



Flooding

The real risks

Background

The floods which hit areas of the UK between June and August 2007 were the results of prolonged and persistent rainfall more often associated with the winter months than summer.

Much of the flooding that occurred was the result of flash floods caused by sudden downpours which left the ground saturated and impermeable, drainage systems unable to cope and streams and waterways overflowing.

The risk of flooding can often be higher than anticipated due to hidden factors such as land drainage and sewer systems, as well as the more obvious threat posed by rivers and to some extent, the sea. This creates a cumulative risk, with crises capable of being triggered by a variety of metrological conditions.

It is imperative that government focuses on the issue of surface water management, as well as 'traditional' flood defences. Many areas with relatively high levels of fluvial (ie pertaining to rivers) defence found themselves flooded during the summer due to the limitations of their urban drainage systems. It is impossible to completely eradicate flooding, however high the standard of flood defence and in genuinely extreme circumstances, fluvial defences are more than likely to be overtopped. It is therefore vital to improve building regulations and urban design to better manage surface water during serious conditions.

In addition to flood defence and urban design, it is necessary to confront the issue of the areas of land which, due to climate change and coastal erosion, may not be defensible in the long term. This point may be decades away, but it is important to begin engaging with the public on this matter and to address factors such as compensation, incentives to relocate and the practicalities of abandoning established settlements.

Key statistics

- Taking into account changing weather and development patterns the Foresight report states the UK may need to spend between £22bn and £75bn in the period up to 2080 on new engineered flood defences¹. This figure could however be reduced by taking an integrated approach encompassing urban design, improved drainage and designated flood plains.
- In England and Wales alone, over four million people and properties valued at over £200bn are at risk from flooding².
- In 2005, 21 major planning applications were approved against Environment Agency (EA) guidance on flood risk³.
- The UK has suffered major inland floods in 1998, 2000, 2003 and 2007. There has not been a major coastal flooding incident since the 1950s but erosion and rising sea levels remain a pressing issue. The 2000 floods caused damage estimated at £1bn⁴. The 2007 floods led to 150,000 homes temporarily losing their water supply and a further 50,000 their power supply⁵.
- The government's July 2006 Housing Green Paper⁶ increased the target for new homes to be built by 2020 to three million and reiterated that a proportion of these homes would be built on flood plains, notably in the Thames Gateway.

ICE has published a number of documents on the issue of flooding. In 2000 the government asked ICE to hold a presidential commission into flood risk management and ICE published *Learning to Live with Rivers* in 2001 and then *Engineering Skills for Flood Risk* in 2004, both of which contain further information on all the points raised.

¹ Office of Science and Technology (2004), *Foresight, Future Flooding*, HMSO, London, UK.

² Office of Science and Technology (2004), *Foresight, Future Flooding*, HMSO, London, UK.

³ Law Society (2006), *Response to consultation on PPS 25*, Law Society, London, UK.

⁴ Environment Agency (2001), *Lessons Learned: Autumn 2000 Floods*, Environment Agency, Bristol, UK.

⁵ *Flooding is a "wake up call" says Environment Agency*, New Civil Engineer, 26 July 2007.

⁶ Communities and Local Government (2007), *Homes for the future: more affordable, more sustainable* – Housing Green Paper, HMSO, London, UK.

Recommendations

Government

- An end to “stop-start” development of flood and coastal defences. A clear, securely funded, long term, forward investment programme is required. In addition to its negative effect on flood defence work overall, stop-start development makes it problematic for industry to recruit and retain skilled engineering staff in the long term
- Government must take a lead in brokering consensus on the level of defence that will be put in place and how the costs for its construction and maintenance should be divided up
- Government must ensure that businesses and the public don't end up paying the clean up costs, which are usually greater than the actual cost of providing flood defences
- Government needs to resolve the lack of clarity over whether defences should be discontinued because they are not sustainable, or whether potentially sustainable defences should not be built due to budget constraints
- The creation of a single body with strategic responsibility, authority and accountability for all aspects of flood risk management is urgently required
- Local Authorities must be given the technical and political support to effectively implement PPS25 and ensure that development and its impact in areas of flood risk is effectively managed.

Agencies

- The EA should take steps to improve the efficiency of the management of its capital programme. To facilitate this process the EA should continue to move to contractual mechanisms that provide a long-term (five to 10 years plus) commitment to investment
- A greater degree of interaction is necessary between the EA and the Met Office. The EA is responsible for giving flood warnings relating to rivers and the sea, but the Met Office is best placed to offer localised warnings using rainfall radar technology. The inadequacies of the warnings in June and July 2007 make it clear that the EA and the Met Office should work more closely in this area.

What happened in Hull and Sheffield

Both Hull and Sheffield were badly affected by the summer floods. Hull was particularly severely hit, with about 17,000 homes flooded and 35,000 people affected.

In Sheffield 1,200 homes were damaged and two people were killed. Flooding expert and ICE member John Grayson said: “Our review of rainfall records indicate that the actual event that triggered the flooding in Sheffield and Hull was greatly exacerbated by the antecedent wetness; ie it followed a period of persistent and extremely wet weather that resulted in normally permeable soils becoming virtually impermeable.

“It is unclear that the rainfall type bore any relation to the type of increased precipitation rates anticipated by climate change predictions; the rainfall was not high intensity summer thunder storms; it was more typical of winter.

“Our investigations into flooding in Hull indicate that areas defended from fluvial flooding and dependent on internal drainage for both land drainage and public sewer system pumping stations were inundated as a result of failure/lack of capacity in the internal drainage systems. Many similar areas whilst possibly defended from fluvial flooding to relatively high standards are dependent on internal drainage systems only designed to provide 1 in 30 year protection against surface flooding. This appears to be totally inadequate and out of step with guidance provided in PPS25 (new property should have 1 in 100 year minimum standard of protection).

“Many new and existing buildings have finished floor levels (FFLs) set that give insufficient ‘freeboard’ allowance to keep internal floors of buildings above surrounding floodwater (from whatever source). This could be addressed for new buildings through revision of the building regulations. Areas of Hull where FFLs were set high – a planning condition to deal with breach conditions – remained largely secure from internal flooding following drainage system failure.”

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