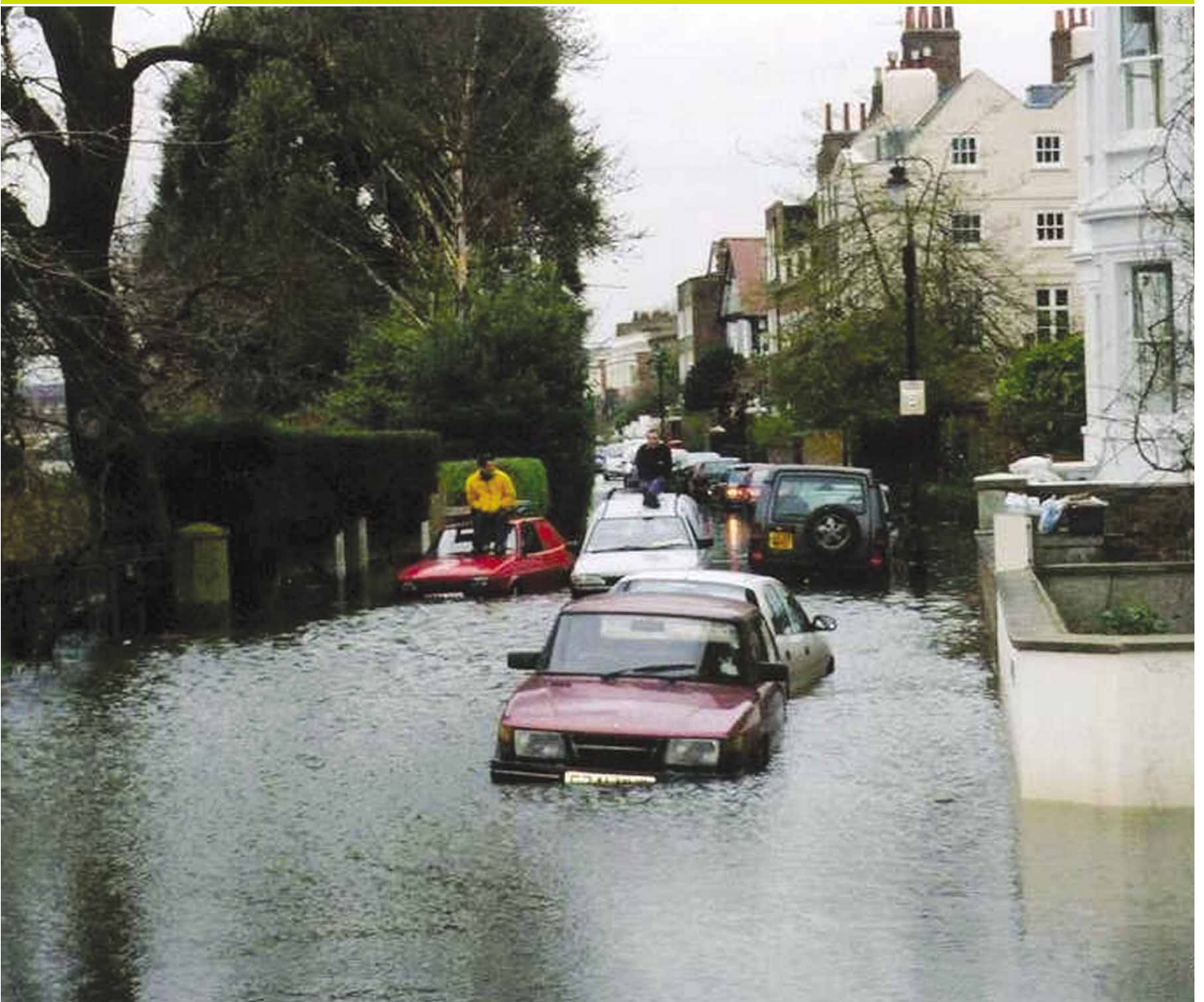


Flooding in London

A London Assembly Scrutiny Report
November 2002



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November 2002**

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Chair's foreword



London is vulnerable to flooding – be it from the Thames tide, from rivers as a result of heavy rainfall, or from our drainage system. This risk will increase with the effects of climate change. Our scrutiny identifies the probability of flooding based on the likelihood of relevant weather conditions and the nature and strength of defences. We cannot, however, defend ourselves against all floods forever. We need to re-educate ourselves to manage floods better, to know more about the risks, to be more prepared, and to ‘live with our rivers’.

The flooding risk is now being taken seriously by many of the responsible authorities and we saw good examples of forward planning on such issues as the future of the Thames Barrier and flood preparation in the Thames Gateway.

But we also identified gaps. There are gaps in information – there is no comprehensive flood risk assessment for London; there is no full map of London’s drainage system; we need more detailed maps of flood risk areas and a better knowledge of the state of our watercourses and drains.

And there are gaps in responsibility. The Fire Brigade lacks a clear statutory duty to respond to floods, and, despite their continuing readiness to help and their excellent work, this is an obstacle to thorough preparedness. The Environment Agency is the body with the duty to supervise and warn on flood risk, but its remit does not extend to the drainage system, despite the serious risk of flooding from this source. There is a general unwillingness to take on the duty of care for sustainable drainage systems.

This Report tells a story of good work being done but also of more work to do, if London is to be adequately prepared for flood risk. We have identified action required from the Government, the Environment Agency, Thames Water, the emergency services and the Boroughs, amongst others. There is also action required from the Mayor. We call on him to build on the work already done by the GLA and assure himself that all bodies involved in flood preparation and management are working together effectively to protect and enhance London’s future. The London Assembly will support him in this task.

A handwritten signature in black ink, appearing to read 'Roger Evans'. The signature is fluid and cursive, with a large initial 'R'.

Roger Evans
Chair of the Flooding Investigative Committee

The Flooding Investigative Committee

The Flooding Investigative Committee was established by the London Assembly on 9 January 2002 with the following membership:

Roger Evans (Chair) – Conservative
Tony Arbour – Conservative
Sally Hamwee – Liberal Democrat
Samantha Heath – Labour
Darren Johnson – Green
Valerie Shawcross – Labour

The terms of reference of the Committee were:

- To consider the risks and causes of flooding in London;
- To consider the Mayor's plans for flood plain development in London;
- To consider how well co-ordinated is the emergency response to flooding in London;
- To examine the responsibility for managing flooding in London.

Work to follow up the recommendations of this Report will be carried out by the London Assembly Environment Committee – Contacts: Tom Middleton, Scrutiny Manager (0207 983 4206 tom.middleton@london.gov.uk) and Andrew Smith, Committee Co-ordinator (0207 983 4425 andrew.smith@london.gov.uk).

Cover: Flooding at Chiswick Mall Autumn 2000¹
Photo: Environment Agency

¹ 'Flooding is a relatively common occurrence at this location on high spring tides as the flood defences here are set behind the road, which local residents will be aware of. Essentially this is tidal inundation within the flood defences. It is a good example of how people need to live with the natural tides and be aware of where the flood defence line is.' Environment Agency

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EXECUTIVE SUMMARY

The floods of Autumn 2000, which so seriously affected many parts of the country, including London, brought home powerfully the message that we need to re-examine the flood risks to the capital. The effects of climate change, though uncertain in detail and extent, will undoubtedly increase that risk significantly for London in coming decades. The London Assembly has conducted a scrutiny to find out how well protected Londoners are, how prepared, and how to plan London for the future.

1. Knowledge of flood risk

Fifty per cent of those living in flood risk areas in the United Kingdom are oblivious to the risk and only 10 per cent take any action to prepare. Further efforts are needed to communicate these risks to the public in a readily understandable way.

Above all, a fundamental culture shift is necessary. Londoners will need to accept that we cannot build defences against all flood risk indefinitely. And sometimes the building of flood defences can produce further problems. We must live with an element of flood risk and change the way we build, design, plan and spend our time accordingly.

If the law is changed to require the provision of home seller's packs, those packs must contain flood risk information.

Indicative Flood risk Maps made available by the Environment Agency have been misleading because their limitations were not effectively communicated.

2. Flooding from the tidal Thames – the Thames Barrier

We conclude that the Thames Barrier gives a high standard of protection to the 420,000 London properties at risk from Thames tidal flooding. Beyond 2030 upgrading of the Barrier and associated defences will be necessary at a currently estimated cost of £4bn – by far the greatest portion of this cost should be met by central Government.

The main area of uncertainty is how climate change will affect the frequency and intensity of storm surges up the Thames from the North Sea. We need to monitor the outcomes of future research so as to plan appropriately.

3. Flooding from rivers

River flooding from the Thames and its tributaries will become more frequent as a result of climate change producing more intense rainfall.

There is an urgent need to improve river flood defences along the Thames upstream of the Barrier at riverside locations in such areas as Hammersmith, Chiswick and Twickenham. This will reduce the number of times the Thames Barrier has to close, thus also reducing flood risk downstream of the Barrier in the Thames Gateway.

Too many tributary river flood defences in London, such as those for much of the River Lee, are either below the Government's minimum standard for river flood defence, or in a poor or very poor condition. A timetable to upgrade these defences by 2007 must be put in place under the supervision of the Environment Agency.

4. Flooding from sewers and drains

There is a whole class of urban floods – drainage flooding – not currently included in any systematic risk assessment and warning policy. This is all the more worrying since many consider such drainage flooding to be the greatest practical threat to London at present. Our current drainage system will not be able to cope with the expected increase in intense storm events as a result of climate change.

There is no comprehensive map available of London's sewer and drainage system. There is clear evidence that the monitoring of the whole of the drainage system is patchy and incomplete, that there is often an unwillingness to take responsibility for certain parts of the network, that maintenance and repair of the system suffers as a consequence, with serious implications for flood risk. This state of affairs cannot be allowed to continue.

There must be a statutory duty on drain owners to report to Government on the performance of their drains against national standards. The Environment Agency must be given responsibility to monitor drainage systems in relation to flood risk and, most importantly, be given the resources and sanctions to do so effectively.

5. Responding to flood risk

Recent government guidance, PPG25 'Development and Flood Risk', provides an important framework for future flood risk planning.

The Mayor and relevant GLA officers should satisfy themselves that an appropriate process of flood defence inspection is operating for the Thames and its tributaries, and that any gaps in flood defence information can be filled by the Environment Agency liaising with owners.

We welcome the emphasis in the draft London Plan on the introduction of Sustainable Urban Drainage Systems (SUDS) in new developments and call for a strengthening of the wording in the draft London Plan on the need for flood-resistant design.

6. Thames Gateway and environmental gain

The regeneration project in the east of London and neighbouring counties, Thames Gateway, is one of the most important of such initiatives in the country and an excellent example of a number of agencies and authorities working effectively together. Much of the areas identified by Thames Gateway London Partnership (TGLP) for development have a medium risk of flooding, which will get worse with the effects of climate change. This presents a challenge which is understood and an impetus to sustainable planning.

We welcome the proposals of TGLP to create a Thames Park and open space both along the Thames and tributaries to accommodate flooding events, enhance biodiversity and provide accessibility to the river for all with recreational opportunity. Planning for flood risk can be an opportunity for environmental gain.

Thames Gateway should not be constrained in acquiring the necessary open space for these purposes and funding agencies need to have a proper understanding of the cost benefits and regeneration value of open space provision. As a last resort, there should be a commitment in the SDS for the London Development Agency to use compulsory purchase powers to acquire the necessary land.

7. Funding of flood defences

Funding of flood defences needs to take account not only of readily measurable economic cost benefits but also of social, environmental and health benefits.

We would encourage the use of section 106 powers to provide flood mitigation measures in new developments. But there remains a serious issue around responsibility for the maintenance of such assets and there is a need for the Government to identify a duty of care and funding proposals which can command general support.

8. Emergency preparedness

We commend the emergency services for their work in responding to flooding in London, particularly during the severe floods of Autumn 2000. The Fire Brigade do not have any statutory duty to respond to floods – this has not affected their willingness to respond but it does limit their ability to acquire necessary equipment and other resources. The Fire Service Act 1947 should be amended as soon as possible.

A flooding risk assessment for London is needed involving the Environment Agency, local authorities and the emergency services, identifying the equipment, training, information and contingency planning needs of the capital.

Effective and direct flood warning cover for Londoners remains extremely low. The Environment Agency needs to think innovatively of how to communicate such warnings to London's mobile population.

9. Recovery and insurance

Assistance in recovery after floods has been neglected in the past. Local authorities should collect good practice into a set of uniform arrangements across London.

We welcome the recent announcement, in response to the Government's commitment to increase spending on flood defences, from the Association of British Insurers that flood cover will remain in place for properties in flood risk areas. We remain concerned that premiums and deductibles will be too high for low income groups and some small businesses. The Mayor should hold discussions with the insurance industry to ensure that insurance cover can be provided at affordable rates. The outcome of these discussions should be reported to the London Assembly Environment Committee as part of the Mayor's response to this report.

1. Introduction - The Autumn 2000 floods

- 1.1 Why look at the flooding risk to London? London is a city growing at an exceptional rate, with a predicted increase of over 700,000 in population and of a further 303,000 households between 2001 and 2016.² Faced with such pressures, the policy challenge is how to manage and accommodate that growth sustainably. Flooding is the one natural disaster to which parts of Britain, including London, are particularly vulnerable. And it has the potential to deprive us of the space we require and to deter the investment we seek to meet London's future needs, unless this risk is properly managed.
- 1.2 At last, with the creation of a London-wide strategic authority in the GLA, there exists a body which has a statutory duty to take an overview of the flooding risk on behalf of Londoners. The GLA will have a key role in coordinating the many organisations with an interest in this question – including the Environment Agency, Thames Water, the Boroughs and Thames Gateway London Partnership. It also has powers in relation to the emergency services (the Fire Service and Police) and in setting the planning framework for London in the Spatial Development Strategy. The GLA is thus well placed to set the strategic framework for London's response to flood risk. The purpose of this Assembly Committee is to investigate whether such a framework is being established and to make recommendations as to what it should contain.
- 1.3 London's wake-up call was the flooding of Autumn 2000, when the United Kingdom experienced its worst weather in over 270 years. Across England and Wales about 10,000 properties were flooded, some on several occasions and for long periods of time. A further 37,000 properties were saved by sandbags alone and in total around 280,000 properties were protected by flood defences. The Association of British Insurers estimated that the cost to insurers was £1.3 billion.
- 1.4 Though not the worst affected part of the country, London too experienced severe flooding at this time. Whilst existing defences successfully prevented flooding for many London properties, the defences on the River Roding at Wanstead and Woodford in Redbridge, North East London, were overtopped as a result of which 230 properties were flooded. There was also flooding of 75 properties at Edmonton in Enfield and 15 at Teddington in Richmond.³ Thus in total 320 properties were flooded in London. The Environment Agency's report on the Autumn 2000 floods also makes clear that there was flooding at a number of properties adjacent to London.
- 1.5 Recent flooding in 2002, both in the north of England and in London, have demonstrated that this is a recurring problem and that public policy needs to be prepared and robust to deal with future emergencies. The floods crisis in continental Europe, which included devastation of property and fatalities, brought home to many quite how serious flooding can be.
- 1.6 Our scrutiny has identified three main types of flood risk to the capital and examined both the impact/costs should such flooding take place and the likelihood of it occurring. Our findings can be summarise in the table below:

² GLA Data Management and Analysis Group 2001 Census: First Results and Implications for the *draft London Plan*

³ Environment Agency Thames Region Autumn 2000 Floods Review Regional Report pp.42-43

Type	Likelihood of event	Likely costs
Tidal	Low	Very high
River	Thames – Low. Tributaries – Medium to high	High but localised
Drainage	High in certain locations	Medium but localised

1.7 In other words, the most immediate and significant flood risk to London comes from drainage flooding. There are also localised areas which are vulnerable to river flooding. There are obviously higher costs and impacts when two or three of these differently sourced floods occur at the same time.

Our scrutiny process

1.8 Our aim has been to provide Londoners with an ‘institutional healthcheck’ – to assure ourselves that the flooding risk to London is being effectively considered and planned for, and that all responsible authorities are working together as productively as possible. We have not been able, in considering a subject as wide as the flooding risk to London, to discuss in detail every aspect of the problem. Two areas in particular which we have not examined at length are the risk of flooding from rising groundwater and the risk of flooding of the London Underground.

1.9 In certain areas of London the water table under London is rising, causing a risk of flooding, in particular to the sub-surface infrastructure such as deep basements, the underground network and building foundations. To tackle the problem of rising groundwater a number of relevant bodies have come together to form GARDIT (General Aquifer Research, Development and Investigation Team).

Conclusion

The work of GARDIT and its five phase strategy to deal with the problem of rising groundwater has already been considered by the London Assembly’s Environment Committee, and that Committee will continue to keep this important project under review.

1.10 Another issue raised in evidence was the impact of flooding on London Underground. London Underground (LUL) provided written evidence to the Committee. Their memorandum identified rising groundwater as one of the main risks of flooding to the underground network. Other risks identified included terrorism, the long-term inadequacy of the Thames Barrier and the responsibilities of third party asset owners to take additional protection measures beyond those relating to their own needs. LUL told us that “for security reasons” they had not given a full account of measures taken in response to the flooding risk.⁴ There are obvious questions which remain – both as to how localised flooding might over time affect LUL’s infrastructure and on how the Underground would deal with a serious flooding event in terms of evacuation and safety.

⁴ Memorandum – London Underground

Recommendation 1

We accept that security considerations might affect the level of detail which can be publicly divulged, but we also believe the London Assembly, and Londoners generally, should be satisfied as to the level of preparedness of the Underground to cope with floods. We therefore refer this matter to the Assembly and its relevant committees for further consideration.

- 1.11 We took evidence from the key authorities - the Environment Agency, the GLA, Thames Water, the Thames Gateway London Partnership, representatives from London Boroughs particularly affected by flooding, the Association of British Insurers, and the emergency services (the Metropolitan Police and the Fire Service). We also received a substantial body of written evidence both from these organisations and from others, including residents affected by the recent floods. We are grateful to all who assisted us during this inquiry.
- 1.12 In recent years there has been a growing body of policy development around flooding and flood risk. A key document has been planning policy guidance PPG25 'Development and Flood Risk' published in July 2001, which was itself the outcome of considerable policy debate, including a House of Commons select committee report. In November 2001 the Institution of Civil Engineers published 'Learning to live with rivers', an independent review of the technical approaches to flood risk management commissioned by the Government. There are a number of reviews ongoing on different aspects of flood risk including a DEFRA consultation process on the future funding of flood defences, due to report shortly. This report draws on the emerging consensus around flood policy, applying it to the particular situation of London.

2. Flooding – the context: development pressure and climate change

- 2.1 Flooding is a natural process. The difficulties for humans arise from our tendency to live and work on floodplains – as the Institution of Civil Engineers put it, “Settlements have always been sited on flood plains, despite the risk of periodic flooding. Historically these risks have been outweighed by the many social, economic and environmental benefits of a riverside location”.⁵ These advantages include transportation, defence, fertile land, and water power. Some of these advantages may now be of only historical significance to London. We discuss below, however, the Mayor’s plans to revitalise our use of the Thames and watercourse network in London. Old advantages are replaced by new ones such as recreation, tourism and environmental protection. Moreover, London’s growth continues apace, and with it continues the pressure for further accommodation and business development on the floodplain. The question is how to manage our coexistence with rivers and the attendant flood risk.
- 2.2 Communities not only choose to live on the floodplain. By their presence they increase the risk of flooding. One way this can happen is by building into the natural watercourse. This will tend to increase the speed of flow through the relevant river reach. Such development into the watercourse, removing the natural floodplain, will result in vulnerability to more severe flooding downstream. In addition, as areas become urbanised we replace permeable earth with harder impermeable surfaces. The result is an increase in what is called “surface runoff”, higher and faster volumes of water being channelled into piped drainage. Such volumes also increase the risk of flooding downstream as well as the likelihood of sudden increases in water level and flow rate.
- 2.3 The other main issue to bear in mind in discussing the context for flooding in London is climate change. This is an area of scientific investigation where there remains considerable uncertainty. The United Kingdom Climate Impacts Programme (UKCIP) is undertaking a wide range of studies at national, regional and thematic level in this area and a report providing guidance on the application of climate change predictions to flood management is due later this year. We have also read with interest the recently published GLA report on the implications of climate change for London, ‘London’s warming’, which supports our main conclusions. Throughout this report climate change scenarios will be central to discussions of risk, design and defences. The Assembly is committed to measures to minimise the impact of climate change through reducing greenhouse gas emissions.
- 2.4 In April 2002 UKCIP published their ‘Climate Change Scenarios for the United Kingdom’. This briefing report presents a set of four alternative scenarios, which relate to four scenarios of future global emissions of greenhouse gases – Low Emissions, Medium-Low Emissions, Medium-High Emissions and High Emissions. The report stresses that “It is impossible to assign objective likelihoods to these emissions scenarios, since they depend on choices made by society”.⁶ Relevant detail from this UKCIP briefing will be provided where relevant throughout our report but it is worth at the outset setting out those impacts in which they have ‘high confidence’. They include an increase in both the amount and intensity of winter rainfall, sea-level rises and more frequent extremes of sea-level (as experienced during storm surges). But even here there is considerable uncertainty as to the extent of these effects.

⁵ ‘Learning to live with rivers’ Institution of Civil Engineers November 2001 para.1.3.1

⁶ Climate Change Scenarios for the United Kingdom, the UKCIP02 Briefing Report April 2002 p.3

2.5 We have established the context for flooding – our preference for settlements near or on floodplains; the way our patterns of settlement increase flood risk; the impact of climate change on future flood risk. In the remainder of this Report we consider –

- Public information and the description of flood risk
- Flooding from the tidal Thames – the Thames Barrier
- Flooding from rivers
- Flooding from sewers and drains
- Responding to flood risk
- The Thames Gateway and environmental gain
- Funding of flood defences
- Emergency preparedness
- Recovery and Insurance.

3. Public information and the description of flood risk

“Floods are a natural occurrence and the risk they pose is wide ranging. However, in societal terms, the main focus is the risk to people and property. It is neither practically nor economically feasible to eliminate all flood risk. The most suitable approach for dealing with flooding must therefore be to manage the risk best”.⁷

3.1 An effective response to flood risk does not only involve technical solutions. As important is a change of attitude and expectation amongst the general public. We discuss below in our section on emergency preparedness the question of the dissemination of flood warnings during a flooding event. There is in addition the wider issue of awareness of flood risk as people decide to buy, live, invest and work in such areas.

Conclusion

Recent research by the Environment Agency shows that nearly 50 per cent of people living in flood plain areas are oblivious to the risk and only one person in ten takes any action to prepare.

3.2 The Institution of Civil Engineers in their report pointed out that recent research “has identified a widely occurring cycle of flooding, investment and complacency until the next flooding event ... In this present period of sensitivity to the importance of, and the widespread potential for, flooding events it is crucial that we take full advantage to communicate some of the key aspects of local flood risk management as it is being developed in England and Wales”.⁸ We agree.

Recommendation 2

There is an urgent need to stave off complacency, to communicate flood risk accurately and widely to Londoners, and to educate the public in ways to manage and live with that risk. We believe the Mayor and the London Assembly have an important role to play in supporting such efforts.

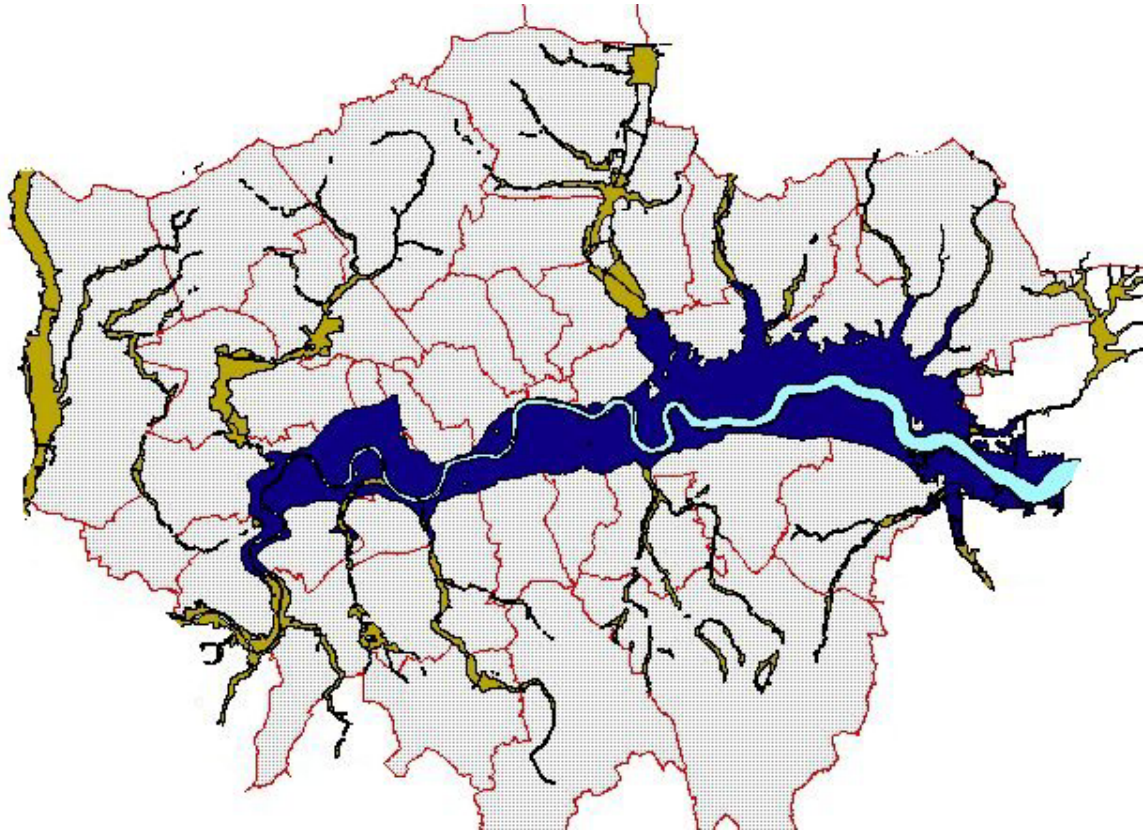
Mapping risk

3.3 One of the most important ways in which the Environment Agency has attempted to meet its statutory role in advice on flood risk is through the mapping of that risk. But we heard criticism of the flood risk maps which the Agency has so far produced in an attempt to alert property owners and residents to the dangers of flooding in London. After the floods of Easter 1998 the Government instructed the Agency to place in the public domain maps

⁷ ‘Learning to live with rivers’ The Institution of Civil Engineers November 2001 para.2.1.1

⁸ Ibid para.2.4.1

which showed the “general possible extent of flooding”. These maps, known as Indicative Floodplain Maps (IFMs), for both tidal and fluvial flooding, were placed on the Agency website in 2000. The areas at risk from tidal flooding approximate to land below the 5 metre contour, though the Environment Agency warns that “It needs to be recognised that there is no precise limit to the flood risk area or to the extent of flooding; this will be dependent on local circumstances and conditions at the time”.⁹



Indicative Flood Risk Areas

Blue area: 1 in 1,000 risk of flooding from the sea

Green area: 1 in 100 risk of flooding from Thames tributaries

The blue area is protected from the 1 in 1,000 level of risk. Much but not all of the green area is protected from the 1 in 100 level of risk.

Source: Environment Agency

⁹ Memorandum – Environment Agency

- 3.4 The Environment Agency state that in London IFMs show “the potential extent of tidal flooding with an annual chance of occurring of 0.1 per cent not allowing for the presence of tidal flood defences”.¹⁰ The purpose of IFMs “was to raise awareness of those at potential risk of flooding ... and to highlight locations where the Agency would wish to input to planning decisions ... It has been emphasised previously that the IFMs are not definitive outlines of flooding, and that further specific information exists”.¹¹ There are also IFMs for the non-tidal rivers in London identifying areas with a 1 per cent risk of flooding.
- 3.5 PPG25 states not only that IFMs do not take account of extant flood defences but that they also “do not take account of the likelihood that flood risk will be increased by climate change”.¹²
- 3.6 The Council of Mortgage Lenders is amongst those critical of the IFMs, “the [Environment Agency] maps are not necessarily helpful. The maps are not always accurate or detailed enough to give confidence and they take no account of any flood defences that may be in place ... In this respect the maps can be misleading and might make people unnecessarily cautious about buying property in certain areas. People need information about flood risk but it needs to be accurate and give a true picture of the threat”.¹³ Similarly Alex Nickson from Thames Gateway London Partnership (TGLP) told us that the Agency’s IFMs had “caused contention. The problem with it was that it was a loosely indicative contour based on ordinance survey maps, which were accurate to within half a metre ... even under PPG25 a lot more work needed to be done to address this”.¹⁴ In their written memorandum TGLP had stated, “the issue of flooding is highly emotive and must be handled sensitively. Many developments in the Thames Gateway lie within the [Environment Agency’s] indicative flood risk area (Indicated by the shaded area within the 5m contour) and further inward investment may be adversely affected by injudicious use of this map”.¹⁵
- 3.7 Steve Clark from Merton said that Boroughs, when they had first seen the Agency’s maps, had not realised that they were only an initial approximation and open to significant amendment. He felt that Boroughs should think carefully before using these indicative maps in their UDP reviews.¹⁶ A similar point was made by Bill Wheeler, Bexley’s Emergency Planning Officer.¹⁷
- 3.8 The Agency is also producing more detailed floodplain maps of tributary rivers, called Section 105 maps.¹⁸ These are detailed flood maps “to show the outline of a flood with an annual chance of occurring of 1 per cent in a specific area, taking account of all conditions, and allowing for the presence of flood defence structures where they are present”.¹⁹ Eight of the 11 section 105 maps for London have been completed, with two more started and one not yet begun (see Appendix).²⁰ They are available on the Agency’s

¹⁰ Supplementary Memorandum – Environment Agency

¹¹ Supplementary Memorandum – Environment Agency

¹² PPG25 Development and Flood Risk para.24

¹³ Council of Mortgage Lenders ‘Housing Finance’ Spring 2002 ‘Flooding: What Impact on the Housing Market?’ Jackie Bennett

¹⁴ Minutes 23 April 2002 para.4.18

¹⁵ Memorandum – Thames Gateway London Partnership

¹⁶ Minutes 23 April 2002 para.4.11

¹⁷ Minutes 15 May 2002 para.4.6

¹⁸ from section 105 of the Water Resources Act 1991

¹⁹ Supplementary Memorandum – Environment Agency

²⁰ Second supplementary memorandum – Environment Agency

website in the “my backyard” section. These maps can be used alongside specific technical advice from the Agency by both developers and local authorities when preparing detailed flood risk assessments for individual sites. Section 105 maps are not being prepared for the Thames tidal floodplain, given the low probability of flooding from this source with the protection currently provided by the Thames Barrier.

- 3.9 The ABI told us that insurers were moving from basing premiums on past claims to more comprehensive risk mapping, basing premiums on the likelihood of flooding.²¹ It is vital, this being the case, that detailed maps, with clear information as to their limitations, and taking account of flood defences, be made available as soon as possible. Without such information there was a real danger of blight for the 90,000 London properties on the indicative floodplains of tributary rivers²².

Conclusion

We conclude that the Indicative Floodplain Maps were disseminated by the Environment Agency with inadequate explanation as to their limitations and the fact that they did not take account of current flood defences. Without prompt explanation and additional information there was a danger of unnecessary blight and loss of investment.

Recommendation 3

We welcome the production of Section 105 maps which will provide some much-needed clarification on flood risk. We recommend that the remaining section 105 maps for the Greater London area be completed as soon as possible.

Communicating risk

- 3.10 One idea currently being considered is the compulsory incorporation of flood risk information in proposed property sellers packs. Such a proposal was included in the Homes Bill but was not enacted before the calling of the 2001 general election. It remains a government commitment to introduce such a requirement but there is as yet no definite indication of when this commitment will be met, though the Environment Agency told us that they understood a Home Seller’s Bill might be reintroduced later this year, in which case the Agency will lobby for inclusion of flooding information in the packs.²³

²¹ Minutes 18 March 2002 para.3.38

²² Supplementary memorandum – Environment Agency ‘there are approximately 90,000 properties in London thought to have a 1 per cent or greater risk in any one year of being flooded by rivers as a result of heavy rainfall’. The Agency’s original memorandum had used a figure of approximately 85,000. We use their revised figure in this report.

²³ Supplementary memorandum – Environment Agency

- 3.11 In the absence of such packs, the Environment Agency, with the support of the Law Society, is going ahead with its own voluntary pilot scheme to transfer relevant environment information to those involved in property transactions. The flooding information currently included in the system is the Agency's Indicative Floodplain Maps. We were told, "If the pilot proves successful and is expanded to a full national system, we would hope to progressively increase the range of information provided".²⁴
- 3.12 The Agency also mentioned making it standard practice for solicitors involved in conveyancing to use such information, and working in conjunction with the Government's National Land Information Service (NLIS) initiative.
- 3.13 We are concerned if the current information provided is simply the Indicative Floodplain Map. We believe this map could make people unnecessarily cautious about buying property in certain areas. Information should be accurate and present a true picture of the threat. IFMs fail to take account of flood defences and thus, for example, would suggest to 420,000 London properties on the Thames tidal floodplain that they were at risk when the annual risk with the Thames Barrier in place is currently only 0.05 per cent.
- 3.14 The Environment Agency told us that it is supportive of "moves to raise awareness of flood risk amongst mortgage owners, and deals with about 30,000 enquiries a year, though there are reported to be more than a million actual mortgage transactions. Clearly resourcing and managing an increase in the number of queries would be a major issue for the Agency if the Pack became law".²⁵
- 3.15 We support proposals for providing homeowners and businesses with accurate information on flooding risk. We do not believe, if properly done, that this need reduce investment and growth in such areas – it should rather affect how we live and work there and the nature of our expectations.

Recommendation 4

We recommend that in any legislation introducing home seller's packs the Government require the inclusion of effective information on flooding risk.

- 3.16 It would, however, be wrong for such information to mislead as to the real risk and we have already made clear our serious misgivings on the use of Indicative Floodplain Maps. The information in home seller's packs should be as full and useful an account as possible of the extent of risk and how to manage it.

²⁴ Supplementary memorandum – Environment Agency

²⁵ Supplementary memorandum – Environment Agency

Recommendation 5

We are certain that Indicative Floodplain Maps alone in seller's packs are not sufficient for people to come to an informed view on whether or not to buy a property and will only generate what is often unnecessary alarm. The information needs at least to be supplemented by and coordinated with section 105 maps before it can be of any use. It should thus include a percentage statement of risk taking account of flood defences, advice on how to interpret the information and on how best to design and prepare for floods, encouragement to be included in the Agency's direct flood warning schemes, and contact details for further advice and information.

3.17 An important issue to be addressed is how to communicate such flood risk. To date the most common way to talk of flood risk has been with the concept of the 'return period'. A flood risk of 1 per cent in any year has been translated into having a return period of 100 years, or a 1 in 100 years event. The problem is that after such an event occurs people would assume that such an event would not repeat itself for their remaining lifetime when in fact the probability of it occurring is exactly the same for any year, including the next one. The Institution recommends that flood risk be communicated through the use of odds or, for professionals, annual percentages, and an end to the use of 'return period' descriptions. We agree.

3.18 But even the percentage description is more complex than it might at first appear to the layperson - "Taking the 1% probability over a reasonably long time period of a lifetime of 70 years, it can be shown that what is today referred to as a 1-in-100 year flood has a 50% chance of occurring within the 70-year lifetime period. More significantly, a 1-in-10 year flood has a 15% chance of occurring twice in that same lifetime".²⁶ PPG25 reminds us that "a 1% flood has a 26% probability of being equalled or exceeded at least once in 30 years (the duration of a typical mortgage) and a 49% chance of being equalled or exceeded at least once in 70 years (a typical human lifetime)".²⁷ We should also note that the odds are changing over time as a result of climate change.

Recommendation 6

We recommend that the Environment Agency and other public bodies communicate flood risk to the public in odds or percentage terms, rather than as a return period. To clarify the nature of the risk, it would also be useful to provide further explanation which presents probabilities over readily understandable timeframes. The odds should also be revisited over time to take account of the impact of climate change.

²⁶ 'Learning to live with rivers' The Institution of Civil Engineers November 2001 para.2.4.3

²⁷ PPG25 Development and Flood Risk para.24

Public information and involvement

- 3.19 The discussion of risk in public policy is always a difficult one. We all have a tendency on the one hand to demand risk-free lives when policy options are put to us, but on the other quite happily to live with all sorts of risks on a day-to-day level which are much more significant than those we read about and consider insupportable.
- 3.20 The Environment Agency listed for us their roles and responsibilities with regard to flooding, which included “Supervising all matters relating to flood defence in England and Wales”. One aspect of such a general supervisory role is the education of the public in flood risk, “The Agency has made vigorous efforts to encourage those at risk to be fully prepared for floods before emergency warnings are issued. As part of this process, the Agency ran extensive flood warning campaigns in 2000 and 2001”.²⁸ The Agency launched their annual awareness campaign for 2002 on 23rd September, including advertisements in local and national newspapers and on local radio. There was a targeted mailing to homes and businesses at high risk from flooding within the Thames region as well as the organisation of local events.²⁹
- 3.21 The Institution of Civil Engineers dedicate a chapter to the issue of risk in their report ‘Learning to live with rivers’. At the heart of the discussion is an emphasis on the uncertainty inherent in these matters. The Institution of Civil Engineers warns against too great a faith in flood defences, “Even where we have a defence structure performing to design specification, it is accepted that the level of protection may be exceeded on extreme occasions – but not so extreme as to be beyond reasonable expectation. Indeed, by designing our defences so that they do not overtop for the 1% annual probability of flooding, we are accepting that for those severe events with a probability of less than 1% in any year, overtopping may occur”.³⁰ They also warn that “it is generally accepted that we may be in a period of more rapid climate change than previously ... and that schemes giving a certain protection today may offer less protection for the same probability of flood event in the future”.³¹
- 3.22 These uncertainties need, says the Institution, to be communicated to the general public without causing unnecessary alarm. An approach is required which “does not trust absolutely in the ability of engineered flood alleviation measures to prevent flooding”.³² They believe “that a long-term education initiative is required to stress that flood risks cannot be removed and to explain the uncertainties inherent in flood forecasting and mapping the extent of flood plain inundation. With a sufficient level of knowledge flood-prone members of the public could become more involved in the process of emergency planning, flood awareness and response”.³³
- 3.23 We received evidence on local flooding, planning and the emergency response from residents in Enfield.³⁴ Their papers make clear the wealth of residents’ knowledge and experience of flooding events and of the state of watercourses and defences, all of which the authorities should use and respond to promptly in dealing effectively with flood risk. We have quoted above the Environment Agency’s warning that the extent of flooding and

²⁸ Memorandum – Environment Agency

²⁹ Second supplementary memorandum – Environment Agency

³⁰ ‘Learning to live with rivers’ The Institution of Civil Engineers November 2001 para.2.3

³¹ *ibid.* para.2.5.4

³² *ibid.* para.2.3

³³ *ibid.* para.2.3

³⁴ Memoranda – Enfield residents

the flood risk area cannot be precisely defined by IFMs but will depend on local conditions and circumstances at the time. We did not come across much evidence that the Environment Agency was actively seeking out and using locally held information.

Recommendation 7

We welcome the work done to date by the Environment Agency in warning the public of flood risk. Given the continuing low levels of public awareness, these efforts must be redoubled. Thought should be given as to how other bodies, including the Mayor and GLA, can assist the Environment Agency in conveying their message. As memories of recent floods fade, there is a danger of complacency.

This process needs to be integrated into a larger programme of public involvement in flood risk management. We recommend that the Mayor discuss with the Environment Agency how to integrate the Agency's work in flood warning within a strategy of flood information-gathering from residents, public involvement in warning and emergency procedures, and flood preparedness.

4. Flooding from the tidal Thames – the Thames Barrier

- 4.1 The most severe form of flooding to London would certainly be flooding from the River Thames. The tidal stretch of the Thames runs from upstream of Teddington in the west to Shoeburyness, just east of Southend – a total length of 100 km. Before the construction of the Thames Barrier an area of 116 km² was at risk.³⁵ Much of London is built on the natural floodplain of the Thames. Were there no flood defences, 420,000 properties on the Thames tidal floodplain would have a 0.1 per cent annual risk of flooding.³⁶ This amounts to a flood risk property value of £80 bn. The risk from tidal flooding is expected to increase with rising tide levels, which are expected as a result of:
- Gradual sea level rise as a result of global warming. Current government advice is that allowances in the order of 4 mm per year should be made for this rise in sea level in this part of the country.
 - Possible increase in the height, intensity and unpredictability of the North Sea surge. This surge is caused by a meteorological depression funnelling a surge of high water down through the North Sea. This would be additional to the gradual sea level rise outlined above. We were told, however, that there is considerable uncertainty as to the extent of this increase, with further research being necessary.³⁷
- 4.2 To these impacts must be added the fact that the South East of England is sinking. London is a third of a metre lower, in relation to sea level, than it was at the end of the Second World War. Current government guidance recommends an annual allowance of 2 mm for sinking land levels. When added to the rising sea level, this means there should be a total allowance of 6 mm per year sea level rise in relation to land levels.³⁸
- 4.3 The Environment Agency states that “With London, the greatest flood risk is from North Sea storm surges”.³⁹ The Association of British Insurers agreed, “The major flood threat to London arises from surge tides (caused by areas of low pressure travelling south or southwest over the North Sea, funnelling a bulge of water into the confines of the southern North Sea and the Thames estuary) combined with high tides”.⁴⁰ To have a sense of the risk from storm surges without appropriate defences, we should look back to 1953 when surge waters overwhelmed flood defences along the East Coast. Over 300 people lost their lives in the storm and resulting floods, including 59 people on Canvey Island alone.
- 4.4 The Environment Agency told us that whilst the risk of tidal flooding from the Thames was significant, the probability was low because “London is protected from flooding by one of the best tidal defence systems in the world. The Thames Barrier and a number of other defences including the Barking and Dartford Creek Barriers provide London with a higher level of protection than is enjoyed by any other part of the UK”.⁴¹

³⁵ Memorandum – Association of British Insurers

³⁶ Memorandum – Environment Agency

³⁷ Memorandum – Environment Agency

³⁸ Memorandum – Environment Agency

³⁹ Memorandum – Environment Agency

⁴⁰ Memorandum – Association of British Insurers

⁴¹ Memorandum – Environment Agency

- 4.5 The Thames Barrier was the response to the obvious and significant risk to London from tidal surges. Construction of the Barrier, under powers provided by the Thames Barrier and Flood Prevention Act 1972, was begun in 1974 and the Barrier finally became operational in October 1982. Without the Thames Barrier, London's flood defence walls would need to be considerably higher – the walls along the Embankment, for example, would have to be as high as the Victorian streetlamps, effectively depriving Londoners of their river.⁴²
- 4.6 On average the Barrier has to close three times per year. During the most recent flood season of 2001/02 there were four closures. But in the preceding winter of 2000/01 there were 24 Barrier closures.⁴³ The Agency explained, "These were largely in response to the extremely heavy rainfall on the Thames and its tributaries. The season was clearly exceptional but it did contain the type of weather conditions we might experience more frequently in the future if current climate predictions hold true".⁴⁴
- 4.7 We were told that the current standard of flood defences in London means that there is only a 0.05 per cent chance of properties in the tidal floodplain being flooded. Defences were constructed with an allowance built in for a sea level rise of 8 mm per year – in other words, the risk estimated with the Barrier in place takes account of the rising sea level and sinking land level outlined above. The chance of flooding will increase to 0.1 per cent by 2030, which "is still a considerably better standard of protection than elsewhere in the UK where 0.5% and 1% defence standards are commonly provided for urban areas".⁴⁵ Although the risk remains small, we note that the risk of tidal flooding in London is estimated to double between now and 2030, eloquent testimony to the impacts of climate change.
- 4.8 But to that must be added the question of changes in the frequency and intensity of storm surges. The Environment Agency told us, "Global sea level rise is reasonably well understood but the question of storm surges is an uncertain science. Some model predictions show storm surges rising in the Thames Estuary and others show the surges falling. The Agency will be commissioning research to provide a greater degree of certainty on these model forecasts".⁴⁶

'Planning for Flood Risk Management in the Thames Estuary'

- 4.9 The Agency states that "London and the Thames Estuary currently have one of the best tidal defence systems in the world which will provide a high standard of protection to well beyond 2030, but the effects of climate change present an unwelcome picture for the flood risk of future generations".⁴⁷ In response to such concerns the Agency has instituted a project entitled 'Planning for Flood Risk Management in the Thames Estuary' to develop a strategy for flood risk management in the Estuary for the next 100 years, covering the tidal Thames and its natural floodplain from Teddington in west London to Sheerness/Shoeburyness in the outer Estuary. The Project aims to:

⁴² For further information on the operation of the Thames Barrier, see the Environment Agency publication 'The Thames Barrier – flood defence for London'

⁴³ see para.5.5 for further explanation

⁴⁴ Second supplementary memorandum – Environment Agency

⁴⁵ Memorandum – Environment Agency

⁴⁶ Second supplementary memorandum – Environment Agency

⁴⁷ Second supplementary memorandum – Environment Agency

- Assess and understand the tidal defences in the context of the wider Thames Estuary setting. This includes assessment of the residual useful life of the defences together with an understanding of the 'drivers' including climate change, urban development, social pressures and the environment.
- Inform and gain the support of political and funding partners and stakeholders.
- Prepare and manage a programme of studies linked with consultation, leading to a strategy for flood risk management in the Thames Estuary for the next 100 years.

4.10 The strategy is to be presented to DEFRA in 2006. The first three years, to 2004, will be a focussed programme of technical studies and data collection, from which in the latter stage of the Project strategic options will be modelled and tested to balance flood risk against the socio-economic and environmental needs of the Estuary.

4.11 From 2030 the then protection offered by the Barrier of 0.1 per cent risk of flooding, although high, will continue to decline unless improvements are made. Without such improvements the defence standard will fall to the unacceptable level by 2100 of a 1.5 per cent risk. Preliminary estimates of the cost of providing a 0.1 per cent standard to the year 2100 show that a major investment in the flood defence infrastructure of the order of £4bn may be required within the next 40 years. This includes the additional costs relating to land purchase. The majority of this will be incurred after 2020 but before 2050. In the 1970s and 1980s 75 per cent of funds were spent on the Barrier and the remaining 25 per cent on associated defences. But it is thought that for the forthcoming upgrading of defences the proportions will be reversed, with 25 per cent of funds being spent on the Thames Barrier and the remaining 75 per cent invested elsewhere on the Thames tidal defence system, including the walls upstream of the Barrier, the downstream embankments and other major moveable defences.⁴⁸

4.12 The Thames Barrier and associated defences were largely paid for by central Government with about 25 per cent paid for by the Greater London Council. The Agency currently expects central Government again to be the main funder of future defence works though there may be opportunities for collaboration with developers and regeneration agencies.

Recommendation 8

We conclude that inner London is defended to the extent which could reasonably be expected against severe tidal flooding until at least 2030. We note, however, the continuing research into the effects of climate change, including storm surges, and consider that the outcomes of that research should be carefully monitored by the Environment Agency.

⁴⁸ Memorandum – Environment Agency

Recommendation 9

The current project ‘Planning for Flood Management in the Thames estuary’ is a welcome and commendable example of forward planning to meet future flood defence needs.

We believe the project should be as transparent as possible and recommend that both the Mayor and London Assembly Environment Committee be regularly informed of research outcomes and policy options as they begin to emerge in advance of 2006.

Recommendation 10

The current estimate is that £4bn will be necessary to upgrade defences against tidal flooding. We recommend that there be a clear statement as soon as possible from the Government on sources of funding. Given the national significance of these defences, we would expect central Government to bear by far the greater part of the financial burden.

4.13 Even in advance of 2030 climate change will have impacts on Londoners’ experience of the Thames. The unusual number of Barrier closures in 2000/01 is thought to presage more frequent closures in the future. By 2030 it is forecast that the Barrier will have to close about 30 times per year to maintain standards of tidal defence in the Thames Estuary. “With closures this frequent, shipping would be severely disrupted as the Barrier needs to be raised near the time of low water – some four to six hours before high tide – and this occurs twice every 24 hours”.⁴⁹ This obviously has serious implications for the Mayor’s ambitions to revitalise use of the Thames for freight and passenger transport.

Recommendation 11

Climate change predictions suggest a significant increase in the number of annual closures of the Thames Barrier between now and 2030. We recommend the Mayor in his response to this report provide an assessment of how such closures will affect the Blue Ribbon Network policies, contained in the draft London Plan, to develop use of the Thames for navigation.

⁴⁹ Second supplementary memorandum – Environment Agency

5. Flooding from rivers

- 5.1 At least until 2030, and with upgrading for considerably longer, London appears well protected against tidal flooding. A more immediate danger is from river, or 'fluvial', flooding as a result of heavy rainfall. There are approximately 90,000 London properties in areas with an annual chance of river flooding of 1 per cent or greater, not taking into account available flood defences. The Environment Agency said, "Many benefit from flood defence schemes which have reduced the more frequent risks but these schemes would not provide protection from more extreme floods. As well as residential property, commercial and industrial premises are also at risk, together with the transport and communications infrastructure that supports the community".⁵⁰
- 5.2 In addition to the Thames, the London area contains a number of tributary rivers, many of which have been built over or culverted as London has developed. These "canalised and culverted watercourses may not cope with high urban run off flows".⁵¹ Recent experience has confirmed that these tributaries can overflow when confronted with heavy rainfall. The experience of Autumn 2000 was of London properties being flooded by the River Roding and Salmons Brook. There seems to be a consensus that the effects of climate change will include increased rainfall in winter, both in volume and intensity, thus also increasing the likelihood of further tributary river flooding. Moreover, the Government minimum, or 'indicative', standard for tributary river flood defences is not as high as for the tidal Thames, being for a 1 per cent chance of flooding in any given year.
- 5.3 The Environment Agency pointed out in their evidence the difficulties of access to many sections of such watercourses as a result of private developments building up to the river's edge, making inspection and maintenance difficult, as well as problems of illegal dumping in rivers and on banks blocking channels. The ignorance of tributary river flood risk, since so many rivers are hidden from view, and the limited advance flood warning possible only compound these problems.⁵² In the future the application of recently introduced planning guidance (PPG25, see below para. 7.3 ff) should prevent such developments.
- 5.4 We have shown that the standard of defence from tidal flooding to 2030 is very high. The same cannot be said of all defences in London against fluvial flooding. The government indicative standard for fluvial defences is a 1 in 100 year protection, or 1 per cent, but the Environment Agency told us that "there are sections of the lower and upper Lee where the provided standard of defence is to a 1 in 70 year level of protection. There are also five stretches of defences along the Lee where the defences are assessed as being in poor or very poor condition. The riparian owners have been informed of the need to upgrade the defences".⁵³ There are also other sections of tributary river in London with sub-standard defences. We discuss in more detail below the recent statement by the Association of British Insurers on future cover for properties at risk from flooding. They state that, for properties not currently defended to the Government's minimum standard, cover will only be provided if necessary improvements are scheduled for completion by 2007. There may be some cases where physical constraints prevent meeting the Government's minimum standard of flood defence and in such instances it may be necessary to restrict further development. But wherever possible London's river flood defences should be upgraded to meet these indicative standards with the minimum of delay.

⁵⁰ Memorandum – Environment Agency

⁵¹ Memorandum – Environment Agency

⁵² Memorandum – Environment Agency

⁵³ Second supplementary memorandum – Environment Agency

Recommendation 12

We are concerned that there are sections of river flood defence in London which currently fall below the Government's indicative standard of defence against a 1 per cent annual flood risk, and other sections in a poor or very poor condition.

We recommend that the Environment Agency, having discussed flood defence improvements with riparian owners and other relevant parties, provide the London Assembly Environment Committee with a timetable for the urgent improvement of London's river flood defences to meet fully the Government's indicative standard by 2007.

- 5.5 The closure of the Thames Barrier can be a response not only to tidal surges but also to heavy rainfall. In the unusual winter of 2000/01 there were, as was stated above, 24 Barrier closures, as opposed to the usual three or so, largely in response to the extremely heavy rainfall on the Thames and its tributaries. We were told that "The volume of tidal water kept out of London by the Thames Barrier – when closed – is some ten to twenty times the amount of river water flowing the other way, even after very heavy rainfall. As a result, closing the gates at low water and holding out the tide can create a useful 'reservoir' behind the gates – into which the rain-swollen river can flow. If the Barrier remains open in such circumstances, the river would effectively be 'pushed back' by the incoming tide. This makes it much more likely that floodwater would be forced to spill out over the riverbanks in vulnerable areas of West London such as Hammersmith, Chiswick and Richmond".⁵⁴ It is expected that low-lying areas and towpaths will be under floodwaters more frequently.
- 5.6 To take account of such higher river flows it might be necessary to raise the height of flood walls upstream of the Barrier – this would also reduce the amount of times the Barrier needs to be closed. The Environment Agency told us that "This is one of the areas being investigated at an early stage in our study programme. Replacement walls would need to be permanent – and sensitive to the surroundings – in order to keep the number of Barrier closures within practical limits and preserve the cultural heritage of central London".⁵⁵

Recommendation 13

We recommend that those vulnerable riverside areas of London upstream of the Barrier, such as in Hammersmith, Chiswick and Twickenham, receive adequate flood protection as soon as possible. Every effort must be made to retain the river as an accessible cultural amenity and for any additional defences to be sensitive to their environment.

⁵⁴ Environment Agency briefing – 'What happens when the Thames Barrier is closed?'

⁵⁵ Second supplementary memorandum – Environment Agency

- 5.7 Some 32km of flood defences were built downstream of the Barrier, with bank levels around 2m higher than has previously existed. The defences also include barriers such as the 60m high Barking Barrier. Such embankments and associated barriers downstream of the Thames Barrier also provide a 1 in 1,000 year, or 0.1 per cent, standard of protection to 2030 and the Environment Agency told us that no upgrading would be required prior to 2030 unless there were dramatic new developments arising from climate change research.
- 5.8 However, as is often the case with flood defences, one area's solution is another's problem. The need to close the Thames Barrier and associated defences can cause fluvial flooding downstream. Thames Gateway London Partnership told us that if such closures were combined with "intense rainfall over the City and London Boroughs of Redbridge, Newham, Barking and Dagenham, Waltham Forest and Havering, the rainwater combined with the output of the Combined Sewer Outflow system floods at certain points".⁵⁶ In effect, the 'ponding' of the tidal water downstream of the Barrier means that the flow from downstream tributary rivers has nowhere to go other than over their banks.

Recommendation 14

As the Mayor plans for London to grow to the East, and in particular in the Thames Gateway, this tension between the defence needs of London upstream of the Thames Barrier and the defence needs of London downstream will need to be resolved.

- 5.9 Most of the measures necessary to respond to the risk of river flooding, such as sustainable drainage, flood-resistant design, effective maintenance of watercourses, also apply to the risk from drainage flooding, and these measures will therefore be discussed in further detail below.

⁵⁶ Supplementary Memorandum – Thames Gateway

6. Flooding from sewers and drains

- 6.1 London has a combined sewer system (or 'combined water network') which takes both foul flow and surface water runoff. We received a considerable body of evidence stating that London's sewerage and drainage system cannot cope effectively with the greater intensity of flooding events which we are now experiencing. Thames Water took the most positive view, telling us that "The vast majority of the existing sewerage infrastructure is of sufficient capacity for the current demand that is put on them. However, there are areas where changes in use have put strain on the drainage systems".⁵⁷ Thames Water also informed us that they were chairing a research project into the effects of climate change on the design of sewers and the drainage system.⁵⁸
- 6.2 Others had a more negative account of the current system. The Association of British Insurers listed five areas of concern:
- "Many drainage systems are designed to cope only with high frequency, low severity flood conditions, such as might occur with a 5% annual probability;
 - The coverage of large areas of land with new development can significantly increase runoff, resulting in additional problems downstream. One solution might be to use soakways and swales rather than drains;
 - Backup into buildings, for example through toilets and baths directly into houses. Where suitable, one-way flap valves should be fitted;
 - Blocked culverts can create local flooding very quickly. These should be inspected, for example by closed circuit television 'moles', and cleared regularly;
 - Open drains and minor water courses are easily blocked by fly-tipping. Regular inspection and remedial action is needed to avoid problems".⁵⁹
- 6.3 The Environment Agency made clear that they did not provide information on the risk from drainage flooding. This must be borne in mind when discussing, for example, the Agency's Indicative Flood Maps, its advice to borough planning authorities and its advice to property-owners. In short ...

Conclusion

There is a whole class of urban floods not currently included in any systematic risk assessment and warning policy. This is all the more worrying since many consider such drainage flooding to be the greatest practical threat to London at present.

⁵⁷ Memorandum – Thames Water

⁵⁸ Supplementary memorandum – Thames Water

⁵⁹ Memorandum – Association of British Insurers

- 6.4 Edmund Penning-Rowell from Middlesex University's Flood Hazard research Centre said that the most serious risk was from a rainstorm event which might generate as much as six inches of rain over 24 hours. Urban drainage could take a rainstorm event which would occur once every three years but a rainstorm of the kind which took place once every fifty years would be a major flooding problem. The warning for such an event could be no more than four hours. Very little work had been done to date on intense rainstorm events. In his view, the number of basement properties in London meant that a 1 in 50 rainstorm event would bring probable loss of life because urban drainage did not have the capacity to take that amount of water underground.⁶⁰
- 6.5 Thames Water in their original written memorandum said that "Flooding from the foul sewerage system is probably the most traumatic flooding experience a person can have" and that 18,000 properties were at risk from such flooding in the Thames Water region, over fifty per cent of that number being in the Greater London area i.e. over 9,000 properties.⁶¹ Properties are divided into risk A and risk B properties – risk A properties have been internally flooded twice or more in the last ten years and risk B have been internally flooded once in the last ten years.
- 6.6 In a supplementary memorandum Thames Water revised their statistics on properties at risk from 18,000 to 8,000. They had changed their reporting methodology to bring it into line with all other water companies. Properties used to move from risk A to risk B category, or from risk B to off the register, if there had been no reported flooding incident for eight years. Now a property moved between categories if there had been no reported incident for five years. We were told that approximately 40 per cent of properties relate to the London area – amounting to about 3,600 properties.
- 6.7 We were told that funding is a constraint on tackling the problem of such internal sewerage flooding. We discuss in the next section the steps required to deal with this.
- 6.8 Although we are discussing tidal, river and drainage flooding separately, we should note that in fact there is a significant connection between them. Not only will, for example, tributary and drainage flooding both be affected by the same weather conditions, such as heavy and intense rainfall. Some former tributary rivers "such as the Fleet, Effra, Tyburn and Wallbrook have been relegated to serve as combined sewers which, in a few cases – the Fleet being an example – discharge into the Thames at times of heavy rainfall".⁶² Certain sewers discharge directly into rivers and "In some parts of London, high river flows may also occasionally interfere with the discharge of storm sewers to watercourses. This, in turn, can lead to surcharging remote from the watercourse".⁶³ We were told that the Environment Agency was collaborating with Thames Water to ascertain the extent of this problem.
- 6.9 In the next section we consider how best to respond to the flood risk from rivers and drainage in London.

⁶⁰ Minutes 18 March 2002 paras.3.23, 3.27

⁶¹ Memorandum – Thames Water

⁶² Memorandum – Environment Agency

⁶³ Memorandum – Environment Agency

7. Responding to flood risk

- 7.1 How do we respond to the risk of flooding? Not in every case simply by building defences. Of course flood defences are often necessary and have repeatedly protected tens of thousands of homes which would otherwise have been flooded. But there is now much greater awareness of the need to respond to floods in ways which are sustainable, which do not export the problem elsewhere or harm the environment.
- 7.2 The most sustainable solution is to reduce the amount of water run off at source, and we discuss below Sustainable Urban Drainage Systems (SUDS) in this context. We agree with the Institution of Civil Engineers who said, “The least sustainable of options include further raising of flood defences to constrain a river ‘within bank’, or the construction of new defences to provide protection to new urban areas on the flood plain”.⁶⁴ These ‘solutions’ will tend simply to make a river inaccessible as the banks are continually raised and/or transfer the floodwaters to landowners and developments elsewhere in the catchment area. The building and maintenance of flood defences will remain an essential part of any responsible response to the risk of flooding. But we place flood defences in our analysis below in the context of what must be an overall sustainable approach to the problem.
- 7.3 The Government has recently propagated new planning guidance in the document PPG25 ‘Development and Flood Risk’. This guidance expects planning authorities to take a risk-based approach to the preparation of development plans and their decisions on development control through a ‘sequential test’ as found at Table 1 of PPG25. Three types of flood zone are defined based on flooding probability:
- Zone 1 – Little or no risk. Annual probability of flooding: River, tidal and coastal <0.1%
 - Zone 2 – Low to medium risk. Annual probability of flooding: River 0.1-1%, Tidal and coastal 0.1-0.5%
 - Zone 3 – High risk. Annual probability of flooding: River 1.0% or greater, Tidal and coastal 0.5% or greater.
- 7.4 PPG25 states that no constraints on development should be imposed in areas of little or no risk. For low to medium risk areas, a flood risk assessment should be provided and flood resistant construction and warning/evacuation procedures may be required. Subject to operational requirements in terms of response times, these and the higher-risk zones are generally not suitable for essential civil infrastructure, such as hospitals, fire stations, emergency depots etc. Where such infrastructure has to be, or is already, located in these areas, access must be guaranteed and they must be capable of remaining operational in times of emergency due to extreme flooding.⁶⁵
- 7.5 High risk areas are divided into three categories. Developed areas may be suitable for development subject to a minimum standard of flood defence that can be maintained for the lifetime of the development. Undeveloped and sparsely developed areas are generally not considered suitable for development and development should not normally be permitted. Functional floodplains may be suitable for some recreation sport, amenity and conservation uses but built development should be wholly exceptional.⁶⁶

⁶⁴ ‘Learning to live with rivers’ The Institution of Civil Engineers November 2001 para.5.2

⁶⁵ PPG25 Development and Flood Risk Table 1

⁶⁶ *ibid.* Table 1

- 7.6 Risk relates to the time when a land allocation decision is made or an application submitted. In determining planning applications local authorities should take advice from the Environment Agency on flood risk.
- 7.7 Thames Gateway said, “The boroughs require definitive, clear guidance on PPG25 to be able to approve/refuse planning applications – so far the boroughs have received ‘mixed messages’ from the Environment Agency”.⁶⁷ Steve Clark from the London Borough of Merton agreed, telling us that there were differences in the implementation of PPG25 which could be attributed to different officers within the Environment Agency offering different solutions rather than variation in local planning officers’ interpretations.⁶⁸ Of the two boroughs whose planning officers gave oral evidence, Merton appeared to have a more fraught relation with the Environment Agency in these matters than did Richmond.⁶⁹
- 7.8 PPG25 was only finalised in 2001 and will be the subject of review after three years. We have not conducted a detailed study of PPG25 implementation in London, nor propose to come to a view on the claims made to us on Environment Agency advice. We passed on these concerns raised in evidence to the Environment Agency, who told us that they had published national guidance for the implementation of PPG25 and also produced an annual report to DEFRA, called the High Level Target 12, on planning applications where the Agency maintained its objection on flooding grounds.⁷⁰ Whilst important, these publications do not constitute an audit of actual advice and practice across Agency officials. It could well be valuable with some experience now of the new arrangements for such an audit to take place to feed into any review of the national guidance and into training programmes.

Recommendation 15

We recommend that the Environment Agency review advice given to local authorities on flood-related planning matters to ensure such advice is clear and consistent across all areas.

Maintenance of watercourses

- 7.9 A key element in the effective defence of London against river flooding must be regular inspection of watercourses for blockages, and of flood defences to ensure prompt maintenance and repair of those defences in poor condition. The report ‘Learning to live with rivers’ argues for a planned and programmed process and “a full knowledge of the systems to be maintained, including the original design and construction, as well as the current condition”.⁷¹ Although a national database is being established of all flood and coastal defence assets by the Environment Agency, provision of information is ‘patchy’. Moreover, it is apparently proving difficult to get the cooperation of all operating

⁶⁷ Memorandum – Thames Gateway

⁶⁸ Minutes 23 April 2002 para.4.12

⁶⁹ Minutes 23 April 2002 paras.4.2-3

⁷⁰ Second supplementary memorandum – Environment Agency

⁷¹ ‘Learning to live with rivers’ The Institution of Civil Engineers November 2001 para.5.7.2

authorities for the inspection of 'ordinary watercourses' (that is, watercourses for which the Environment Agency is not directly responsible). As the Institution comments, "This is an unfortunate situation, especially since a significant proportion of the flooding in the Autumn of 2000 came from non-main river sources".⁷²

- 7.10 We should also mention briefly an issue highlighted by the Institution of Civil Engineers in their report 'Learning to live with rivers', where they concluded that "Urgent consideration should ... be given to increased levels of expenditure on asset maintenance – perhaps as much as double the present level of investment".⁷³ The current level of annual investment in maintenance is around £80 million, considered to be the minimum level of investment necessary to maintain defences in a safe condition. The report considered that such a rate of investment would inevitably lead to a decline in the state of flood defence infrastructure, citing in evidence a recent NAO report which indicated that 40 per cent of flood defences were in a fair, poor or very poor condition.
- 7.11 We endorse the call of the Institution's report for an increase in funding for flood defence asset maintenance and for an effective programme of maintenance to be established on the basis of comprehensive and up-to-date information. But there are also actions to take at the London-wide level to assist this process.

Recommendation 16

Although the GLA is not an operating authority, it has a duty as the regional strategic body to ensure that the health, environment and economic well-being of London are not endangered by poor maintenance of our flood defences. We recommend that the GLA discuss with the Environment Agency any remaining gaps in their flood defence information for the Greater London area in order to identify how best to supply the missing data. The GLA should assure itself that an appropriate process of flood defence inspection is operating not only for the Thames but for all watercourses in the capital.

Sustainable Urban Drainage Systems – 'SUDS'

- 7.12 An important element in designing out flood risk is dealing with the problem of surface water run off from development. Built upon surfaces are not permeable to water, and this results in the water running off into drainage systems rather than naturally soaking into the earth, as would otherwise be the case. This surface water runoff due to urban development can increase the risk of flooding downstream and also result in sudden rises in water levels and flow rates. There are environmental consequences in addition to the risk of flooding. The water runoff can contain various pollutants such as oil, organic matter and toxic materials which cumulatively can harm the water quality of our rivers and streams. And increased flows can also erode watercourses, with a potential loss of wildlife habitats and amenity areas.

⁷² 'Learning to live with rivers' The Institution of Civil Engineers November 2001 para.5.7.2

⁷³ *ibid.* para.5.7.1

- 7.13 Our evidence emphasised the need to introduce Sustainable Urban Drainage Systems, commonly known as SUDS, in new developments. This is a sustainable response at source to the problem of excess water run off from new developments. SUDS allows surface water to soak into the ground and then find its way to rivers at a ‘natural’ rate. This reduces flood risk whilst at the same time allowing pollution to be dealt with at source and more biodiverse open spaces to be created. SUDS is particularly important for developments such as industrial estates and distribution warehouses which have traditionally been responsible for considerable volumes of surface water runoff.
- 7.14 SUDS technology includes porous surfaces (for example in car parks), reed beds, ‘balancing ponds’ and gravel swales.
- 7.15 PPG25 recommends the use of SUDS, “Local planning authorities should ... work closely with the Environment Agency, sewerage undertakers, navigation authorities and prospective developers to enable surface-water run-off to be controlled as near to the source as possible by the encouragement of sustainable drainage systems”.⁷⁴
- 7.16 Thames Gateway London Partnership said that “The Boroughs need to be able to force developers to install [SUDS] in any new developments, and where possible enforce the creation of (quality) open spaces to assist in the functional infrastructure of water management”.⁷⁵
- 7.17 We were told in evidence from Nicky Gavron, Deputy Mayor and the Mayor’s Cabinet Adviser on Strategic Planning, that guidance in the draft London Plan went beyond the national guidance contained in PPG25. The draft London Plan states that “The use of sustainable urban drainage systems should be the norm unless there are practical reasons for not doing so. Such reasons may include the local ground conditions or density of development. In such cases the developer should seek to manage as much run off as possible on site and explore sustainable methods of managing the remainder as close as possible to the site”.⁷⁶ There is evidence that the Mayor and GLA officers are already promoting SUDS in their planning work.

Conclusion

We welcome the strong presumption in the draft London Plan in favour of sustainable urban drainage systems in all new developments.

- 7.18 Much of the discussion on SUDS has been limited to their introduction to new developments. There has been less on their ‘retrofitting’ to existing developments. Such introduction of SUDS to existing developments is obviously more difficult and expensive than planning SUDS in at an early stage in new developments. The Environment Agency

⁷⁴ PPG25 ‘Development and Flood Risk’ para.42

⁷⁵ Memorandum – Thames Gateway London Partnership

⁷⁶ Policy BR7 Sustainable drainage, The draft London Plan p.309

said, “Accommodating SUDS into historic development is also a difficult proposition, particularly in very high density developed areas, since the associated disruption is both unwelcome and expensive”.⁷⁷ It is, however, possible in certain cases. The Institution of Civil Engineers state that “Although sustainable urban drainage systems have been mainly targeted at new developments, some application of the techniques in existing urban areas is possible”.⁷⁸ More research is necessary into the possibility of such retrofitting in London. The section in the draft London Plan on SUDS does not discuss the use of SUDS for existing developments. There may be less potential for such work but opportunities and costs need to be assessed, and guidance provided on this matter.

- 7.19 Edmund Penning-Rowsell from the Flood Hazard Research Centre at Middlesex University suggested the targeting of small-scale local works to provide some on-site storage of water where there was an identified liability to flood as a result of excessive rainfall.⁷⁹ It will be important to prioritise the areas most in need.

Recommendation 17

We recommend that the promised Supplementary Planning Guidance on Sustainable Design and Construction contain guidance on the use of opportunities to retrofit SUDS within existing developments.

Sustainable design for new developments

- 7.20 Whilst SUDS will have some effect in reducing the risk of flooding as a result of new development, it will have much less impact on current flood risk, and does not address tidal and river flood risk not associated with excess water runoff.
- 7.21 The challenge for Londoners is to learn to live with the Thames and its tributaries, and accept the possibility of occasional flooding – to accommodate some flooding and mitigate its effects. The Environment Agency stated, “there is a need to manage people’s expectations and encourage a culture where people are prepared to adapt to live with the changing Thames. For London to continue to exist and thrive, there will always be a need for fixed defences and a robust flood defence infrastructure, but protection of all areas of the Gateway irrespective of the cost will become increasingly untenable with rising sea levels”.⁸⁰ We received evidence that the way we design new developments in flood-risk areas, and the kind of developments permitted, will be crucial to whether such an approach is achievable.
- 7.22 In evidence to the House of Commons Select Committee on Environment, Transport and Rural Affairs, City of York Council wrote that “In recent years the Council has successfully facilitated the development of a number of riverside sites in and around York City Centre (eg ‘General Accident’ office building and ‘City Screen’ leisure complex which face each other across the River Ouse in York City Centre). These have been designed to minimise

⁷⁷ Memorandum – Environment Agency

⁷⁸ ‘Learning to live with rivers’ The Institution of Civil Engineers November 2001 para.4.3.3

⁷⁹ Minutes 18 March 2002 para.3.28

⁸⁰ Memorandum – Environment Agency

any cumulative flooding impact as a result of the development by incorporating techniques such as basement flood storage. Whilst the Council would fully accept that such techniques may not offer the long-term solution to flooding in and around York City Centre, they do allow the authority to continue to meet its regeneration and social inclusion objectives through prioritising urban re-development".⁸¹

7.23 The ABI pointed out that many modern buildings have an increased susceptibility to flood damage, "The vulnerability of a property to flood damage is determined not just by its location but by its design and the materials it is built of. Modern housing is much more vulnerable to flood damage due to the greater use of chipboard floors, dry wall plasterboard, cavity insulation etc and certain design features such as lower thresholds to improve access for the disabled. Social and technological changes such as the increasing use of computers and electronic equipment in the home, are making contents claims more costly each year – a trend which is likely to accelerate with increasing affluence".⁸²

7.24 In February 2002 DTLR produced guidance on 'Preparing for Floods' (relevant responsibilities have now passed to ODPM). Measures recommended to mitigate the effects of flooding include:

- Using solid concrete floors on the ground floor area
- Placing electrical sockets at around one metre above floor level
- Replacing chipboard/MDF kitchen units with PVC units that have a higher flood resistance
- Installing temporary barriers at gates or doors and windows. Covers for airbricks may also be purchased.
- The use of different types of plaster that have a higher flood resistance e.g lime-based plaster
- Replacing steel cavity wall ties with stainless steel ties
- Waterproofing external walls.

7.25 The draft London Plan recognises the need for appropriate design, "The need to take a precautionary approach to flood risk will affect the form, layout and design of many sites and not just those adjacent to the river. Suitable measures will need to be identified on a site by site basis as the result of flood risk assessments. They may include ... buildings that will remain structurally sound and could recover in the event of flooding".⁸³

7.26 We would like to see this advice strengthened in the final version of the SDS. There should be a requirement on the property developer to demonstrate that, within the constraints of the development and in the light of flood risk assessments, reasonable steps have been taken to design flood resistance into the buildings.

⁸¹ Second Report from the Select Committee on Environment, Transport and Regional Affairs, 'Development on, or Affecting, the Flood Plain', Session 2000-01, HC64, Memorandum by City of York Council

⁸² Memorandum – Association of British Insurers

⁸³ The draft London Plan Annex 2 The Blue Ribbon Network para.20 p.309

7.27 The ABI told us that, “the reduced reinstatement costs of these [flood resistance measures], should a flood event occur, would enable the cost of insurance to be contained”.⁸⁴ Jackie Bennett, in her article on the impact of flooding on the housing market, suggests that insurers “should be encouraged to restore properties which have been flooded with flood resilient techniques”. She also proposes grants or loans to assist householders make properties flood resistant.⁸⁵

Recommendation 18

We expect all new developments on low to medium and on high risk flood plains, in particular those in the Thames Gateway, to contain design features, along the lines of those recommended by ODPM, intended to mitigate the effects of flooding.

Recommendation 19

We recommend that the insurance industry reconsider the ‘new for old’ policy in relation to property restoration and replacement. Flooded properties should be restored using flood-resistant techniques.

7.28 PPG25 in its sequential test for development in flood risk areas states that low to medium risk areas and high risk areas “are generally not suitable for essential civil infrastructure, such as hospitals, fire stations, emergency depots etc. Where such infrastructure has to be, or is already, located in these areas, access must be guaranteed and they must be capable of remaining operational in times of emergency due to extreme flooding”.⁸⁶

7.29 In oral evidence both emergency services representatives and Borough emergency planning officers were asked about the location of their emergency infrastructure and facilities relative to flood risk areas, in the light of this PPG25 advice. Inspector Taylor from the Metropolitan Police said that the police were stationed all over London and that they would have the opportunity to get their vehicles out of the way and redistribute resources. Ron Dobson from LFEP said that LFEP did not know which of its buildings were within the specified floodplains but that they did have the means to move their resources from one building to another.⁸⁷ The emergency planning officers from Redbridge, Enfield and Bexley assured the Committee that their control centres could operate in a flooding emergency.⁸⁸

⁸⁴ Memorandum – Association of British Insurers

⁸⁵ Council of Mortgage Lenders ‘Housing Finance’ Spring 2002 ‘Flooding: What Impact on the Housing Market?’ Jackie Bennett

⁸⁶ PPG25 Development and Flood Risk Table 1

⁸⁷ Minutes 25 March 2002 para.3.18

⁸⁸ Minutes 15 May 2002 para.4.16

7.30 The location of such infrastructure is above all influenced by where the people are – and the fact that many Londoners live on the floodplain means that police stations, fire stations and hospitals, for example, will also and necessarily be found there. Whilst the overtopping of the Thames Barrier may be a remote prospect, and thus the sort of review envisaged by PPG25 less immediately necessary, the dangers of fluvial flooding from tributary rivers do require some review of preparedness.

Recommendation 20

For those parts of London which are defined as at low to medium or at high risk of fluvial flooding there should be a thorough review of how the essential civil infrastructure – including hospitals, fire, police and ambulance stations, and Borough emergency control centres – can maintain accessibility and operation during extreme floods. Such a review could be integrated into the flood risk assessments which we also recommend in this Report.

Accessibility

7.31 One issue relating to flood mitigating design was raised by Steve Clark, Head of Planning and Public Protection, London Borough of Merton, in discussing the council's relationship with the Environment Agency and interpretation of PPG25. Three schools proposed for expansion by the council fell within the Pill Brook floodplain. The Agency objected to the proposed extensions in their original form. The Borough worked with architects and eventually came up with an acceptable scheme involving the creation of upstream storage areas, building the extensions largely on stilts, the provision of storage beneath buildings and the use of sustainable drainage methods. It was, however, subsequently discovered that building on stilts had made accessibility for those with mobility problems extremely difficult, contravening other regulatory requirements, and ramps were reinstated after a risk assessment.⁸⁹ PPG25 in advising on flood-resistant design requires that such design ensure "appropriate access is maintained for disabled people".⁹⁰ It is disappointing then that the subsequent departmental guidance on flood-resistant construction techniques makes no mention of accessibility issues.

Recommendation 21

It is vital in designing sustainably resistant buildings in flood risk areas to bear in mind accessibility issues. We recommend that the ODPM document 'Preparing for Floods' be reviewed to include information on how flood-resistant design should take account of accessibility and the needs of the disabled.

⁸⁹ Minutes 23 April 2002 para.4.3

⁹⁰ PPG25 Development and Flood Risk para.28

Planning and Emergency Planning Liaison

- 7.32 It is vital in planning for floods that all services, and all departments within services, are ‘joined up’, achieving a consistent response to the risk. We were concerned to discover that there appeared to be little or no cross-London liaison between Borough Planning Officers and Borough Emergency Planning Officers on flooding issues. Keith Delaney, Emergency Planning Officer from Enfield, admitted that there was more scope for liaison between the two professions. He suggested that Borough Planning Officers attend meetings of the regional flood warning groups.⁹¹

Recommendation 22

We recommend that, both within Boroughs and across London, Borough Planning Officers and Emergency Planning Officers liaise on a regular basis to ensure the planning of new developments is consistent with and facilitates the Boroughs’ emergency plans in cases of flooding.

London’s drainage system

- 7.33 We have already discussed one aspect of drainage – SUDS – in the context of designing new developments. The Mayor is proposing in his draft London Plan further housing and business development to meet expected rates of growth for the capital city. Growth in London’s population combined with the effects of climate change will continue to exert pressure on London’s “ageing and decaying sewer system”.⁹² Energetic application of SUDS to new developments will have some impact in mitigating this. As important is the monitoring, maintenance and repair of the current drainage system.
- 7.34 The Committee received compelling evidence from a number of London Boroughs, as well as others, on the need for a rationalisation of the current system of drain ownership and supervision. Ownership of the drainage system is divided between a number of bodies. Thames Water provides underground sewerage to the Greater London area. But there are in addition large numbers of private owners who have responsibility for sections of the whole drainage system. In addition the Boroughs have responsibility for above-ground highway drainage.

Mapping London’s drains

- 7.35 We were told in evidence that there was no adequate drainage map for London.⁹³ Thames Water has a ‘Map of Sewers’ conveying public sewers for which it is responsible but this does not cover private, local authority or other drainage systems not maintained by

⁹¹ Minutes 15 May 2002 para.4.14

⁹² Memorandum – Association of British Insurers

⁹³ Minutes 18 March 2002 para.3.33

Thames Water. The lack of such a comprehensive map is confirmed by the fact that two of the Boroughs which gave evidence told us that they had begun projects to map the drainage system within their own boundaries. Haringey has commissioned Imperial College London to undertake a Waterways Study in the Borough. Objectives include the identification of the nature of watercourses requiring maintenance and of the responsibility for their maintenance and repair.⁹⁴ Harrow told us that whilst they had mapped and recorded all highway gullies, and there was a map available of 'ordinary watercourses', "the extent of the underground piped highway has not been fully mapped. Principally, because of the lack of any detailed records".⁹⁵ They said that "Whilst the Council has already instigated a programme of mapping and recording watercourse and highway drainage assets that come within its remit, other private drainage remains largely unmapped".⁹⁶

7.36 We have already explored the real threats from drainage flooding in London. Although Thames Water did not see any significant benefit to themselves from a comprehensive drainage map,⁹⁷ it seems self-evident to us that an effective response to this problem requires comprehensive knowledge of London's drainage system. In evidence Nicky Gavron, the Deputy Mayor, agreed with the Committee that it was a good idea to revisit this issue.⁹⁸ The draft London Plan, however, says nothing about the need to map London's drainage system. With divided and often obscure ownership it is perhaps not surprising that to date little has been done. The value of a London-wide strategic body is precisely to step in and ensure such information is researched and made available. We acknowledge that this could well be a long-term and substantial project but believe such investment in accurate information will prove invaluable.

Recommendation 23

The risk of flooding is increased by our current inadequate knowledge of London's drainage system.

We recommend that the GLA work with Thames Water, the Boroughs and the Environment Agency to collate their information on London's drainage system and identify all privately owned drains, producing a London drainage map which is as comprehensive as possible. We believe this to be an essential step in ensuring the effective monitoring and maintenance of London's drains, and thus in reducing the risk of flooding in London.

⁹⁴ Memorandum – London Borough of Haringey

⁹⁵ Memorandum – London Borough of Harrow

⁹⁶ Memorandum – London Borough of Harrow

⁹⁷ Supplementary memorandum – Thames Water

⁹⁸ Minutes 23 April 2002 para.4.38

Ownership, monitoring, maintenance and repair

- 7.37 In mapping the drainage system the question of ownership will inevitable arise. Harrow told us that they are “becoming increasingly concerned about the fragmented level of responsibility for surface water drainage ... Residents have frequently expressed the view that under current arrangements for surface water drainage there is little or no public accountability, no overall control and a general level of confusion”.⁹⁹ We were told by the Environment Agency that “the responsibility for some surface water drains is unclear and the subject of correspondence between Thames Water and the relevant Local Authorities ... the criteria for classification of drains appears to require clarification, and ... records of ownership and operational responsibility should be publicly available”.¹⁰⁰
- 7.38 London’s drainage system is, as Keith Delaney from the London Borough of Harrow put it, “a single hydraulic entity and cannot be separated artificially along lines of legal responsibility. The causes of flooding and the processes involved are well known and understood. However, they can be difficult to assign to individual parts of any system without extensive, and often costly, investigations. This is particularly true in urban areas where determining ownership of pipes can be almost impossible”.¹⁰¹
- 7.39 At the end of the 1990s Thames Water in-sourced the sewerage management contracts which had previously been undertaken by local authorities. Ealing Council told us that “Prior to 1995 the Council had an agency agreement with Thames Water to carry out routine surface water sewer cleansing. Since that agreement ended I believe no routine sewer cleansing has been taking place and many sewers are found to be badly silted, which of course affects the performance of road gullies”.¹⁰²
- 7.40 Thames Water told us that the majority of its 77,000 km of sewers were ‘self-cleansing’, constructed in such a fashion that flushing or cleaning are not regularly required. There are sewer maintenance programmes to monitor ‘hotspots’ where problems occur. There is also a programme of ‘condition monitoring’ identifying parts of the network due for replacement or refurbishment.¹⁰³ It is not clear to us that this amounts to proactive monitoring of the state of the sewerage system
- 7.41 The Environment Agency said that “As regards non-main water courses that fall within the responsibility of the Boroughs, there are differences in the approach to their maintenance between boroughs. This may be due to watercourse maintenance competing with other priorities in the borough for resources, as opposed to the situation in the Agency where we have a ring-fenced budget for flood defence works. We would support the promotion of greater consistency in monitoring and maintenance of these channels across London to reduce flood risk associated with poorly maintained channels”.¹⁰⁴

⁹⁹ Memorandum – London Borough of Harrow

¹⁰⁰ Supplementary memorandum – Environment Agency

¹⁰¹ Memorandum – London Borough of Harrow, see also 15 May 2002 para.4.9

¹⁰² Memorandum – London Borough of Ealing

¹⁰³ Supplementary memorandum – Thames Water

¹⁰⁴ Supplementary memorandum – Environment Agency

Conclusion

There is clear evidence that the monitoring of the whole of the drainage system is patchy and incomplete, that there is often an unwillingness to take responsibility for certain parts of the network, that maintenance and repair of the system suffers as a consequence, with serious implications for flooding risk. This state of affairs cannot be allowed to continue.

- 7.42 Many of those who gave evidence recommended legislative change to remedy the current confused state of affairs. The Environment Agency proposed that all owners of drains be required to report to the Government annually on the drains' performance against a set of government standards. They also suggested that "the Agency's supervisory duty to reduce flood risk is made more explicit (rather than solely relating to rivers and coastal flooding)", only then to add that "this would be fraught with potential pitfalls and would need to be accompanied by sanctions of some kind".¹⁰⁵
- 7.43 A number of boroughs also called for a rationalisation of the system, though there were differences as to what the rationalisation should look like. Haringey argued that that both ownership of the drainage system and responsibility for its maintenance be rationalised under Thames Water, and that the Environment Agency take on responsibility for the monitoring and auditing of the flood and drainage systems.¹⁰⁶ The London Borough of Ealing also proposed that "surface water sewers, culverts, water courses and highway gullies (including connections to sewers) should all fall under the same ownership."¹⁰⁷ Hounslow thought the monitoring should be done by the local authority.¹⁰⁸ Harrow also argued that the Boroughs should monitor flooding and the operation of the drainage system and that the GLA should take responsibilities for strategy and funding in a manner similar to their role for Transport for London.¹⁰⁹

Recommendation 24

We recommend that the Environment Agency be given the responsibility to monitor drainage systems in relation to flood risk and the necessary sanctions and resources to undertake this significant extension to their responsibilities. There should also be a statutory requirement on drain owners to report on the performance of drains for which they are responsible.

¹⁰⁵ Supplementary memorandum – Environment Agency

¹⁰⁶ Memorandum – Haringey Council

¹⁰⁷ Memorandum – London Borough of Ealing

¹⁰⁸ Memorandum – Hounslow Council

¹⁰⁹ Memorandum – London Borough of Harrow

Sewerage flooding

- 7.44 We described above the threat of sewerage flooding to properties within the Greater London area. We also noted the change in method of reporting properties at risk which has reduced the number at risk in London from about 9,000 to just under 4,000. We are not in a position to comment on the change in methodology, which brings Thames Water into line with all the other water companies. Of course estimation of risk should take into account the impacts of climate change over time.
- 7.45 In oral evidence Duncan McCombie from Thames Water said that their at-risk register only contained properties which had been previously flooded. In their supplementary evidence, Thames Water stated that “Properties are also added to the register where there is a risk of flooding. This is done using hydraulic models of the sewerage network”.¹¹⁰ We interpret this to mean the application of hydraulic models to those portions of the network where a flooding incident suggests there may be a wider problem. We repeat the point made above on the need for a proactive monitoring of the whole sewerage network rather than a purely reactive one so that we can attain a more thorough knowledge of the true numbers of properties at risk. At present we cannot be sure that the numbers cited are not an underestimate of properties actually at risk.
- 7.46 Given the seriousness and severe trauma associated with this type of flooding, we consider the funds allocated to the problem to be inadequate. Thames Water had gone to OFWAT with its Asset Management Programme and determination and asked for funds to remove 3,000 properties from the risk of flooding. Following negotiation, OFWAT granted funding of £48 million for 1,500 properties across the Thames region (not just in London) over a five-year period.¹¹¹ We were told that properties would be prioritised according to the seriousness of the risk. A further £32 million has recently been agreed with OFWAT to relieve a further 250 higher cost risk A and B properties and, for the first time, 250 properties suffering from external flooding.¹¹²

Recommendation 25

For only 1,500 of the London properties vulnerable to internal sewerage flooding to be removed from the at-risk register over a five-year period is in our view wholly inadequate. Thames Water must allocate funds to remove all properties currently at risk from sewerage funding from the at-risk register over a five-year period.

¹¹⁰ Supplementary memorandum – Thames Water

¹¹¹ Minutes 25 March 2002 para.3.31

¹¹² Supplementary memorandum – Thames Water

7.47 There were claims in evidence that Thames Water could improve its responses to such flooding incidents. Steve Clark from Merton said that his Borough was more at risk from sewerage flooding than fluvial flooding because of the inadequate capacity of the sewerage system. During a recent sewerage flood in Colliers Wood the Council had had great difficulty finding anyone in Thames Water prepared to deal with the situation. In Merton's view Thames Water was not sufficiently well set up to respond to sewerage flooding problems.¹¹³

A regional drainage strategy

7.48 One issue raised in evidence was the impact of London's projected population growth and the Mayor's proposals for high-density development on London's sewerage and drainage system. There is a danger in considering only on a case-by-case basis development proposals that no one stands back at any point to consider the cumulative impact on sewer capacity of significant developments across London. Although in areas such as the Thames Gateway SUDS and the use of open spaces will reduce adverse impacts, increases in development density in other areas will need to be assessed for wider drainage impacts.

7.49 Of course knowledge of the impact of development over time on London's drainage system will require a more comprehensive assessment of London's drainage network and its current state than we have at present. But the Deputy Mayor agreed that the SDS needed to address this question. The draft London Plan states that "The Mayor will work with Thames Water, the Environment Agency and other relevant organisations to ensure that London's drainage and sewerage infrastructure is sustainable".¹¹⁴

Recommendation 26

We recommend that regional and sub-regional assessments of sewerage capacity be undertaken by Thames Water, in cooperation with the GLA, so that there can be monitoring of the cumulative effects of development on the drainage network.

¹¹³ Minutes 23 April 2002 para.4.6

¹¹⁴ Policy BR11 Water and sewerage infrastructure Draft London Plan

8. Thames Gateway and environmental gain

- 8.1 Much attention has been given recently to the Thames Gateway development, a regeneration initiative in the east of London and neighbouring counties, which is a national priority area for regeneration and constitutes the main part of the Mayor's priority area for development, regeneration and infrastructure improvement.¹¹⁵ Fourteen zones of change are planned, with forecasts of housing growth from 2001 to 2016 of about 100,000 and employment growth of about 300,000. The policy issues and choices outlined in this Report are all starkly illustrated in this key development area since, as the Environment Agency pointed out, "The proposed development in the Thames Gateway area is largely in areas which are at risk of tidal flooding ... the challenge facing the Gateway is how to balance the future use and operations in the area with current flood risk and the implications of rising sea levels. With the sea level rise that is anticipated and increased storminess, it will become increasingly difficult to keep raising defences to maintain the current standard of protection".¹¹⁶ We were told that the Environment Agency, in conjunction with Thames Gateway, is currently undertaking studies of the flood risk in the Gateway's fourteen zones of change, but the Agency said bluntly that "protection of all areas of the Gateway irrespective of cost will become increasingly untenable with rising sea levels".¹¹⁷
- 8.2 We have mainly discussed flood defence in terms of the protection of property and human life, but there is also a need to defend London's environmental heritage and biodiversity. Environmental impacts of flooding include erosion of existing tidal mudflats and marshes, and saline intrusion into the Estuary and adjacent freshwater marshland, rivers and lakes. The project 'Planning for Flood Risk Management in the Thames Estuary' states that "To counter [such impacts] we need to identify existing estuarine habitats, determine and set targets for those habitats which are required to sustain and promote local and national biodiversity and actively consider and pursue managed realignment to restore parts of the natural flood plain and intertidal habitats".¹¹⁸ A similar point is made in the Mayor's Biodiversity Strategy, "In some places it may be possible to reverse [encroachment into waterways] as part of redevelopment or flood defence works, by retreating the flood defences to allow the establishment of waterside flora and fauna".¹¹⁹
- 8.3 To respond to the future risk of flooding in the Thames Gateway there will need to be a trade-off between some raising of defences and the taking back of defences from the banks to provide open space over which flood waters can encroach. Alex Nickson from TGLP told us in oral evidence that flooding issues might allow for the creation of an extended Thames Park running linearly down both sides of the river.¹²⁰ He said that it was important to create more open space in the zones of change. Such parks would have the effect of stepping back the flood defence and allowing some flooding of the natural floodplain.¹²¹ There would thus be both environmental and recreational gain, as well as a more sustainable management of flood risk.

¹¹⁵ The draft London Plan paras.2B.33.34

¹¹⁶ Memorandum – Environment Agency

¹¹⁷ Memorandum – Environment Agency

¹¹⁸ Second supplementary memorandum – Environment Agency

¹¹⁹ Mayor's Biodiversity Strategy para.4.64

¹²⁰ Minutes 23 April 2002 para.4.17

¹²¹ Minutes 23 April 2002 para.4.22

Conclusion

We strongly support the work of Thames Gateway London Partnership in planning for open spaces along the Thames and tributaries, and in particular a Thames Park, providing access to the river for all, environmental and recreational assets, and floodplain capacity for future flooding events. Planning for flood risk can provide opportunities for environmental gain.

8.4 In discussing the need for open spaces and flood storage capacity, it is important to ensure that funds are available for the purchase of the necessary land. There is concern that funding bodies do not as yet place a high enough value on the cost benefits of open space provision. Regeneration funds should be used to purchase open space for environmental and recreational purposes and for flood capacity. As a last resort, TGLP stated that “Compulsory Purchase Orders (CPOs) can play an important role in the strategic acquisition of sites where negotiation has failed and public benefit outweighs private loss. TGLP would like to see a policy developed in the London Plan that defines an explicit commitment to use CPO powers for the strategic acquisition of land and property for environmental improvement and flood risk management. Associated with the use of these powers must be a dedicated fund commensurate with the scale of the problem”.¹²²

Recommendation 27

Regeneration and other funds should be used to purchase open space for environmental and recreational purposes and for flood capacity. We support Thames Gateway London Partnership in their call for the London Plan to include a specific commitment that the London Development Agency will if necessary use compulsory purchase powers to secure land for flood risk management in the Thames Gateway.

¹²² Supplementary Memorandum – Thames Gateway London Partnership, see also Minutes 23 April 2002 para.4.27

9. Funding of flood defences

- 9.1 Will the money be made available to defend London against flooding? The serious flooding of the last few years and increasing evidence of the impact of climate change have made clear that there is a continuing and growing need for flood defences, and that meeting this need will require higher levels of funding. It has not been our intention to look in detail at funding options or respond to the current Government consultation on funding of flood defences. But we are obviously concerned to assure ourselves, and Londoners, that funding will be forthcoming to meet London's flood defence requirements.
- 9.2 Currently the Environment Agency raises monies for the maintenance of existing assets and the creation of new defences through a levy on local authorities. Investment plans are put to Regional Flood Defence Committees. We were pleased to learn that to date the local authorities represented on London's Regional Flood Defence Committee had always found the required funds for flood defence and there was every expectation that they would continue to do so in the future.¹²³
- 9.3 We have already discussed the resources required for the Thames Barrier and funding issues relating to sustainable flood-sensitive design. Two further questions arise. First, given that it is impossible to afford, and undesirable to provide, defences against every flood risk, how should the priorities for expenditure be determined? Secondly, should such increasing costs continue to be met by the taxpayer, or is there a case for developers and others also to contribute?
- 9.4 Deciding what to defend and what not to defend from flooding cannot simply be based on a common standard of risk. That would mean spending considerable sums to defend land which might be of little value, unpopulated or a necessary floodplain. An alternative approach is to apply a strict cost-benefit analysis in which areas of lesser asset value would receive defences of a lower level of protection. DEFRA's current guidance adopts in general terms the route of a consistent approach based on cost-benefit analysis. There has recently been some debate as to the acceptability of mainly economic criteria in forming judgements on flood defences.
- 9.5 The Institution of Civil Engineers stated that many submissions to their inquiry asked for the inclusion of health and social benefits in the cost-benefit justification for a scheme.¹²⁴ This would reduce the likelihood of areas of high density but lower property value being defended to a lower standard than areas elsewhere of high property value but perhaps low density. DEFRA already require a consideration of such social impacts in their approach but there is clear evidence that many think this does not go far enough. The difficulty, however, lies in attributing monetary values to social distress, and further research is needed in this area.

¹²³ Minutes 18 March 2002 para.3.14

¹²⁴ 'Learning to live with rivers' The Institution of Civil Engineers November 2001 para.2.5.3

Recommendation 28

We consider it essential that consideration of whether to build flood defences, and to what standard, take full account of social as well as measurable economic costs. We welcome research currently funded by the Government to identify how best to assess such social costs.

- 9.6 It is worth noting, as PPG25 makes clear, that such a full consideration of environmental and social costs might also on occasion be an argument against the provision of engineered flood defences.¹²⁵
- 9.7 The Government is currently considering responses to a consultation exercise on flood and coastal defence flooding, and its conclusions are expected shortly. The consultation document, published in February 2002, was itself based on a report produced by a Steering Group¹²⁶ in 2001 focussing on “whether sources of funds should and could be redistributed so that more responsibility for funding would fall on those directly benefiting from the expenditure and on whether the identification of priorities was sufficiently coherent”.¹²⁷ In addition to looking at Exchequer funding the steering group considered new ways to secure funds from developers or “polluters”. These options included:
- A ‘development charge’, provided for under PPG25, which enables flood defence costs arising as a result of a new development on a flood plain to be met by the developers
 - A ‘connection charge’, payable by all developers on a flood plain to recover general flood defence costs not attributable to an individual development
 - A ‘flood plain levy’, through which those occupying the flood plain would contribute to flood defence costs
 - A ‘surface water drainage charge’, based on ‘the polluter pays principle’, either based on ability to pay or as a universal charge.
- 9.8 The development charge alluded to can already be applied through use of section 106 agreements to secure planning gain relating to flood defence. PPG25 states that where material considerations outweigh the risk of flooding, and development in an area is therefore permitted, “any necessary flood defences or flood alleviation works required because of the development form a part of that development. They should normally be fully funded by the developer. Authorities may wish to consider entering into an agreement under Section 106 of the Town and Country Planning Act 1990 to ensure that the developer carries out necessary works and that future maintenance commitments are met. It will probably be appropriate to vest the resulting defences, which have been constructed to the operating authority’s satisfaction, in the operating authority, with a dedicated commuted sum to cover maintenance for 30 years. After that time, it would be reasonable to regard the defences as a public asset that should then be maintained from the public purse”.¹²⁸

¹²⁵ PPG25 Development and Flood Risk para.8

¹²⁶ The Steering Group comprised representatives from MAFF (subsequently DEFRA), HMT, DETR (subsequently DTLR), the National Assembly for Wales and the Environment Agency.

¹²⁷ Flood and Coastal Defence Flooding Review – Report to Ministers by the Review Steering Group Executive Summary

¹²⁸ PPG25 Development and Flood Risk para.61

- 9.9 The Guidance also states that similar arrangements might be necessary in relation to culverts and sustainable drainage systems. One suggestion is the establishment of a management company with the right to levy service charges, matched by enforceable obligations on the parts of owners and occupiers.
- 9.10 We heard from London Boroughs that section 106 had been successfully used to pay for additional flood mitigation measures. Steve Clark from Merton gave the example of upstream storage being provided as part of a school redevelopment.¹²⁹
- 9.11 PPG25 is still a young document and more time is needed to assess how it is operating in practice. We are concerned, however, at evidence claiming that questions over funding and accountability for maintenance are acting as an impediment to the widespread adoption of SUDS. We were told that “some organisations may be reluctant to become involved [in provision of SUDS] due to perceived difficulty over the matter”.¹³⁰ Thames Water told us that they supported the introduction of SUDS in new developments but would not take on the responsibility for SUDS-related above ground assets in the long term. They would look at individual cases for management of underground assets as they arose in the future.¹³¹ TGLP said “there are concerns over the subsequent maintenance and management of the system, with neither the water utilities, the boroughs nor the Environment Agency required or willing to take up a duty of care”.¹³²

Recommendation 29

We are concerned at evidence that the introduction of SUDS is being obstructed by concern over maintenance and funding responsibilities. We recommend that the Government intervene to identify the duty of care and effective funding options which can command general support.

Recommendation 30

We recommend that the London Assembly Environment Committee revisit the issue of the maintenance and funding of SUDS in the near future. The matter merits more detailed and separate consideration. We need to be confident that SUDS can be actively and effectively implemented across London.

- 9.12 The Steering Group concluded that the PPG25 development charge provision needed time to bed down before it could be judged as an effective means of generating additional flood defence funds.¹³³

¹²⁹ Minutes 23 April 2002 para.4.5

¹³⁰ Memorandum – Environment Agency

¹³¹ Minutes 25 March 2002 para.3.24

¹³² Supplementary memorandum – Thames Gateway London Partnership

¹³³ Flood and Coastal Defence Funding Review – Report to Ministers by the Review Steering Group para.13

Recommendation 31

We believe that Boroughs should proactively use their section 106 powers under PPG25 to secure funding for flood mitigation specific to particular developments. We also recommend that the use and impact of such powers be collated London-wide by the GLA so as to monitor their effectiveness in encouraging properly funded, flood-sensitive development.

9.13 Turning to other additional funding options, the Steering Group considered that the surface water drainage charge is not a viable option but saw possibilities in both the connection charge and the flood plain levy. We await the outcome of the DEFRA review of funding of flood defences to know the views both of consultees and of the Government. What is clear is that solutions are required which provide additional funds for general flood defence from those in such at-risk areas.

10. Emergency Preparedness

10.1 Flood defences can prepare for many if not most possibilities but however thorough and robust they cannot totally remove the possibility of flooding. The Environment Agency emphasised, "It is impossible to guarantee flood protection. Even where a flood defence is provided there will be occasions so severe that the defence is overwhelmed".¹³⁴ We must therefore ensure that London can react promptly and effectively when flooding occurs, saving life and limb and minimising harm. We took evidence from the Boroughs and the emergency services on their experiences of and lessons taken from the floods of Autumn 2000.

Flood warnings

10.2 PPG25 states that in low to medium and in high risk areas, where development is permitted there may well be a need, depending on the flood risk assessment, for suitable warning/evacuation procedures. The Environment Agency is responsible for the provision of flood warnings and of information to promote public awareness of the risks of flooding. Both the emergency services and local authorities made clear that they rely on the Environment Agency for such advice before setting in train their plans for emergency response. The Agency told us that it "endeavours to give the public as much warning as possible of flood threats ... Where we can accurately forecast flooding we aim to issue warnings to the public **at least two hours** before the onset of the flooding".¹³⁵ Just before the Autumn 2000 floods a new warning system had been introduced with four codes indicating the level of danger. They are:

- **Flood watch** – Flooding possible. Be aware! Be prepared! Watch out.
- **Flood warning** – Flooding of homes, businesses and main roads is expected. Act now!
- **Severe Flood Warning** – Severe flooding is expected. Imminent danger to life and property. Act now!
- **All clear** – All clear is issued when flood watches or warnings are no longer in force. Flood water levels receding. Check all is safe to return. Seek advice.

10.3 LFEPA welcomed the Agency's progress in providing warnings to the public, hoping that this "will reduce the risk of people being caught unawares by flood waters and therefore the number of rescues required".¹³⁶ But some of the local authorities expressed concern at some ambiguity in the warning system. Redbridge argue that "confusion exists because the generic warning term is 'Flood Warning' but so is one of the alert states".¹³⁷ Redbridge went on to admit that during the Autumn 2000 floods when they received the 'Flood Warning' code that this was "new territory" for them and they did not "appreciate the full implication".

¹³⁴ Memorandum - Environment Agency

¹³⁵ Memorandum - Environment Agency

¹³⁶ Memorandum - LFEPA

¹³⁷ Memorandum - London Borough of Redbridge

Recommendation 32

We consider that to use the term ‘flood warning’ both for the generic flood warning system and for one of the four codes can cause confusion and we recommend that the Environment Agency agree alternative wording for the relevant code.

- 10.4 There are a number of different ways in which the Agency disseminates flood warnings. These include Automatic Voice Message (AVM); fax; public address – loud hailer or siren; flood wardens; media – TV and radio; Agency website; Floodline 24 hr telephone service. AVM is available to those members of the public living in high risk areas who elect to use the system. Warning messages are automatically sent to a list of contact numbers. Several hundred messages can be sent simultaneously. Nationally there are over 70,000 properties on this system. Planned future developments of the service include the use of e-mail, mobile text messaging and digital television.¹³⁸
- 10.5 It should be noted that the two last means – the Agency website and Floodline – are indirect, as are the media, relying on action instigated by a concerned individual. The fax system is “to professional partners, which includes all London Boroughs, all emergency services within London, and utility & transport companies”.¹³⁹ This leaves for residents the AVM system, public address systems and flood wardens. The Agency warns, however, that for AVM “maintaining contact lists can be difficult in urban areas whose populations are mobile” and that the flood warden system “works well in stable communities with a clear identity but is more challenging to establish when the population is more unstable or diverse”.¹⁴⁰
- 10.6 On 1st March 2002 the House of Commons Public Accounts Committee criticised the Environment Agency’s record and plans on flood warning coverage. At the time only 40 per cent of residents living in flood warning areas would receive a flood warning within two hours’ notice. Over the next ten years the Agency was seeking to increase progressively the geographic coverage of systems from 40 to 80 per cent of the flood risk area by 2009-2010. In the Autumn 2000 floods 60 per cent of those at risk from flooding successfully received warnings, as opposed to 13 per cent in the floods of 1996.¹⁴¹
- 10.7 The Public Accounts Committee, whilst welcoming the progress which had been made, recommended that the Agency “put in place a strategy which would ensure that virtually all households at risk receive a flood warning within at least two hours’ notice. This should be achievable within a shorter timescale than 2009-10. It is unacceptable that for the next few years 4 out of 10 homes will not receive at least 2 hours warning of floods”.¹⁴²

¹³⁸ Memorandum - Environment Agency

¹³⁹ Memorandum - Environment Agency

¹⁴⁰ Memorandum - Environment Agency

¹⁴¹ Eighteenth Report of the House of Commons Public Accounts Committee, Session 2002-03, HC587, ‘Inland Flood Defence’, para.37

¹⁴² *ibid.* para.6

- 10.8 The Agency did not accept this criticism, stating in response that 80 per cent coverage is close to the limit of what is possible and that the Agency is continually looking at ways to improve its service.
- 10.9 The evidence from the Environment Agency emphasised that “the very transient nature of London’s urban population means that the Agency faces a difficult challenge in achieving continual coverage of flood awareness”.¹⁴³ Clearly, Automatic Voice Messaging is the most efficient and direct means to communicate a flood warning but the Environment Agency told us that there are only 2,784 recipients of AVM within the Greater London area. There are 90,000 properties with an annual chance of flooding of 1 per cent or greater – this works out as flood warning coverage of about 3.1 per cent.
- 10.10 The Agency aims to achieve 77.5 per cent coverage by 2007. In supplementary evidence the Agency explained that “this means that by 2007 we will have written to 77.5% of properties in flood risk areas to invite them to sign up to an appropriate flood warning service for their property. The type of service offered will differ depending on the property ... In the higher risk areas a direct warning is offered e.g. Automatic Voice Messaging (AVM), but in the lower risk areas an indirect warning may be appropriate e.g. Loudhailer ... The target for 2007 will include properties that decline our offer to sign up to the service as well as those that receive direct and indirect warnings”.¹⁴⁴
- 10.11 It is not apparent how the target of offering a warning service to 77.5 per cent of properties in flood risk areas relates to the previously stated target of an 80 per cent geographic coverage of flood warning systems in flood risk areas by 2009–10. There seems to be a reclassification of warning target in terms of offer rather than effective coverage, in terms of input rather than outcome. As the Agency itself admits, however, the particular challenges of London’s mobile and transient population make the offer to a ‘property’ an unhelpful standard for the capital. And a possible excuse not to think innovatively of how to secure real warning cover for properties and people at risk.
- 10.12 Whilst accepting that the nature of London’s population poses difficulties for any flood warning system, this should not preclude thinking on how to meet such challenges. The mobility and diversity of London’s population is a challenge for a range of public service providers and there needs to be concerted consideration across a variety of services and disciplines on how to deliver information and assistance. The Environment Agency states the problem but does not indicate any specific projects to overcome the difficulties of consistently informing a mobile population. There might, for example, be opportunities, in conjunction with local authorities, to contact owners of rented accommodation and agree systems to include new tenants, perhaps as part of the tenancy agreement process, in direct warning schemes.

¹⁴³ Supplementary memorandum - Environment Agency

¹⁴⁴ Second supplementary memorandum – Environment Agency

Conclusion

We are concerned at the very small percentage of Londoners (3.1 per cent) at risk from fluvial flooding who are covered by the Environment Agency's direct flood warning system of Automatic Voice Messaging (AVM). This is simply too small a percentage. Londoners deserve better protection.

- 10.13 Although many Londoners might hear of the flood risk indirectly through the media it will often be the most vulnerable who do not have access to such channels, or cannot understand them.

Recommendation 33

We recommend that the GLA organise discussions between the Environment Agency, local authorities, the police and other relevant bodies to produce innovative solutions to communicating direct flood warnings to Londoners. This should be done in the wider context of how to provide the range of public services to a population often newly arrived or highly mobile.

The response of the emergency services

- 10.14 As has been stated above, the overall verdict on the emergency response to the Autumn 2000 floods was a large measure of satisfaction in a job well done and the fact that there was no loss of life or serious injury. A number of issues did, however, emerge in evidence received by the Committee.
- 10.15 Witnesses and written evidence outlined the current system of emergency service response in the event of flooding. We were told that the function of the police was the same in any emergency. Their role was to secure the area once an incident had happened and act as facilitators for other emergency services. The police co-ordinated activities at the scene of the emergency and tried to avoid duplication. As with other services, the police were responsible for the preservation of life and property, but the skilled rescue services were the fire and ambulance services".¹⁴⁵
- 10.16 The London Ambulance Service stressed that they had no bespoke role with regard to flooding and simply responded as they did to other major incidents according to the agreed procedures of the London Emergency Services Liaison Panel (LES�P).¹⁴⁶

¹⁴⁵ Minutes 25 March 2002 para.3.4

¹⁴⁶ Memorandum - London Ambulance Service

- 10.17 In responding to floods, the emergency services followed the general emergency procedures contained in the LESLP major incident procedure manual. The LESLP website contains the full text of this document for those who wish to read the procedures in detail. We were told by the emergency services that the general conclusion from the Autumn 2000 floods was that LESLP procedures worked well.¹⁴⁷ We were told that in response to the events of Autumn 2000 an appendix was being drafted on responses to flooding.
- 10.18 One question arising was the emergency services' resources for such flooding emergencies. LFEPA's evidence pointed out that the "London Fire Brigade has no statutory duty to respond to flooding incidents and therefore this is a discretionary activity which currently attracts no funding. However, there is a public expectation that the Brigade will continue to respond to 'special service' incidents, including those that occur in, on, or near water. It must be appreciated that Brigade personnel would find it extremely difficult to arrive at an incident and take no action to try to rectify or mitigate the situation".¹⁴⁸ In oral evidence, Ron Dobson, Assistant Commissioner, Operational Planning, LFEPA, said that the primary legislation covering the work of the Fire Authority was the 1947 Fire Service Act which required the Fire Authority to make provisions for fire-fighting purposes only. There was also a discretionary power to use resources acquired for fire-fighting purposes in other incidents.¹⁴⁹
- 10.19 The role of the Fire Brigade in a flooding emergency included lifesaving, rendering humanitarian services, allowing for the management of hazardous materials and the protection of the environment, salvage and damage control at incidents, and safety management within an inner cordon.¹⁵⁰
- 10.20 Concern at the lack of resources for the emergency services was expressed by some local authorities. Richmond Council told us that "Very little resources are now directly available to cope with a major flood ... From personal experience of recent floods here the local authority has no water borne resources, the Metropolitan Police few and LFEPA minimal. Reliance was placed on privately owned and operated boats being available. Police and fire service resources were deployed but took a long time arriving".¹⁵¹
- 10.21 Redbridge pointed out that at the time of the Autumn 2000 floods the London Ambulance Service had no equipment to effect the recovery of injured or ill persons caught up in flooding. We were told that they do now have inflatable boats and crews trained in their use. At 2 am after the onset of flooding the Council were able to supply boats from a boating centre but no one trained and competent to use them. The Fire Brigade agreed to use their firefighters for rescue but had to send away for lifejackets. We were told that events at Redbridge highlighted to the police that they "were not specifically trained for rescue work and that if they had more lightweight watercraft they could be of more service".¹⁵² The Fire Service had learned that they "had not got the inflatable boats needed for such incidents, though they were able to give ground assistance".¹⁵³

¹⁴⁷ Minutes 25 March 2002 para.3.5

¹⁴⁸ Memorandum - LFEPA

¹⁴⁹ Minutes 25 March 2002 para.3.3

¹⁵⁰ Minutes 25 March 2002 para.3.3

¹⁵¹ Memorandum - London Borough of Richmond

¹⁵² Minutes 25 March 2002 para.3.5

¹⁵³ Minutes 25 March 2002 para.3.5

- 10.22 Redbridge pointed out that though police vehicles are fitted with public address equipment, the speakers are located under the front bumper, an obvious problem in flood waters.¹⁵⁴ Similarly, the Metropolitan Police Marine Support Unit, based at Wapping, has only limited capability to respond to an emergency with rigid inflatable craft.¹⁵⁵ This could cause problems when the Police were asked to assist in a number of flooding incidents in different areas of London.¹⁵⁶
- 10.23 Redbridge also stated that in the Autumn 2000 floods it had taken over six hours to get the command structure of the local police to acknowledge that a major incident was taking place and a further two hours actually to respond to the incident itself.¹⁵⁷
- 10.24 Ron Dobson stressed that for improvement to take place it was necessary to carry out a risk assessment of the likely impact of flooding the risk areas, and other hazards likely to occur following a flood. The level of provision of resources for flooding would depend on the risk assessment in that area where the resources were being provided. There was currently no programme to carry out a risk assessment. Such a risk assessment would include:
- Identification of causes of flooding in relation to particular areas in London
 - Identification of the likely impact of flooding (e.g likely depth of water, types of premises affected)
 - Consideration of the resources needed in order to mitigate the risks.¹⁵⁸
- 10.25 It is important to stress that this goes beyond the initial estimation of flood risk as provided by the Environment Agency. It includes not only that initial estimate of flood risk but also what the possible control measures to reduce or mitigate these risks could be.
- 10.26 There are clearly legitimate concerns over the preparedness of the emergency services to deal with severe and multiple incidents of flooding London, particularly with regard to the specialised training necessary and the provision of appropriate equipment, such as boats, lifejackets and suitable ropes. This does not detract from the impressive and effective work done in 2000 by the emergency services. It is important both to congratulate them for their work but also heed the lessons that both they and others are drawing from those experiences. The gaps identified seem to result from a combination of a lack of specific statutory responsibilities and a lack of awareness, prior to 2000, of the extent of flooding risk in London. Two remedies have been identified – to give the Fire Brigade statutory responsibility to respond to flooding, thus authorising expenditure and the use of resources specifically for this purpose, and a London-wide risk assessment to ascertain the equipment and training necessary for the emergency services to be fully prepared for serious flooding events. Both LESLP and the London Boroughs' Emergency Planning Forum¹⁵⁹ should be involved.

¹⁵⁴ Memorandum - London Borough of Redbridge

¹⁵⁵ Minutes 25 March 2002 para.3.4

¹⁵⁶ Memorandum - London Borough of Redbridge

¹⁵⁷ Minutes 15 May 2002 para.4.12

¹⁵⁸ Minutes 25 March 2002 paras. 3.6, 3.9-10

¹⁵⁹ Minutes 15 May 2002 para.4.8

Recommendation 34

We recommend that the Government at the earliest legislative opportunity amend the 1947 Fire Service Act to make the response to emergencies other than fire, including flooding, one of the Fire Service's statutory duties. This will at last enable Fire Brigades to call for resources and then spend them on the necessary training and equipment for an effective response to floods.

Recommendation 35

We recommend that the Environment Agency, the relevant local authorities and the emergency services join together at the earliest opportunity to undertake a flooding risk assessment for London, identifying the equipment, training and information needs for the capital. The Mayor should take the lead in ensuring such a risk assessment occurs, given his responsibilities for London's emergency preparedness. This will no doubt include negotiations on the funding of the assessment.

- 10.27 It is apparent that Boroughs such as Redbridge and Enfield with recent experience of significant flooding have important lessons and good practice to share with other Boroughs. We trust that good practice on such issues as the identification of vulnerable people, and on liaison with the emergency services and the Environment Agency, is disseminated effectively across London. We were concerned to note in some written evidence uncertainty over the effectiveness of current emergency liaison arrangements.

11 Recovery and Insurance

*“It is widely acknowledged that recovery from major flooding incidents is the ‘Cinderella’ part of the whole process. Flood-affected buildings may take many months to dry out and renovate, leaving people’s lives disrupted for long periods. The social and economic effects are immense, not least on the health and well-being of those directly affected by floods. Insurance cover will help replace or restore the property of the individual householder or business but the wider issues of community recovery from flooding are hardly resourced at all”.*¹⁶⁰

- 11.1 The costs of flooding were emphasised by the ABI. Total economic costs cover more than simply insurance costs. Some households and businesses will not be insured (25 per cent of households choose not to insure their contents, rising to 50 per cent in low income groups). Some households and businesses may be underinsured (an informal survey in Lewes suggested that some 15 per cent of residents were underinsured by between £5,000 to £20,000). Government has to pay for the costs of emergency measures and repairs to infrastructure. And there are the ‘hidden costs’, such as higher healthcare costs, days lost at work due to sickness and the need to deal with the effects of flooding.¹⁶¹
- 11.2 No survey was conducted of the after-effects and impact of the Autumn 2000 floods within London but we were provided with the outcome of a study in 2000 by the Flood Hazard Research Centre at Middlesex University of the longer-term health effects of the 1998 flooding in Banbury and Kidlington in the Thames region. Studies in flood-affected areas reveal immediate impacts such as respiratory and skin problems, depression and other stress related conditions. The 2000 follow-up survey showed that whilst physical health problems had diminished, there were still significant psychological health impacts remaining.¹⁶²
- 11.3 The recent report from the Institution of Civil Engineers stated that “Evidence to the Commission clearly indicates that insufficient weight is being placed by the engineering profession on the human distress caused by flooding – its social impact. The distress is strongly reinforced where flooding is relatively frequent, or where sewage contamination of floodwater has occurred. Studies have occasionally been made of the health and psychiatric impacts of flooding (*Bennet, 1970; Flood Hazard Research Centre, 1999*). Emotions can still be stirred again many years later, as was seen in a recent television programme on the Lynmouth flood of nearly 50 years ago”.¹⁶³
- 11.4 We heard of various activities undertaken by local authorities and others in the aftermath of floods to assist recovery. These include assistance on insurance claims, provision of bedding, supply of utilities such as gas, cleansing services, disposal of furniture, and provision of temporary accommodation. Enfield, for example, had set up a small recovery team after the Autumn 2000 floods.¹⁶⁴ Bill Wheeler from Bexley stressed the need for flooding information, particularly on insurance matters, and the need for support facilities, such as rest centres, for victims.¹⁶⁵

¹⁶⁰ ‘Learning to Live with Rivers’ The Institution of Civil Engineers November 2001 section 6.9

¹⁶¹ Memorandum – Association of British Insurers

¹⁶² Memorandum – Environment Agency

¹⁶³ ‘Learning to live with rivers’ The Institution of Civil Engineers November 2001 para.1.5

¹⁶⁴ Minutes 15 May 2002 para.4.3

¹⁶⁵ Minutes 15 May 2002 para.4.5

Recommendation 36

There is a need for good practice on flood recovery to be collated for use by all local authorities in the event of flooding. We recommend that the GLA supervise the collation of such recovery good practice in cooperation with London's local authorities.

Insurance

- 11.5 We received evidence from the ABI on the implications of flooding for insurance cover. Government research estimates that some £200 billion of assets are currently at risk from flooding, half of that asset value (£110 billion) being in the Environment Agency's Thames Region. The relevant Thames region properties include 577,000 domestic and 45,000 commercial properties.
- 11.6 Since 1990 weather related insurance claims (storm, flood damage, burst pipes) have cost an average of £825 million per annum in the UK, and in four of the last 15 years have risen to over £1 billion. The ABI estimate, given the effects of climate change, that this trend of increasing claims will continue.
- 11.7 Flood claims are typically between £15,000 and £30,000 on a household policy. Where flooding occurs regularly continued insurance availability requires both significant premium rises, often by several orders of magnitude, and terms such as high deductibles. The impact of such premium increases would be to reduce the level of protection afforded to low income households either because of unaffordability or because they must find the first £2,500 to £5,000 of subsequent flood claims.
- 11.8 The ABI told us that they are actively promoting the increased availability of insurance protection to low-income groups.¹⁶⁶
- 11.9 After the floods of Autumn 2000 the ABI responded to concerns over the continuing availability of flood cover by committing insurers to a two-year agreement for existing domestic properties and small business policyholders. The two-year period ends on 31 December 2002. There were, however, exceptional circumstances where cover would be discontinued. These include residents in a flood risk area refusing a flood alleviation scheme, new properties being built on a floodplain without sustainable defences, or where the flood risk has become so great that there is no prospect of a flood defence being put in place within a reasonable timescale. The agreement does not cover premium rates or other policy issues such as deductibles.
- 11.10 In return insurers were looking to the Government to commit itself to greater investment in flood defences, radical curtailment of development in flood risk areas, and faster and more consistent decisions on where flood defences are built. The ABI told us that they

¹⁶⁶ Memorandum – Association of British Insurers

were seeking an increase in annual capital spending on flood defences by at least £145 million per annum. In July 2002 the Government published their Comprehensive Spending Review (CSR), containing new public spending plans for 2003-2006. The CSR pointed to significant increases in expenditure on flood defences since 1997 and stated “That growth will now accelerate: overall, government expenditure on flood and coastal defences will rise by £150 million by 2005-06, equivalent to an annual real rate of growth of 8.6 per cent”.¹⁶⁷

- 11.11 In response to the Government’s announcement of increases in flood defence funding, the ABI issued a press release on 26 September 2002, welcoming the Government’s spending plans and stating that their members will continue to provide flood insurance to “the great majority of homes and small businesses in areas at risk from flooding” with “full access to a competitive market for insurance ... Going beyond the terms of the existing two-year agreement, insurers will also make special efforts to maintain cover for properties when they are sold, subject to satisfactory information about the new owners and proposed use of the premises”.¹⁶⁸

Conclusion

We welcome the Government’s continuing commitment to significant increases in funding for flood defences and the ABI’s commitment to maintain flooding insurance for existing customers in flood-risk areas beyond 2002.

- 11.12 This does not, however, address the extent and terms of insurance for new households and businesses in such areas, nor more generally the question of the level of premiums and terms of cover. A failure to provide insurance readily on reasonable terms could well deter investment in an area, exclude lower income groups, and blight both further development and the ability of property owners to sell.
- 11.13 Thames Gateway London Partnership expressed concerns over flood insurance cover, in particular the raising of flood risk premiums. They told the Committee, “This financial penalty could mean that Thames Gateway inhabitants in selected areas are unable to afford flood insurance cover, or may be unable to secure insurance on a mortgage. This could create areas of blight within the Thames Gateway where house sales/business development is impossible”.¹⁶⁹ We have addressed elsewhere how the Thames Gateway can be developed so as to accommodate the risk of flooding in a sustainable way. We believe this should allow insurance to be provided on reasonable terms.

¹⁶⁷ ‘Opportunity and security for all’ New Public Spending Plans 2003-2006 Cm 5570 para.16.9

¹⁶⁸ ABI News Release 26 September 2002

¹⁶⁹ Memorandum – Thames Gateway London Partnership

Recommendation 37

There is clearly a need for the Mayor to undertake discussions with the insurance industry on flood cover in London, giving special attention to cover for lower income groups. We recommend he instigate such discussions as soon as possible.

12. CONCLUSION

- 12.1 Our scrutiny has provided a survey of the increasing risk of flooding to London. We have been reassured by the considerable research and initiative going into ensuring that London is adequately protected from floods.
- 12.2 But there are also matters for concern. We have identified a serious lack of information in key areas for flood management – we need more research into climate change, more detailed maps of flood risk, area risk assessments (which include consideration of possible control measures), and a full knowledge of the nature and state of our watercourses and drains, irrespective of ownership.
- 12.3 Whilst welcoming the Environment Agency’s work in bringing relevant bodies together to consider flood risk, there is clearly a need for more strategic coordination. The Environment Agency, whilst having a supervisory responsibility for flooding, does not, for example, have responsibility for London’s drainage system even though the system is connected to river watercourses and is a significant flood risk. We rely on the emergency services when a flood occurs yet they do not have adequate statutory powers to equip them for the task.
- 12.4 What has become clear is the vast number of bodies with flood responsibilities. The Environment Agency, Thames Water, local authorities, highways authorities, private owners, regeneration agencies, insurers, the emergency services, central Government departments, Londoners themselves, the list goes on. It has seemed sensible to us to recommend that the Environment Agency extend its supervisory responsibility for flooding to the drainage system. But there is also a need for London’s regional government to assure itself that there is coordination across the board on all flooding issues and that everything appropriate is done to manage flood risk safely, effectively and sustainably.
- 12.5 The Mayor has done important work in relation to the future of flood defence – the concept of the Blue Ribbon Network in the SDS, support for climate change research, involvement of the GLA in the development of the Thames Gateway to name a few. We believe he must develop this work.

Recommendation 38

With the multitude of bodies involved in flood management, and the numerous flood-related initiatives, the Mayor has a political responsibility to satisfy himself that effective planning and coordination are taking place to secure London’s future in relation to flood risk. We recommend he do so. We also recommend that he lend his weight to efforts to raise Londoners’ awareness of flooding and of how to live with these risks.

Appendix

SECTION 105 FLOODPLAIN MAPS FOR LONDON (GLA BOUNDARY)

<i>Completed</i>	<i>Started</i>	<i>Not started</i>
Ravensbourne Wandle Beverley Brook Lee Lower Lee and Tributaries Beam Ingrebourne Lower Colne	Hogsmill Marsh Dykes	Crane

Source: Environment Agency

Annex A – Summary of Recommendations and Conclusions

Recommendations

Introduction

- 1) We accept that security considerations might affect the level of detail which can be publicly divulged, but we also believe the London Assembly, and Londoners generally, should be satisfied as to the level of preparedness of the Underground to cope with floods. We therefore refer this matter to the Assembly and its relevant committees for further consideration. [Action: London Assembly]

Public information and the description of flood risk

- 2) There is an urgent need to stave off complacency, to communicate flood risk accurately and widely to Londoners, and to educate the public in ways to manage and live with that risk. We believe the Mayor and the London Assembly have an important role to play in supporting such efforts. [Action: Mayor and London Assembly]
- 3) We welcome the production of Section 105 maps which will provide some much-needed clarification on flood risk. We recommend that the remaining section 105 maps for the Greater London area be completed as soon as possible. [Action: Environment Agency]
- 4) We recommend that in any legislation introducing home seller's packs the Government require the inclusion of effective information on flooding risk. [Action: Government]
- 5) We are certain that Indicative Floodplain Maps alone in seller's packs are not sufficient for people to come to an informed view on whether or not to buy a property and will only generate what is often unnecessary alarm. The information needs at least to be supplemented by and coordinated with section 105 maps before it can be of any use. It should thus include a percentage statement of risk taking account of flood defences, advice on how to interpret the information and on how best to design and prepare for floods, encouragement to be included in the Agency's direct flood warning schemes, and contact details for further advice and information. [Action: Environment Agency]
- 6) We recommend that the Environment Agency and other public bodies communicate flood risk to the public in odds or percentage terms, rather than as a return period. To clarify the nature of the risk, it would also be useful to provide further explanation which presents probabilities over readily understandable timeframes. The odds should also be revisited over time to take account of the impact of climate change. [Action: Environment Agency]
- 7) We welcome the work done to date by the Environment Agency in warning the public of flood risk. Given the continuing low levels of public awareness, these efforts must be redoubled. Thought should be given as to how other bodies, including the Mayor and GLA, can assist the Environment Agency in conveying their message. As memories of recent floods fade, there is a danger of complacency.

This process needs to be integrated into a larger programme of public involvement in flood risk management. We recommend that the Mayor discuss with the Environment Agency how to integrate the Agency's work in flood warning within a strategy of flood information-

gathering from residents, public involvement in warning and emergency procedures, and flood preparedness. [Action: Mayor, Environment Agency]

Flooding from the tidal Thames – the Thames Barrier

- 8) We conclude that inner London is defended to the extent which could reasonably be expected against severe tidal flooding until at least 2030. We note, however, the continuing research into the effects of climate change, including storm surges, and consider that the outcomes of that research should be carefully monitored. [Action: Environment Agency, GLA]
- 9) The current project 'Planning for Flood Management in the Thames estuary' is a welcome and commendable example of forward planning to meet future flood defence needs.

We believe the project should be as transparent as possible and recommend that both the Mayor and London Assembly Environment Committee be regularly informed of research outcomes and policy options as they begin to emerge in advance of 2006. [Action: Environment Agency]

- 10) The current estimate is that £4bn will be necessary to upgrade defences against tidal flooding. We recommend that there be a clear statement as soon as possible from the Government on sources of funding. Given the national significance of these defences, we would expect central Government to bear by far the greater part of the financial burden. [Action: Government]
- 11) Climate change predictions suggest a significant increase in the number of annual closures of the Thames Barrier between now and 2030. We recommend the Mayor in his response to this report provide an assessment of how such closures will affect the Blue Ribbon Network policies, contained in the draft London Plan, to develop use of the Thames for navigation. [Action: Mayor]

Flooding from rivers

- 12) We are concerned that there are sections of river flood defence in London which currently fall below the Government's indicative standard of defence against a 1 per cent annual flood risk, and other sections in a poor or very poor condition.

We recommend that the Environment Agency, having discussed flood defence improvements with riparian owners and other relevant parties, provide the London Assembly Environment Committee with a timetable for the urgent improvement of London's river flood defences to meet fully the Government's indicative standard by 2007. [Action: Environment Agency]

- 13) We recommend that those vulnerable riverside areas of London upstream of the Barrier, such as in Hammersmith, Chiswick and Twickenham, receive adequate flood protection as soon as possible. Every effort must be made to retain the river as an accessible cultural amenity and for any additional defences to be sensitive to their environment. [Action: Environment Agency and flood defence asset owners]
- 14) As the Mayor plans for London to grow to the East, and in particular in the Thames Gateway, this tension between the defence needs of London upstream of the Thames

Barrier and the defence needs of London downstream will need to be resolved. [Action: Mayor]

Responding to flood risk

- 15) We recommend that the Environment Agency review advice given to local authorities on flood-related planning matters to ensure such advice is clear and consistent across all areas. [Action: Environment Agency]
- 16) Although the GLA is not an operating authority, it has a duty as the regional strategic body to ensure that the health, environment and economic well-being of London are not endangered by poor maintenance of our flood defences. We recommend that the GLA discuss with the Environment Agency any remaining gaps in their flood defence information for the Greater London area in order to identify how best to supply the missing data. The GLA should assure itself that an appropriate process of flood defence inspection is operating not only for the Thames but for all watercourses in the capital. [Action: GLA, Environment Agency]
- 17) We recommend that the promised Supplementary Planning Guidance on Sustainable Design and Construction contain guidance on the use of opportunities to retrofit SUDS within existing developments. [Action: Mayor]
- 18) We expect all new developments on low to medium and on high risk flood plains, in particular those in the Thames Gateway, to contain design features, along the lines of those recommended by ODPM, intended to mitigate the effects of flooding. [Action: Mayor, Boroughs, developers]
- 19) We recommend that the insurance industry reconsider the 'new for old' policy in relation to property restoration and replacement. Flooded properties should be restored using flood-resistant techniques. [Action: Association of British Insurers]
- 20) For those parts of London which are defined as at low to medium or at high risk of fluvial flooding there should be a thorough review of how the essential civil infrastructure – including hospitals, fire, police and ambulance stations, and Borough emergency control centres – can maintain accessibility and operation during extreme floods. Such a review could be integrated into the flood risk assessments which we also recommend in this Report. [Action: Boroughs, emergency services]
- 21) It is vital in designing sustainably resistant buildings in flood risk areas to bear in mind accessibility issues. We recommend that the ODPM document 'Preparing for Floods' be reviewed to include information on how flood-resistant design should take account of accessibility and the needs of the disabled. [Action: Government]
- 22) We recommend that, both within Boroughs and across London, Borough Planning Officers and Emergency Planning Officers liaise on a regular basis to ensure the planning of new developments is consistent with and facilitates the Boroughs' emergency plans in cases of flooding. [Action: Borough Planning Officers and Emergency Planning Officers]
- 23) The risk of flooding is increased by our current inadequate knowledge of London's drainage system.

We recommend that the GLA work with Thames Water, the Boroughs and the Environment Agency to collate their information on London's drainage system and identify all privately owned drains, producing a London drainage map which is as comprehensive as possible. We believe this to be an essential step in ensuring the effective monitoring and maintenance of London's drains, and thus in reducing the risk of flooding in London. [Action: GLA, Thames Water, Environment Agency, Boroughs]

- 24) We recommend that the Environment Agency be given the responsibility to monitor drainage systems in relation to flood risk and the necessary sanctions and resources to undertake this significant extension to their responsibilities. There should also be a statutory requirement on drain owners to report on the performance of drains for which they are responsible. [Action: Government]
- 25) For only 1,500 of the London properties vulnerable to sewerage flooding to be removed from the at-risk register over a five-year period is in our view wholly inadequate. Thames Water must allocate funds to remove all properties currently at risk from sewerage funding from the at-risk register over a five-year period. [Action: Thames Water]
- 26) We recommend that regional and sub-regional assessments of sewerage capacity be undertaken by Thames Water, in cooperation with the GLA, so that there can be monitoring of the cumulative effects of development on the drainage network. [Action: Thames Water, GLA]

Thames Gateway and environmental gain

- 27) Regeneration and other funds should be used to purchase open space for environmental and recreational purposes and for flood capacity. We support Thames Gateway London Partnership in their call for the London Plan to include a specific commitment that the London Development Agency will if necessary use compulsory purchase powers to secure land for flood risk management in the Thames Gateway. [Action: Mayor, London Development Agency]

Funding of flood defences

- 28) We consider it essential that consideration of whether to build flood defences, and to what standard, take full account of social as well as measurable economic costs. We welcome research currently funded by the Government to identify how best to assess such social costs. [Action: Government]
- 29) We are concerned at evidence that the introduction of SUDS is being obstructed by concern over maintenance and funding responsibilities. We recommend that the Government intervene to identify the duty of care and effective funding options which can command general support. [Action: Government]
- 30) We recommend that the London Assembly Environment Committee revisit the issue of the maintenance and funding of SUDS in the near future. The matter merits more detailed and separate consideration. We need to be confident that SUDS can be actively and effectively implemented across London. [Action: London Assembly Environment Committee]
- 31) We believe that Boroughs should proactively use their section 106 powers under PPG25 to secure funding for flood mitigation specific to particular developments. We also recommend that the use and impact of such powers be collated London-wide by the GLA so as to

monitor their effectiveness in encouraging properly funded, flood-sensitive development. [Action: Boroughs, GLA]

Emergency Preparedness

- 32) We consider that to use the term 'flood warning' both for the generic flood warning system and for one of the four codes can cause confusion and we recommend that the Environment Agency agree alternative wording for the relevant code. [Action: Environment Agency]
- 33) We recommend that the GLA organise discussions between the Environment Agency, local authorities, the police and other relevant bodies to produce innovative solutions to communicating direct flood warnings to Londoners. This should be done in the wider context of how to provide the range of public services to a population often newly arrived or highly mobile. [Action: GLA, Environment Agency, Boroughs, Metropolitan Police]
- 34) We recommend that the Government at the earliest legislative opportunity amend the 1947 Fire Service Act to make the response to emergencies other than fire, including flooding, one of the Fire Service's statutory duties. This will at last enable Fire Brigades to call for resources and then spend them on the necessary training and equipment for an effective response to floods. [Action: Government]
- 35) We recommend that the Environment Agency, the relevant local authorities and the emergency services join together at the earliest opportunity to undertake a flooding risk assessment for London, identifying the equipment, training and information needs for the capital. The Mayor should take the lead in ensuring such a risk assessment occurs, given his responsibilities for London's emergency preparedness. This will no doubt include negotiations on the funding of the assessment. [Action: Environment Agency, Boroughs, emergency services]

Recovery and Insurance

- 36) There is a need for good practice on flood recovery to be collated for use by all local authorities in the event of flooding. We recommend that the GLA supervise the collation of such recovery good practice in cooperation with London's local authorities. [Action: GLA, Boroughs]
- 37) There is clearly a need for the Mayor to undertake discussions with the insurance industry on flood cover in London, giving special attention to cover for lower income groups. We recommend he instigate such discussions as soon as possible. [Mayor, Association of British Insurers]

Conclusion

- 38) With the multitude of bodies involved in flood management, and the numerous flood-related initiatives, the Mayor has a political responsibility to satisfy himself that effective planning and coordination are taking place to secure London's future in relation to flood risk. We recommend he do so. We also recommend that he lend his weight to efforts to raise Londoners' awareness of flooding and of how to live with these risks. [Action: Mayor]

Other conclusions

Introduction

39) The work of GARDIT and its five phase strategy to deal with the problem of rising groundwater has already been considered by the London Assembly's Environment Committee, and that Committee will continue to keep this important project under review.

Public information and the description of flood risk

40) Recent research by the Environment Agency shows that nearly 50 per cent of people living in flood plain areas are oblivious to the risk and only one person in ten takes any action to prepare.

41) We conclude that the Indicative Floodplain Maps were disseminated by the Environment Agency with inadequate explanation as to their limitations and the fact that they did not take account of current flood defences. Without prompt explanation and additional information there was a danger of unnecessary blight and loss of investment.

Flooding from sewers and drains

42) There is a whole class of urban floods not currently included in any systematic risk assessment and warning policy. This is all the more worrying since many consider such drainage flooding to be the greatest practical threat to London at present.

Responding to flood risk

43) We welcome the strong presumption in the draft London Plan in favour of sustainable urban drainage systems in all new developments.

44) There is clear evidence that the monitoring of the whole of the drainage system is patchy and incomplete, that there is often an unwillingness to take responsibility for certain parts of the network, that maintenance and repair of the system suffers as a consequence, with serious implications for flooding risk. This state of affairs cannot be allowed to continue.

Thames Gateway and environmental gain

45) We strongly support the work of Thames Gateway London Partnership in planning for open spaces along the Thames and tributaries, and in particular a Thames Park, providing access to the river for all, environmental and recreational assets, and floodplain capacity for future flooding events. Planning for flood risk can provide opportunities for environmental gain.

Emergency Preparedness

46) We are concerned at the very small percentage of Londoners (3.1 per cent) at risk from flooding who are covered by the Environment Agency's direct flood warning system of Automatic Voice Messaging (AVM). This is simply too small a percentage. Londoners deserve better protection.

Recovery and Insurance

- 47) We welcome the Government's continuing commitment to significant increases in funding for flood defences and the ABI's commitment to maintain flooding insurance for existing customers in flood-risk areas beyond 2002.

Annex B – Evidentiary hearings

18 March 2002

Peter Borrows – Regional Flood Defence Manager, Environment Agency
Colin Candish – Regional Environment Protection Manager, Environment Agency
Edmund Penning-Rowse – Head, Middlesex University Flood Hazard Research Centre
Jane Milne – Manager of Property and Household, Association of British Insurers (ABI)

25 March 2002

Ron Dobson – Assistant Commissioner Operational Planning, LFEPA
Inspector Kevin Taylor – Contingency Planning Department, MPS
PC Dave Sutton – Contingency Planning Department, MPS
Duncan McCombie – Thames Water

23 April 2002

Nicky Gavron - Deputy Mayor of London
Kevin Reid – Planning Strategist, GLA
Alex Nickson – Sustainability Officer, Thames Gateway London Partnership (TGLP)
Simon Cartwright - Best Practice Development Manager, TGLP
Sebastian Salom – Senior Planner, London Borough of Bexley (attending with TGLP)
Steve Clark – Head of Planning and Public Protection, London Borough of Merton
Roy Summers – Senior Team Leader, Development Control, London Borough of Richmond

15 May 2002

John O'Mahoney – Emergency Planning Officer, London Borough of Redbridge
Keith Delaney – Emergency Planning Officer, London Borough of Enfield
Bill Wheeler – Emergency Planning Officer, London Borough of Bexley

Annex C – Written evidence

Written evidence was received from:

Association of British Insurers
City of Westminster
Corporation of London
Enfield Flood Group
Environment Agency (7/03/02, 28/06/02, 20/09/02)
Levett-Therivel (sustainability consultants)
London Ambulance Service
London Borough of Ealing
London Borough of Enfield
London Borough of Hammersmith and Fulham
London Borough of Haringey – Environmental Services
London Borough of Harrow
London Borough of Harrow – Environmental Services
London Borough of Hounslow – Environmental Services
London Borough of Redbridge (26/02/02, 09/05/02)
London Borough of Richmond
London Fire and Emergency Planning Authority (LFEPA)
London Underground Limited
Metropolitan Police Authority (MPA)
Riverside Concern
Thames Gateway London Partnership (TGLP)
Thames Water Utilities

Annex D – Further information, orders and translations

For further information on this report or to order a bound copy, please contact:

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London SE1 2AA
tom.middleton@london.gov.uk
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Annex E – Scrutiny principles

The powers of the London Assembly include power to investigate and report on decisions and actions of the Mayor, or on matters relating to the principal purposes of the Greater London Authority, and on any other matters, which the Assembly considers to be of importance to Londoners. In the conduct of scrutiny and investigation the Assembly abides by a number of principles.

Scrutinies:

- aim to recommend action to achieve improvements;
- are conducted with objectivity and independence;
- examine all aspects of the Mayor’s strategies;
- consult widely, having regard to issues of timeliness and cost;
- are conducted in a constructive and positive manner; and
- are conducted with an awareness of the need to spend taxpayers’ money wisely and well.

More information about the scrutiny work of the London Assembly, including published reports, details of committee meetings and contact information, can be found on the GLA website at <http://www.london.gov.uk/approot/assembly/index.jsp>

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