

A step change on the streets

How should we manage surface water and what does this mean for our traditional urban drainage systems? **Christopher Digman**, senior principal engineer at MWH, explores the options

In recent years, combined sewer overflow (CSO) discharges and urban drainage flooding have been the target of major improvements. To date, this approach has mainly been to build larger assets to convey or store the flow whilst installing many screens to prevent the discharge of aesthetic pollutants.

However, the risk of flooding is still increasing as a result of climate change and standards are becoming increasingly tighter. This is leading to further major investment in AMP5 by water companies to improve water quality and reduce flooding impacts. Yet many of the solutions will increase the operational costs through increased treatment volumes, and in the future many assets may have to be made bigger; with carbon burdens increasing.

There is growing recognition that we need to change our approach to managing surface water. Continuing in our current state is unsustainable as well as leaving assets with limited adaptability for future requirements. The Foresight Report identified that the costs to increase capacity and storage in the light of future climate change projections are substantial. Such increases in the system size produce greater quantities of flow to treat. And even where we have separate systems surface pollutants are washed off. This pollution is now starting to get recognition as a problem that needs addressing.

Our current approach to manage rainfall in urban areas is to move it from the surface to below-ground pipes as soon as possible. This uses a traditional engineering approach and rarely dabbles with the sustainable urban drainage system (SUDS) options. When rainfall exceeds the capacity of the piped system, exceedance occurs with flow running on the surface.

The step change will be to keep the water on the surface, manage flows at source to reduce runoff, return it to the ground and treat the pollution at source or as close to source as possible. New development is already moving towards this, with the soon to be published National SUDS Standards and the recently enacted *Floods & Water Bill*.

This approach follows a number of key principles, bringing surface water management together with urban design:



Bio retention (top) can help manage more flow at source; the main driver of landscaping the street (above) was traffic calming, however the opportunity to manage surface water using permeable paving was taken during the process Image: Sustrans

- Engage communities before work is decided
- Hold rainfall back at the source and keep it on the surface
- Make buildings and infrastructure flood resilient
- Safely convey extreme events as well as more frequent events
- Place surface water at the heart of urban design
- Mix the professions
- Maximise the multiple benefits

Applying these principles in our existing urban areas will help to manage the impacts of flooding and water quality. To help achieve this, CIRIA have initiated a project called Retrofitting Surface Water Management Measures that adopts these guiding principles. MWH and University of Sheffield are writing the guidance.

The project aims to provide practitioners with the knowledge of how to prepare for and assess where retrofitting is appropriate. It looks to identify the types of measures to retrofit into specific types of areas, for example, at the individual property level, Victorian terraces, semi-detached modern housing, commercial out of town areas.

It will provide examples of how the measures such as SUDS can become part of and contribute to the existing urban area. This includes designing aesthetically pleasing measures and where possible increasing bio-diversity and the level of green infrastructure. Achieving surface water management for frequent and extreme events will require the professions to work closer together. Funding remains a big challenge for the different stakeholders to deliver holistic solutions and use non-traditional surface water management measures. Without this we will continue to build larger below ground assets.

The time period to deliver retrofit solutions will take many years. The level of retrofitting needed to achieve this varies and is heavily dependent upon how many times the CSO already spills.

Until we have more joined up funding it is vital to take advantage of opportunities such as replacement, regeneration and redevelopment when they come along to retrofit measures and remove surface water from the sewers. When we start to manage our surface water differently our communities will be able to embrace the wider benefits such an approach brings. ■■■