



## Fluvial Design Guide

### Project Summary SC050012/S1

The *Fluvial Design Guide* is a web-based publication aimed at professional staff involved in the design process for the construction, maintenance, refurbishment or alteration of flood defence or land drainage assets. It covers the whole design process, from the early stages of looking at alternative solutions through to design completion. The guide is intended to be used by both designers and asset managers. It can be found at:

<http://evidence.environment-agency.gov.uk/FCERM/en/FluvialDesignGuide.aspx>

The guide has 11 chapters, which are accessed via a table of contents in the web pages. In addition, individual chapters are available as pdf downloads.

The scope of this guide is limited to what can be termed 'interventions' in the fluvial environment. This includes both hard and soft engineering as well as maintenance interventions such as de-silting and vegetation control. The fluvial environment includes not only the watercourse (bed and banks) but also the floodplain and immediate hinterland.

The guide is intended primarily for situations where flood risk management or land drainage is an important driver. It aims to support fluvial design that is in line with government policy, as set out in Defra's 2005 publication, *Making Space for Water*.

The impact of fluvial interventions extends beyond the physical environment to cover a wide range of uses of the fluvial system such as navigation, angling, walking, water supply and wildlife. In addition, the full extent of the fluvial system – as encompassed by the catchment – has a direct impact on the hydrology, geomorphology and ecology of the river, all of which are important inputs to the fluvial design process.

The guide covers all of these elements, though its primary focus is inland flood risk management. It does not stray into issues of land use management or surface water drainage in the catchment. At the downstream end of the fluvial system, the guide deals with issues of tidal influence, but does not cover saline water ecology, or waves in estuaries or on the coast.

Design choices and decisions need to be based on proper analyses of relevant information. Getting this right is vital to the quality of design decisions as well as the time taken for the design process.

It is important to recognise that in fluvial design in general – and flood risk management in particular – a full understanding of the historical context greatly assists the development of appropriate solutions. This not only relates to the history of flooding problems (past events, mechanism of flooding, records of flows and levels, significance of blockages, loss of floodplain, for example) but also to the morphological, environmental and anthropomorphic history associated with the river system.

Designing in the fluvial environment involves the development of management interventions to alter or support the workings of the fluvial system. Effective consultation with the stakeholders in the design process is vital, particularly:

- early input to the planning and design process to identify all relevant information, issues and constraints and to exploit any 'win-win' opportunities;
- feedback of emerging plans to the various stakeholders, explaining how their inputs have affected the plans, identifying any outstanding issues and encouraging wider acceptance and ownership.

#### **The eight principles of fluvial design are:**

1. Fluvial design must be sustainable.
2. Fluvial design must consider all stages in the lifecycle of the intervention.
3. Fluvial design must involve all stakeholders from the early stages of a project.
4. Fluvial design must adopt a systems approach.
5. Fluvial design must be performance-based.
6. Fluvial design must consider the full range of loading conditions that the asset is likely to meet in its design life.
7. Fluvial design must be flexible and adaptable.
8. Fluvial design must take account of the inherent uncertainty associated with natural events and our understanding of them.

The *Fluvial Design Guide* demonstrates good practice for those involved with the planning, design and maintenance of fluvial rivers and streams and balancing areas. The guide will ensure compliance with legislation and regulation and will support improvements in integrated river management and enable wider benefits to be achieved. As an online publication, the guidance will be more accessible to the range of users .

By applying the guidance the Environment Agency and Operating Authorities will reduce capital and operational expenditure and reduce average annual damages from flood events in the future.

This summary relates to information from project SC050012, reported in detail in the following output(s):

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