-2 metres wide culverted river, increasing habitat diversity through incorporating sinuosity, backwaters, low-level wet ledges (berms) and extensive planting.

Lessons learnt included ensuring that local authorities and local communities are fully consulted, particularly in regard to access. In heavily-populated areas, access is a big issue and requires as much detailed attention as habitat creation and engineering.

Washwood Heath Brook, Ward End, Birmingham

In 1997, land became available which contained the Washwood Heath Brook, which runs underneath the M6 flyover through the heart of Birmingham.

Regional Development Agency Advantage West Midlands initiated the opening of a 200 metre section of culvert into an open concrete trapezoidal channel whilst diverting the line of the stream to maximise the area of land available.

Within one season the stream became repopulated with wagtails, waders and ducks despite the industrial surrounds and low quality habitat of the constructed channel.

Pymmes Brook, Edmonton

During 2005/06, the Environment Agency strengthened the channel walls of a section of the Pymmes Brook which had been culverted within the former Tottenham Gas Works. Inspection of the culvert revealed a risk of it collapsing, putting 1,500 properties at risk of major flooding.

The Environment Agency's work removed pressure on the existing culvert walls, allowing removal of the roof of the culvert and the associated flood risk.

The restoration will encourage more wildlife and fits with the Environment Agency's policy to remove existing culverts and open up river channels where possible.

The project cost was £1.9 million with an allocated £25,000 from the budget for environmental improvements in the area.

Twin Rivers Diversion / Enhancement Scheme, Heathrow

Terminal 5 construction at Heathrow Airport required the diversion of two rivers running through the middle of the site.

50% of the Duke of Northumberland's River and the Longford River were previously fully enclosed. Under the new realignment scheme 3 km of new channels were constructed. Two thirds of this length are enclosed in concrete channels with in-channel enhancements to improve the habitat for wildlife, with the remaining third being semi-naturalised channel. 95% of the channels are now open.

More than 8000m² of pre-grown native plants comprising 37 species from the nearby Colne Valley were planted on the river banks, and pre-existing sediments from the old channels containing important macro-invertebrates, as well as populations of several fish species, were translocated to the new channels.

Quaggy Flood Alleviation Plan

In response to a 1990 NRA proposed flood alleviation scheme, The Friends of the Quaggy instead suggested restoring the old channelized river profile, including a section of culvert, upstream to allow more natural flood storage in Sutcliffe Park.

Restoration commenced in June 2003.

The benefits derived from increased physical activity associated with the Quaggy scheme (in terms of less sickness, lost working hours etc) was estimated as potentially being capable of offsetting the cost of the whole scheme in three years.

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- i Environment Agency: Policy Regarding Culverts – Policy Statement, March 1999
 - ii SEPA Position Statement to support the implementation of the Water Environment (Controlled Activities) (Scotland) Regulations 2005: Culverting of Watercourses, December 2006
 - iii Liquid Assets, Urban Design Alliance / Institute of Civil Engineering, 1990