



**CabinetOffice**

# Sector Resilience Plan for Critical Infrastructure 2010

March 2010

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Publication date: March 2010

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# INTRODUCTION

The independent review by Sir Michael Pitt of the summer 2007 floods recommended the development of plans to reduce the vulnerability of critical national infrastructure to flooding and other natural hazards.<sup>1</sup>

Accordingly, the Government has established a Critical Infrastructure Resilience Programme: a collaboration between owners/operators of critical infrastructure in the nine recognised infrastructure sectors,<sup>2</sup> government departments sponsoring these sectors, and regulators.<sup>3, 4</sup>

A key output from this programme is the development of sector resilience plans, setting out the current level of resilience of critical infrastructure and essential services to natural hazards. The first iteration of the plans were completed at the end of 2009. They focussed on the resilience of the most critical infrastructure in each infrastructure sector, and to flooding only. Information in respect of other critical infrastructure, and other types of hazard, will be included in future iterations.

The detailed plans for each sector were required to address, as a minimum:

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<sup>1</sup> Further information on the Pitt Review and the Government's response can be found at: [www.defra.gov.uk](http://www.defra.gov.uk)

<sup>2</sup> The National Infrastructure is categorised into nine sectors: energy, food, water, transportation, communications, emergency services, health care, financial services and government

<sup>3</sup> Further details of the Critical Infrastructure Resilience Programme can be found at: [www.cabinetoffice.gov.uk](http://www.cabinetoffice.gov.uk)

<sup>4</sup> Where a sector or sub-sector is devolved, the devolved administration is the equivalent of the sponsoring government department

- the identification of critical national infrastructure in each sector
- current understanding of the risks from river and coastal flooding to critical infrastructure and essential services in each sector;
- what is already being done directly and indirectly to address deficiencies in resilience to severe disruption from flooding; and
- further work that will be needed to improve resilience to disruption from flooding to the initial interim standard of resilience to a 0.5 per cent annual probability of flooding.

This document sets out a summary of those plans.

## The National Infrastructure Sectors

The UK's national infrastructure is defined by the Government as: "those facilities, systems, sites and networks necessary for the functioning of the country and the delivery of the essential services upon which daily life in the UK depends".

Within the national infrastructure, there are certain critical elements, the loss or compromise of which would have a major impact on the availability or integrity of essential services leading to severe economic or social consequences or to loss of life in the UK. These critical elements make up the critical national infrastructure (CNI).

The national infrastructure is categorised into nine sectors: energy, food, water, transportation, communications, emergency

services, health care, financial services and government. Some sectors are further divided into sub-sectors, as represented in Figure 1. Of course, in an increasingly networked society, these sectors and sub-sectors do not work in isolation and there are many dependencies and interdependencies between them.

This first iteration of the Sector Resilience Plan for Critical Infrastructure focuses on the vulnerability of the most critical assets in each of the nine sectors, referred herein as Critical National Infrastructure (CNI). The Cabinet Office undertook this initial prioritisation by mapping the most critical sites in each sector with the Environment Agency flood maps to determine the sites located in areas that could flood from rivers or the sea within England and Wales. Separate mapping exercises were undertaken using the relevant flood information for Scotland and Northern Ireland.

## Resilience

In the Critical Infrastructure Resilience Programme, resilience is defined as “the ability of a system or organisation to withstand and recover from adversity”. A resilient organisation is one that is still able to achieve its core objectives in the face of adversity through a combination of measures.

Protection may make up an important part of resilience, but it is not the only factor. Resilience is also underpinned by good design of infrastructure networks, effective emergency response, business continuity planning, and recovery arrangements.

## Sector Resilience Plans

The sector resilience plans set out:

**The priorities** for improving resilience within each sector, taking into account:

- The numbers of critical national infrastructure sites within the sector;
- The extent to which the risks to these sites, initially of coastal/fluviat flooding, have been able to be mapped on a geographic basis;
- The extent to which the resilience of the sites has been assessed.

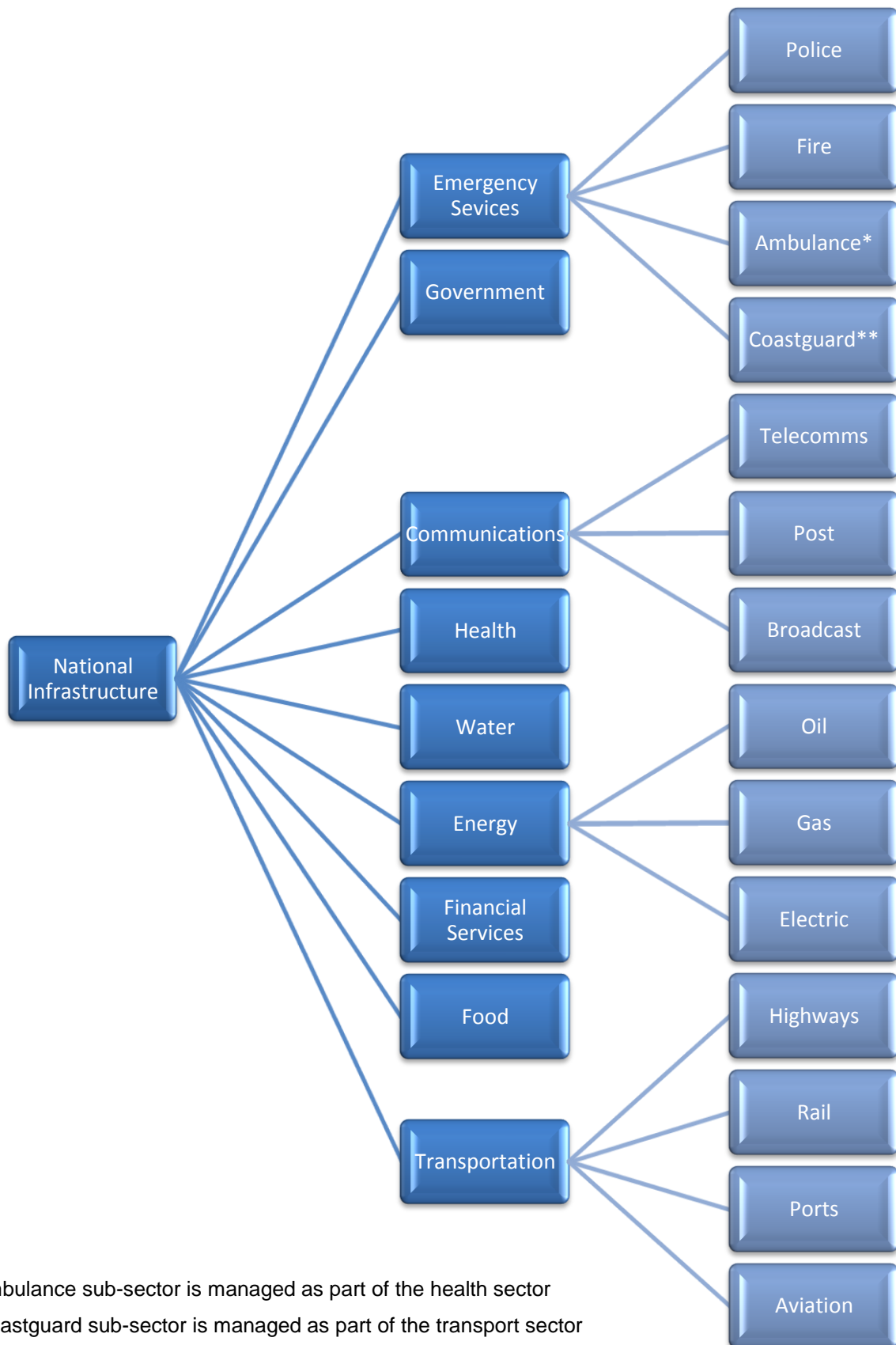
**Plans** to improve resilience through an efficient, and cost-effective, combination of one or more of the following:

- Reduced vulnerability through
  - Permanent measures reducing the vulnerability of infrastructure to flooding
  - Temporary or emergency preventive measures such as temporary or dismantable barriers
- Improved preparedness through
  - Better linkage to alert mechanisms such as the Flood Forecasting Centre, and Floodline Warnings Direct
  - Better contingency planning and exercises
  - Improved mechanisms for cooperating with other (both category 1 and 2) emergency responders.
- Improved response/business continuity measures

- Business continuity standard BS25999 or equivalent
- Mutual aid within the sector or industry
- Improved recovery measures.

***The respective roles and responsibilities*** of infrastructure operators, lead government departments, devolved administrations and regulators in each sector for setting standards, determining priorities, and meeting costs of improving resilience for that sector.

**Figure 1: The nine national infrastructure sectors with associated sub-sectors**



\* Ambulance sub-sector is managed as part of the health sector

\*\*Coastguard sub-sector is managed as part of the transport sector

## Next Steps

Sector Resilience Plans are the first step towards the establishment of a national resilience plan for critical infrastructure, which meets the full intent of the proposals accepted by the government from Sir Michael Pitt's review of the 2007 floods:<sup>5</sup>

“that the Government should establish a systematic, coordinated, cross-sector campaign to reduce the disruption caused by natural events to critical infrastructure and essential services.”

Specifically, it meets recommendation 51, and contributes to recommendations 50 and 52, of the five recommendations of the final Review:

- Recommendation 50: The Government should urgently begin its systematic programme to reduce the disruption of essential services resulting from natural hazards by publishing a national framework and policy statement setting out the process, timescales and expectations. (This recommendation was accepted in the Government's response to the review)
- Recommendation 51: Relevant government departments and the Environment Agency should work with infrastructure operators to identify the vulnerability and risk of assets to flooding and a summary of the analysis should be published in Sector Resilience Plans. (Accepted)

- Recommendation 52: In the short-term, the Government and infrastructure operators should work together to build a level of resilience into critical infrastructure assets that ensures continuity during a worst case flood event. (Accepted)

The first iterations of the sector plans will be used in the short term to build resilience in the most critical infrastructure to flooding hazards. The outcome of that work will be set out in the National Resilience Plan for Critical Infrastructure, due to be published in 2011. This will establish a long-term, all-risks programme to reduce the vulnerability of critical infrastructure and essential services to severe disruption from natural hazards.

The Cabinet Office will work closely with the Government's Adapting to Climate Change Programme, which takes a broader view of how future climate will impact on an organisation's functions and how organisations will need to adapt to these impacts.<sup>6</sup>

The Programme also has close links with the Resilience Capabilities Programme within Cabinet Office, which aims to ensure that a robust infrastructure of response is in place to deal rapidly, effectively and flexibly with the consequences of civil emergencies and widespread disaster inflicted as a result of conventional or non-conventional disruptive activity and natural disasters.<sup>7</sup>

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<sup>5</sup> Further information on the Pitt Review and the Government's response can be found at: [www.defra.gov.uk](http://www.defra.gov.uk)

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<sup>6</sup> Further information on the Adapting to Climate Change Programme can be found at: [www.defra.gov.uk](http://www.defra.gov.uk)

<sup>7</sup> Further information on the Resilience Capabilities Programme can be found at: [www.cabinetoffice.gov.uk](http://www.cabinetoffice.gov.uk)



# WATER SECTOR

## Overview

The UK water sector comprises a combination of public and private bodies, delivering water and sewage services.

The sector was badly affected by the flooding in 2007. Notably, the Mythe water treatment works in Gloucestershire was flooded leading to loss of piped water supply to 350,000 people. As with the electricity sector, this 'wake up call' has prompted rapid action by asset owners to put in place protective measures to prevent a repeat of the 2007 failures. For example, the temporary flood defences erected around the Mythe water treatment works have been reinforced.

A longer term programme of resilience building continues across the sector. The final determination by the Office of water regulation (Ofwat) on water company prices in November 2009 provided for some £400m of expenditure by water companies over the next five years on making their treatment works and other assets more resilient to flooding and other hazards, thus protecting customer supply. In addition around £400m was also included within the price review to increase resilience related to Security and Emergency Measures Direction.

In the mapping exercise of the Critical Infrastructure Resilience Programme, sixty-three CNI sites in the water sector were identified as being at risk from flooding. Asset owners provided information about risk and resilience for their sites and the majority have monies committed to further resilience work

or have determined that flooding of the sites would have a limited operational impact.

Overall, the historical focus has involved the hardening of assets against physical attack rather than building asset resilience to flooding. Flood resilience has therefore been developed on a piecemeal basis by individual asset owners. The policy initiatives by the Department for Environment, Food and Rural Affairs (Defra) and Ofwat in response to the 2007 floods have now set in train a programme of flood resilience building across the sector.

## Background

In England, there are nine water and sewage companies and eleven water supply only companies. Wales and Scotland are primarily serviced by single organisations – a not for profit company and public body respectively. There is also one water only company in Wales. In Northern Ireland water remains a government function.

Since privatisation in 1989, most of the industry in England has been funded by a combination of shareholders and lenders. As sole economic regulator, covering England and Wales, Ofwat is responsible for both setting price limits and economic levels of service. In 2009, Ofwat established price limits for the period 2010 to 2015, based upon company business following a methodology that had been subject to public consultation.

The obligation on a water company to protect infrastructure from flooding and/or build in resilience is not explicitly stated, but it is implicit in the Water Industry Act and the

Security and Emergency Measures Direction. Section 37 of the Water Industry Act states: General duty to maintain water supply system etc

(1) It shall be the duty of every water undertaker to develop and maintain an efficient and economical system of water supply within its area and to ensure that all such arrangements have been made -  
(a) for providing supplies of water to premises in that area and for making such supplies available to persons who demand them; and  
(b) for maintaining, improving and extending the water undertaker's water mains and other pipes, as are necessary for securing that the undertaker is and continues to be able to meet its obligations under this Part;  
and Section 94 states likewise for sewerage.

The Security and Emergency Measures Direction again does not explicitly state that infrastructure should be protected, but that "1-(1) The undertaker shall make, keep under review and revise such plans as it considers necessary to ensure the provision of essential water supply or, as the case may be, sewerage services at all times, including a civil emergency or any event threatening national security..."

To this end, the focus of resilience building has tended to be on hardening assets to deter physical attacks, build in network interconnectivity to minimise sole supply and providing a continued service in the event of failure (e.g. supply of alternative water in bowsers and bottles), rather than making each individual asset more resilient.

Following the floods of 2007, the new Statutory Social and Environmental Guidance issued to Ofwat stated that companies are

expected to consider the vulnerability of their critical assets and assess the resilience of their asset systems in providing services to their customers and the environment. And in June 2008, in preparation for the price review, Ofwat produced guidance on flood resilience – "Asset Resilience to Flood Hazards: Development of an analytical framework". This gives specific interpretation of the need to use Environment Agency mapping of flood risk to formulate a proportionate and prioritised response.

### **Assessment of Vulnerability**

Sixty-three critical sites in the water sector were identified as being at risk from flooding.

By its very nature, the water industry is threatened by flooding, as many of its core assets must be located adjacent to sources of water. Although locating these assets outside a floodplain is possible, the increased levels of pumping would vastly enlarge the industry's carbon footprint and increase the vulnerability of operations to loss of power supply, making this an unsustainable option.

Based on the information provided by asset owners of the identified 'at risk' sites, it has been determined that flooding of their sites would either have limited operational impact (either by the protection afforded by defences or the elevation of critical components out of the flood plain) or are currently undertaking resilience works. Some of this resilience building work has taken place very quickly following the 2007 floods, for example, the temporary flood defences erected around the Mythe Water Treatment Works in Gloucestershire have been reinforced, and handling capacities associated with some of the key pumping installations in Hull were increased by August 2008.

## Building Resilience

As part of the Security and Emergency Measures Direction and Cabinet Office Resilience Capabilities Programme, Defra works with the water industry to develop and provide a safe and secure industry. This is achieved by protecting water supplies and sewerage services from deliberate disruption and ensuring water companies have plans in place for dealing with any event.

Security and Emergency Measures Direction (SEMD) 1998 is the main guidance of planning for 'any event' in regards to security of supply and service in the water sector. SEMD operates in a similar way to other business continuity standards such as British Standards Institute Business Continuity Management (BS25999) but is specifically honed to the needs of the water industry. SEMD compliance is annually assessed and audited externally by Defra appointed certifiers. This ensures emergency response and continuity of service plans are up-to-date.

While the direction itself has remained unchanged since 1998, the accompanying guidelines which drive business continuity have been already been updated five times. This flexibility within the regulatory framework allows Ofwat and the lead department to update, amend or alter duties upon the industry. For example, since 1998 the water industry in England and Wales has planned to deliver a minimum water supply of 10 litres per person per day during a loss of the piped supply. During the Mythe incident in 2007 the actual amounts delivered exceeded this planning value by 150%. Therefore, Defra reviewed the minimum requirement, and in 2009 issued a revised requirement that the planning threshold is raised to 20 litres per

person per day when the event exceeds 5 days in duration.

While the Water Industry Act and the SEMD form the backbone for addressing resilience, there were a series of developments from 2007 onward that have contributed the establishment of a wider resilience agenda within the sector.

Capability analysis is undertaken for the water industry twice a year. This enables long term capability targets to be set based on an assessment of the capabilities already in place against those necessary to cope with the risks in the National Risk Register coordinated by the Cabinet Office.<sup>8</sup> Capability analysis is not limited to natural hazards but looks at a range of scenarios that could disrupt water supply and sewerage services including the loss of infrastructure as a result of flooding.

As noted above, however, there has previously been a focus on being able to respond in the event of an emergency by providing alternative water. Since 2007 the focus has broadened towards building network resilience e.g. flood barriers, and the ability to switch supply within the network from unaffected sources. The main factor limiting the development of this wider network capability has been an insufficient consideration of the potential impacts of extreme flood events at critical sites.

The Ofwat guidance and subsequent approvals in the 2009 price review have sought to address this issue (see above) and in September, 2009, Defra published a consultation on competition within the water

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<sup>8</sup> Further information on the National Risk Register can be found at: [www.cabinetoffice.gov.uk](http://www.cabinetoffice.gov.uk)

sector called the Cave Report.<sup>9</sup> This report accepts that there are structural issues in the water sector which need regulation innovation to drive up competition and may by default increase resilience.

Given the work done by the tripartite working relationship within the sector (industry, regulators and government), 'Advice Notes' and 'Baseline' standards for SEMD were provided to all of the water companies to assist in the recent price review. In addition the Ofwat publication on flood resilience – 'Asset Resilience to Flood Hazards: Development of an analytical framework' – also provided clear guidance and a methodology for companies to follow.

This approach in the lead up to the 2009 price review led to the approval of over £400 million of proposals to increase the resilience of key services to hazards such as flooding, over the next five years. There was also a similar amount of investment related to SEMD activities.

There is flexibility and adaptability built into the regulatory approach to resilience planning and funding and any work deemed necessary but which fell outside the current five year plan may be allowed by Ofwat under the change protocol procedure.<sup>10</sup>

## Further Action

The proposed Flood and Water Management Bill 2009, will affect the water sector in terms of resilience building.<sup>12</sup> A specific duty has been assigned to Local Authorities and the Environment Agency for responsibility for pluvial flooding mapping and management. Additional legislation is being developed to

reclassify water company duties to cover risk management for flood and coastal erosion. This is being developed between Defra, Ofwat and the industry.

Building upon the experience of the Periodic Pricing Review of 2009, Ofwat will publish in March 2010 a good practice in climate change review and exemplars. These exemplars will include successfully funded real-life case studies of resilience projects. They will highlight best practice in impact assessment, mitigation planning and cost benefit analysis and serve to raise the standard and detail of resilience proposals submitted to Ofwat.

Industry itself has proactively organised a protocol for emergency sharing of equipment between water companies. This is brokered by Water UK, the main industry trade body. This supplements existing individual company resilience plans. It offers a more holistic approach to the water sector as a networked utility and not as stand alone operators.

As set out in the introduction to this document, the Critical Infrastructure Resilience Programme (CIRP) within Cabinet Office will be working with relevant Lead Government Departments to put in place procedures for assessing the vulnerability of critical infrastructure to natural hazards, and to measure the levels of resilience in the sector.

Once the levels of resilience expected by Government has been determined and the current levels of resilience better understood, a further programme of resilience building can be quantified and planned. The resilience building programme will be integrated with the Cabinet Office Resilience Capabilities

<sup>9</sup> [www.defra.gov.uk](http://www.defra.gov.uk)  
<sup>10</sup> [www.ofwat.gov.uk](http://www.ofwat.gov.uk)

Programme, to align the programmes with those addressing issues of response and recovery in the event of an emergency.

The Critical Infrastructure Resilience Programme will also work closely with the water sector, ensuring it provides the more detailed standards of resilience which the sector seeks for future activity and establishing what further information on hazards the government can provide in order to assist with resilience building.

Future plans to improve resilience need to be developed jointly through a tripartite relationship between the Defra, the economic regulator Ofwat and the water industry as the owners and operators of the assets. This needs to be built on a common understanding of service standards to protect against flooding and other natural hazards and over an agreed timetable.

# COMMUNICATIONS SECTOR

## Overview

The Communications Sector comprises telecommunication, broadcast and postal services. There are currently no CNI assets at risk of flooding in the broadcast and postal service sub-sectors and therefore this commentary focuses primarily on the telecoms sub-sector.

The UK telecommunications industry is a constantly evolving sector offering a wide variety of different services and containing a multiplicity of companies. It is considered that resilience is conferred by:

- The ability to switch between the major networks in the event of failure;
- The competitive nature of the market, which should encourage building resilience within business models;
- The ongoing co-operation between Government and the sector through a number of fora including the Electronic Communications - Resilience and Response Group (EC-RRG) and the Telecommunications Industry Security Advisory Council (TISAC).

There is also an extensive programme of work being put in place, led by the Cabinet Office, to ensure essential lines of communication (e.g. for the emergency services) are maintained in the event of the failure of the network.

In the mapping exercise of the Critical Infrastructure Resilience Programme, fourteen CNI sites in the telecoms sub-sector were identified as being at risk from flooding. The majority of those sites are already protected by wider flood defence mechanisms, although the Department for Business Innovations and Skills (BIS) is seeking further information regarding the vulnerability of these specific sites to flooding and the consequence of loss. However, the nature of the sector is such that most of these sites already have remote back up in place.

In conclusion therefore, although there are procedures in place to ensure the continuity of essential communications in the event of the loss of part of the communications network, and the sector already has an inbuilt level of resilience to flooding as a consequence of the actions of individual companies, reassurance and the details of the level of resilience have not previously been sought by Government. BIS is now working closely with the sector as a whole to address this knowledge gap. In particular, the Digital Economy Bill will place a duty on the regulator, Ofcom, to report to the Secretary of State on the overall resilience of the telecoms sector to any form of shock, which will include flooding. This is intended to provide a clearer view of the resilience of UK telecoms, with the intention of enhancing overall investment in infrastructure.

## Background

The UK telecommunications infrastructure is based around several different types of communication: fixed telephony, mobile telephony, the internet and satellite communication, and is regulated by Ofcom.

These different types of telecoms provision are broken down into a number of different companies who operate on and/or maintain the UK's telecoms infrastructure. This infrastructure is an interlinked network or mesh of cables and services that link together to provide the UK with its telecommunications network. The main part of this network - the backbone of the interlinked network - is operated by British Telecom (BT). BT still retains responsibility for the most important and greatest part of the network.

Telecoms emergency planning and response is lightly regulated, and no general powers of direction are available to the Secretary of State, although providers of public telephony have a basic responsibility to make arrangement for provision of rapid restoration of communications service in disasters. The emergency plan for the telecoms sector is owned by the industry, which it maintains in close cooperation with Government.

The postal sub-sector is inherently resilient owing to the wide and dispersed network of collection points, points of presence, mail centres, satellites hubs and delivery offices. At short notice these facilities can be deployed to compensate for disruptions within the network. There are no CNI sites within the sub-sector and therefore it is not considered further in this iteration of the Sector Resilience Plan.

### **Assessment of Vulnerability**

It is in the interest of telecoms companies, in an extremely competitive market, to maintain service by ensuring a good level of resilience. The ability to switch between the major networks, combined with industry and Government cooperation to mitigate against

disruption to telecoms services, has ensured a good level of inherent resilience. In addition, the network is continually improving. The transition to 21st century networks is replacing copper cables with fibre optic cables, which can carry more information making it easier to re-route large volumes of calls over the network if there is a failure in one part of it. Resilience activity has been driven by an ongoing commitment to maintain and improve resilience, as well as an ability to react quickly to individual incidents resulting in, for example, the reassessment of cabling locations and alternative back-up capacity.

This inherent resilience has meant that major telecoms installations have not been badly affected by flooding. For example, the summer 2007 floods had very little impact upon the network infrastructure.

Nonetheless, flooding can still disrupt the network, for example, preventing access to the masts that the mobile network relies on. The floods in Carlisle in January 2005 caused flooding of a local exchange, which impacted on the ability of emergency responders to operate effectively. However, lessons have been learnt and changes made to emergency response plans since this event. These were demonstrated by the effective response of the industry to further Cumbrian flooding in November 2009.

It is therefore vital that Government is able to work with industry and Ofcom to ensure the light touch regulation continues, whilst seeking reassurance that the sector adequately understands the risks posed by natural hazards and is taking appropriate resilience building activity.

## Building Resilience

The main forum for cross sector co-operation for resilience is the EC-RRG. This group is an industry chaired group comprising many of the UK's major telecoms providers and relevant Government departments. BIS provides the secretariat function. There is also representation from the Cabinet Office, the Centre for the Protection of National Infrastructure (CPNI) and the sector's regulator, Ofcom.

Individual operators each have their own plans for how to manage an emergency affecting their systems and restore service to their customers. In the event of an emergency where coordination is required between telecoms companies, a process is in place to manage this, known as the National Emergency Alert for Telecoms (NEAT).

NEAT is a conference call convened between all key UK telecoms companies, Government and relevant emergency responders when telecoms providers become aware of a problem or potential problem affecting the normal flow of telecommunications. It is a forum used to ascertain the severity of a problem, and, if necessary, coordinate an effective pan-industry response to restore normal service within the affected area as soon as possible, both on a service and a technical level.

There is also a strategy for enhancing the resilience of emergency responders' telecommunications, coordinated by the Civil Contingencies Secretariat within Cabinet Office.<sup>11</sup>

While the programmes and procedures outlined above seek to improve the response and recovery of the telecoms sector in the event of an emergency, the sector does not have a history of providing Government with regular formal assessment of the vulnerability to risks such as flooding, although this may be done independently by individual companies where necessary.

## Further Action

The proposed Digital Economy Bill extends resilience duties managed by Ofcom to the telecommunications sector to report biennially on the overall resilience of the sector.

The Cabinet Office will continue to work with the Department for Business, Innovation and Skills, Ofcom and industry to develop these options and improve Government's understanding and implementation of resilience measures to natural hazards in the sector. It is intended that this work will be integrated with the Cabinet Office Resilience Capabilities Programme, to align the programmes with those addressing issues of response and recovery in the event of an emergency.

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<sup>11</sup> Further information on the Resilient Telecommunications Programme can be found at: [www.cabinetoffice.gov.uk](http://www.cabinetoffice.gov.uk)



# ENERGY SECTOR

## Overview

The Department of Energy and Climate Change is the Lead Government Department for the Energy Sector and this section of the resilience plan covers the electricity, gas and oil sub-sectors.

Like the water sector, the energy sector (electricity specifically) had a number a failures or 'near misses' in the 2007 floods, which highlighted the vulnerability of parts of the sector to flooding.

The sector has already undertaken a number of activities to deliver improved resilience:

- Increased funding for asset specific resilience from the regulator based on agreed assessment methodologies and standards;
- Instigated a review of vulnerability to flooding at all major substations, gas sites, and the oil sector;
- Improved protection of specific sites, including permanent barriers and elevation;
- Established a process for getting all major substations and gas sites up to an agreed standard;
- Invested in moveable flood defences, owned by National Grid.

In the mapping exercise of the Critical Infrastructure Resilience Programme, less than fifty CNI sites in the energy sector were

identified as being at risk from flooding, but it should be recognised that the actions in hand go well beyond these CNI sites. In the electricity sub-sector there are over 1,000 major substations. Those at risk have been identified and remedial work is in hand, focused initially on those sites with the greatest risk. The work is expected to be completed by 2020. Therefore, there will be residual, reducing risk for the next ten years. This risk will be mitigated by business continuity plans such as electricity distribution through alternative substations and, in particular for the transmission network, mobile flood defences.

The lack of high voltage electricity in the delivery of gas lowers the risk in this sub-sector, both in terms of likelihood of failure and also the extent of the damage that could be caused. However, the required remedial work for the small number of gas transmission sites considered at risk is being assured and designed.

In the oil sub-sector, the multitude of supply routes (pipeline, rail, coastal tanker and road) provides inherent resilience to any potential failure of individual assets. Nonetheless, the relevant companies are aware of the risks to their facilities and have either completed or continue to work with the Environment Agency to improve flooding protection.

Overall, the events of 2007 have prompted rapid action by the energy industry to make the sector more resilient for flooding. However, the lead time on some of the engineering works does mean that effective response and business continuity measures may need to be relied upon in the short term.

## Background

The energy sector consists of electricity generation, transmission and distribution companies, gas distribution networks, gas transmission and upstream gas production, oil production, refining, supply and distribution.

Downstream oil, electricity generation and supply of gas/electricity are considered to be competitive markets and as a result they are not price regulated. The electricity and gas transmission and distribution networks are natural monopolies and are subject to price controls, which currently includes a provision for investment in flood defences, and are regulated by the Office of the Gas and Electricity Markets (Ofgem). The recent Price Control agreed for Distribution Businesses (DPCR5) includes an allowance for substation flooding resilience based on the principles of the Engineering Technical Report on Resilience of Flooding of Grid and Primary Substations (ETR 138). The new Transmission Price Control, which is expected to contain similar allowances, is not due until 2013.

## Assessment of Vulnerability

The energy industry has already carried out scoping of sector resilience and is putting in place a programme to improve standards of resilience where necessary.

The Energy Networks Association has led on the development of a panel committed to improving the resilience of equipment and has worked with the electricity sub-sector to establish a methodology (ETR 138) for analysing flood risk and providing guidance in meeting established target levels of resilience. This is currently being rolled out to

include gas. Information from this process can be utilised during price control reviews to support companies in accessing funding for improved resilience.

As part of this overarching programme, resilience activities in the sector have been prioritised based on impact of loss calculations. The current priority for activity is grid and primary substations, which are vulnerable to flooding and the loss of which could cause medium term (weeks to months) loss of supply to large numbers of customers. Programmes are currently underway on these sites to upgrade resilience to an agreed standard. Other electricity assets have been assessed as lower priority, either due to inherent resilience to flooding, or limited potential impact.

As a consequence of this programme of work, of the sites identified at risk of flooding, the electricity assets are either already protected from flooding, will not have a significant impact if they do flood (e.g. because the critical equipment is all above the potential flood level) or have a programme of resilience building in place.

The potential disruption caused by flooding to gas supplies is lower than that for electricity. The reasons for this are twofold: the pressure of the gas (except in the low pressure network) prevents water from entering the network, and the absence of high voltage electricity removes the risk of major damage if water enters equipment. Gas pipelines are generally resilient to flooding as they are designed to operate underground in potentially wet conditions for many years.

Similarly, the downstream oil sub-sector is inherently resilient to flooding, in part because the coastal nature of many of the

assets means they are designed to flood, or are suitably defended, but also because there are multiple alternative routes and sources. However, as with all other sectors, the oil sub-sector is dependent on other essential services, especially electricity and transport.

## **Building Resilience**

As described above, there is now a rolling programme in place across the energy sector to improve resilience to flooding. The work currently being carried out by the electricity network operators is expected to be complete by the end of the price control period (2020/2022). ETR138 includes proposals for short term mitigation activity if implementation of permanent mitigation is likely to take more than a year and this is supported by the Cabinet Office Resilience Capabilities Programme, which builds capability to respond to emergencies.

The gas industry is currently carrying out the Energy Networks Association process which delivered ETR 138. Detailed site risk assessments are expected as part of this process by March 2010. Next steps include development of a general action plan, including site prioritisation based on CNI ratings.

The Department of Energy and Climate Change is working with the downstream oil sector to establish a baseline level of information and risk assessment before asking the sector to undertake evaluation. During 2010 the sector will also be looking at other natural hazards, aside from flooding. The Department of Energy and Climate Change proposes to monitor progress throughout the sector by requesting annual

updates from relevant organisations. In response, it will deliver a follow up timetable where slippage is perceived. Future Energy Sector Resilience Plans will be progressively extended to cover all natural hazards and critical infrastructure, and to plan for future climate parameters.

## **Further Action**

It is intended that the ongoing resilience building work will continue to be monitored and work will be integrated with the Cabinet Office Resilience Capabilities Programme, to align the programmes with those addressing issues of response and recovery in the event of an emergency.

# TRANSPORT SECTOR

## Overview

The Department for Transport is the Lead Government Department for the transport sector, which comprises the UK's roads, rail (including the Channel Tunnel), aviation and ports.

The variety of options provided by the UK's transport infrastructure makes the sector inherently resilient. There are very few individual critical assets and therefore resilience building tends to take a whole network approach.

As a consequence, operators in the sector have made a strategic decision not to undertake all possible resilience measures, but instead to accept some cancellation of service for reasons of cost effectiveness or safety.

In the mapping exercise of the Critical Infrastructure Resilience Programme, eleven CNI sites in the transport sector were identified as being at risk from flooding.

## Background

The UK transport sector is dominated by private sector operations, with most regulation focussing on safety and security. England's road and rail network is managed by multiple layers of government. Many strategic decisions are made at a European level, whilst most other decisions are made by Local Authorities, particularly in London. Local Authorities have the legal duty to

maintain local roads (98% of the road network) whilst the Highways Agency and Network Rail retain overall oversight of their sectors. As road transport is a devolved matter, Scotland, Wales and Northern Ireland largely plan their own road networks. Rail is also devolved to Scotland (other than rail security) and Northern Ireland.

Many key decisions on aviation and shipping are made by the United Nations, following engagement with the UK and other countries. Transport emergency planning remains almost unregulated, as the majority of sector regulators focus on safety and security. The government has limited powers over management of transport services, which are mostly managed by the private sector. Although some sub-sectors, such as rail, do have an economic regulator, these have a broader remit than some of the utility regulators in other sectors.

## Assessment of Vulnerability

Transport is predicated on networks even within local areas. Owing to its structure and varied nature, it has an in-built overall resilience but can be affected at a local level across all sub-sectors. For this reason, cancellations of operations tend to be more cost effective than trying to build in protective measures to natural hazards across whole networks. Nonetheless, there are a small number of CNI sites, eleven of which have been identified as being located on floodplains.

Local Authorities are responsible for 98 per cent of the road network in England and Wales, most of which have experienced some form of disruption caused by natural hazards in recent years. However, there is no overarching policy aimed at improving

resilience and it remains at the discretion of the Highways Authorities, i.e. Local Authorities, as to what work is undertaken in this area.

The risks to local roads and preparing for such risks would be expected to be undertaken by Local Resilience Forums.

The UK Roads Liaison Group, which brings together government at all levels to discuss engineering and operational issues, recommended in its report of the severe weather in winter 2008/2009 that the Highways Authorities should review their approach to climate change, and in particular their resilience specifically to prolonged cold weather.

The management, maintenance and improvement of the strategic road network in England is overseen by the Highways Agency. The network carries a third of all road traffic in England and two thirds of all heavy freight traffic. The Network Resilience Team within the Highways Agency undertakes monthly risk assessments looking at major hazards that would be likely to substantially disrupt the strategic road network.

In terms of flooding, the Highways Agency has identified those parts of the strategic road network that are most vulnerable to flooding and have developed guidance for operations staff on the implementation of flood risk management strategies.

Network Rail, which operates across Great Britain, has similar organisational arrangements, with established methods for receiving and circulating information, teams, codes of practice and reviewing standards for periods of extreme weather. Although there is

no universal standard, the majority of the rail network has been built to withstand a 1 per cent annual probability flood event. Beyond this, Network Rail has specific technical recommendations, establishing flooding levels to which it is safe to run a service.

Despite the vulnerable location of ports, very few owners have addressed the issue of flooding in their business planning. The Department for Transport is currently looking into the option of a UK response to the flooding of a port.

To date, risk assessments for the UK's airports to flooding have not been undertaken as, historically, flood events have not impacted the sub-sector.

### **Further Action**

It is intended that the ongoing resilience building work will continue to be monitored and work will be integrated with the Cabinet Office Resilience Capabilities Programme, to align the programmes with those addressing issues of response and recovery in the event of an emergency.

# FOOD SECTOR

## Overview

The food sector is made up of food manufacturing, wholesale and retail and catering supply chains. It comprises roughly 522,000 enterprises employing 3.7 million people.

Owing to its size and the number and diversity of its supply chains from domestic and international suppliers, there are no CNI assets within the sector and the sector is judged to be resilient to disruption from flooding and other hazards. Should significant flooding occur, this would affect the local delivery of foodstuffs, which would most likely would impact on consumer choice rather than the overall supply of food.

## Background

The Department for Environment, Food and Rural Affairs (Defra) is the Lead Government Department for the food sector and has responsibility for responding to emergencies disrupting food & drink manufacturing and wholesale or retail food distribution in England (other than contamination issues, where the Food Standards Agency has the lead role) and improving the resilience of the sector to disruptive challenges, where necessary. Food is a devolved matter.

Defra works with the food industry to promote an understanding in the relevant government departments of its dependencies. Defra set up and chairs the Food Chain Emergency Liaison Group, a forum at which other government departments, industry, and the

relevant trade associations can share information and jointly consider developing government policy in this field. This meets three to four times a year and has considered issues that might affect the food sector, such as a flu pandemic and interruptions to fuel, gas or electricity.

## Assessment of Vulnerability

The commercial pressures that have promoted the drive for efficiencies have created a just-in-time culture in food distribution that requires an immediate response to an interruption to production or supply. Coupled with the number of supply chains, manufacturing and retail options and the high degree of substitutability of foodstuffs in the industry, the sector is extremely resilient to disruption. However, the sector is critically dependent on other infrastructure sectors, notably energy, transport, water and communications.

The Centre for Protection of the National Infrastructure (CPNI) completed a review of criticality of assets and products in the food sector in August 2009. This looked at nine sub-sectors - agriculture, fisheries, food ingredients production, food manufacture, packaging and other materials, storage and distribution, food retail, food service and waste disposal - and failed to identify any single critical asset which might affect the supply of food. Whilst the remit of the review wasn't specifically looking from a flooding angle it demonstrated that the food industry didn't appear to have any single points of failure.

The resilience of the food sector was demonstrated in its ability and flexibility to deal effectively with the 2007 floods in Gloucester and the South-West, where the

supermarkets remained open and able to provide food to the affected populations and, with the dairy and alcoholic drinks industry, the provision and distribution of water.

### **Building Resilience**

Owing to the large size of the food industry and the competition that exists within the various sectors, it is down to individual companies to review business continuity arrangements and plan for dealing with incidents such as flooding.

### **Further Action**

The resilience of the food sector to both threats and hazards continues to be monitored through the Cabinet Office Resilience Capabilities Programme.

# HEALTH SECTOR

## Overview

The health sector in England incorporates a large number of organisations, providing a wide variety of different services. Types of patient care offered by the NHS include locally administered primary care (provided through 29,000 GPs in more than 8,200 independent practices), hospital-based acute care (provided through more than 200 hospitals of varying types), and inpatient or community-based mental health care. The significant majority of acute hospitals and the sector's support services operate under the auspices of the NHS, and thus lie within public ownership. As health is a largely devolved issue, the remit of the Department of Health only covers the NHS in England, but strong working relationships are maintained with the Devolved Administrations.

The scale of the NHS, coupled with the wide geographic distribution of individual assets and the ability to relocate key services to alternative sites in emergencies, provides an inherent degree of resilience in the sector. However, it is inevitable that disruption to individual sites will have tangible impacts for the local communities that they serve, and there are a small number of facilities for which the consequences of loss or disruption would be felt across a region or even nationally. The sector also has crucial interdependencies with other national infrastructure sectors including, energy, communications, water, food, transport and emergency services.

The majority of organisations within the health sector have responsibilities under the Civil Contingencies Act 2004 and are therefore required to maintain robust business continuity and emergency management plans. The Department of Health has responsibility for the strategic direction of emergency preparedness policy in the health sector, and maintains oversight of resilience-building activities via the ten Strategic Health Authorities (SHAs) in England. In general, the focus with emergency preparedness in the NHS is on consequence management, rather than outright vulnerability reduction. For instance, local and regional emergency planning in the sector will consider issues such as the evacuation of hospital sites, and business continuity procedures. NHS organisations are also key participants in local and regional resilience structures: Local Resilience Forums (LRFs) and Regional Resilience Forums (RRFs) respectively.

## Assessment of Vulnerability

Only the most important critical sites were assessed in detail for this iteration of the Sector Resilience Plan, which excludes the majority of hospitals and all primary care facilities, e.g. GPs' surgeries. Eleven sites were identified as being at risk of flooding, covering a wide range of health care functions and support services.

Investigations found the sites to either be suitably defended, by either river based flood defences or additional site-specific flood defences, have backup sites available or have specific business continuity plans in place for flooding. Two sites were in the process of decommissioning.



Each NHS Trust or Foundation Trust is responsible for maintaining its own emergency plans, overseen by the Strategic Health Authority and there are standard command and control structures in place for implementation during an emergency.

## **Building Resilience**

The Department of Health is developing a resilience framework for critical infrastructure in the sector, covering issues including consideration of resilience standards, and associated governance and funding issues. The Department is also leading on the NHS Resilience Project, developing business continuity management standards for the sector.

Additionally, the NHS has also provided guidance on development of appropriately resilient facilities through NHS Estates Health Building Notes. A resilient location is ensured for many future facilities through Planning Policy Statement 25 (PPS25), which will generally limit the development of new healthcare facilities in areas at risk of flooding.

## **Further Action**

The focus of the health sector's current resilience strategy is based on proportionate consequence management, rather than a primary focus on the reduction of local vulnerability to flooding. However, flooding will remain an important issue for consideration within the NHS, and work will continue at a site and trust level to identify and address flood risk. This will be supplemented by the development of an overarching strategy for ensuring resilience of the most critical sites within the sector.

# EMERGENCY SERVICES SECTOR

## Overview

The emergency services sector consists of the Fire and Rescue, Police, Ambulance and Maritime and Coastguard services.

Eleven CNI sites were identified as being located in a fluvial floodplain; one ambulance site, seven fire and rescue sites and three police services. No critical Maritime and Coastguard Agency sites were located on floodplains.

The responsible bodies for the majority of the sites were aware of the risk from flooding and had in place robust and well embedded business continuity plans, including fall back sites and mutual aid arrangements. Indeed, preparedness for emergencies is inherent in the sector owing to the nature of the work.

Five of the assets considered in this plan had taken specific action to improve the asset's resilience to flooding, including relocating services and key information technology to areas of reduced flood risk, building and maintaining on-site flood defences, and ensuring compliance with drainage regulations. Four of the sites have combined contingency arrangements, in the form of fall back sites, with flood defences.

For the sector as a whole, the interconnectivity of the sector's network and its geographic spread affords it a considerable degree of resilience to disruptive challenges, including flooding, by channelling key services through unaffected

sites. In addition, cross sector agreements are in place to facilitate inter service mutual aid arrangements as and when necessary. The sector is also required to undertake business continuity planning as part of its duty under the Civil Contingencies Act 2004.

## Assessment of Vulnerability

### *Ambulance Service*

NHS Ambulance services range from orthodox "blue light" services to urgent (but non-emergency) care, clinical advice by telephone and patient transport. These are provided by eleven NHS ambulance trusts in England. In general, disruption to the ambulance service from flooding is more likely to arise due to wider impacts in the affected area, e.g. road closures, than through direct impacts upon its fixed infrastructure.

As part of this review, one CNI site was identified as at risk from fluvial flooding. This site benefits from existing river flood defences, providing protection up to a 0.1 per cent annual probability flood event. Robust contingency arrangements are also in place, involving fallback sites and mutual aid agreements with other blue light services should the service become severely disrupted.

Further information on the approach to flood resilience planning in this sub-sector can be found in the Health Sector section of this document.

### *Police Force*

There are forty-three police forces in England and Wales comprising approximately 239,000 staff. The review identified three of

the services' CNI sites as at risk from flooding.

Of the three sites in question, one benefits from river based flood defences, affording protection up to a 0.1 percent annual probability flood event, although there are no site specific flood defences at this site.

The other two sites have installed extensive flood protection, established alternative sites with complete or near complete functionality and embedded flood warning systems into their processes. The use of flood defences and the activation of contingency arrangements are tested regularly at each site.

### ***Fire and Rescue Service***

Within England there are forty-six Fire and Rescue Authorities providing fire and rescue services in cities, towns and rural communities across the country.

All the fire and rescue services with CNI sites at risk from flooding are aware of the vulnerability of these sites and have either implemented or are developing suitable resilience and/or business continuity arrangements to ensure that the essential services provided by these sites can continue in the event of a disruptive incident.

All existing fire and rescue control sites have fallback arrangements to firstly divert calls to another fire and rescue service control site, in the event of a disruptive incident, and then set up a secondary control site within their own organisation to resume responsibility for call handling.

For headquarter sites, most of the essential services are provided by software based

packages. Therefore, in the event of a flood, only minor impacts to the every day operations of the organisation should occur as a consequence of backup servers for 'at risk' sites and access to alternative locations for displaced employees,.

Other services, such as training and distribution services, can also be relocated providing suitable pre-event planning arrangements are undertaken.

Whilst all the fire and rescue services considered as part of this plan either have or are developing business continuity plans, the majority of sites have chosen not to invest in or implement any physical flood defence measures and have chosen to rely on alternative fallback facilities instead.

### ***Maritime and Coastguard Agency***

No sites were identified as at risk from flooding in this sector.

### **Sector approach to Building Resilience**

The Civil Contingencies Act 2004, and accompanying non-legislative measures, delivers a single framework for civil protection in the United Kingdom. Part 1 of the Act and supporting regulations and statutory guidance "Emergency Preparedness" establish a clear set of roles and responsibilities for those involved in emergency preparation and response at the local level. The Act divides local responders into two categories, imposing a different set of duties on each.

Organisations within the emergency services sector service, falls under Category 1 within the Schedule of the Act and therefore is

subject to the full set of civil protection duties. These duties will include the requirement to:

- Assess the risk of emergencies occurring and use this to inform contingency planning;
- Put in place emergency plans;
- Put in place Business Continuity Management arrangements;

However, the Fire and Rescue Services Regional Control Centres will be under Local Authority Controlled Companies and therefore not covered by the Civil Contingencies Act 2004.

Across the sector, extensive quality assurance regimes are in place. Each service must demonstrate compliance with strict performance and service provision targets to government departments and external auditors.

### **Further Action**

The Cabinet Office will continue to work with the Home Office (Police Force), Department of Health (Ambulance Service), Department for Communities and Local Government (Fire and Rescue Service) and the Department for Transport (Maritime and Coastguard Agency) and representatives from the emergency services to develop options and improve Government's understanding of resilience measures to natural hazards in the sector. It is intended that this work will be integrated with the Cabinet Office Resilience Capabilities Programme, to align the programmes with those addressing issues of response and recovery in the event of an emergency.

# FINANCE SECTOR

## Overview

The financial stability of the UK is managed by the 'Tripartite Authorities': HM Treasury, the Bank of England and the Financial Services Authority (FSA).

In the mapping exercise of the Critical Infrastructure Resilience Programme, four sites were identified that were potentially vulnerable to flooding. However, all of these sites have in place backup sites that allow the continuation of service with minimum disruption and the process of switching sites is regularly tested and exercised.

The sector as a whole is inherently resilient because of the competitive nature of the industry i.e. it makes good business sense to be resilient and able to continue operations in the event of an emergency. The sector is regularly assessed, benchmarked and tested through Market Wide Exercises (MWEs) coordinated by the Tripartite Authorities, the most recent of which incorporated a flooding scenario.

## Background

The Bank of England and FSA are responsible for regulatory oversight of the UK financial services sector, the Bank having oversight of payment systems and the FSA regulating firms and Recognised Bodies (principally markets and exchanges).

The FSA's powers and responsibilities are set out in the Financial Services and Market Act 2000 (FSMA). The FSA is principally responsible for the authorisation and prudential supervision of banks and building

societies, investment firms, insurance companies and brokers, credit unions and friendly societies and the supervision of financial markets, securities listings and of clearing and settlement systems. The regulatory policy developed by the FSA includes that intended to promote the resilience to operational disruption of authorised firms; and of exchanges and clearing houses, known as Recognised Bodies or 'RBs'.

As sponsor department for finance critical infrastructure, HM Treasury is responsible for designating finance CNI, in consultation with the Bank of England and the FSA.

Part 5 of the Banking Act 2009 established a new statutory framework for the oversight of recognised inter-bank payment systems by conferring powers on HM Treasury to designate, by order, an inter-bank payment system as a "recognised system", where HM Treasury is satisfied that any deficiencies in the design of the system or disruption of its operation would be likely to (a) threaten the stability of, or confidence in, the UK financial system; or (b) have serious consequences for business or other interests throughout the UK; and the Bank of England to formally oversee recognised systems, including powers for the Bank to impose penalties where compliance failures are committed.

## Assessment of vulnerability

Four CNI sites in the financial services sector were identified as being at risk from flooding in the flood mapping process. However, all sites had in place the capability to switch to an alternative site that enables them to continue operations with the minimum of disruption to service. This process of switching to alternative sites forms part of the

infrastructure providers' regular internal testing and exercising programme. The capability to provide an effective response to flooding is therefore considered high and, as long as their testing and exercising programmes remain in place, is expected to remain so.

## **Building Resilience**

The FSA carries out regular Market Wide Exercises (MWEs) to test the resilience of the sector as a whole. The latest of these, focussing on severe weather, was carried out in November 2009 and included 76 organisations and more than 5,000 staff.<sup>12</sup> The main challenge of the scenario was to try to sustain financial services in the face of large-scale staff absences, denial of access to buildings and uncertainty over the scale and duration of the disruption. The exercise also included an opportunity to plan for a return to normal business. From these exercises, information is provided to infrastructure owners to support them in enhancing their resilience. As part of its 2010 work programme, the Tripartite Authorities will be developing its future sector exercising strategy.

The Tripartite Authorities have also carried out a comprehensive study of the resilience of the sector and two Resilience Benchmarking Projects. A further Benchmarking is scheduled for 2010 / 11. Resilience Benchmarking provides participants with a detailed assessment of the effectiveness of their own business continuity arrangements, insight into how their arrangements compare to those of their peers and provides all participants with an

overview of the resilience of the key parts of the UK financial sector.

## **Further Action**

The resilience of the financial services sector to both threats and hazards continues to be monitored through the Cabinet Office Resilience Capabilities Programme and the exercise programme described above.

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<sup>12</sup> [www.fsc.gov.uk](http://www.fsc.gov.uk)

# GOVERNMENT SECTOR

## Overview

The Government sector comprises a large number of assets carrying out a wide variety of operations. They include government departments themselves, but also national crisis response facilities, information networks, data centres, laboratories and many others supporting the functions of central government.

Nine critical assets were identified as being on floodplains, all but two benefiting from the protection of the Thames Barrier and associated tidal defences.

All nine sites have been subject to a flood risk assessment. In two cases, the decision has been taken to vacate the site and move core functions to more resilient and secure accommodation. In two cases, significant programmes are in place to improve resilience by a number of means, and further measures are planned. In three cases minor or no additional measures are proposed to manage the assessed flood risk. In two cases, responses are awaited from the site owner/operator on the need for additional measures.

## Background

The Government sector employs in excess of five million people in organisations that vary widely in terms of their size, functions and services. They include government departments themselves, but also national crisis response facilities, information networks, data centres, laboratories and

many others supporting the functions of central government.

In the confidential 2008 National Capabilities Survey, government departments were asked to assess their preparedness for civil emergencies in the National Risk Register. Most showed progress in the preparation and testing of robust business continuity plans and contingency planning, compared with results of a similar survey in 2006. The next survey is planned to take place during 2010.

The Government sector is wholly owned and managed by the UK Government, although the management of some of the assets is outsourced to private contractors.

## Assessment of Vulnerability

The assets considered in this plan reflect the diversity of the Government Sector and the national importance of some of its services. Of the many CNI sites or assets in this sector, nine were identified as being at risk of flooding because they are located on a flood plain.

Seven of the nine sites are located in the River Thames floodplain and therefore benefit from the protection of the Thames Barrier, which offers a high degree of protection, up to a 0.1 per cent annual probability tidal flood event over its design life (up to 2030). For the remaining two assets there are no river based flood defences.

The flood risk assessment for the nine sites also takes into account measures in hand to improve resilience, which include:

- Measures to reduce vulnerability to flooding include modification of drainage and overflow ponds, construction of berms,

and temporary flood defence measures. In two cases, the decision has been taken to move critical assets to sites that carry a significantly reduced flooding risk: one site has now been vacated; the other will close within two years.

- Measures to improve preparedness for flooding include, in all cases, identified back-up facilities and contingency planning to ensure the smooth transfer of critical services to these sites. In more than one case, back up facilities have themselves been situated within a flood plain, thus reducing but not eliminating the risk mitigation afforded by having back-up facilities.
- Measures to improve business continuity – all government departments concerned participate in the cross-government business continuity forum and subscribe to the British Standard BS 25999. In all but one case, the owner/operator has confirmed that business continuity plans for the site/asset have been updated and exercised. Asset owners have not in every case used the risk of disruption from flooding risk as a basis in the development of plans.
- Measures to improve recovery – disaster recovery plans are in place for most sites.

### **Further Action**

The exercise of producing a sector resilience plan has highlighted some resilience gaps in terms of flood risk. In these instances, the Cabinet Office will work closely with asset owners and the Environment Agency to deliver tangible asset specific improvements in resilience standards. Actions planned

under the government sector resilience plan in relation to flood risk include:

- Completion of existing programmes of improvement to resilience;
- Further provision of disaster recovery for key Information Systems, and back-up processes as insurance against the loss of critical information systems – for completion by spring 2010;
- Further development and testing of business continuity plans

In the cases of two critical sites, the owner/operator is considering implementation of further flood risk mitigation measures.

The responsibility for ensuring resilience in the government sector lies with departments owning or operating critical sites or assets. Under the Critical Infrastructure Resilience Programme, Cabinet Office will be working with relevant lead Government departments to put in place procedures for assessing the vulnerability of critical infrastructure to flooding and other natural hazards.

Government departments also contribute to the cross government climate change adaptation programme.

It is intended that this work will be integrated with the Cabinet Office Resilience Capability Programme, to align the programmes with those addressing issues of response and recovery in the event of an emergency.



