

## Environment, Food and Rural Affairs Committee Future flood prevention

### Background to CIWEM

CIWEM is the leading independent Chartered professional body for water and environmental professionals, promoting excellence within the sector. The Institution provides independent comment on a wide range of issues related to water and environmental management, environmental resilience and sustainable development.

CIWEM welcomes the opportunity to respond to the Environment, Food and Rural Affairs Committee on future flood prevention. In formulating this evidence, we have utilised the expertise of CIWEM's Rivers and Coastal Group, Urban Drainage Group and Climate Change Network which represent hundreds of members working in flood and coastal risk management.

CIWEM has previously published reports on flooding, *Breaking the bank? Funding for FCERM in England*<sup>1</sup>, which assesses both the amount of funding and its prioritisation and *Floods and Dredging: a reality check*<sup>2</sup>. CIWEM's Urban Drainage Group is shortly due to publish a rainfall guide to assist in planning for surface water.

### Summary

- Funding of flood risk management research and development has fallen dramatically in the last seven years. Wider and new funding opportunities will need to be sought.
- A more rapid transfer of knowledge into guidance and practice on estimates of future rainfall taking account of the recent past is needed urgently.
- There is no obligation on those who design or approve proposals for development to use up-to-date estimates of rainfall when designing surface water drainage and preparing flood risk assessments.
- As Schedule 3 of the Flood and Water Management Act was not implemented there is no ongoing monitoring at a national level of the uptake of sustainable drainage systems (SUDs), nor of the effectiveness of final designs in managing run-off from new developments. Data is an important driver for change.
- Developers retain their automatic right to connect new homes to the public sewerage system, with no regard given to their capacity.

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<sup>1</sup> CIWEM. 2015. Breaking the Bank? Funding for flood and coastal erosion risk management in England. [www.ciwem.org/floodfunding](http://www.ciwem.org/floodfunding)

<sup>2</sup> CIWEM. 2014. Floods and Dredging – a reality check. [www.ciwem.org/floodsanddredging](http://www.ciwem.org/floodsanddredging)

- There are also no implications for a developer if they build inappropriate development or increase flood risk to third parties as a result of the development.
- CIWEM considers that the current priorities for allocating funds for flood defence schemes are appropriate, however partnership funding needs to be monitored to ensure it is delivering enough schemes and helping the most vulnerable.
- More work is needed to improve funding mechanisms for natural flood management measures and enhancing opportunities for storing water in upstream catchment areas.

### Answer to consultation questions

1. Predicting the future: Are the Environment Agency and Met Office models that predict rainfall patterns and the likelihood of future floods fit for purpose - and do they correctly calculate the costs of future flooding to communities?

The long term management of flooding should be based on evidence and the latest science and understanding. To continue to move forward in our understanding and techniques, stability in R&D funding is required. Recent figures show that funding for R&D to improve flood forecasting and defences has fallen by 62 per cent in the last seven years and there is now a large and increasing backlog of research waiting to get funding.

There is an issue around the time taken for knowledge generated from research to reach implementation in practice. The Government should consider whether the standard methods of estimating flood likelihood are appropriate and whether the current methods need updating. For example the Extreme Rainfall project funded by Defra and the Environment Agency was completed in 2009 but it took around six years for the methods to be available for use in practice through an update of the Centre for Ecology and Hydrology Flood Estimation Handbook (the handbook and software is the industry standard for estimating UK flood risk).

The original research was carried out prior to the 2009 flooding and the 2015/6 flooding in Northern England and so it lacks any influence in the statistics that these more recent exceptional events have occurred. Given the concerns about "unprecedented" rainfall in the current winter's floods; a more rapid transfer of knowledge into practice on estimates of future rainfall taking account of the recent past is needed urgently.

Moreover, there is no obligation on those who design or approve proposals for development to use up-to-date estimates of rainfall when designing surface water drainage and preparing flood risk assessments.

The recent guidance from the Environment Agency – '*Adapting to climate change: guidance for risk management authorities*' (updated February 2016) is not fit for purpose for calculating extreme rainfall. The Environment Agency is right to point out that the values in Table 4 are for daily maxima and that "it is not possible to provide guidance on how rainfall at hourly timescales may change". Unfortunately it is these changes at hourly timescales which are especially important when assessing the performance of urban drainage systems. Previously, and in the absence of better advice, urban drainage practitioners have erroneously applied these uplifts for drainage design.

The latest climate science<sup>3</sup> suggests that future extreme rainfall may be higher than existing UK climate change allowances for rainfall intensity, largely due to summer convective storms such as those experienced in 2007 and 2012. Sub-daily intensities are likely to increase at a higher rate than daily intensities because of the impact of phenomena such as intense convective cells.

The water and sewerage companies have recognised this and conducted research (in collaboration with the Met Office) in 2015 to develop alternative change factors specifically for urban drainage and for different UK regions. This work via UK Water Industry Research is being extended into 2016 to provide greater coverage in England and the wider UK.

It is unfortunate that the Environment Agency has not recognised this latest science and identified the problems of using UKCP09 for drainage design. SEPA have done so and included the UKWIR values in their latest guidance. There is now a difference of approach in Scotland and England. CIWEM's Urban Drainage Group is shortly to publish a rainfall guide which includes a discussion of climate change and how its effect can be considered for urban drainage systems.

CIWEM is also concerned that the next UKCP (UKCP18) which is currently being developed by the Met Office and others may miss opportunities to integrate value-added information such as river flows and flood heights which are the main utility to flood practitioners. As a result it may be some years until this information is on the market and available to practitioners.

There is also a need to look at the response of the synoptic scale meteorology over the North Atlantic to the gradual warming of the climate (including jet stream, storm generation and frequency, storm track etc.) and the possibility for "tele-connection" to disturbances further afield (e.g. the Pacific el Niño events).

2. [Protecting communities and infrastructure: How adequately do defences protect communities and agricultural land from floods and do current funding arrangements target spending in the right way?](#)

Flood risk management infrastructure reduces the risk of flooding. It does not prevent all flooding and there could be an event that overwhelms infrastructure. When FRM infrastructure is overwhelmed the instant reaction of many is that it has failed, even if it has protected a community on several occasions.

Clear priorities have been set for the Environment Agency by successive governments: the top priority is protecting lives; the second is protecting people's homes and people's businesses; and the third is to protect as much agricultural land as is possible. These are reflected in policies that allocate money, which are formulated to provide the best value for money, deliberately protect the most vulnerable and incentivise those that are able to, to

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<sup>3</sup> Dale, Luck, Fowler et al. New climate change rainfall estimates for sustainable drainage. *Engineering Sustainability*. Part of UK Water Industry Research's programme of climate change related projects. [https://www.researchgate.net/publication/284546535\\_New\\_climate\\_change\\_rainfall\\_estimates\\_for\\_sustainable\\_drainage](https://www.researchgate.net/publication/284546535_New_climate_change_rainfall_estimates_for_sustainable_drainage)

increase their resilience. On balance CIWEM considers that the current priorities for allocating funds for schemes are appropriate.

The comparative value of property versus land per square metre makes farmland more of a challenge to protect. For instance, a single house valued at £200k might only need 10 or 20 metres of flood embankment to protect it. Yet the same value of farmland could be 12 hectares and likely to need at least 300m of flood embankment.

Many have questioned the lack of an outcome measure for critical infrastructure. However the benefit cost ratio is influenced by all economic benefit, as calculated in the Multi Coloured Manual<sup>4</sup>, and this does therefore take critical infrastructure into account. Yet the costs, for example of a road being flooded, are relatively low as they are calculated by the increased time of travel for passengers due to the diversion. A road therefore needs to be very busy, have a long diversion, and flood frequently to accrue significant economic benefits. The current funding model for flood risk management schemes does not significantly encourage Defra funded schemes to include critical infrastructure unless it is relatively inexpensive to do so. This is a deliberate decision to create the right incentives for operators to invest themselves in infrastructure resilience, rather than rely on the taxpayer to pay.

However the current funding regime depends on partnership funding contributions. This means that schemes are not delivered in order of priority, moreover they are delivered in order of which community can attract third party funding. Whilst the partnership funding calculator provides additional funding to deprived areas of the country, it does not offset the fact that deprived communities are less likely to be able to raise partnership funding contributions.

CIWEM supports the emphasis on partnership funding as it aims to increase the number of schemes being supported, increases local choice and should lead to an increase in external contributions. It introduces the concept that beneficiaries should contribute towards schemes from which they derive gain, which would not otherwise go ahead. However it does not yet appear that enough schemes are attracting partnership funding and this needs to be monitored to see if other measures are needed to encourage, for example, private companies to contribute. The Government needs to assess the many communities that cannot attract additional funding and will not benefit from a scheme under the current regime.

3. [Managing water flows: How effectively do Defra and the Environment Agency's policies encourage innovative approaches to managing risk such as slowing the flow of water in urban and rural river catchment areas and promoting water storage?](#)

Defra and Environment Agency policies, namely *Making Space for Water* and the *Catchment Based Approach*, positively promote the use of a variety of flood risk management techniques and working with nature. However the current mechanisms for securing Government funding for flood risk management schemes (FCERM Grant in Aid) is not aligned to these policies. To attract grant in aid, a business case must be submitted to demonstrate the costs and benefits of a scheme. There is an inherent difficulty with quantifying the benefits of natural flood

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<sup>4</sup> Middlesex University. 2013. Multi-coloured Manual. London Flood Hazard research centre. Routledge

management measures, for example how does one quantify the benefit of planting 1000 trees 10km upstream of a town, yet it would clearly be of benefit. More work is needed to improve funding mechanisms for natural flood management measures and enhancing opportunities for storing water in upstream catchment areas.

There is beginning to be a more positive approach and dialogue towards the way that agricultural land is considered in flood risk management. The catchment based approach and payment for ecosystem services could assist in paying farmers to flood farmland where it is better used to store water to protect communities downstream.

There is a tension between high-level policy for flood risk management and the public expectation for flood protection. This can be described as a tension between policies that rely on "resilience" rather than "resistance". There needs to be a focus on the resilience of communities that benefit from defences and those living in flood risk areas to also change attitudes and take self-help measures.

4. **Planning for floods: How well do planning policies ensure new buildings are not put in areas of high flood risk nor where they would increase risk to others – and how well do new developments incorporate sustainable drainage and flood-resilient buildings?**

Planning policy presents a clear approach to spatial planning on flood risk grounds via the *sequential* and *exception testing* process through the National Planning Policy Framework (NPPF). Planning applications for new developments on sites of greater than one hectare or in Flood Zones 2 and/or 3 need to be accompanied by a flood risk assessment. The FRA needs to demonstrate that the development will: (i) be safe from flood risk, and (ii) not increase flood risk elsewhere, for the lifetime of the development.

However, whilst the policy is well established, there are weaknesses in practice:

Policies and practices for developing in areas at risk of surface water flooding is less well established. The Environment Agency's updated flood map for surface water is a useful tool for identifying risk areas, but the associated guidance advises that it should not be used as a basis for objecting to development and the guidance is less defined.

New development can increase the risk of flooding to neighbouring areas, by displacing fluvial flood water, changing overland flow routes or generating more surface water. Displacement of fluvial floodwater from Main River is considered via a well-established process yet there is no statutory duty in the planning process for considering flood risk from Ordinary Watercourses and groundwater. Lead local flood authorities (LLFAs) are responsible for managing flood risk from these sources but only have a statutory duty for commenting on the surface water flood risk of Major developments.

Service by LLFAs varies significantly across the country with some and not others fulfilling their statutory duties to comment on surface water matters of Major developments. Many do not have the adequate resources and skills.

The implementation of Schedule 3 of the Flood and Water Management Act was shelved by Government. A revised approach was announced based on 'strengthening' the planning system (through the National Planning Policy Framework), to create an 'expectation' that major planning applications (i.e. those of ten dwellings or more) would include SUDs.

However this failed to address the fundamental barriers to the uptake of SUDs highlighted by the Pitt Review:

- Developers retain their automatic right to connect new homes to the public sewerage system, with no regard given to their capacity.
- It leaves the biggest challenge for LLFAs in the responsibility for the ongoing maintenance of SUDs systems. If SUDs are not maintained, particularly by private management companies, they will fail to operate, pose a flood risk and their multiple benefits will be lost. Without the creation of SABs there is no agreement on who will pay for and perform maintenance on proposed SUDs. This is currently decided on a case-by-case basis, with the SUDs removed from the plans if no agreement can be reached.
- Had SABs been created they would have had to consult with a number of bodies, including the Environment Agency, any relevant internal drainage board and any relevant sewerage company when considering an application.
- Without statutory SUDs standards there is no hierarchy of acceptable discharge solutions (with infiltration to the ground the most preferred option). A traditional underground oversized pipe and tank solution would actually meet the National Standards for SUDs at present which do not tackle water quality or improve amenity.

There is a risk that Flood Risk Assessments are simply a paperwork exercise. The statutory consultees (EA/LLFA) bear no liabilities if planning consent is granted and flooding occurs. Developers have no incentive to ensure that houses are safe from all sources of flooding. The Government needs to consider what incentives are placed on developers to ensure that a development is safe on flood risk grounds and consider the implications for a developer if they build inappropriate development or increase flood risk to third parties as a result of the development. DCLG also need to be engaged with to consider whether building regulations need to be changed so that all property as new build, improvements or renovations are resilient to flooding.