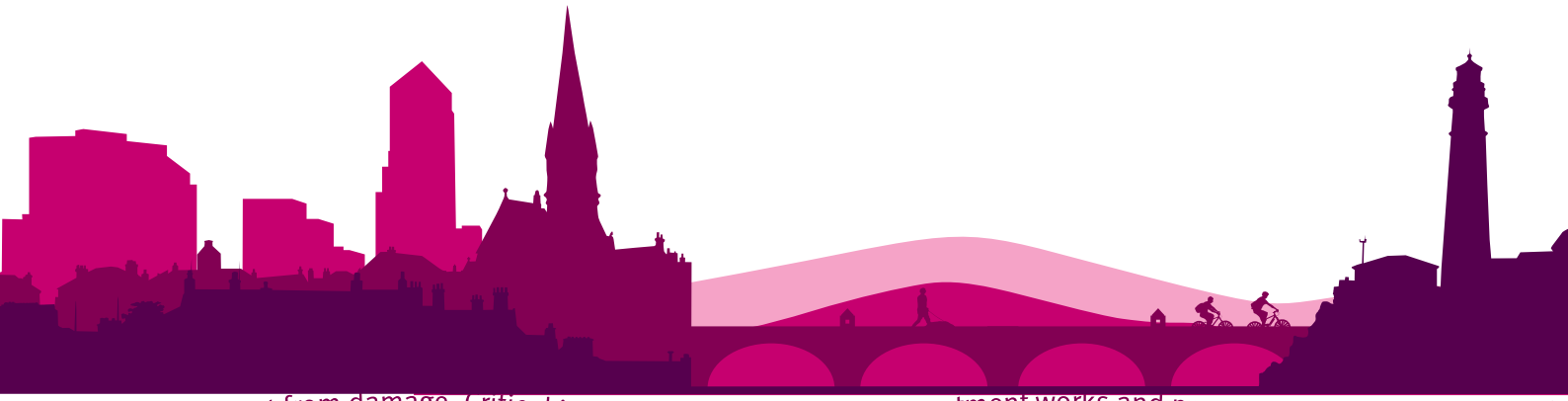
Environment Agency

investing for the future

Flood and coastal risk management in England

A long-term investment strategy



omes that are at threat from damage. Critical infrastructure such as water treatment works and power stations are often close to
ure. It is neither technically feasible nor economically affordable to prevent all properties from flooding. We therefore take a risk
cations for new building or development in flood and coastal risk areas. Our interventions help control development and prevent
pact of flooding can reduce if we continue to invest in flood warnings and public information campaigns. They help householder

We are the Environment Agency. It's our job to look after your environment and make it a better place – for you, and for future generations.

Your environment is the air you breathe, the water you drink and the ground you walk on. Working with business, Government and society as a whole, we are making your environment cleaner and healthier.

The Environment Agency. Out there, making your environment a better place.

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Foreword

I welcome this report from the Environment Agency - their first major national publication since taking on the strategic overview of flood and coastal erosion risk management across England. It is fitting that this Strategy is published two years after the devastating floods of 2007, and a year after Sir Michael Pitt published his influential report. It provides compelling evidence to inform the choices we face, which Government will carefully consider as part of the next Spending Review. Sir Michael and others have called for this Strategy, recognising that a long-term approach to flood and coastal risk management is needed to counter the impacts of climate change and to achieve greater efficiency in delivery. The latest UK Climate Projections make it even clearer just how dramatically our climate could change in the decades ahead.

Future costs to manage the rising risk of flooding and coastal erosion will be considerable under any scenario, but this assessment also shows that the benefits will substantially outweigh costs, many times over. Everyone recognises the benefits that community defences can bring - safeguarding families, businesses and communities, property and valued possessions, as well as the surrounding landscape and environment. Noting the private as well as public benefits involved, Sir Michael said that we should not assume all costs should be met centrally. Instead, he recommended that local areas should be encouraged to invest more in their own protection. Community defences should not be taken for granted, given the substantial costs and benefits involved. It would seem fair for those that directly benefit from them to contribute more than others towards their costs.

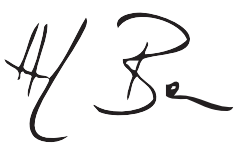
So based on the evidence presented in this document; what should we aim to achieve by 2035, and how should investment needs be funded? The answer may be different in different places, depending on local priorities and circumstances. The Environment Agency will continue to set out what it can afford in each region with Government funding, but that shouldn't be the end of the story. Those at risk – who live and work in vulnerable areas and communities - should have a real choice in what gets done; and should be able to say they want to do more if they value going further than Government can justify from a national perspective.

As the Government response to the Pitt Review identified, county and unitary authorities can already work individually or through their Regional Flood Defence Committee to invest in additional local projects and benefits. In this way, local democracy can help decide where there is a need to target more resources, and how the extra costs are best shared. Developing partnerships within local and multi area agreements may be part of the answer, and I will review whether the current national indicator on flood and coastal risk could be improved to encourage such approaches.

For its part, the Environment Agency expects to deliver its investment programme even more efficiently than at present, doing more with each pound they are given, wherever it comes from. Their savings in recent years have been commendable, and I applaud them for these plans that go considerably further and help offset future funding needs. The Environment Agency is also publishing a new external contributions policy which will make their money from Government go further by routinely seeking support from major beneficiaries towards project costs, in return for allowing some influence over the scope and timing of works.

In the short-term, we should realise that tough economic conditions may constrain what is affordable to Government. Looking beyond the current spending period my department will need to consider how to allocate its resources between all the important environmental issues that affect our quality of life. In the meantime, Government will spend more than £2.1 billion on managing flood and coastal erosion risk in England over the three years to March 2011. With this, operating authorities are on course to exceed targets and provide better protection to 160,000 homes - 15,000 more than I asked for. But the analysis in this report shows that there is much more to do if as a country we are to successfully adapt to the long-term impacts of climate change.

But if all of us - central and local government, businesses, individuals and communities - recognise our shared goals and shared responsibility, and pool our energy and resources, we will be able to tackle the risks we face.



Rt Hon. Hilary Benn MP, Secretary of state

Preface

Around 5.2 million properties in England, or one in six properties, are at risk of flooding. More than five million people live and work in the 2.4 million properties that are at risk of flooding from rivers or the sea, one million of which are also at risk of surface water flooding. A further 2.8 million properties are susceptible to surface water flooding alone

Rising sea levels and increasingly severe and frequent rainstorms caused by climate change mean that the risk of flooding will increase. A risk-based approach to flood and coastal risk management is essential to limit the distress, damage and loss of life that flooding can cause.

The Environment Agency is now responsible for the strategic overview of all sources of flooding. Since 2003, the Government has steadily increased the amount of money available to manage the risk of flooding and coastal erosion. The likely impact of climate change on flooding and coastal erosion, as well as the investment required over the longer term, needs to be better understood.

This *Long-term investment strategy* sets out the best available evidence on the choices the people of England face about how much should be invested in managing the increasing risk of flooding and coastal erosion, and how the Environment Agency should deliver a long-term programme of investment. The strategy does not assume that these investment needs will be funded by central government alone. The Environment Agency's role is to present an evidence-based analysis of potential needs, outcomes and benefits.

The modelling detailed in this *Long-term investment strategy* suggests that a steady increase in investment is needed to around £1040 million a year plus inflation by 2035 for building and maintaining new and existing flood and coastal risk management assets. This is the level required if current protection levels are to be maintained. This figure is an increase of around 80 per cent on 2010-2011 levels (£570 million) and **excludes** the costs of managing the risk of surface and groundwater flooding.

1. Introduction

This *Long-term investment strategy* sets out the Environment Agency's evidence and views on the choices that the people of England face concerning the amount of investment needed to manage the risk of flooding and coastal erosion between 2010 and 2035.

The strategy describes:

- the present scale of flood and coastal erosion risk, and the achievements in managing it so far;
- an analysis of the investment needed to adapt to climate change and manage the potential increased risk over the period 2010-2035;
- ways to manage flood and coastal erosion risk more efficiently;
- an analysis of the benefits of investment, and the potential to broaden the sources of investment.

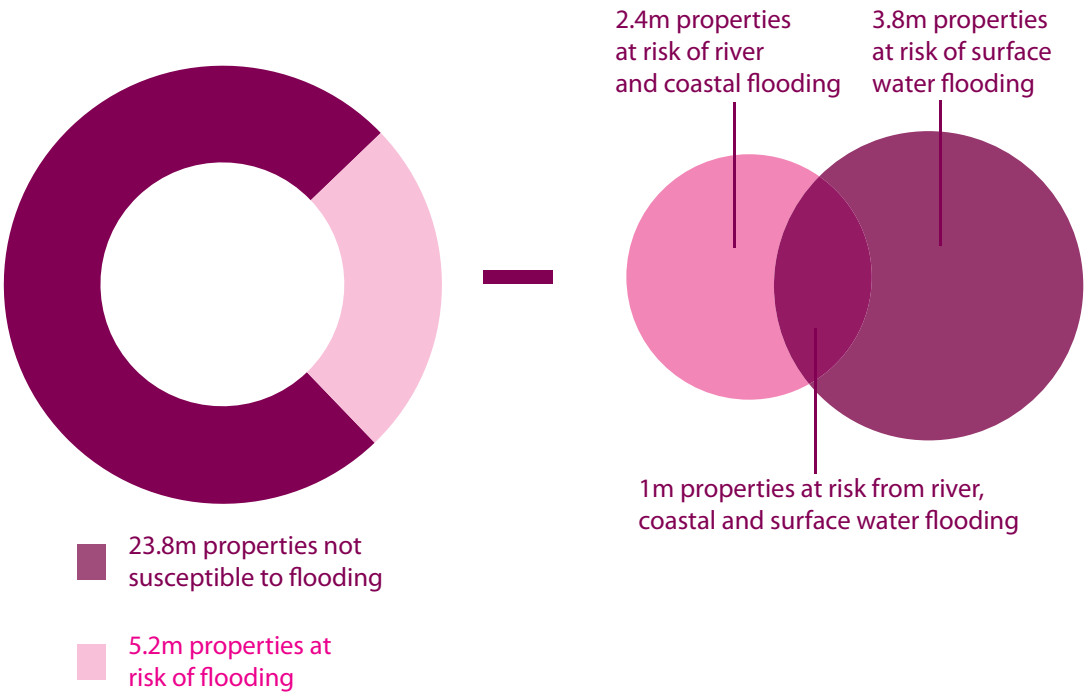
2. The present and future scale of flood and coastal risk management and the benefits from investment

In England about one in six residential and commercial properties is at risk from river, coastal or surface water flooding.

For many years, houses, hospitals, schools and work places have been built in areas that are susceptible to flooding. Successive governments have funded flood and coastal erosion risk management over many decades, which has allowed flood defences to be built and maintained – and further development in the floodplain to be controlled. This investment is targeted towards reducing flood and coastal erosion risk.

However, climate change, the deterioration of assets, as well as continuing pressure to build in areas at risk of flooding, will contibute to increased flood and coastal erosion risk in England. Around 5.2 million properties in England remain at risk of flooding (Figure one).

Figure one: Properties at risk of flooding in England



This report focuses on the 2.4 million properties at risk of flooding from rivers or the sea. Of these 2.4 million properties, almost half a million have a significant chance of flooding ,which means that these properties have at least a 1 in 75 chance of flooding in any given year (Figure two). Properties include households and non-residential properties such as offices, factories, commercial properties and warehouses. There are also properties at risk from coastal erosion. Although the overall number is considerably smaller, local impact can be severe. Coastal erosion is progressive and practically irreversible.

Figure two: 2.4 million properties at risk of river and coastal flooding by chance of flooding

Significant chance of flooding: more than 1:75	
Moderate:	1:75 - 1:200
Low:	1:200 - 1:1000

Source: National Flood Risk Assessment, Environment Agency 2008

Understanding the risk of flooding from surface water is at a very early stage. Work is well under way to improve the mapping and modelling of surface water flood risk. Preliminary work shows that around 3.8 million properties could be susceptible to surface water flooding, including around one million that are also at risk of flooding from rivers or the sea. Initial estimates suggest that up to £150 million (in today's prices) a year may be needed to mitigate the risk of surface water flooding by 2035.

The need to adapt to climate change

Flood and coastal risk management work must adapt to climate change. It is predicted that:

- Sea level will rise over the coming decades.
- The frequency and severity of rainstorms will progressively increase.
- The risk of coastal flooding and erosion will increase, especially for parts of the east and south coasts of England.
- Flood management assets will need to cope with an expected average 20 per cent increase in river flows by 2080. The degree of increase varies between regions.

The *Foresight Future Flooding* report published in 2004 identified the need for year-on-year increases of £10 - £30 million in funding for new and improved management assets (for England and Wales) every year until the 2080s on top of inflation to respond to climate change. Climate change modelling has developed since then, but the impact remains uncertain.

The analysis used in Chapter Three uses the mid-range predictions from the UK Climate Projections 2009 (UKCP09) dataset. Future greenhouse gas emissions and climate predictions remain uncertain. We have not included large allowances to cover the more extreme, but possible, climate change predictions. The figures used are the best available, given current knowledge and are an appropriate basis for this 25-year strategy. As the strategy is implemented, we will continue to model future assessments of the impacts of climate change.

Investment in recent years has grown significantly, and more properties are better protected

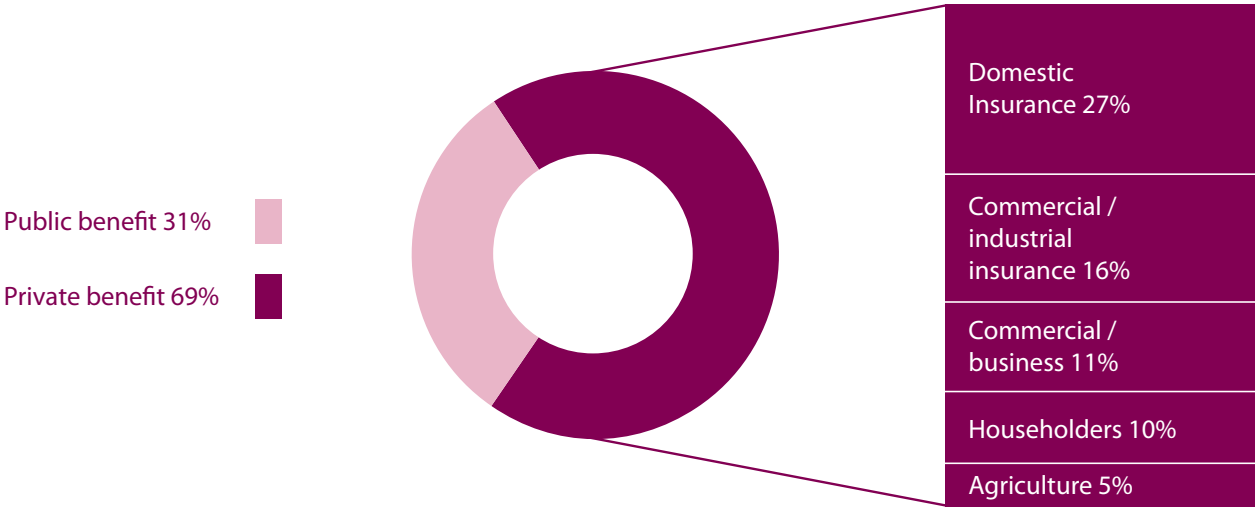
The average annual cost of damage from flooding in England is estimated at more than £1 billion. These costs are borne by householders, businesses, central and local government and others including insurance companies. On average, every £1 currently invested in new and improved flood risk management assets reduces the long-term cost of flooding and coastal erosion damages by around £8.

Better national data and new approaches to assessing investment choices allow the benefits of investment to be assigned to the individuals, properties and sectors at risk of flooding and coastal erosion.

Figure three indicates that a considerable proportion of the benefits of better protection – perhaps as high as 69 per cent – are private beneficiaries such as homeowners and businesses. This assessment is based on individual flood risk management projects around the country, an in-depth assessment of the Thames Estuary 2100 (TE2100) strategy, and an analysis of who bore the costs of the 2007 floods.

New or improved flood defences mean that the householders and businesses protected by them will need to spend less of their money in the future recovering from floods. This will be reflected in their insurance costs, and possibly in property values. These financial benefits over the long-term are worth about £20,000 on average for each household provided with additional protection. Central and local government also benefit from having to respond to fewer floods.

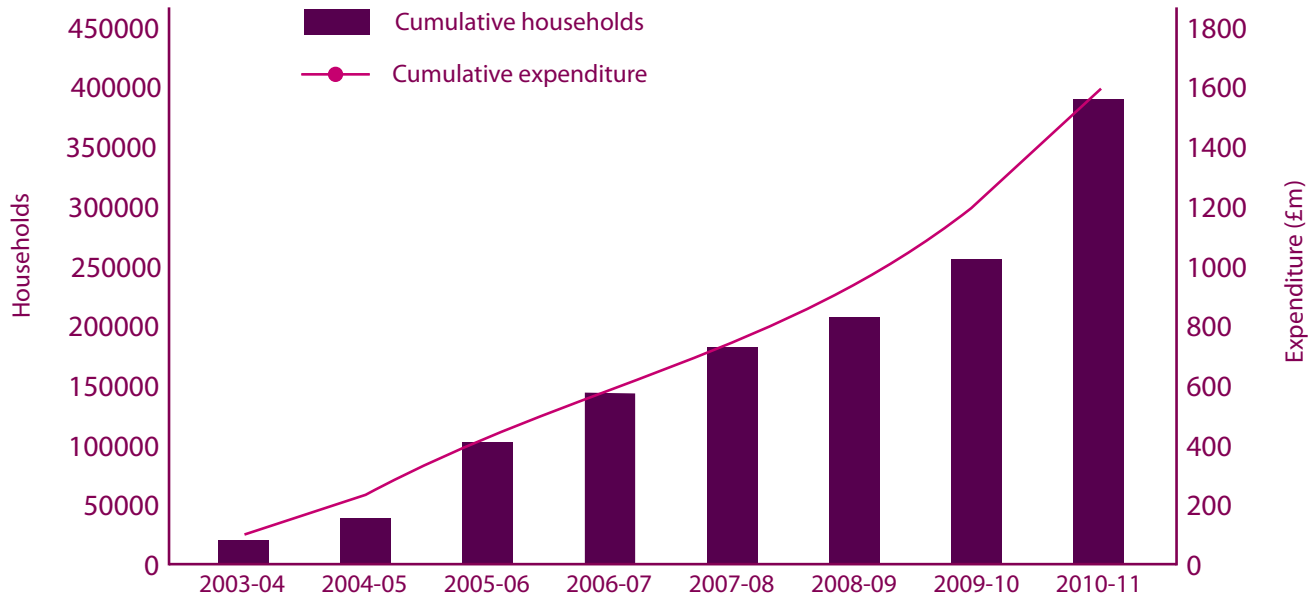
Figure three: Beneficiaries of flood risk management assets



Flooding is highly distressing. It is in the public interest to protect private property, as well as safeguarding the health and welfare of the individuals and communities at risk. However, the substantial private benefits that arise from managing flood risk should not be ignored. Sir Michael Pitt recommended that the Government encourages local communities to invest in their own protection. A result of this would be a better match between those that benefit and those that pay. This is discussed more in Section five.

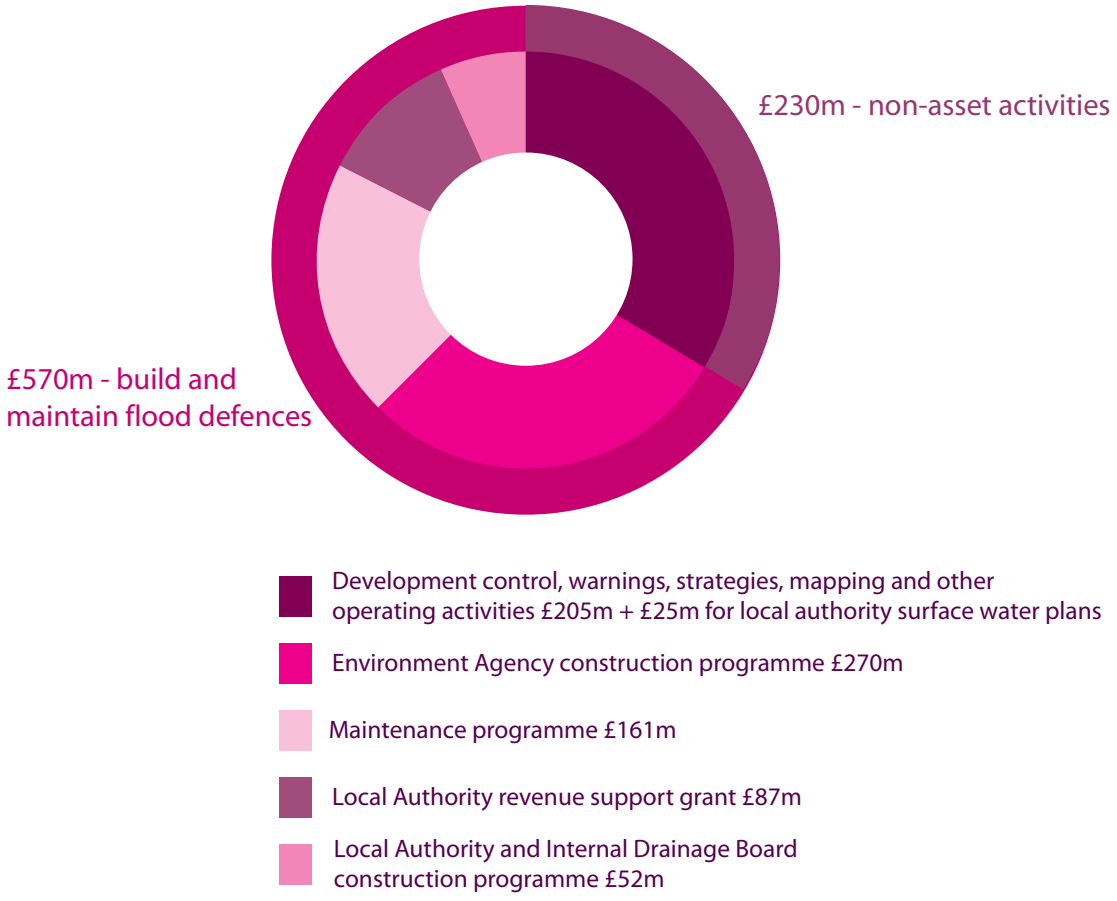
Figure four shows the Environment Agency's and local authorities' recent and planned spending on new and improved flood defences in England. Figure four does not include local authorities' own spending on maintaining defences and local drainage, of around £87 million a year. Investment over the last decade has led to a reduced risk of flooding for over 250,000 households.

Figure four: Number of households with reduced yearly risk of flooding and cumulative capital spending in cash terms on flood risk management assets



Building new flood management assets, like barriers or defences, is just one means of providing protection. Figure five shows how funding for flood and coastal risk management will be spent in 2010-2011. Most of the available funding is spent on improving existing flood defences or keeping them in good working order.

Figure five: Flood and coastal risk expenditure of £800m in 2010-2011



National infrastructure is often vulnerable to flooding

During a flood it is not just homes that are threatened by damage. National infrastructure and public services such as water treatment works and power stations are often close to rivers or the sea, and areas of high population. In the summer 2007 floods, Mythe water treatment works was flooded, which meant that 140,000 homes were without water for many days. Walham electricity substation, which supplies power to half a million homes, was very close to being flooded. Flooding also brought the M5 to a halt, leaving hundreds of motorists stranded and restricting access for emergency services. The closure also prevented temporary flood defences reaching Upton upon Severn.

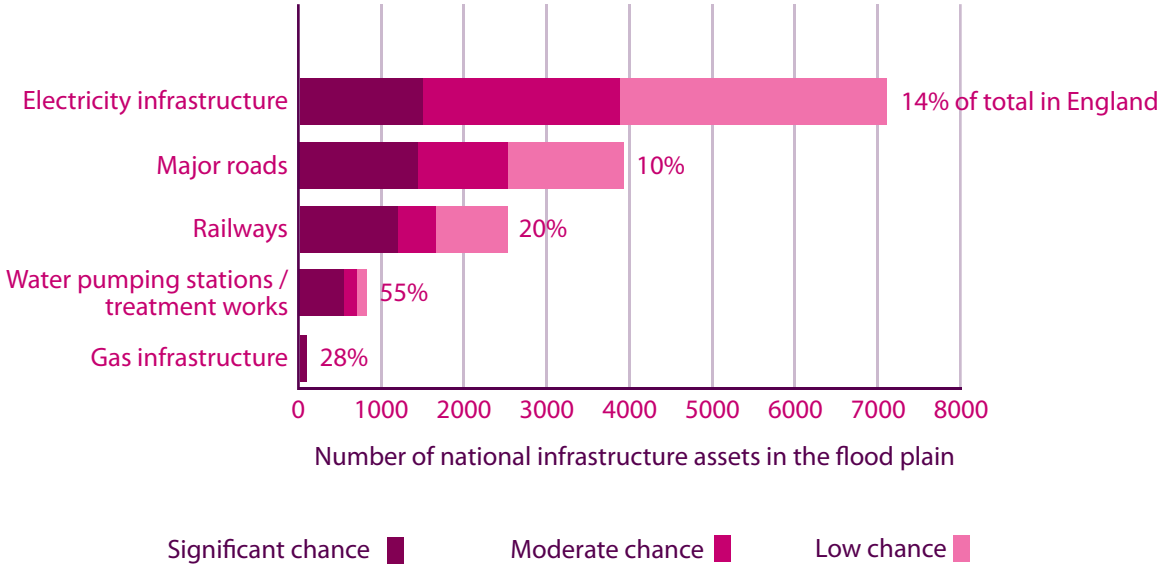
It has been estimated that the summer 2007 floods caused £36 million of rail-related costs to Network Rail including damage to infrastructure and compensation for train delays and cancellations. In addition, buildings that are critical in responding to and managing floods are themselves at risk of flooding. Of 39 'Gold Control Centres' in England in 2008, nine were in locations at risk of flooding.

In response to the review by Sir Michael Pitt into the 2007 floods, the Government has proposed a series of programmes to strengthen the resilience of essential services to flooding, focusing on the most critical sites. In particular, improvements have been planned to enhance the resilience of services to flooding of major water and electricity supply sites.

As well as national infrastructure, it is also important to consider other sites and services that accommodate and look after vulnerable people. These include hospitals, care homes, schools and nurseries. Similarly, caravan parks located near the sea may be used extensively by elderly people, but may also be located in areas with a significant chance of flooding. In such cases, early flood warnings and effective incident response activities are crucial to make sure that the people can be evacuated to a safe place in good time.

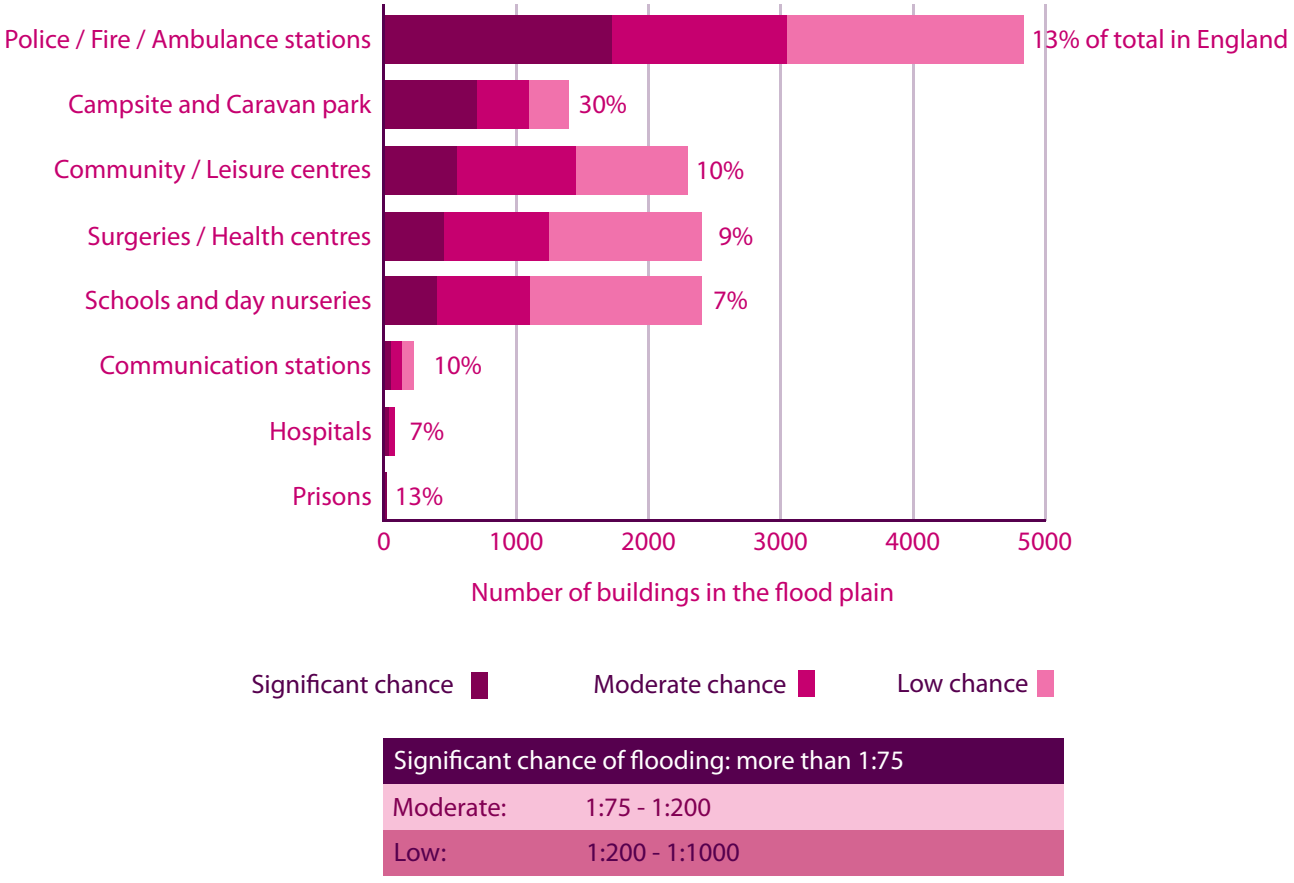
Figure six: National infrastructure assets in flood risk areas

Transport and utilities infrastructure:



(Note: the figures shown for roads and railways relate to network lengths in km.)

Other services:



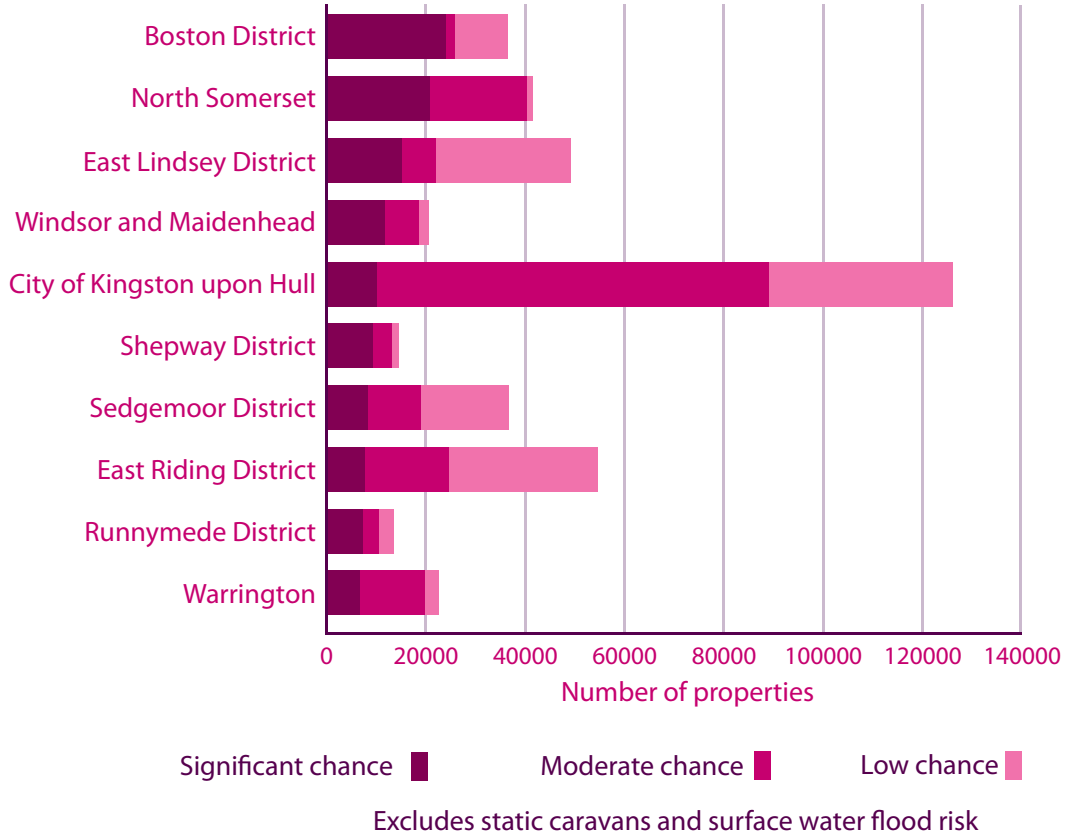
Source: National Flood Risk Assessment, Environment Agency 2008

Local authorities with most properties at significant risk of flooding

The Environment Agency's National Flood Risk Assessment (2008) allows us to identify those local authorities with the most properties in areas that have a significant chance of flooding.

Kingston Upon Hull and the East Riding of Yorkshire are two of the local authorities with the largest total number of properties at risk of flooding. However other local authorities, such as Boston and North Somerset, have a higher proportion of properties in areas of significant flood risk. For instance, in Boston about two-thirds of those properties at risk of flooding are in areas with a 1 in 75 chance of flooding in any given year.

Figure seven: Properties at flood risk: top ten by local authority



A mix of activities is used for flood and coastal risk management in a cost-effective, risk-based way

Floods are part of nature. It is neither technically feasible nor economically affordable to prevent all properties from flooding. Therefore, a risk-based approach is taken to achieve the best results possible using the budget and resources available.

The Environment Agency is a statutory consultee on applications for new building or development in flood and coastal risk areas, and influences developments to limit increases in flood risk. This work ensures that 96 per cent of new proposals that we object to on flood risk grounds do not obtain approval. However, it remains the responsibility of local authorities to make sure development does not affect future flood risk.

In 2007-2008, the Environment Agency's flood warning service was available to 61 per cent of properties at low, moderate and significant risk. The impact of flooding can reduce if investment in flood warnings and public information campaigns is continued. They help householders and business owners know what to do to prepare for a flood and when to take emergency action. Insurers can help, by reducing premiums and excesses for properties where occupiers subscribe to the Environment Agency's free Floodline Warnings Direct service.

3. The investment need for flood and coastal risk management

Five investment scenarios have been tested to assess how different levels of investment change the level of flood and coastal risk management.

In each, the costs and benefits are set out, including the damage avoided, for the one-hundred-year period between 2011 and 2110, and the number of properties at risk in 2035. This has allowed us to analyse the long-term results of these investments.

Our modelling includes the costs and benefits of assets to manage coastal, tidal and river flooding, together with the costs and benefits of managing coastal erosion. We have taken account of the changing risk of flooding and future rates of erosion at the coast. The number of properties at risk is for flood only, as data on properties at risk from erosion is not directly comparable.

Each investment scenario is explained below. The figures given are at today's prices, meaning that they ignore what inflation may do in the future.

The calculations used in this analysis follow standard procedures for valuing benefits of public investments in line with HM Treasury's Green Book.

Investment scenarios

1. £800 million from 2010-2011, with no inflation increase. Assumes the current level of investment in all flood and coastal risk management is not increased during the 25 year period.
2. £800 million from 2010-2011, plus inflation. Assumes the current level of investment in all flood and coastal risk management keeps pace with inflation.
3. £800 million from 2010-2011, with year-on-year increases as suggested in the *Foresight Future Flooding* report (an increase of around £15 million per year plus inflation was used).
4. As well as the investment in scenario three, target properties at significant risk of flooding where benefits of doing so are at least double the costs.
5. Target properties with a significant risk of flooding, where benefits of doing so are at least double the costs. Maintain the current level of risk for all other properties, regardless of cost.

For each scenario:

- Financial data shown uses 2008-2009 prices, and only spending on asset construction and maintenance has been analysed. This will be £570 million in 2010-2011.
- The costs and benefits of items such as flood warnings, development control and mapping have been excluded. To include them brings funding in 2010-2011 to £800 million.
- The risks and investment needs for surface water and groundwater flooding is much less developed than that for river and coastal flooding and coastal erosion. Therefore these sources of flooding have been excluded.
- Each scenario assumes that two per cent of efficiencies over and above inflation will be realised each year until 2015.
- Inflation is assumed to be 2.7 per cent a year until 2015, and two per a year annum thereafter.
- The Environment Agency will not have to meet the costs of funding defences for future developments as it is assumed that any new properties built in areas at flood risk will be defended by the developer.

Charts included in this section:

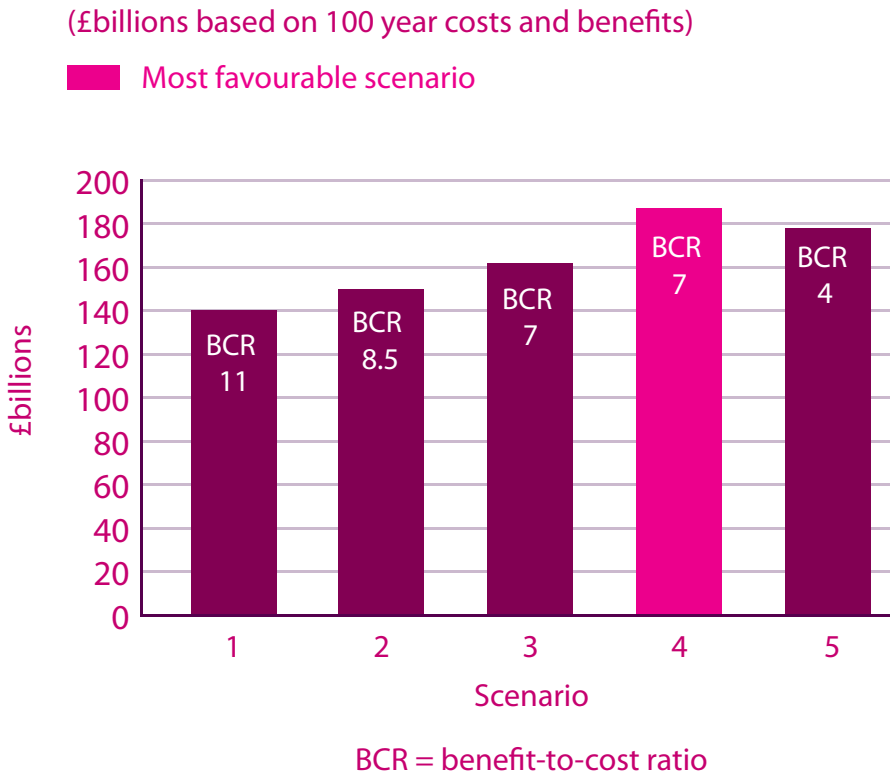
- Figure eight shows the 'net benefit' of each investment scenario.
- Figure nine shows the number of properties at significant and moderate risk in 2035 for each of the scenarios. For clarity, properties with a low chance of flooding (less than a 1 in 200 chance of flooding in a given year) are not shown.
- Figure ten shows the cumulative spend between 2011 and 2035 for each scenario.

Most favourable investment

Scenario four is the most favourable investment of those tested. It provides the greatest overall benefit to society, because it generates the greatest net return on investment. However, with this scenario, spending needs to **increase from the £570 million asset maintenance and construction budget in 2010-2011 to around £1,040 million by 2035, plus inflation**. This equates to an increase in investment in asset construction and maintenance of around £20 million plus inflation each and every year.

It is also worth noting that scenario five, which specifically targets the removal of properties from significant risk, includes some investment that may represent lower value for money – the net benefit of this scenario is lower than that of scenario four. This is because, although this scenario targets properties at significant risk while maintaining a benefit-to-cost ratio greater than two, it also includes significant investment to prevent properties from moving into the significant risk category, even if the benefit-to-cost ratio of this work is less than two.

Figure eight: Investment scenarios – the net benefit of investment

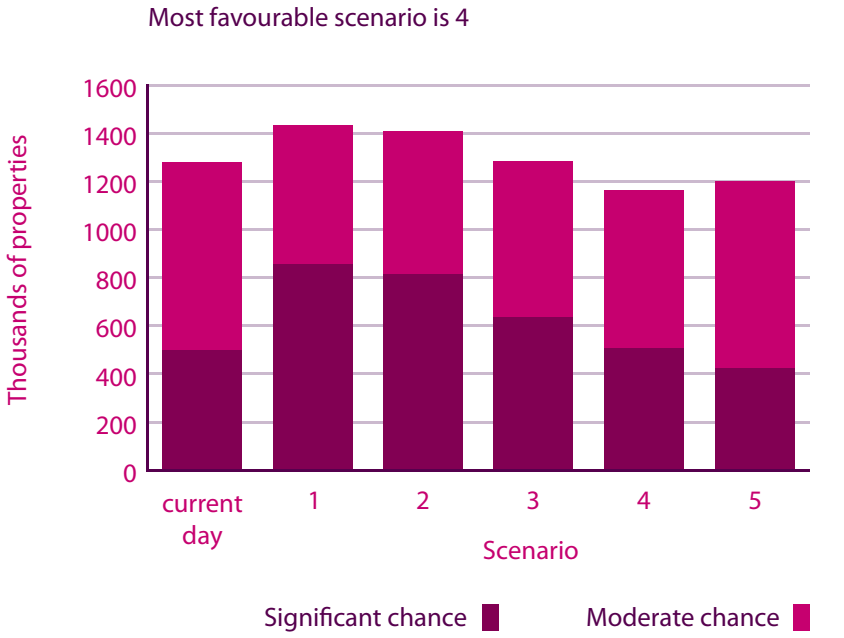


Future risk to property

Today, around 490,000 properties face a significant risk of flooding. If investment is kept at current levels (in 'cash terms'), there will be 350,000 more properties of which 280,000 will be residential with a significant chance of flooding by 2035. Increasing asset investment in line with inflation would mean that 330,000 more properties would be at significant risk of flooding than now.

If asset investment is increased to £1,040 million by 2035, as suggested by scenario four, from the £570 million in 2010-2011, roughly the same number of properties can be protected as today. As this scenario provides the highest net benefits for the money invested, this is proposed as the most favourable investment scenario of those tested. This analysis can be further explored and refined at regular intervals in the future, to help inform government comprehensive spending reviews.

Figure nine: Investment scenarios – properties at risk of flooding in 2035



For clarity, properties with a low chance of flooding are not shown

Future investment

The most favourable investment scenario needs nearly twice as much cumulative funding between 2011 and 2035 compared to scenario one (flat funding not accounting for inflation), but considerably less than scenario five, which targets the reduction of properties at significant risk.

Figure ten: Investment scenarios – cumulative spending 2011 to 2035 (shown in today's prices)

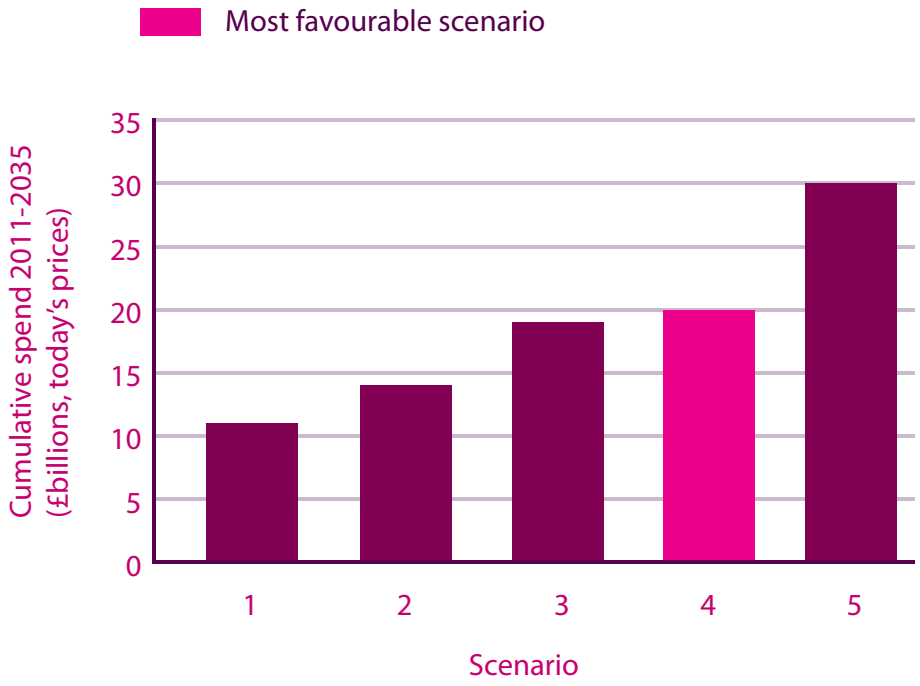


Table one shows that, with scenario four, spending on building and maintaining flood risk assets in 2035 will be £1040 million plus inflation, which is an 80 per cent increase on 2010-2011 levels. An estimate of the cost of managing the risk of surface water in 2035 is also shown for illustrative purposes.

Table one

	2011	2035 (Scenario four)
Build and maintain flood risk assets	570	1,040
Surface water actions	25	150
Totals	**595**	**1,190**

Other considerations

Defence against flooding can be increased, but floods will still happen, and not all properties can be defended. In the most favourable scenario almost half a million properties will still be at significant risk by 2035. Therefore, we must prevent properties from being built in areas susceptible to flooding in the first place, and the consequences of flooding must be reduced.

The Environment Agency will spend £17 million in 2010-2011 on ensuring that development in the flood plain is limited. The Environment Agency's advice on over 38,000 development applications in 2007-2008 prevented properties being built that might have increased flood risk to others or be at risk themselves. From January 2009 new developments built against Environment Agency advice will no longer be guaranteed affordable insurance by the Association of British Insurers.

The Environment Agency, with other organisations, will work with the owners and occupiers of properties already in the floodplain to reduce the consequences of floods. Properties can be made more resilient. Over the next 25 years, making individual properties more resilient to flooding will play an increasingly significant role in reducing risk.

In 2007-2008, Floodline Warnings Direct (FWD) was available to 1.23 million properties in England and Wales. FWD should be available to 80 per cent of properties at flood risk by April 2013. By 2035 the service should be available to all properties at risk. The Environment Agency will spend £42 million on flood warnings and responding to flood incidents in 2010-2011. By 2035, these costs are likely to have risen as coverage is increased.

The insurance industry has a vital role in managing flood risk. Working with the insurance industry, it may be possible to change people's behaviour before, during and after floods. For example, companies could reduce premiums and excesses for policy holders who subscribe to flood warning services. The Environment Agency believes that insurers could do more to ensure that properties that have been flooded are restored to a higher standard of flood resilience.

4. Working more effectively with partners and suppliers

Many different public and private bodies are involved in managing flood and coastal erosion risk, each accountable for different aspects of risk management.

Many different public and private organisations have a part to play in successful flood and coastal erosion risk management. Each has its own duties and responsibilities. The Environment Agency's role is to guide, oversee and advise, and to allocate available funding according to a strict hierarchy of national need. We maintain regular communication with all other flood and coastal risk management organisations, including contractors and consultants. We continuously review working arrangements to be as efficient as possible.

The Environment Agency's challenge is to help all of these bodies work together to achieve the Government's outcome measures. The Pitt Review recommended greater involvement in flood and coastal risk management at a local level. This section explores the approach that needs to be taken to bring all of these bodies together. Further analysis and consultation is needed, however, before decisions are made.

Future approaches will need to consider ways of harnessing the 'centres of expertise' that exist within those delivery bodies and suppliers.

Working with partners

Any agreed future approach to flood and coastal risk management needs to:

- Be based on a coherent, all-embracing approach to flood and coastal risk management whatever the source.
- Ensure all delivery partners share common objectives which can be communicated to those at risk of flooding, leading to greater awareness and confidence within the community.
- Ensure coordinated planning between all organisations to deliver improved outcomes for at-risk communities.
- Reconcile potential tensions between national priorities and the need for local leadership, influence and accountability.
- Ensure that all partners have access to high quality flood and coastal erosion risk data and have the skills and knowledge to carry out their responsibilities.
- Pool funding, skills, knowledge and expertise from different organisations to execute joint projects and avoid duplication.
- Continue striving for efficiency gains.

The Environment Agency has discussed this approach, and how it might be achieved, with partners and suppliers that play a role in reducing flood risk. There is a clear appetite to work together more effectively.

However, changes will be required from all organisations to achieve a fully integrated approach. It is envisioned that this will build upon good practice which already exists in parts of the country, where strategic governance boards develop local action plans and generate programmes exploiting joint schemes wherever possible.

Working with other delivery bodies

Local Area Agreements (LAAs) and Multiple Area Agreements (MAAs) provide a platform for increased collaboration between public sector organisations in the early phases of planning. LAAs are widely used with over 150 currently in place. However only a small number currently explicitly include flood and coastal risk management issues. Making flood and coastal risk management a primary objective within LAAs will be a key step to improving planning processes. MAAs have the potential to encourage additional funding from other sources, and provide greater flexibility and stronger partnerships.

Working with suppliers

The Environment Agency already uses external suppliers widely across its flood risk management work. In 2007-2008 the expenditure on external services was around £240 million, out of a total £400 million spent on asset construction and maintenance. Consultants and contractors undertake the detailed design and construction of assets, and supplement capacity and capabilities in other areas.

Some of the changes being considered will mean that the Environment Agency's Flood and Coastal Risk Management business will be delivered very differently. Managing longer-term high-value contracts may realise efficiencies, but will require different skills in our workforce, and core skills sets will need to be strengthened. For example, the potential to increase the scope and scale of tasks carried out by external suppliers will increase the need for the Environment Agency to retain and develop its 'intelligent client' role. Both the Environment Agency and local authorities have identified the difficulties in recruiting technical resources which will present an ongoing risk to managing flooding and coastal erosion.

Within the Environment Agency, there will be further savings from:

- streamlining the overall planning and approval processes for new assets;
- designing and implementing simpler asset management processes;
- combining asset improvement and maintenance activities, while ensuring there is no detrimental impact on incident response activities;
- integrating the design, build and operation of assets;
- reviewing risk transfer provisions in our contracts, including making contractors responsible to a greater extent for the achievement of outcomes.

Future developments

Achieving an increased partnering approach to delivery is realistic in the early years of this 25-year investment strategy. This, and the further development of new business models in the longer-term across all delivery partners and suppliers will require continued consultation and information gathering, including:

- consultation with other organisations (the Department of Communities and Local Government, local authorities, water companies) on working more closely to agree how sustainable flood risk solutions are developed and implemented;
- determining the extent to which integration should be applied (for example at a national, regional or catchment level);
- determining the scope of activities that could be included and the timescales for how future flood risk governance will operate;
- finding out whether suppliers are able to work with these approaches, and the commercial issues that would need to be overcome to make them work;
- considering how such arrangements would impact on the current structure, processes and culture of the organisations involved.

5. Additional sources of funding and efficiency

This strategy demonstrates the need for increasing investment to combat the impact of climate change. If the favourable scenario is adopted, annual spending needs to almost double in real terms by 2035.

Local contributions

In calling for this *Long-term investment strategy* in his independent review of the 2007 floods, Sir Michael Pitt said that, 'this long-term approach should not assume that the costs of flood risk will be met centrally. There are direct beneficiaries from flood defence work, and aligning those who benefit with those who pay will bring greater efficiency and greater responsiveness from those carrying out the work.'

Government supported this view in its response to Sir Michael's report and suggested county and unitary authorities, in their new local flood risk leadership role, should consider whether local priorities could be funded differently. The Environment Agency supports the Government in its desire for a well-informed public debate on what further approaches might be explored to supplement central funding by enabling (local) beneficiaries to contribute to reducing flood risk.

In recent years almost all investment has been funded by central government from taxation revenues. A shift towards 'beneficiary pays' has already begun for new developments. The Environment Agency's new external contributions policy aims to ensure that developers pay the full cost of any risk mitigation measures necessary for their projects.

Developers

The Government and the Association of British Insurers agreed a revised Statement of Principles in 2008. This states that owners of properties in areas at significant flood risk built after January 2009 can no longer assume they will receive cover under their domestic insurance policies, necessitating more costly stand-alone insurance cover. This encourages developers and property owners to better manage the risk themselves, and for developers to consider the flood and coastal erosion risk management costs as they plan and present applications for new building projects.

Insurance companies

Insurance companies could help reduce the cost of recovering from water damage by ensuring that repairs to flooded homes make the property better able to withstand and resist the impact of future flooding. The trend is for insurance terms to more and more closely reflect local risk. We believe that insurers should reduce premiums and excesses when new defences are announced or built, or when owners sign up to the flood warning service and fit measures such as flood boards and air-brick covers, giving property owners an incentive to manage their flood risk better. At present there is no evidence that insurance premiums reduce when customers take measures to protect themselves from flooding.

The Environment Agency

In the Environment Agency we have also improved our ways of working to be more cost-effective. Defra and HM Treasury recognise the way we manage procurement for projects as an exemplar of good practice within the public sector. Our approach has also featured positively in the NAO's report on *improving Public Services Through Better Construction* and in the OGC's documentation *Achieving Excellence in Construction*. We have also reduced our project development times and costs.

Improvements in procurement and contracts with suppliers, as well as in asset construction and maintenance activities, have achieved savings of £70 million (five per cent) between 2005 and 2008. This money has been invested in additional flood and coastal risk management schemes. A further £50 million (three per cent) of savings are forecast for the three years to 2011. This performance sets the foundation to achieve further savings in the future – the analysis detailed in chapter three includes the assumption that two per cent of efficiencies in flood and coastal risk management will be realised each year over and above inflation until 2015.

Summary

This *Long-term investment strategy* provides an evidence base which clearly shows that investment must rise significantly because of climate change impact, and that the associated benefits of doing so will substantially outweigh the cost.

If investment continues at the current level of £800 million a year, there will be a further 350,000 properties in England with a significant chance of flooding from rivers or the sea by 2035.

Developers should pay for the management of any increased flood risk that they create, and voluntary contributions for local flood risk management schemes have some potential. However, the modelling outlined in this strategy suggests that investment will need to have almost doubled by 2035 compared with 2010-2011, (excluding inflation). In addition to efficiency savings and voluntary contributions, it is likely that more fundamental measures – including alternative sources of funding – will be needed.

A well-informed public debate is needed to decide what such measures would look like. Currently around 95 per cent of flood and coastal risk management investment is funded through central government. Such a debate will be vital to inform the next comprehensive spending review, and the choices that the Government will need to make.

Flooding is a natural, complex process. Knowledge about flood and coastal risk and about climate change is constantly developing. The risk of surface water flooding is far less understood than that of flooding from rivers or the sea. Work continues to improve the understanding and mapping of surface water flood risk.

This *Long-term investment strategy* will form the foundation for our future work in analysing future flood and coastal risk and the associated investment needs.

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To view annexes containing further supplementary information to this strategy and to view relevant case studies, please visit www.environment-agency.gov.uk/flood

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