

FOR BOARD USE ONLY

PAPER BY: THE DIRECTOR OF WATER MANAGEMENT

SUBJECT: URBAN FLOOD MANAGEMENT AND WARNING: A STRATEGIC APPROACH

ISSUES

This summer, Defra launched a consultation on the role of the Environment Agency in the management of inland drainage and flooding. The summer floods which followed exposed the lack of coordination of flood forecasting, warning and management in inland and especially urban areas away from main rivers.

The Environment Agency has to decide what role it should play in the management of this problem. This paper proposes a way forward which will give the Environment Agency a strategic role, guiding other operators in their approach and with sanction applied through the land use planning system.

The Board are asked to consider this approach and advise on the appropriate way forward. This will inform our discussions with Defra and the Cabinet Office Review of recent flooding.

1.0 BACKGROUND AND INTRODUCTION

- 1.1 This paper sets out a mechanism through which strategic overview of urban flooding and quality assurance of key processes supporting management of all inland flood risks could be achieved.
- 1.2 Defra's Making Space for Water programme promotes the Environment Agency as the sole body capable of taking on the strategic overview of all inland flooding. This paper deals with the elements of that role involving management of flooding within the built environment.
- 1.3 We agree that there is a need for one organisation to take a strategic overview, provided appropriate powers and resources come with the new responsibilities, and that Local Authority and utility company responsibilities are made clear. We believe that the Environment Agency should be that organisation. Defra, prior to the summer floods had gone out to consultation on the Environment Agency taking such a strategic overview role.
- 1.4 Two key issues need to be addressed in order to deliver effectively a strategic overview of urban flooding. Firstly, there must be an assessment of risk posed by all forms of flooding that is shared by all key operators. This is critical to identify where risks are greatest and intervention most urgent. Secondly, a common action-planning process that can coordinate responses and investments across the broad range of organisations involved, but which has sanctions to ensure compliance and standards of output, needs to be agreed.

- 1.5 We do not seek a significant delivery role, and see Local Authorities being best placed to co-ordinate local planning and delivery. This is because:
- they operate the planning system – a major lever in the management of the urban environment;
 - they are a key stakeholder;
 - the scale of response will be at the local level; and
 - they represent the communities and individuals affected.

2.0 A SHARED ASSESSMENT OF RISK

- 2.1 Under Planning Policy Statement PPS25 (and TAN15 in Wales), Strategic Flood Risk Assessments (SFRAs) are required for all areas. They are currently variable in quality, often not providing a good assessment of the risk from surface water, sewer and other forms of flooding. This is principally due to use of inappropriate methodology and lack of suitable data and information on some forms of flooding – either because it does not exist or it has not been provided by others, such as water utility companies.
- 2.2 We propose that the Environment Agency takes responsibility for developing an industry standard toolkit of methods for preparing a SFRA that includes data and models provided by water utility companies. The Environment Agency position should be to object to Local Development Frameworks (LDFs) that are not accompanied by a SFRA that is fit for purpose. We understand that this approach is broadly supported by Communities and Local Government (CLG) and Defra officials and representatives of Water UK.
- 2.3 Water utility companies may need to be compelled to share their data and models required to make a proper assessment of the overall flood risk. We are exploring how this might be achieved with Defra, CLG, Ofwat and Water UK.

3.0 MAPPING, FORECASTING AND WARNING FOR SURFACE WATER FLOODING

- 3.1 The technical and practical challenges of mapping where flooding from surface water, sewers, drains and run-off may happen are much greater than for flooding from rivers and the sea. To achieve an accurate result will rely substantially on data, information and models being provided by water utility companies, the Environment Agency, Local Authorities and others. However, even with this data available, local conditions as seemingly trivial as street furniture location, kerb height or new buildings can have significant impact on local flow, depth and longevity of urban flooding.
- 3.2 However a rapid, GIS-based national topographic screening technique has been developed and tested in four locations over the last two months by the Environment Agency in partnership with the Met Office. It demonstrates that it is possible to identify the most susceptible locations where there is potential for surface water to collect and cause flooding problems.
- 3.3 We are currently assessing the feasibility and potential costs of applying this approach more widely to give a rudimentary national picture of susceptibility to flooding from extreme rainfall. But to be fully effective, such an approach would need also to incorporate information about the drainage infrastructure, overland flood routes and other routes water could take. We see the Surface Water Management Plan (SWMP) as the driving force to

ensure these data are incorporated in locations where the risk is greatest. The need for such plans would be identified by Environment Agency Catchment Flood Management Plans (CFMPs) which by 2009 will cover all of England. CFMPs in turn inform SFRAs, which will trigger Surface Water Management Plans (SWMPs) and local area action.

- 3.4 Early warning systems can help reduce the impact of flooding, provided they trigger an effective response, either by people or in key emergency response organisations, but we are currently unable to provide meaningful warnings for imminent surface water or sewer flooding.
- 3.5 It is difficult to predict accurately where the heavy rainfall that would cause severe surface water flooding will actually fall. While the current Meteorological Office severe weather warnings are helpful in raising awareness, the majority of areas issued with heavy rainfall warnings by the Met Office in June and July 2007 did not experience the rainfall forecast.
- 3.6 We support early conclusions from the summer floods that a form of warning service for surface water flooding caused by very heavy rainfall should be available to the public and our professional partners. However the difficulty of achieving a high degree of accuracy of rainfall quantity, location, timing and impact cannot be over estimated.
- 3.7 A joint Defra / Environment Agency study considering the technical feasibility for such a system was completed shortly after the summer 2007 floods. It concluded that a form of warning service was technically feasible for flooding from groundwater and very heavy rainfall, but it raised a number of questions which are currently under further investigation, regarding forecasting, surface water flooding, run-off in different rainfall levels, and drainage infrastructure conditions.
- 3.8 Early proposals include a rudimentary service that could provide an early warning of problem rainfall. To be effective, such a system would rely on triggering different stages in previously agreed emergency plans. The need for such plans would be identified in the SWMP process and delivered as part of Area Action Plans or our own flood warning plans. This approach could offer a more effective response by professional partners in highest risk areas, but - in the short and medium term at least - would be subject to a much greater degree of uncertainty than the current system for river and coastal flooding (see 4.2).
- 3.9 It must be appreciated however, that in order to provide warnings that give people at household, street or community level the time required to take appropriate action, much finer spatial scale weather forecasts will be required from the Met Office. The case still has to be made that more precise forecasts that could come with more computer power would provide the level of resolution required, and translate into better warnings of surface water flooding and result in effective action by people and authorities. It is therefore unlikely that a household-level warning system for flooding caused by run-off from heavy rainfall will be practical in the near future.
- 3.10 To be effective, warnings would need to be received by a more informed and aware public who are prepared to take action, but who tolerate a high false alarm rate. The challenges of effectively delivering such a system should not be underestimated. For example despite substantial investment over several years to promote it, only 41% of people are signed up to our Flood Warning Direct service, and only around 75% of those receiving a warning take appropriate action. In order to be effective, significant effort to promote such schemes and the expected response will be required.

4.0 PLANNING FOR MITIGATION

- 4.1 PPS25 technical guidance allows for the preparation of SWMPs in areas where urban drainage is a critical problem. They are considered by CLG to be an important new planning document that would become part of the Local Development Framework.
- 4.2 SWMPs are the mechanism by which stakeholders should agree responsibility for different elements of urban flooding, and the actions to tackle it. It is expected that they would inform Local Government's Area Action Plans (an integral part of the land use planning process), as well as the investment strategies of the stakeholders involved. They represent the opportunity to put in place the broad range of implementation tools which we believe the summer floods identify as policy or operational gaps.
- 4.3 We propose that SWMPs are prepared by Local Authorities. Locations where they are required would be identified by the improved SFRA process, and through our own CFMPs which are developed in discussions with Local Authorities and other key stakeholders.
- 4.4 The Environment Agency's sanction would be through objection to a Local Authority's Local Development Framework if it were not accompanied by an appropriate SWMP.

5.0 CLARIFIED RESPONSIBILITIES

- 5.1 It will need to be broadly accepted that SFRAs should cover all forms of flooding and that water utilities companies (and others) will be required to share data and models to ensure they are fit for purpose. This could be achieved through PPS25 technical guidance. A requirement for water companies to share data and models could be delivered through Ofwat guidance and PR09, the water price round.
- 5.2 For any sanction of objecting to a local development framework to be effective, we will need support of the planning inspectorate and the Secretary of State. It will also need to be made clear that SFRAs and SWMPs must cover existing as well as new development and that the intentions of PPS25 in restricting new flood plain development are fulfilled.
- 5.3 Other quality control and monitoring options could be considered through the extended role of the National Audit Office given its ability to investigate Local Authority activity, although we have not investigated this option fully to date.
- 5.4 We believe that there is a clear and logical extension to the existing system of flood management and warning developed and operated by the Environment Agency. Flood mapping, modelling and data analysis, coupled with risk assessments, should be carried out or facilitated by the Environment Agency where currently most expertise lies. Strategic plans, such as CFMPs, inform the planning process and associated plans developed by tiers of Local Authorities and would trigger planning and management actions. The roles of other operators and their responsibilities have to be made clear.
- 5.5 Flood warning in urban areas prone to localised flooding remains difficult and further work is required to establish whether technological advances both in rainfall forecasting and in on-the-ground flow modelling pioneered by the Environment Agency may make this possible.

6.0 INCIDENT MANAGEMENT

- 6.1 The multi-agency approach to emergency planning and management, established under the Civil Contingencies Act, stood us in good stead during the flood emergency. We believe these need little further development to focus on particular flood emergency issues.
- 6.2 The data, information and emergency planning scenarios that operate through this framework will need to change to reflect the risks posed by surface water and other forms of flooding. An effective programme of surface water management planning, supported by more comprehensive strategic flood risk assessments should highlight areas where these risks need to be managed, in part through more robust emergency planning and response. Examples would be locations where extreme rainfall would result in overland flood flows, the filling up of natural depressions with rainwater, or the likely failure of drainage infrastructure.
- 6.3 Whilst we expect the Environment Agency would continue to provide authoritative information on flood risk from all sources in the planning and emergency management phases, we expect there to be a need for greater involvement by others – particularly water utility companies in providing core data, models and information to support the Environment Agency's flood forecasting.
- 6.4 We do have concerns that the readiness and responsiveness of key responders to warnings of potential flooding could be improved. We would expect this to be tackled through the current Cabinet Office / Defra Flood Emergencies Capability Programme. This should be reinforced by a greater involvement of the Environment Agency in helping ensure emergency plans are fit for purpose. Joint exercises may help promote better understanding of each responders' roles.

7.0 FUNDING AND RESOURCES

- 7.1 To be successful, the SWMP will require effective influence over the investment and operational plans of a range of organisations. Whilst the specifics will differ between areas with different problems to be tackled, we expect that the key organisations would include Local Authorities, water utility companies (including sewerage undertakers), the Environment Agency, the Highways Agency, Regional Development Agencies, developers and major landowners (for example key non-governmental organisations, the National Health Service, and the Ministry of Defence).
- 7.2 It will be important that the key players in a particular location are involved in the planning process from an early stage, and that the recommendations in the SWMP can be delivered through changes to their respective activities. In extreme cases this could include re-design and replacement of sewer systems to higher standards, or changed management of public green spaces to protect them as overland flood routes.
- 7.3 Funding and resource requirements to deliver this approach will be a hurdle. The approach outlined in this paper requires Local Authorities to take on a body of work which has to date been given little attention, even though the mechanisms for strategic plan production are in place. It is estimated that each SWMP could cost between £50 and £150k. The practical action then required on the ground could also give rise to significant costs but these could be spread across the Environment Agency, Local Authorities, developers, Regional Development Agencies, water companies, the Highways Agency and others, depending on location and

response. Local Authorities would be expected to coordinate these, given that other operators would need to be made compliant through legislation or existing planning or pricing routes.

- 7.4 Costs could also be significant for the Environment Agency. Developing and maintaining a toolkit of flood risk assessment methods, and providing advice on their use would require technical staff and investment in science and technology to support it. We are carrying out work now to estimate the level of resource such a duty would require.

8.0 CONCLUSIONS

- 8.1 The approach proposed would allow more strategic management of inland flood risk, led by the Environment Agency but in partnership with Local Authorities, water utility companies and others. It locates operation in the hands of Local Authorities and others, whilst giving the Environment Agency sanction over quality and output through the land use planning system and PPS25.

- 8.2 To be successful, the approach would require Local Authorities to take flood risk management seriously, and for it to be supported by Government as a fundamental part of the planning system and its examination. It requires other operators such as the utilities to share data, and take responsibility for action. This in turn will require the support of regulators and Government. It would also require significant investment in better forecasting, more detailed urban flood mapping and a new approach to flood warning. The Environment Agency is the lead organisation in this area and would welcome the opportunity to help Local Authorities and others develop this new approach.

9.0 RECOMMENDATIONS

- 9.1 The Board is asked to accept this paper as the basic script for discussion with Government and the Cabinet Office review.

DR DAVID KING
Director of Water Management
7 November 2007