

# Dealing with the deluge

How councils supported their communities during the 2012 floods



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# 1. Foreword



Flooding is predicted to be the largest risk of climate change to the UK and affects a growing number of communities each year. Those who

have experienced flooding will know the misery and hardship it causes. Flooding is also very disruptive to the local economy – businesses are prevented from making and receiving vital deliveries, and in some cases the complete collapse of roads can prevent a return to business-as-usual a good while longer after flood waters have receded.

Flooding events last year highlighted only too clearly some of these challenges and risks.

In a year that went from hosepipe bans to what felt at times like a constant deluge, councils rose to the challenge in providing immediate support during flooding events, helping households, communities and businesses recover and putting in place actions to reduce flood risk and improve resilience in the future.

When a major local event occurs, such as flooding, communities look for leadership from their local authority. Communities don't expect local authorities to do it all, but they do expect them to ensure that those organisations who are best placed to help, or responsible for failing assets, are mobilised to respond. The one thing that really struck me when I read this report was the huge variety of ways in which lead local

flood authorities are collaborating with other organisations, be it government agencies, district and borough councils, internal drainage boards, voluntary organisations or emergency services in providing an enhanced combined response before, during and after flood events to support local communities.

With the next downpour unlikely to be too far away it is vital that these relationships continue to develop and mature to ensure that we can continue to protect our communities from the inevitable impacts of flooding on people, property and the economy.

This report looks at the experiences of, and action taken by those councils that suffered most from the 2012 floods, and draws out lessons and good practice that I hope will be useful to other areas.

Finally, I would like to thank Councillor Andrew Cooper for chairing the Local Government Association's (LGA) Inland Flood Risk Management Group, which commissioned this valuable report.



**Councillor Mike Jones**  
Chairman LGA Environment  
and Housing Board

# Executive summary

## Introduction

2012 was the wettest year on record for England and followed severe drought during the first quarter of the year.

The impacts on people, property and the economy were significant and included: 8,000 flooded properties; 9 fatalities; estimated insured losses of £1.2 billion and estimated damages to the farming industry of £1.3 billion.

However, there were also around 200,000 properties nationally that were protected by flood defences, and under new partnership funding arrangements councils are major players in delivering flood protection<sup>1</sup>.

Councils were at the heart of helping protect their residents and businesses from the impact of floods.

Through gathering the widespread experiences from 2012 this report:

- demonstrates how councils have provided leadership in supporting their communities
- highlights the results that can be achieved through effective partnership working to reduce risk and identifying key partnerships

- draws out lessons for councils, other flood risk management authorities and partners on how the impact and risks of floods can be reduced in future.

## Preparing for floods

Understanding the causes and sources of local flooding is vital to enable relevant organisations to take appropriate action and alert communities at risk.

Whilst the science and understanding of weather forecasting has improved greatly over recent years, the nature of the rainfall in 2012, which in many places was very intense and sporadic, made it difficult to predict exactly where the risk of flooding was greatest.

In response, a number of councils have improved the ways they monitor and forecast impacts to reflect local circumstances, such as using telemetry to monitor borehole levels.

## Helping communities to recover

As well as immediate support during a flood incident councils played a significant role in helping households, communities and businesses recover. This has included:

- Providing advice and assistance, coordinating the activities of the relevant

<sup>1</sup> <http://www.environment-agency.gov.uk/research/planning/134732.aspx>

professional partners and ensuring that actions are taken to reduce the risk of flooding in the future.

- Community engagement – councils have used a range of techniques to engage affected households and businesses including flood surgeries.
- Helping communities become more resilient and take greater ownership in managing flood risk – for example facilitating the creation of local flood action groups and offering free property level flood protection surveys.
- Providing financial assistance through flood relief funds and business rate relief.
- Coordinating multi-agency recovery meetings which have focused on assisting people back into their homes, restoring utility services and repairing environment damage.

## Protecting people and property

- Councils are investing heavily in flood alleviation and play a key role in planning for and bringing together different partnership funding contributions to enable the delivery of schemes. Between 2012/13 and 2014/15, councils are expected to contribute around £144 million to flood defence schemes.
- In places where flooding had occurred before, councils were able to put into action learning from previous major flood incidents
- Some implemented a proactive maintenance and gully clearance regime in advance of significant rainfall events.
- The deployment of temporary defences,

pumps and sandbags played a critical role in both minimising damage and reassuring the public that the relevant authorities were taking action.

- Prior assessment of potentially available defence measures as well as appropriate locations to use them helped to minimise lead-in times and achieve effective deployment.
- Councils affected by flooding recognised the improvements between the key risk management authorities in enhancing the combined response to flood events in 2012.

## Working in partnership

- In numerous locations local flood authorities (LLFAs) have been supported by and worked closely with a range of partner organisations including the Environment Agency, district and borough councils, internal drainage boards (IDBs) and water companies. The voluntary sector has also been crucial in delivering assistance to communities. The Highways Agency and Network Rail have also participated where their assets have been affected.
- As well as joining forces to support communities before, during and in the immediate recovery phases of flood events, partners also collaborated to investigate and understand the causes of flooding and develop action plans for reducing risk in the future.
- This was particularly important where flooding was caused by a number of different sources. Information from partners was collated by LLFAs and combined with their own investigations to produce flood investigation reports.



## Dealing with critical infrastructure damage

The impacts of the flooding in 2012 on infrastructure, particularly the sewer and highways networks were extensive. In addition rail networks were compromised in some instances.

Water is the most severe threat to road condition in this country, often leading to major damage. The flooding of 2012 caused a total of £338 million of damage to the road network in England and Wales.

There were numerous instances of flooding causing the closure of roads. As well as preventing road travel leading to delays and losses for the local economy, this also reduced the ability of the council and emergency services to respond to emergencies.

- Councils utilised online media platforms such as their own websites and Twitter to provide live updates on road closures and diversion routes.
- During the events several highways teams suspended roadworks to concentrate on emptying gullies, clearing debris and rescuing stranded motorists.
- The rail network also suffered due to flooding, disrupting services and having significant knock on effects on the local economy. Affected councils are now working with Network Rail in areas to identify permanent solutions to reduce flooding.
- A number of highways authorities have developed comprehensive drainage inventories and drainage asset management strategies which can help

them to reduce the impact of flooding on roads, such as major disruption and damage to the highway network.

## Conclusion

Experiences from 2012 demonstrated the wide variety of impacts that flooding can have on people, their property, and on local businesses. This report shows the many different ways councils responded to events and applied learning from past experiences. Effective partnership working was key to helping households and local economies recover. Councils and other risk management authorities, individual households and businesses can all benefit from working together to build greater resilience to avoid the expense and misery of flooding.

# INTRODUCTION

The flooding experienced in 2012 was severe with rainfall totals across England and Wales reaching 161 per cent of the long term average. 2012 was the wettest year on record in England, even though during the first quarter of the year much of the country experienced severe drought conditions.

The impacts on people, property and the economy were very significant:

- The estimated insured losses from flooding in 2012 were £1.2 billion according to the Association of British Insurers. Of this £690 million was paid out to repair damaged homes while £73 million was paid to repair business property. £84 million was paid out for damage to motor vehicles.
- Nearly 8,000 properties are recorded as having been flooded, and a total of nine fatalities.
- Agriculture has also suffered with several tens of thousands of hectares of farmland affected leading to significant financial losses. The National Farmers Union estimated the damages to Britain's Farming Industry at £1.3 billion. This may well have an impact on our food security as well as exerting upwards pressure on food prices.

Whilst the impacts of the floods on communities and local economies was significant, there are numerous examples of where people and property were protected by existing flood defence schemes. Nationally, around 200,000 properties were

protected from flooding by defences.

Once again, councils were at the heart of helping protect their residents and businesses from the impacts of the 2012 floods. From helping householders to recover, putting in temporary measures to prevent further damage, to working with their communities to make them and their physical environment more resilient, councils have demonstrated leadership in supporting their cities, towns and villages from the misery and costs of floods.

Councils are also investing heavily in flood alleviation and play a key role in planning for and bringing together different partnership funding contributions to enable the delivery of schemes.

Through gathering the widespread experiences from 2012 this report:

- demonstrates how councils have provided leadership in supporting their communities
- highlights the results that can be achieved through effective partnership working to reduce risk and identifying key partnerships
- draws out lessons and good practice for councils, other flood risk management authorities and partners on how their communities can be made more resilient to future flood risks.

We would like to acknowledge the contributions made by councils in compiling this report (listed at the end of this report).

## Our Approach

The LGA recognises that protecting people, property and our businesses from flooding and helping them to recover requires a partnership approach between local and national government, and its agencies.

Whilst local government is best placed to deal with local flood risks and recovery, national government plays an important role in providing legislative clarity in the roles that different organisations have in managing flood risk. The Department for Environment, Food and Rural Affairs (Defra) has overall national responsibility for flood and coastal erosion risk management policy, and provides funding for flood risk management authorities through grants to the Environment Agency and local authorities.

Other departments play a key role too. For example the Department for Communities and Local Government (CLG) administers the Bellwin scheme for emergency financial assistance which a number of councils accessed in 2012 to help with the cost of recovering communities from flooding events.

Over the course of the last 18 months, the LGA has worked with many of the affected councils in this report to ensure that central government supports local authorities in ensuring our communities and business receive the best protection and help that the country can afford. Key actions have included:

- applying pressure on Government and the insurance industry to find a long-term replacement to the Statement of Principles in the provision of floods insurance cover
- presentation of evidence to improve the

Partnership Funding model for flood defences

- lobbying for a change in the Bellwin scheme so that it covers infrastructure damage
- working with Defra and the Environment Agency to provide a one-stop-shop for practitioners dealing with local flood risk [www.local.gov.uk/floodportal](http://www.local.gov.uk/floodportal)

As public sector resources continue to reduce to cut the national deficit, and flood risks increase, it is crucial that all organisations – local and national, are able to constantly learn from our experiences. This Local Government Association (LGA) report is intended to contribute to that learning. It draws upon information gathered by Royal HaskoningDHV on behalf of the LGA from publicly available reports produced by LLFAs on their experiences during 2012 in addition to targeted interviews with key LLFA officers.

The targeted interviews of officers focused on seven LLFAs areas that experienced significant and repeated flooding during 2012.

## Preparing for floods

Understanding the causes and sources of local flooding is vital so that relevant authorities can take appropriate preparatory action and alert communities at risk. However, determining the sources of flooding is difficult and complex, and the experience of 2012 was no exception.

The flooding during 2012 was caused by a variety of factors. According to the Environment Agency, out of 7,950 properties flooded, over 3,000 resulted solely from rivers bursting their banks. However nearly



60 per cent (4,750) flooded from a variety of sources – including surface water. Flooding from main rivers was limited with existing defences providing adequate protection in many locations.

The first significant floods of 2012 were caused by severe rainfall events in April, June, July and August. This caused substantial surface water flooding across the UK including Calderdale, Devon, Dorset, West Sussex and Newcastle. Due to the localised nature of many of these events, prediction and forecasting varied in its accuracy. In several instances the LLFAs were alerted to flooding as it was happening with little or no time to prepare.

### **Early flood warning system**

Wychavon District Council has installed an early flood warning system at six sites at high risk of flooding across the district. The scheme uses a combination of equipment including cameras to monitor water levels. If the monitoring system detects a sudden rise in levels, it sends a message direct to the council flood team so that they can take appropriate action and warn residents and professional partners. This means everyone can be better prepared; allowing more time to get measures in place, move vulnerable residents to safety and take other steps to protect people and property. The early flood warning system provides a suitable warning to around 50 home owners who have suffered from fluvial (ordinary watercourse) flooding and pluvial

(surface water) flooding previously and live away from the main river flood warning alerts provided by the Environment Agency. During 2012, the council only had to issue four warnings to residents as a result of closely monitoring the conditions. The average cost per monitor is £3,500.

The Flood Forecasting Centre (FFC) uses a combination of satellite data, weather forecasts and flood models to forecast potential flooding and alert councils and other emergency responders<sup>2</sup> to impending floods.

Whilst the science and understanding has improved greatly over recent years, the nature of the rainfall in 2012, which in many places was very intense and sporadic, made it very difficult to predict exactly where risk of flooding was greatest. This meant that although severe weather was predicted, where the rainfall fell compared to the forecast often differed. In some instances LLFAs have reported that initial forecasts suggested moderate rainfall, however over a couple of hours, sometimes overnight, this changed rapidly into an extreme event.

Later on in the year the sustained rainfall over numerous months led to saturated catchments that reacted quickly to rainfall that normally would not cause a problem. The flooding in October, November and December was characterised by this, with high river levels and flooding problems being sustained into the New Year in some locations, such as North Yorkshire.

As a result, a number of councils have

<sup>2</sup> <https://www.gov.uk/local-resilience-forums-contact-details>

improved ways of monitoring and forecasting information to reflect local circumstances. For example, groundwater flooding was a significant element of the flooding experienced in some locations, such as Dorset where this prolonged the duration of the impacts. The ground water table rose 12 metres and stayed elevated for five to six months. Borehole monitoring of the groundwater table and predicting impacts of changing levels is now being improved using telemetry.

## Helping communities to recover

The 2012 floods provided further evidence of the leadership role of councils. As well as immediate support during a flood incident as part of the multi-agency local resilience forums (LRF), councils played a significant role in helping households, communities and businesses recover.

### Community engagement

Councils used a range of techniques to engage affected households and businesses and many took these opportunities to help communities become more resilient and take greater ownership in managing flood risk and recovery. This has included providing advice and assistance to the local population, coordinating the activities of the relevant professional partners and ensuring that actions are taken to reduce the risk of flooding in the future.

Flood surgeries to engage those affected by flooding, particularly in the immediate aftermath, have provided vital support and advice. Bringing together partners such as the Environment Agency, district councils,

water companies, emergency services and community based groups, these events have allowed for a two-way transfer of information between risk management authorities and flooded residents. Residents were able to speak about their experiences on a one to one basis and gain support and advice on how they can start to recover. Key topics for discussion have included clean-up of and repairs to property, insurance claims and getting involved in development of community action groups.

Councils found the flood surgeries far more useful and effective than open public meetings which can be dominated by more vocal individuals. The one to one nature of the discussions allowed less confident individuals to express their views and LLFAs to capture far more valuable information.

Through the surgeries councils were able to collect important information around the extent of flooding. In some cases locations previously thought to have been unaffected were revealed to have been flooded. This has been the case in rural locations such as Devon where flooding has been spread over a wide area with small numbers of properties affected in numerous locations. Through their 23 drop-in events in Devon the LLFA gained significant amounts of additional information on the scale and nature of flooding that occurred. However some households are reluctant to admit to flooding in the hope of avoiding increased insurance costs and risk of blight in the area they live.

In Newcastle upon Tyne, the city council used questionnaires to obtain information on the extent of flooding. Their experience of widespread flooding in a densely populated urban area was that this was a more fitting and effective approach compared to face to face conversations.. A total of 13,000

questionnaires were sent out and some 3,000 replies were received.

In several locations regular meetings between the key agencies involved in assisting recovery have been held. These multi-agency recovery meetings have focused on assisting people back into their homes, restoring utility services and repairing environment damage. Leadership was taken at the appropriate level. In a number of cases, district councils have acted as the primary organisation where they were most affected, such as Arun District Council in Sussex. LLFAs have taken the lead where flooding was more widespread and strategic coordination was required.

### **Assistance to businesses in Calderdale**

Calderdale was seriously flooded three times in quick succession during 2012. This had a significant impact on small businesses. The council has been active in assisting businesses recover from flooding, facilitating financial help and organising events to promote business in the three main towns.



*Flooded businesses in Mytholmroyd*

They have ensured that those which have been closed due to flooding

received business rate relief. This is reimbursed by central government for the first six months. For businesses that are still closed following this period, the council has worked with the Valuation Office Agency to change their rating and extend the relief.

To promote business in the valley, the council organised the Valley of Lights events at the end of November to coincide with the switching on of the Christmas lights in Todmorden, Hebden Bridge and Mytholmroyd. These events were designed to give a boost to the local economy in the build up to Christmas, and promote local shops and businesses.

### **Promoting community resilience**

LLFAs were involved in facilitating the creation of local flood action groups to enable communities to take ownership of the risks they face. This was often supported by the National Flood Forum<sup>3</sup>.

In Shropshire, the council offered free property level flood protection surveys to residents at risk of flooding. These allow residents to better understand the risks they face from flooding and what they can do to be better prepared in the future. To date more than 200 assessments have been completed for residents who have experienced flooding.

In Dorset, the LLFA sent out targeted community questionnaires to gather additional flood event data and gauge interest

<sup>3</sup> National Flood Forum is a national charity dedicated to supporting and representing communities and individuals at risk of flooding: <http://nationalfloodforum.org.uk/>

in property level protection schemes. This has created a prioritised list to be put forward for Grant in Aid and local levy funding.

### **Financial assistance**

Following the events of 2012 some councils were active in managing financial assistance through flood relief funds. Councils assisted business recovery through business rate relief where flooding has caused them to close. In Calderdale commercial properties made up a significant proportion of those affected and there has been a specific focus on helping them recover.

In the short term following flooding a number of councils loaned essential household items such as washing machines, cookers and fridges to people affected by flooding, as well as providing emergency accommodation.

Several of the affected authorities have been successful in bids for the Defra community resilience pathfinder projects<sup>4</sup>. This money will be used to develop and support community groups, improving resilience to flooding at the local level.

### **Supporting frontline staff**

Resources of those organisations dealing with floods are always going to come under pressure during and in the aftermath of major flood incidents. Close working between Environment Agency staff and district councils in two-tier areas helped ensure that help got to where it was needed.

However, with the repeated flooding of 2012, and in particular an almost constant stream of events during November and December staff exhaustion became an issue.

In Calderdale both the LLFA and the Environment Agency took staff away from their normal responsibilities to focus on the flood investigation and recovery. This allowed for a significantly accelerated process of understanding the causes and impacts of the flooding, and developing actions for the future.

## **Protecting people and property**

The Environment Agency estimated that around 200,000 properties were protected from flooding by existing defences during 2012. In addition approximately £1.3 billion of economic damage was prevented by flood defences between April and September.

Councils also invest heavily in flood alleviation and play a key role in planning for and bringing together different partnership funding contributions to enable the delivery of schemes. Between 2012/13 and 2014/15, councils are expected to contribute around £144 million<sup>5</sup> to flood defence schemes. For example, Northumberland Council has committed to contributing £7- £12 million towards a £21 million scheme in Morpeth protecting a further 1,000 homes and businesses.

Warrington Borough Council have contributed £3.4 million towards a £23.7 million scheme which will reduce the risk of flooding to 2,129 homes, 123 businesses and an electricity substation which is now underway and due to be completed in October 2015.

Cumbria County Council and Allerdale

<sup>4</sup> <https://www.gov.uk/government/news/5-million-to-support-innovative-flood-defence-schemes>

<sup>5</sup> <http://www.parliament.uk/documents/commons-committees/environment-food-rural-affairs/NAOmemorandafloodriskmanagement.pdf>

Borough Council have contributed £700,000 and £100,000 respectively to fund a £4.4million scheme in Cockermouth to reduce flooding to 400 homes and businesses. Cockermouth residents also raised £126,000 through a council tax precept. It opened in June 2013 and is the

### **£200,000 grant fund to improve Somerset's flood defences**

Somerset County Council has recently launched a £200,000 grant fund to support residents and local councils boost flood defences.

Available to anyone provided that support is given by the applicant's local council, funding will be allocated to small-scale schemes – such as ditch clearance – which keep rising surface water away from roads and houses during heavy rainfall.

Priority will be given to applications which have secured additional funding, include a commitment to maintenance, improve previously neglected land of unknown ownership, or are made by a town or parish council.

first time that self-closing flood barriers have been used in the UK in a publicly-funded scheme.

In places where flooding had occurred before, LLFAs were able to implement lessons learned and good practice to their response to the 2012 floods. For example, Worcestershire County Council has significantly improved the way in which

it maintains its road drainage systems and improved safety at critical locations such as fords.

### **Temporary defences**

Councils adopted the common practice of providing sandbags to the public during flood events. Not only did this provide a degree of protection, they were of great value in reassuring the public that action was being taken by the relevant authorities.

Whilst sandbags have a very useful public reassurance role, councils acknowledged that there were more effective temporary protection systems available. What really helped their efforts was to undertake a prior assessment of potentially available resources as well as appropriate locations and systems to fit the council's emergency operations. This helped councils to provide more targeted and effective temporary flood protection deployment.

A number of councils found the use of pumps as a key measure in limiting the impacts of flooding during 2012. Once again, pre-planning helped to minimise lead-in times and achieve effective deployment. In North Yorkshire the locations where pumps were likely to be required were been identified along with access routes for pump delivery, and who will supply them.

Councils affected by flooding recognised generally recognised the improvements in relationships between the key risk management authorities in enhancing the combined response to flood events in 2012. As LLFAs, district councils, the Environment Agency, internal drainage boards and water companies work closer together the potential for realising mutual benefits will improve further.



### **Improving resilience to flooding in Worcestershire**

Following from their experiences in 2007, Worcestershire County Council have implemented several initiatives to improve their resilience to flooding.

Their innovative gully clearance system Drainman uses GIS technology and monitoring of asset condition to target those gullies that need most work. In addition this enables the council to do proactive maintenance in advance of significant rainfall events enhancing the capacity of the road drainage system where it is needed most. This has significantly cut the cost of delivering the service by 25 per cent over four years.



They have also revised their ford crossing plans. They have significantly improved the signage around all fords to discourage drivers from crossing when water levels are raised. In addition they are now inspected monthly.

## **Working in partnership**

Several examples of successful partnership working have already been described – this is a clear positive message from the way in which the councils have dealt with the flooding of 2012.

In numerous locations LLFAs have been supported by and worked closely with a range of partner organisations. These have primarily been the Environment Agency, district councils in two tier areas, the relevant sewer operator and internal drainage boards where these exist. In addition to this in certain places the voluntary sector has been crucial in delivering assistance to the local population. The Highways Agency and Network Rail have also been participated where their assets have been affected.

During the flooding events different organisations worked closely to manage the impacts of flooding and then moving into the recovery phase they collaborated to understand both the causes of flooding and to develop action plans for reducing risk in the future.

### **During flood events**

Multiple agency teleconference facilities were used in several areas to coordinate the response of the different organisations during the flood events.

There was also evidence of cross boundary working. This was typically where large river systems such as the Ouse in Yorkshire and the Severn in the West Midlands affect several LLFAs.

Deployment of temporary and demountable defences requires a multi-agency response. In Worcestershire whilst the temporary

defences are installed by the Environment Agency, the county council organise road closures and diversions, and Severn Trent Water provide pumps to control seepage through the defences.



*Deployment of temporary defences at Bewdley*

Strong relationships with partners also led to the sharing of resources and assets such as high volume pumps during flood events. In West Sussex the county council, Arun District Council and Southern Water shared their pumps so that they could be deployed where they were needed most. This accelerated the removal of flood water from homes and businesses, allowing the recovery process to start sooner. In many places fire authority pumps were also required to pump out flooded properties.

Understanding the causes of flooding is important especially where different sources of flooding have combined.

Under the Floods and Water Management Act 2010, LLFAs have a responsibility to

investigate significant local flooding incidents and publish the results of such investigations. Flood investigation reports are a key mechanism by which significant flood incidences are diagnosed and improvements made. Significantly, they also include recommendations for other stakeholders, such as riparian owners.

Even though the responsibility is with LLFAs, other flood risk authorities, very often the Environment Agency and relevant sewer operator (water company) have also assisted in this activity. The information has been collated by LLFAs and combined with their own investigations to produce flood investigation reports.

### **Facilitating Recovery**

This report has already provided several examples of multi-agency collaboration during 2012 incidents in providing support to those affected. In Dorset, Devon and Calderdale flood drop-in sessions were organised by the LLFA, while in West Sussex the National Flood Forum led this activity supported by LLFA, the local council, water company and fire and rescue services.

In addition there were numerous examples of multi-agency debriefs to evaluate the response from all partners to the significant flood events.

### **The role of key partners**

#### **The Environment Agency**

The Environment Agency is responsible for taking a strategic overview of the management of all sources of flooding and coastal erosion and is a key partner for the LLFA in dealing with flooding events. Councils' experiences of 2012 demonstrated that strong relationships exist at a local level across the country with key contacts in the

Environment Agency. This has enhanced the ability of LLFAs to respond to the flooding. Such close working relationships between officers has led to schemes of mutual benefit being implemented.

The Environment Agency's network of Flood Wardens has also been used to assist in dealing with flooding. Their local knowledge and immediate availability can be crucial in managing flood events. In Dorset they are used to assist in monitoring ground water levels, local provision of sandbags and helping vulnerable residents.

### **District councils**

In two tier areas of local government LLFAs have worked with their district councils to facilitate recovery from the flood events.

Some LLFAs have actively delegated responsibilities to the district councils, maximising the existing knowledge and resources. In West Sussex the county council has funded districts to retain their drainage engineers at the local level and delegated responsibility for land drainage. This enabled the LLFA to draw heavily on this resource in managing the flood events and producing their flood investigation report.

In Devon the scale of the flooding necessitated the district council to support the LLFA. For one flood event Devon County Council funded Teignbridge District Council to carry out a flood investigation report for a localised issue.

Secondment of staff from LLFAs to district councils has also occurred to maximise the use of the available resources. North Yorkshire County Council seconded a member of staff to support the delivery of flood alleviation projects in and around

Skipton, while West Sussex County Council seconded an emergency planner to Arun District Council.

In Worcestershire the LLFA also delegates powers to district councils. This is facilitated through two arrangements; the north and south flood management partnerships. The districts are responsible for land drainage and are funded by Worcestershire County Council. The County Council are responsible for highways and provide the overview function.

### **Water companies**

The role of water companies as sewer operators is a crucial component of dealing with flood risk in an increasingly urbanised country.

LLFAs have noted improvements in the way in which they have been able to engage with their relevant water company to share information, understand the causes of flooding and work together to undertake schemes which give mutual benefits.

In large cities the water company is often a primary partner for the LLFA as a combination of surface water and sewer flooding is usually the main issue. The surface water and foul drainage networks are often combined, leading to a need for a partnership approach to these problems. In the city of Newcastle, the 2012 floods have reinforced the need for a close working relationship with Northumbrian Water.



### *Sewer surcharging in Newcastle*

In response to the 2012 floods in North Tyneside, and to help prepare for future flooding incidents, a multi-agency Surface Water and Drainage Partnership was set up – bringing together the council, Northumbrian Water, emergency services, the Environment Agency and Capita Symonds (the council's strategic partner).

Its focus is working together on engineering schemes to prevent future flooding; and supporting community action so that residents and businesses can help themselves and their local area.

Water companies also attended public drop-in sessions organised by a number of LLFAs enabling them to answer public queries regarding their assets.

### **Internal drainage boards**

Internal drainage boards (IDBs) manage drainage of 1.2 million hectares of low lying land in England. IDBs also experienced flooding of their systems in 2012 resulting in close cooperation between LLFAs and drainage boards.

In Somerset, repeated and prolonged flooding left farmland under water for months on the Somerset Levels and Moors. Following this the Somerset Flood Summit<sup>6</sup>

was held in March 2013 including the Somerset Drainage Boards Consortium. The summit covered issues including community resilience, business continuity / economic impact, flood prevention and inter-agency working. The points raised were fed into the development of a county wide action plan to ensure that all partners are well prepared for flooding and have clear roles and responsibilities.

### **Partnership working in Devon with South West Water**

South West Water was an integral part of the flood recovery group in Devon and attended all of the flood surgeries. They have provided data for flood investigation reports and subsequently shared their priority list for drainage improvement work with Devon County Council. The county council has reciprocated, allowing them to assist each other in delivering shared objectives to tackle flood risk. They are also working in partnership to deliver surface water management plans and/or integrated urban drainage studies to share the workload and minimise duplication of effort.

In Lincolnshire the LLFA has developed the Lincolnshire Flood Risk and Drainage Management Partnership Framework<sup>7</sup>. The framework ensures that all agencies responsible for managing water operate more effectively and efficiently at a local

<sup>6</sup> <http://www.southsomerset.gov.uk/latest-news/march-2013/somerset-flooding-summit-considered-great-success/>

<sup>7</sup> <http://www.lincolnshire.gov.uk/residents/environment-and-planning/flood-risk-management/flood-risk-management-partnership/103046.article>



level. Through this the council works closely with the 14 IDBs operating in Lincolnshire. In addition the council has delegated its responsibilities to the IDBs for the regulation of ordinary watercourses, including consenting and enforcement activity.

### Voluntary sector

The voluntary sector also played an important role in assisting LLFAs in responding to the flooding of 2012.

As an example, councils have worked with the National Flood Forum to provide help and assistance across the country, particularly in engaging with members of the public who have been affected.

#### National Flood Forum

The National Flood Forum (NFF) has been actively involved in assisting recovery from the flooding of 2012 across the country.

The NFF deployed their Flood Recovery Trailer to numerous locations including Calderdale, Newcastle, North Yorkshire and West Sussex. This has provided a neutral location for members of the public to come and gain advice of how they can start to recover. Officers for the LLFAs, Environment Agency, district councils and water companies have also been present to answer questions.

They have also been active in supporting the development of flood action groups, enabling communities



*Flood Recovery Trailer at Bracklesham Bay, West Sussex*

to be more involved in management of their local flood risk. Six have been formed in West Sussex in 2012.

In West Sussex the county council has funded the NFF to run a series of flood fairs. These enabled the public to learn more about the risks they face from flooding and gain advice on how to protect their property.

### Dealing with critical infrastructure damage

The impacts of the flooding in 2012 on infrastructure, particularly the sewer and highways networks were extensive. In addition rail networks were also compromised in some instances.

#### Highways network

Water is the most severe threat to road condition in this country, often leading to major damage. The flooding of 2012 caused a total of £338 million of damage to the road network in England and Wales<sup>8</sup>.

<sup>8</sup> Annual Local Authority Road Maintenance (ALARM) Survey 2013





### *Highway damage in Newcastle*

There were numerous instances of flooding causing the closure of roads. The most high profile examples include the A1 at Catterick in September and the M5 near Exeter in November. In Calderdale, flooding closed the main road (A646), effectively preventing road travel along the valley and reducing the ability of the council and emergency services to respond to emergencies. Other significant incidents were closure of the A35 in Dorset and the A27 in West Sussex. In both cases this blocked the main route along the south coast leading to delays and losses for the local economy.

Another impact of the prolonged heavy rainfall was landslides, primarily in Dorset. These included several along on the coast

#### **Using online media during flood events**

North Yorkshire County Council maintained a list of the locations where roads and bridges were either closed or only passable with care throughout each of the major

incidents, and used their twitter account to provide regular updates. Twitter was also used as an important tool for harvesting information from the public on where issues were emerging.

near Lyme Regis and one inland at the Beaminster Tunnel. These led to three fatalities.

Two high profile landslips also occurred in Whitby, North Yorkshire resulting in the demolition of a terrace of properties and significant works at the iconic St Mary's church on the cliff top. In addition, North Yorkshire County Council had to work through a large number of landslips affecting the highway network.

Councils responded in a number of ways to minimise disruption from road closures.

For example, they used online media platforms such as their own websites and twitter to provide live updates on road closures and diversion routes.

In addition to the disruption caused by road closures, the diversions directed heavy traffic onto smaller roads. This caused damage to these highways that were not designed to cope with larger vehicles such as HGVs.

During the events several highways teams suspended roadworks to prioritise their efforts on emptying gullies, clearing debris and rescuing stranded motorists.

In Worcestershire the council has assessed flood risk to key highways to ensure they minimise disruption to businesses, reducing road closures where possible.

### **Rail network**

The rail network also suffered due to flooding. Services were disrupted and this had significant knock on effects on the local economy.

Repeated flooding of signals and a major junction near Exeter led to weeks of delays. In Calderdale the line between Leeds and Manchester was closed due to flooding. In Tyneside the city metro system was brought to a halt by surface water flooding in several locations.



*Flooded railway in Calderdale*

As a result, councils have been engaging with Network Rail to prevent and mitigate impacts on the rail network. For example in North Yorkshire the council worked with Network Rail and other risk management authorities to dig a pipe under the railway to allow pumping of surface water into the adjacent river. They are now working together to create a permanent solution.

Following the significant disruption to railway services near Exeter in December, Network Rail has been working in collaboration with the Environment Agency and industry experts to investigate improved resilience of the railway infrastructure to flood events.

This is in conjunction with the Environment Agency and local authority combined scheme to improve the flood defence of the city of Exeter. As part of this an immediate programme of lifting the signalling equipment above flood levels has begun; this will reduce the time from a flood event to restoration of normal train services.

### **Sewer networks**

In many cases the sewer networks interacted with flood water exacerbating the problem. In urban areas, where the sewer system provides the main if not the only drainage for surface water run-off, improvements to capacity, the use of Sustainable Drainage Systems (SuDS) and adequate maintenance are required to ensure the resilience of these systems.

In Newcastle, the collapse of an aged culvert beneath a block of flats highlighted the risks of hidden watercourses.

LLFAs were often faced with difficulties regarding ownership of such assets. Lack of clarity of ownership can lead to lack of attention and inadequate maintenance. However, under their new flood risk responsibilities, LLFAs are now establishing and maintaining flood asset registers. These include key assets (structures and features such as a wall, ditch or bridge) that are known to cause or allow the major flooding of properties, critical infrastructure or block major roads when the asset is not functioning to an adequate level. This enables LLFAs to be able to define ownership and therefore maintenance responsibility and enforcement action can be taken if appropriate. Lincolnshire County Council have opted to adopt a web-based<sup>9</sup> system that is accessible to the public at all times, and that brings together information about flood risk

assets that are managed by as many flood risk management authorities as possible.

Highways and railways organisations were not the only transport bodies that were involved. The Canal and River Trust also actively engaged with supporting councils and their communities, for example with the flooding in Calderdale. Although it has no formal responsibilities regarding flood risk, the Trust worked with LLFAs and help manage flood risk where canals form a significant part of the drainage infrastructure. This highlighted the multiple roles that structures such as waterway infrastructure serve in dealing with flood risk.

### **Good practice on management of highways drainage assets**

Developing more comprehensive drainage inventories and drainage asset management strategies can help highways authorities to reduce the impact of flooding on roads, such as major disruption and damage to the highway network. Such strategies allow local highway authorities to quantify the condition of their drainage assets, prioritise maintenance, and assess the suitability of those assets to deal with present and future flood and contamination risks.

The Department for Transport sponsored Highways Maintenance Efficiency Programme (HMEP) produced a local government led good practice guide, 'Guidance on the Management of Highways Drainage

Assets'<sup>\*</sup>, which can help councils reduce the risk of roads damage from floods.

<sup>\*</sup> Guidance on the Management of Highways Drainage Assets, November 2012  
[www.dft.gov.uk/hmep/docs/asset-management/121127-guidance-on-management-of-drainage-assets.pdf](http://www.dft.gov.uk/hmep/docs/asset-management/121127-guidance-on-management-of-drainage-assets.pdf)

### **The Drainage Strategy Framework**

A 2011 report for Ofwat showed that the impacts of climate change, urban creep and urban growth are estimated to increase sewer flows by 50 per cent by 2040 if no action is taken. This will mean increased pollution and flooding.

In response, in May 2013, the Environment Agency and Ofwat published a Drainage Strategy Framework<sup>#</sup>. This sets out best practice for water companies in developing drainage strategies for a particular catchment that is in line with it delivering its outcomes. It is also designed to help promote a more strategic approach to drainage planning, demonstrating how water companies can work with other, such as local authorities, in meeting shared outcomes, such as reduced flood risk. The framework contains a number of examples of close working with local authorities which have resulted in joint investments and sharing of costs.

<sup>#</sup> Drainage Strategy Framework – for water and sewerage companies to prepare Drainage Strategies, May 20: [www.environment-agency.gov.uk/research/library/publications/147922.aspx](http://www.environment-agency.gov.uk/research/library/publications/147922.aspx)

<sup>9</sup> <http://tinyurl.com/ne9kpk>

## Conclusion

Experiences from 2012 demonstrated the wide variety of impacts that flooding can have on people, their property, and on local businesses. The sources of flooding were difficult to predict and varied greatly, with nearly 60 per cent of affected properties suffering from more than one source.

During times of extreme weather, local people and businesses look to their council for leadership. This report shows the many different ways councils responded to events, but also applied learning from past experiences to reduce impact on local communities. Effective partnership working with the Environment Agency, water companies, community groups and others was key to helping households and local economies recover.

Looking ahead, the real prize is to minimise the risk of flooding in the first place. Whilst we will never be able to eliminate all flood risk, councils and other risk management authorities, individual households and businesses can all benefit from working together to build greater resilience to avoid the expense and misery of flooding.

### **Councils that contributed to this report:**

Blackburn and Darwen Borough Council

Calderdale Metropolitan Borough Council

Devon County Council

Dorset County Council

Lincolnshire County Council

Newcastle City Council

Northamptonshire County Council

Northumberland County Council

North Tyneside Council

North Yorkshire County Council

South Tyneside Council

West Sussex County Council

Worcestershire County Council

Wychavon District Council





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